Directorate of Technical Education (DTE)
Technical and Madrasa Education Division (TMED)
Ministry of Education

Preparatory Survey Report

For

The Project for Modernization of Polytechnic Institutes

in

the People's Republic of Bangladesh

FEBRUARY 2022

Japan International Cooperation Agency (JICA)

INTEM Consulting, Inc.

IC Net Limited

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PREFACE

Japan International Cooperation Agency (JICA) decided to conduct the preparatory survey and entrust the survey to the consortium INTEM Consulting, Inc and IC Net Limited.

The survey team held a series of discussions with the officials concerned of the Government of the People's Republic of Bangladesh, and conducted field investigations. As a result of further studies in Japan, 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 the two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of the Government of Bangladesh for their close cooperation extended to the survey team.

February, 2022

SAKUMA Jun
Director General
Human Development Department
Japan International Cooperation Agency

SUMMARY

Overview of the Country

The People's Republic of Bangladesh (hereinafter referred to as “Bangladesh”) is located in the delta of the Ganges and Brahmaputra rivers in the northeastern part of the Indian subcontinenthe and is bordered by India to the North and Myanmar to the southeast. Bangladesh faces the the Indian Ocean to the north. Bangladesh is predominantly rich fertile flat land. Most of the country is less than 12 m above sea level, and 17% of the country is covered by forests and 12% is covered by hill systems. Bangladesh's climate is tropical, with a mild winter from October to March and a hot, humid summer from March to June. A warm and humid monsoon season lasts from June to October and supplies most of the country's rainfall. Bangladesh is divided into eight administrative divisions, Barisal, Chittagong, Dhaka, Khulna, Mymensingh, Rajshahi, Rangpur, and Sylhet. The capital is Dhaka.

Although Dhaka is an area with a lot of rainfall, no history of water damage such as flooding has been confirmed at all three target institutions. On the other hand, damage to facilities and equipment caused by cyclones occur relatively frequently in April, May, October, and November. For example, wind and rain blowed into the building through the windows and roofs damaged by cyclones cause damage to equipment. In addition, a considerable amount of dust is generated from the adjacent highway mainly in the dry season from November to March, which is one of the causes of equipment malfunctions. From the aspect of equipment maintenance, it is necessary to pay attention to the maintenance of the waterproof and dustproof functions of the building including the roof and window glass. It is also necessary to consider ventilation as a measure against hot and humid environment and direct sunlight, and installation of curtains depending on the position of windows.

Most of Bangladesh's land, including Dhaka City where the project site is located, belongs to the tropical monsoon climate. The seasons are generally divided into the hot season (April-May), the rainy season (June-October), and the dry season (November-March). Except for the dry season from December to February, the climate is hot and humid. Most of the natural disasters that cause great damage such as floods, cyclones, and tornadoes occur from the hot to the rainy season.

In general, the wind direction is south and the average wind speed per hour is 12 to 16 km/hr in the hot and the rainy seasons, and the wind direction is north and wind speed is less than 10 km/hr in the dry season. In addition, although the amount of rainfall and the number of natural disasters vary greatly from year to year, the frequency of natural disasters is on the rise due to the effects of global warming in recent years. In 2019 and annual average rainfall and temperature data in Dhaka City are shown below.

GDP in Bangladesh is 323.06 billion USD and the GDP per capita is 1,962 USD. Bangladesh is the 33rd largest in the world in nominal terms, and 31st largest by purchasing power parity. Agriculture is the largest employment sector in Bangladesh, making up 12.9 percent of Bangladesh's

GDP in 2020 and employing about 37.8 percent of the workforce. Manufacturing in Bangladesh makes up 12.9 percent of Bangladesh's GDP in 2020 and employing about 21.7 percent of the workforce.

Bangladesh has fertilizer factories, textile mills, sugar factories, glassworks, and aluminum works. The most important cottage industry centres on the production of yarn and textile fabrics. Another cottage industry produces cigarettes, carpets, ceramics, and cane furniture also are products of cottage industries.

Background, History and Outline of the Requested Japanese Assistance

In the manufacturing industry, which is the main industry of Bangladesh, it is necessary to break away from the current economic structure that depends on exports of readymade garments industry and to foster competitive other industries and diversify the industries. Therefore, urgent needs have been confirmed for the development of industrial human resources necessary for achieving it.

According to JICA's "Preparatory Survey Report on Education Program in Bangladesh (2017)", in addition to lack of specialized knowledge and skills, and practical experience, lack of basic social skills such as independence and communication skills were mentioned as challenges of industrial human resources in Bangladesh

It also became clear that there were high needs of engineers such as manufacturing line managers, factory heads, middle-level managers who understand quality control and assurance, mechanical engineers, engineers who can operate and maintain machines, and electricians as technical challenges in the promising industrial field. Furthermore, in the report on the manufacturing industry in Bangladesh issued by the World Bank in June 2021, it was presumed that a need in Bangladesh to develop human resources who can adapt to advanced industries including industrial automation in order to maintain or improve international competitiveness in the future will increase. Perspective Plan of Bangladesh 2021-2041 (PP2041) aims to fill such a gap between industrial needs and human resources development while maximizing the benefits of increasing the working-age population.

In the education system of Bangladesh, human resource development of engineers who engage in the field of such industry is mainly conducted by the TVET education institutes under the jurisdiction of the Directorate of Technical Education (DTE) of the Ministry of Education, and the TVET education institutes include Secondary School Certificate (SSC) vocational course, Higher Secondary Certificate (HSC) vocational course, Polytechnic institutes, and so on. Among them, those who have completed the polytechnic institutes are considered to have the ability equivalent to the above-mentioned middle-level managers in the field of industry, and the scale of polytechnic institutes are also larger compared to other institutes. In addition, high-quality engineers trained by the polytechnic institutes are greatly needed from the industry in anticipation of future transformation of the industrial structure and expansion of the industrial fields. However, the

employment rate of students who graduated from polytechnic institutes is only 37%, and improvement of their quality of education is an urgent issue.

In this situation, Bangladesh requested that Japan undertake a technical cooperation project to develop a model of technical education regarding improving teaching materials and strengthening the ability of teachers and instructors in technical colleges so that they can produce human resources who have the knowledge and skills required by industry. The name of the project is "Project for the Improvement of Technical Education Based on the Needs of Industrial Human Resources (hereinafter referred to as “Technical Cooperation”)” and it started in February 2019. (This grant aid is hereinafter referred to as the "Project")

Outline of the Survey Results and Description of the Project

JICA organized a Survey Team and conducted the first field survey remotely from Japan in the middle of 2021 due to the outbreak of COVID-19, and conducted the second field survey from September 26 to November 14, 2021 to explain the contents of the Draft Report to the Bangaladeshi side. Through the site survey, the contents of the request, costs and work to be borne by the Bangladeshi side, the points to be noted in the implementation of the project were confirmed, and the necessary information was collected for the outline design.

The planned equipment for this project will be installed at the existing facilities of the three target institutes. The planned equipment and the facilities to be installed are summarized below.

Summary of Equipment and Target Areas

Site	Technology	Main Equipment	Room
DPI	Electric	Transformer Trainer, Motor-Generator Set, Transformer Trainer	Electrical Power Shop, Switch Gear Lab
	Electronics	Satellite Communication Trainer, Arbitrary Function Generator, Biomedical Measurement System	Communication Lab, Digital Electronics Lab, Instrumentation & Electromedical Lab
	Mechanical	CNC Lathe Machine, Centrifugal Pump Module, Universal Testing Machine	Manufacturing Process Lab, Fluid Mechanics Lab, Material Testing Lab
	Computer	28-port Gigabit Managed SFP Switch, Data Communication Traine, VPN Router	Software La, Network Lab, CISCO Network Lab
DMPI	Electronics	LVDT Trainer, Robot Station with Artificial Vision, X-Ray Machine	Advanced Electronics & Communication Lab, Digital Multimedia Lab, Bio-Medical Lab
	Computer	28-port Gigabit Managed SFP Switch, Data Communication Traine	Software Lab, Network Lab

TTTC	Electric	Motor-Generator Set, Electrical Power System Simulator, VFD/PLC Wiring Learning System	Electrical Machine & Circuit Lab, Electrical Installation & Maintenance Lab
	Electronics	Industrial Power Electronics Trainer with Different Module, Power Electronics Trainer, Robot Trainer	Advance Electronics Lab, Basic/Advance Electronics Lab, Microcontroller & Microprocessor Lab
	Mechanical	CNC Lathe Machine, Centrifugal Pump Module, Universal Testing Machine	Manufacturing Process Lab, Fluid Mechanics Lab, Material Testing Lab
	Computer	Router, Router with Network Security Function	ICT Lab

Equipment Plan

1) Examination of Requested Equipment

The status of equipment at the three institutes at the start of the survey is as follows.

- There is basic experimental / practical equipment, but the quantity is insufficient for the number of students. Especially, at Dhaka Institute of Technology, the number of students is large, and the class system is two-shift, so the lack seems to be more prominent.
- Almost no experimental or practical equipment required for the diploma course is installed.

Based on this information, the consultant finalized the requested equipment by the following process.

① Confirmation of the curriculum and syllabus currently in operation in Bangladesh
② Discussion with instructors
③ Confirmation of requests from each institute and technology
④ Survey of industry needs
⑤ Confirmation of the quantity, usage status and status of existing equipment, and the maintenance status.
⑥ Proposal for equipment package
⑦ Finalization of requested equipment
⑧ Confirmation of proposed specification for each piece of equipment
⑨ Confirmation of requested quantity according to the usage such as demonstration, group learning, individual use, etc.

[Proposal for formulating equipment package]

This project has common technologies in all three institutes, and those institutes are targeted for technical cooperation. To achieve the purpose of "developing a technical education model by

improving teaching materials for technical education and strengthening teachers' and instructors' abilities", it is considered that creating common equipment packages for all three institutes would enhance the effectiveness and contribution of this project. The structure of the requested equipment list is as follows.

<Technical Cooperation Program Package>

"Training of technical education instructors" is the most important article in the construction of the "technical education improvement model" implemented in the technical cooperation. The equipment required for the program will be given the top priority. The specifications of the equipment and the quantity to be allocated to the three institutes will be decided in a discussion with the technical cooperation team. Duplication of the equipment currently procured with the technical cooperation budget will be avoided.

<Common package>

In this project, since there are technologies common to all three institutes, common equipment packages are created. By having common packages (procuring the same equipment to the three institutes), "training of technical education instructors" by TTTC can be carried out smoothly and efficiently.

<Package by institute>

- DPI

DPI is considered the No. 1 polytechnic institute in Bangladesh and the number of students is large. Expectations from the technical education field and industry for this project are also high. In consideration of these points, the equipment specialized for the institute (Specific & Iconic) is considered within the range of not pursuing excessive advancement and based on the current and future level of instructors and the operation / maintenance system. The quantity will be set to contribute to efficient and effective technical education of a small number of students. Through these efforts, an increase in the attractiveness to the industrial sector and improvement of corporate collaboration and the employment rate are expected. In addition, the experimental and practical equipment that can support the establishment of the Project Based Laboratory (PBL) requested by the institute are considered.

- DMPI

Since many career paths of graduates are employment or entrepreneurship, students need to acquire knowledge and abilities that can be put into practice immediately. In particular, the equipment used in the industry is considered, such as: in the case of female students, ICT-related-office work, accounting work using a computer / software, programming, software development, etc. The equipment for PBL is considered. In addition, a gender perspective should be considered when planning equipment.

- TTTC

In view of the institute's purpose of training technical instructors at polytechnic institutes nationwide, the equipment for practical training / learning and the equipment for making theoretical learning more effective are considered. In addition, since the training of instructors of DPI and DMPI which represent the country is the core of the technical cooperation, it is considered to procure the same equipment as the equipment owned by both institutes.

- Equipment that reflects the circumstances of the three institutes

If the necessary training / experiments are not carried out effectively and efficiently due to aging of existing equipment, lack of quantity, etc., replenishment is considered for each institute.

2) Examination of Equipment Quantity

The quantity of equipment is set according to the purpose such as presentation, personal use, or group use. Based on the estimated budget of the project, the appropriate quantity is calculated from the number of students by institute and technology, the number of students per class, and the area of the rooms where the equipment will be installed.

3) Basic Specifications of Equipment

Regarding the examination of specifications, the assumed equipment specifications based on the curriculum and syllabus "Bangladesh Technical Education Board, 4-Year Diploma-in-Engineering Program Syllabus" is used as a starting point, and the opinions of the technical cooperation are considered. At the same time, information on reference specifications or reference models from the three institutes is requested and it will be confirmed that they are not overly advanced or that actual machines are not requested for technical education. Specifically, the basic specifications are set with the following items in mind.

① Status of 3 institutes (facility, condition of existing equipment)
② Technical level and organizational structure of teachers and instructors (operation and maintenance of equipment)
③ Consistency with the current curriculum and syllabus
④ Equipment specifications that contribute to the achievement of the goals of the technical cooperation
⑤ Plan (update of the curriculum, budget provision for equipment operation)
⑥ Consistency with Bangladesh's industrial needs

Project Schedule and Cost Estimate

The implementation period for the Project will be about 20 months in total; 4 months for the detailed design, 2.0 months for bidding procedures and 14.0 months of the procurement and installation of equipment. The total cost to be borne by the Bangladeshi side is estimated at approximately 6 million yen.

Project Evaluation

(1) Relevance

1) Beneficiaries of the Project

The direct beneficiaries of the Project are the students, teachers, and instructors of the three target institutes. Indirectly, the project will benefit the people of Bangladesh in the target area, since it is expected that the production of the large number of human resources required by the relevant industries in Bangladesh will lead to Bangladeshi industrial development and the generation of further employment.

2) Contribution to the achievement of medium-long-term development goals

The human resource development strategy of the Perspective Plan 2021-2041 (PP2041) includes "To mainstream the technical education and vocational training (TVET) for the fourth industrial revolution" and "To provide the flexible training institutions for all people seeking to acquire vocational skills". To achieve these objectives, there are specific strategies such as "Strengthening National Skills Development Policy (NSDP 2011)", "To promote the women's participation in the technical education and training" and "Strengthen the partnership between public-private in the technical education and training". The contribution of this project is significant as it aims to bridge the gap between the needs of industry and the needs of the government through strengthening the functioning of industrial human resource development in the three target institutes.

3) Consistency with Japanese Government Country Development Cooperation Policy

It is consistent with the Japanese "Country Development Cooperation Policy for the People's Republic of Bangladesh (February 2008)" for which the assistance policy is "GDP Growth acceleration, employment generation and rapid poverty reduction", "A broad-based strategy of inclusiveness with a view to empowering every citizen to participate fully and benefit from the development process" and "Overcoming social vulnerabilities (improving the quality of primary education, improving technical education, and promoting research and development in the field of science and technology).

(2) Effectiveness

The expected effects of implementation of the Project are as follows.

1) Quantitative Effect

The BTEB (Bangladesh Technical Education Board) sets the common ratio in all institutes regarding theory and practice as 5:5 for all courses. However, practical training is not being conducted due to inadequate and aging equipment and insufficient equipment quantity. Based on this situation, we propose the following effectiveness indicators.

1) Cumulative number of students

	Baseline (Actual figure in 2021)	Target (2026) 【3 years after the project completion】
Dhaka Polytechnic Institute (no. of student)	-	1,100
Dhaka Mohila Polytechnic Institute (no. of student)	-	200
Technical Teachers Training College (no. of student)	-	40

2) Cumulative number of subjects conducted by using the main equipment

	Baseline (Actual figure in 2021)	Target (2026) 【3 years after the project completion】
Electrical and Electronics Technology (Subject)	-	20
Mechanical Technology (Subject)	-	10
Computer Technology (Subject)	-	10

1) Qualitative Effect

- To improve the skills and know-how for practical education by using the equipment.
- To improve the students' proficiency.
- To produce human resources to meet the needs of industry.
- To develop the Bangladeshi industry in the areas covered by the Project.

As stated above, the Project is determined to be highly relevant and effective.

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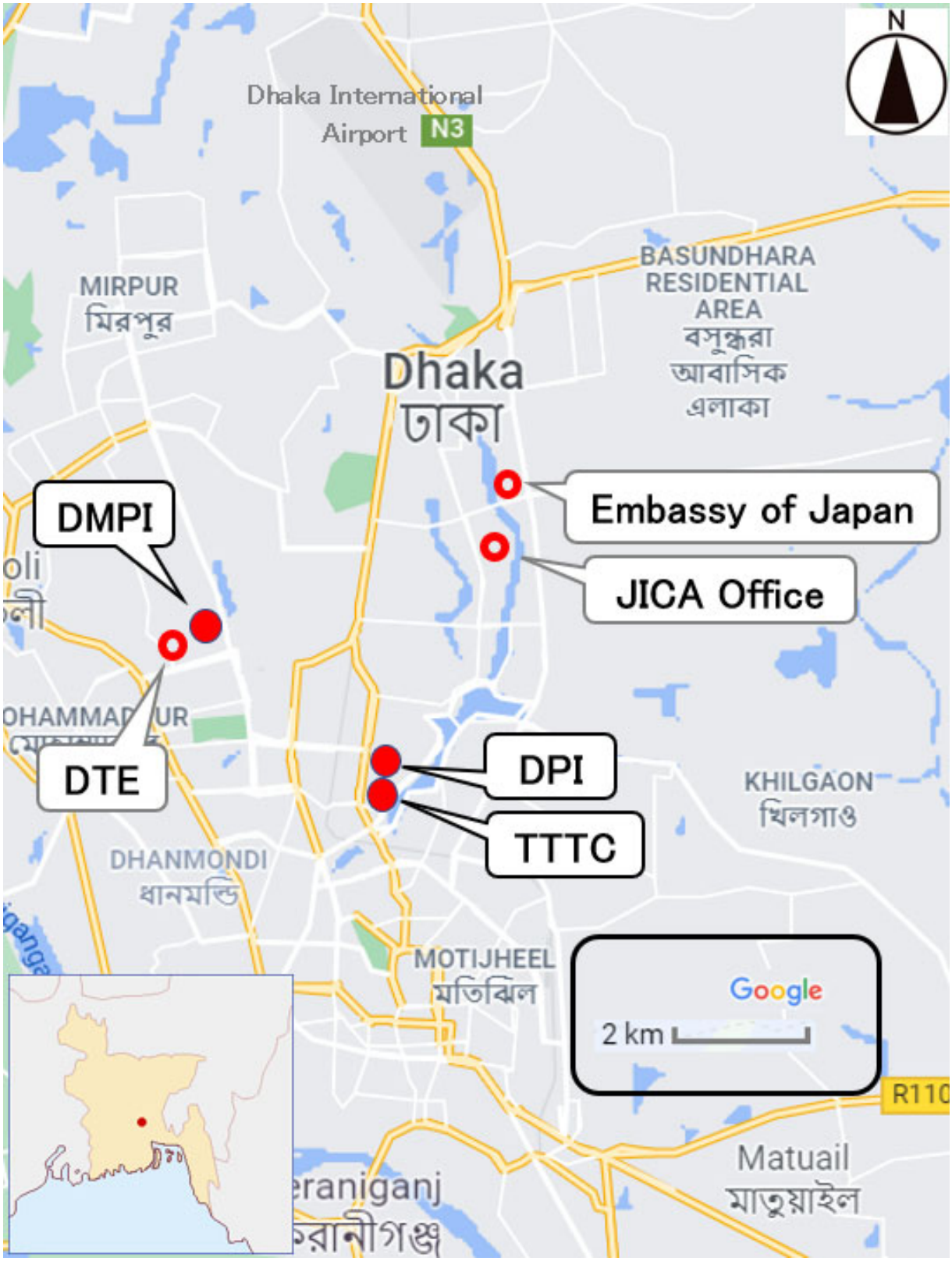
Appendix

LOCATION MAP



LIST OF TABLES AND FIGURES

ABBREVIATIONS

A/P	Authorization to Pay
APP	Annual Procurement Plan
B/A	Banking Arrangement
BDT	Bangladeshi Taka
BTEB	Bangladesh Technical Education Board
CE	Conformité Européenne
DAC	Development Assistance Committee
DTE	Directorate of Technical Education
DPI	Dhaka Polytechnic Institute
DPP	Development Project Proposal
DMPI	Dhaka Mohila Polytechnic Institute
ECA	Environment Conservation Act
E/N	Exchange of Notes
G/A	Grant Agreement
GDP	Gross Domestic Product
GNI	Gross National Income
HIC	High Income Country
ICT	Information and Communication Technology
JIS	Japanese Industrial Standards
NGO	Non-governmental organizations
NSDP	National Skills Development Policy
NTVQF	National Technical and Vocational Qualifications Framework
ODA	Official Development Assistance
OECD	Organisation for Economic Co-operation and Development
PBL	Project Based Laboratory
PDPP	Preliminary Development Project Proposal
PIC	Project Implementation Committee
PMR	Project Monitoring Report
PSC	Project Steering Committee
RFQ	Request for Quotation
TMED	Techhical and Madrasah Education Division
TOR	Terms of Reference
TOT	Training of Trainers
TTTC	Technical Teachers Training College
TVET	Technical and Vocational Education and Training
VAT	Value Added Tax

Chapter 1 Background of the Project

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1-1 Background of the Grant Aid

In the manufacturing industry, which is the main industry of Bangladesh, it is necessary to break away from the current economic structure that depends on exports of the readymade garments industry and to foster competitive other industries and diversify the industries. Therefore, urgent needs have been confirmed for the development of industrial human resources necessary for achieving it.

According to JICA's "Preparatory Survey Report on Education Program in Bangladesh (2017)", in addition to lack of specialized knowledge and skills, and practical experience, lack of basic social skills such as independence and communication skills were mentioned as challenges of industrial human resources in Bangladesh

It also became clear that there were high needs of engineers such as manufacturing line managers, factory heads, middle-level managers who understand quality control and assurance, mechanical engineers, engineers who can operate and maintain machines, and electricians as technical challenges in the promising industrial field. Furthermore, in the report on the manufacturing industry in Bangladesh issued by the World Bank in June 2021, it was presumed that a need in Bangladesh to develop human resources who can adapt to advanced industries including industrial automation to maintain or improve international competitiveness in the future will increase. Perspective Plan of Bangladesh 2021-2041 (PP2041) aims to fill such a gap between industrial needs and human resources development while maximizing the benefits of increasing the working-age population.

In the education system of Bangladesh, human resource development of engineers who engage in the field of such industry is mainly conducted by the TVET education institutes under the jurisdiction of the Directorate of Technical Education (DTE) of the Ministry of Education, and the TVET education institutes include Secondary School Certificate (SSC) vocational course, Higher Secondary Certificate (HSC) vocational course, Polytechnic institutes, and so on. Among them, those who have completed the polytechnic institutes are considered to have the ability equivalent to the above-mentioned middle-level managers in the field of industry, and the scale of polytechnic institutes is also larger compared to other institutes. In addition, high-quality engineers trained by the polytechnic institutes are greatly needed from the industry in anticipation of the future transformation of the industrial structure and expansion of the industrial fields. However, the employment rate of students who graduated from polytechnic institutes is only 37%, and improvement of their quality of education is an urgent issue.

In this situation, Bangladesh requested that Japan undertake a technical cooperation project to develop a model of technical education regarding improving teaching materials and strengthening the ability of teachers and instructors in technical colleges so that they can produce human resources who have the knowledge and skills required by industry. The name of the project is "Project for the

Improvement of Technical Education Based on the Needs of Industrial Human Resources (hereinafter referred to as “Technical Cooperation”)” and it started in February 2019. (This grant aid is hereinafter referred to as the "Project")

Note: Title of the Project

In OD, The Bangladesh side suggested changing the name of the project because it is non-representational and does not specify the objectives of the Project. Moreover, Technical Teachers Training College is not a Polytechnic Institute. And a large-scale renovation of the facilities resulted as unnecessary in the survey. Both sides confirmed in DOD that the project title is changed as follows.

Original title: "the Project for Modernization of Polytechnic Institutes"

New title: "the Project for the Improvement of Equipment for Technical Education"

1-2 Environment and Social Considerations of the Grant Aid

1-2-1 Natural Condition

Although Dhaka is an area with a lot of rainfall, no history of water damage such as flooding has been confirmed at all three target institutions. On the other hand, damage to facilities and equipment caused by cyclones occurs relatively frequently in April, May, October, and November. For example, wind and rain blow into the building through the windows and roofs damaged by cyclones cause damage to equipment.

In addition, a considerable amount of dust is generated from the adjacent highway mainly in the dry season from November to March, which is one of the causes of equipment malfunctions. From the aspect of equipment maintenance, it is necessary to pay attention to the maintenance of the waterproof and dustproof functions of the building including the roof and window glass. It is also necessary to consider ventilation as a measure against the hot and humid environment and direct sunlight, and the installation of curtains depending on the position of windows.

【Weather Condition Survey】

Most of Bangladesh's land, including Dhaka City where the project site is located, belongs to the tropical monsoon climate. The seasons are generally divided into the hot season (April-May), the rainy season (June-October), and the dry season (November-March). Except for the dry season from December to February, the climate is hot and humid. Most of the natural disasters that cause great damage such as floods, cyclones, and tornadoes occur from the hot to the rainy season.

In general, the wind direction is south and the average wind speed per hour is 12 to 16 km/hr in the hot and the rainy seasons, and the wind direction is north and wind speed is less than 10 km/hr in the dry season. In addition, although the amount of rainfall and the number of natural disasters vary greatly from year to year, the frequency of natural disasters is on the rise due to the effects of global warming in recent years. In 2019 and annual average rainfall and temperature data in Dhaka

City are shown below.

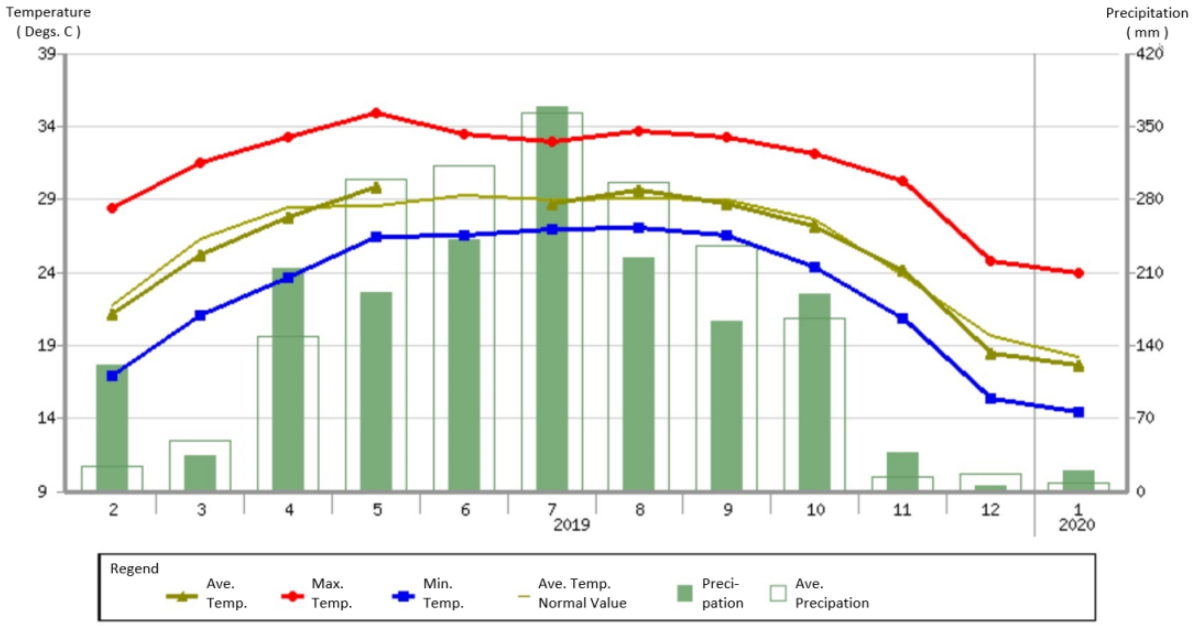

Figure 1 Climograph of Dhaka City (2019-2020 observations and averages)

Source: Japan Meteorological Agency website

1-2-2 Environmental and Social Considerations

There will be no environmental and social impacts in the procurement of equipment and materials bear by Japan and in the transfer and disposal of existing equipment and materials, renovation works, and facility works at the facilities where the equipment and materials are to be installed borne by Bangladesh. Therefore, based on the "Guidelines for Environmental and Social Considerations of the Japan International Cooperation Agency" (April 2010), the undesirable effects on the environment are minimal, and the category classification is judged to be "C".

Chapter 2 Contents of the Project

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2-1 Basic Concept of the Project

2-1-1 Outline of the Project

(1) Overall Goal and Project Goal for the Technical Education Project in Bangladesh

【Perspective Plan 2021-2041 (Perspective Plan of Bangladesh 2021-2041)】

Bangladesh has set the goal of rooting out its terrible poverty and becoming an upper-middle-income country (UMIC) by 2031 and a high-income country (HIC) by 2041 in its Vision 2041. The "Perspective Plan 2021-2041 for Realizing Vision" (PP2041) was released in March 2020 as a policy summary of the development strategy to realize the PP2041. The human resource development strategy of PP2041 includes "To mainstream the technical education and vocational training (TVET) for the fourth industrial revolution" and "To provide the flexible training institutions for all people seeking to acquire vocational skills" and sets the goal to increase the enrollment rate in TVET schools from 16% in 2018 to 30% by 2031, and to 41% by 2041[1]. To achieve this, there are the specific strategies of "Strengthen National Skills Development Policy (NSDP2011)", "To promote the women's participation in the technical education and training" and "Strengthen the partnership between public-private in the training". In the "Preparatory Survey Report for the Education Program in Bangladesh (2017)", JICA reported some issues of the industrial human resources in Bangladesh such as a lack of specialized knowledge and skills, work experiences, and basic skills of members of society such as personal initiative and communication skills. The report also clarifies the issues in the promising industrial sectors regarding a high need for middle managers such as line managers, on-site plant managers, and managers who know quality control and assurance, in addition to mechanical engineers, engineers who can maintain and manage the machinery, and electrical engineers. Furthermore, according to the World Bank June 2021 report on Bangladesh's manufacturing industry, "Gearing Up for the Future of Manufacturing in Bangladesh", the need is growing to develop the human resources that can adapt the advanced industries such as industrial automation to maintain and improve their international competitiveness. Perspective Plan (PP) 2041 aims to fill this gap in industries by making maximal use of the benefits of a growing working-age population.

(2) 8th Five Year Plan

【8th Five Year Plan FY2020–FY2025】

The 8th Five Year Plan, announced in December 2020, is designed to cover the first five years of PP2041 and is influenced by the coronavirus pandemic. It consists of six major themes, including

[1] TVET Education in Bangladesh includes （SSC Vocational, 9-10 grade）、（HSC Vocational, 11-12 grade） and Diploma-in-Engineering Program by Polytechnic Institutes（11-14 grade）, and it has 16 types and 6,865 schools (as of 2018). Grades for entrying TVET schools are usually 9 or 11. Thus, the enrolment ratio is calculated from the average of the enrolment ratio to TVET schools of grade 9 and 11 students.

"Rapid recovery from COVID-19 in national health, confidence, employment, income, and economic activity" and "Accelerated GDP growth, job creation, accelerated productivity and rapid poverty reduction". The focus of the comprehensive growth strategy in the Eighth Five Year Plan is to create far more jobs through economic growth than were created in the Seventh Five Year Plan, to absorb the new unemployment due to COVID-19, and to maximize the benefits of population growth. In the past, the expansion of exports in the garment industry helped to boost GDP growth and create 4 million jobs. However, in recent years, job creation in the manufacturing sector slowed because of the lack of success in exports outside of the garment industry. In response to this, the 8th Five-Year Plan sets the growth strategy to diversify the production and export bases in non-sewing industry sectors such as food processing, leather and footwear, light industry, and pharmaceuticals.

In addition, the strategy for human resource development focuses on the learning and acquisition of skills directly related to work and sets out to promote technical education through the expansion of the TVET system by emphasizing the quality of education such as the development of science, mathematics, ICT and problem-solving skills. Training programs will also be significantly expanded through public-private partnerships, on-the-job training, and collaboration with NGOs and aid agencies.

The industrial structure of Bangladesh has been gradually changing from agricultural to manufacturing and services. The low-wage workforce with a basic education level has participated actively in this transition up until now. However, to become a middle- and high-income country by 2031, Bangladesh will need to develop both hard skills (expertise and technology) and soft skills (communication, problem-solving, time management, etc.) to upgrade and diverse the industry and realize the fourth industrial revolution. However, the workers' ability and productivity are not improved sufficiently because the existing education system, including TVET, does not adequately address the development of these skills.

The BTEB (Bangladesh Technical Education Board) sets the common ratio in all institutes for theory and practice as 5:5 for all courses. However, practical technical education is not being conducted due to inadequate and aging equipment and insufficient equipment quantity. For these reasons, the rate of practical technical education in the three institutes is generally between 40-60%.

The Project aims to improve technical education (in the fields of electricity, electronics, mechanics, and computers) in collaboration with Technical Cooperation. To this end, it will procure the teaching and technical education equipment that is lacking in this field, considering the needs of industry, and utilize it in the model activities. This will create improved conditions for human resource development in the three institutes and thereby contribute to the economic growth of Bangladesh.

An overview of the Project is given below.

Overview of the Project

OBJECT	:	To contribute to the economic growth of Bangladesh by developing human resources to meet the needs of industry through the procurement of teaching and practical equipment and associated educational facilities at Dhaka Polytechnic Institutes (DPI), Dhaka Mohila Polytechnic Institute (DMPI), and Technical Teacher Training College (TTTC).
SUMMARY[2]	:	1. Procurement of equipment for technical education Procurement and installation of the set of equipment necessary for practical education in the fields of electricity, electronics, machinery, and computers, and for the Model Activity for Improving Technological Education for Technical Cooperation in the above three institutes (including replacement of obsolete equipment). 2. Renovation of simple facilities necessary for the installation of the equipment above. 3. Consulting service Detailed design, bidding assistance, procurement supervision, and instruction for facility managers and users on the proper maintenance of equipment. 4. Procurement and construction method Procurement of equipment through bids by trading companies. The equipment will be procured from Japan (or from third countries if it is difficult to procure in Japan or the country).
TARGET SITE	:	Dhaka City: DPI, DMPI, TTTC
ASSOCIATED GOVERNMENT AUTHORITY/ AGENCY	:	Line Ministry : Technical and Madrasa Education Division (TMED), Ministry of Education Implementing Agency: Directorate of Technical Education (DTE)

2-2 Outline Design of the Japanese Assistance

2-2-1 Design Policy

(1) Basic Policy

The project will provide and install the necessary equipment for the fields of electricity, electronics, machinery, and computers, and for the Model Activity for Improving Technological Education for Technical Cooperation in the three target institutes. The installation site is existing facilities for each institute. The transportation will be carried out in a dry season and vacation period.

The list of equipment required by the three institutes for the Project was not prepared at the beginning of the study. The consultant prepared a list of recommended equipment based on the curriculum of the technical colleges, the status of the equipment in the three institutes, and similar

[2] Most of the target equipment of the project is for the replacement or addition of the existing equipment. Since each institute is familiar with the equipment operation, soft component is not implemented.

projects that the consultant had carried out. Based on this list, the consultant discussed the content, specifications, and quantity of the requested equipment with each technology.

Based on the following three items and our criteria, we had discussions with the three institutes and finalized the requested equipment. Each piece of the requested equipment was given a priority (A, B, C) for each institute, which was used as a reference when calculating the project cost.

a. To be consistent with the curriculums and syllabi currently in use at each institute

b. To reflect the result of the survey of human resource needs which was collected from Japanese and local companies

c. To reflect the advice from the expert who participated in the Technical Project into equipment design

Criteria for Selecting Equipment

1.	Consistency with the existing curriculums
2.	Consistency with the needs for industrial human resources
3.	Consistency with the Technical Cooperation
4.	Quantitative consistency with the number of students or groups in each technology
5.	Existence of a plan and budgetary measures for equipment space and utilities
6.	Consistency with the operation and maintenance management system and budgetary measures (current and prospective)
7.	Not likely to quickly become obsolete
8.	Not having a short durable lifetime
9.	Not the property of the office administration department
10.	No duplication with other donors

(2) Needs for Industrial Human Resources

In its National Industrial Policy-2016, The Ministry of Industries has set out to improve the skills and productivity of the workforce and to promote projects in areas such as ICT, food, beverages, optical engineering, luxury readymade garments, pharmaceuticals, and shipbuilding. However, driven by significant economic development, the increasing sophistication and diversification of the private sector's work have resulted in a qualitative and quantitative gap in the workforce, because the institutions are limited in their ability to produce intermediate and advanced technicians to meet industry needs. Specifically, as mentioned above, there are some issues regarding a lack of specialized knowledge and skills, work experiences, and the basic skills of members of society such as personal initiative and communication skills. There is a high need for middle managers such as line managers, on-site plant managers, and managers who know quality control and assurance as well as for mechanical engineers, engineers who can maintain and manage the machinery, and electrical engineers.

To solve these issues, the "Project for the Improvement of Technical Education Based on the Needs of Industrial Human Resources" started in February 2019 as Technical Cooperation in the three target institutes. That Technical Cooperation aims to develop the technical educational model

by improving the teaching material and strengthening the ability of teachers and instructors so that they can produce human resources who have the knowledge and skills required by industry.

The needs of companies which we confirmed at the local survey are below.

1) List of Target Companies, Job Types, and Size of Companies

To carry out the needs assessment of individual companies, the following criteria were used to select the companies, in consultation with the instructors in charge of the DPI and DMPI placement offices.

- Employment of engineers in the target fields (electrical, electronic, mechanical, computer)
- Size of the company (preference given to large companies)
- Local reputation of the company
- Existence of cooperation with DPI and DMPI
- The popularity of the company with DPI and DMPI students

Since these corporate needs survey was conducted under the influence of COVID-19, including lockdown with local action restrictions, it was conducted in the form of a questionnaire survey using e-mail and telephone. A total of 15 companies, including three Japanese companies, responded to the questionnaire survey, which was conducted among companies selected based on the above criteria.

The list of responding companies is given in the table below.

The highlighted companies are Japanese or other foreign companies operating in Bangladesh and the rest are local companies in Bangladesh. As it is difficult for the companies to clearly distinguish between the electrical and electronic sectors, both sectors will be reported together in the following sections.

Table 1 Summary of Target Company

Field	Name of company	Business Description	Number of employees
Electricity Electronics	Walton	1. Manufacture of electrical appliances such as refrigerators, televisions, mobile phones, computers, and kitchen appliances 2. Manufacture of electric cars, lifts, batteries, LED lights, cables, etc.	Technical personnel: 2,700 Total: 28,400
Electricity Electronics	Walton Hi-Tech Ind. Ltd.	1. Manufacture of household appliances, air conditioners, etc. 2. Manufacture of electric cars, lifts, batteries, LED lights, cables, etc.	Total: 14,309 (Including technical personnel)
Electricity Electronics	System Engineering Ltd.	1. Manufacture of electrical transformers, switchgear, and cable trays 2. Electrical automation, energy/power control, and monitoring systems	Technical personnel: 120 Total: 600

Electricity Electronics	Development Design Consultant Ltd.	3. Consultancy services of financial analysis and project management 4. Assistance with detailed technical planning, design, development, technical specifications, and procurement	Technical personnel: 522 Total: 1,550
Electricity Electronics	Rainbow Automation	1. Improving the skills of engineering students 2. Training and research activities for engineering students	Technical personnel: 12 Total: 38
Electricity Electronics	Schneider Electric Overseas Pte Ltd. (French company)	1. Power distribution and electrical protection 2. Electrical automation 3. Power and energy software	Total: 15 (Including technical personnel)
Electricity Electronics Machinery	YKK Bangladesh Pte Ltd. (Japanese company)	1. Manufacture of zip clasps 2. Manufacture of slider and snap fastenings	Technical personnel: 220 Total: 1651
Electricity Electronics Machinery	Maruhisa Pacific Co., Ltd.(Japanese company)	1. Manufacture of cut and sewn products (for men, women, children, and babies)	Total: 1,650 (Including technical personnel)
Machinery	Bangladesh Machine Tools Factory Ltd. (BMTF)	1. Commercial vehicle assembly plant of Bangladesh Army 2. Special vehicle manufacturing and modification for the defense industry	Total: More than1,500 (Including technical personnel)
Machinery	Bangladesh Water Development Board	1. Proper management of water resources and sustainable development 2. Sustainable development of agriculture, fisheries, and forests through proper management of the natural environment	Technical personnel: 647 Total: 1,412
Machinery	British American Tobacco Bangladesh (British company)	1. Tobacco processing 2. Tobacco production 3. Distribution and export of tobacco	Technical personnel: 300 Total: 1,200
Computer	BD Task Software Limited.	1. News portal development, e-commerce, telemedicine 2. Software development, domain hosting, website development	Technical personnel: 70 Total: 99
Computer	Naztech Inc.Ltd.	1. Custom Application Development 2. Data Engineering 3. Business Process Outsourcing	Technical personnel: 62 Total: 79
Computer	Creative IT	1. IT training center for the development of students 2. Training in graphic design, networking, web, film & media, digital marketing, robotics & automation, 3D animation, etc.	Technical personnel: 120 Total: 187
Computer	Kaicom Solutions Japan BD Co. Ltd. (Japanese company)	1. Software development 2. Japanese language school management 3. Consulting services	Technical personnel:27 Total: 33

2) Needs for Human Resources

To carry out the needs assessment of individual companies, the following criteria were used to select the companies, in consultation with the instructors in charge of the DPI and DMPI placement offices. The following shows the human resource needs in each sector identified through the company needs survey. The results for Japanese companies are presented separately from those

for other countries for analyzing trends in the unique human resource needs of Japanese companies.

(1) Electrical and electronics field (6 companies responded)

- Regarding the excess or shortage of engineers, three companies answered that " there is a tendency of shortage" and three companies answered that " there is no shortage at present", and half of the respondents felt that there was a shortage of human resources.
- The average years of experience of the engineers employed by one company were more than 10 years, more than five years for three companies, and more than three years for two companies. 3 to 5 years is the average number of years of experience because the one company that answered more than 10 years is a consulting company that requires a high level of knowledge.
- Five of six companies answered that they were "very satisfied" or "satisfied" with the technical level of their engineers, indicating that they generally meet the technical level required for their work. One of the companies that answered that they were "unsatisfied with the somewhat low level" said that they were working with an insufficient level of technology.
- As for the prediction of the need for training engineers in the future, all six companies answered that "it will increase very much" or "it will increase somewhat". There is a recognition that the need for training engineers will increase in the future.

(2) Machinery field (3 companies responded)

- Regarding the shortage or excess of engineers, one company answered, "Significant shortage" and two companies answered, "No shortage at present" or "Sufficient". The one company that answered "Significant shortage" was particularly short of highly specialized engineers.
- The answers by the individual companies regarding the average number of years of experience of engineers employed by one company were 15 years or more, 10 years or more, and 5 years or more. The average number of years of experience tended to be longer than in other fields.
- All three companies responded that they were " satisfied " with the technical level of their engineers, indicating a high level of satisfaction with the technical level. These companies are actively providing training to improve the quality of their engineers through external and internal training and guidance by experienced personnel and are providing excellent human resource development support for their current engineers.
- As for the prediction of the future needs for training engineers, all three companies answered that they "it will increase greatly" or "it will increase somewhat", and there is a recognition that the needs for training engineers will increase in the future.

(3) Computer field (3 companies responded)

- Regarding the shortage of engineers, one company answered that " there is a tendency of shortage" and two companies answered that "there is no shortage at present" or "sufficient". One of the companies answered that there is a tendency of shortage and that there was a shortage of highly skilled engineers who can serve as instructors and team leaders, indicating that the shortage of engineers is more of a qualitative issue than a quantitative one.
- The individual company answers to the average number of years of experience of the engineers employed were more than 10 years, more than 3 years and less than 1 year. Except for one company that employed a student as an intern, most of the engineers had about 2 to 3 years of experience.
- As for the level of satisfaction with the engineers' skills, one company answered that it was "unsatisfactory due to the low level" and two companies answered that it was "satisfactory". One company that answered "unsatisfactory due to the low level," said that they were working with an insufficient level of technology.
- As for the prediction of the need for training engineers in the future, all three companies answered, "It is likely to increase very much" or "It is likely to increase somewhat", and there is a recognition that the need for training engineers will increase in the future.

(4) Japanese company (3 companies responded)

- Regarding the shortage of engineers, two companies answered that " there is a tendency of shortage" and one company answered that " there is no shortage at present". The average number of years of experience of the engineers employed by two companies was more than five years, and that of one company was more than three years.
- Regarding the satisfaction with the technical level of the engineers, one company answered that it was "unsatisfactory because it is somewhat low" and one company answered that it was "satisfactory". The other company answered both "sufficient" and "unsatisfactory because it is somewhat low". The two companies that answered "unsatisfactory because it is somewhat low" have either asked for help from other companies or are working with insufficient skills.
- As for the prediction of the need for training engineers in the future, all three companies answered, "It is likely to increase very much" or "It is likely to increase somewhat", and there is a recognition that the need for training engineers will increase in the future.

As a result of the above, it was confirmed that the current situation of human resource needs of the companies is not necessarily insufficient in terms of the number of engineers. However, it was also confirmed that the companies are experiencing problems of human resources shortage not in terms of quantity of engineers, but rather in terms of quality. The manufacturing sector in Bangladesh was predominantly a low-wage labor-intensive industry. This suggests that the demand of companies for low-wage labor that does not require advanced technology and the needs for non-technical workers are aligned, which may be the reason behind this result. On the other hand, all companies unanimously predict that the need for training engineers will increase in the future. This suggests that the need to train human resources who can adapt to advanced industries, including industrial automation, will increase to maintain or improve international competitiveness in the future. In addition, companies' expectations of polytechnic institutes and Technical Teacher Training Colleges (TTTCs) include "implementation of equipment and improvement of educational content for learning the latest technology such as industrial automation", "improvement of students' technical and practical skills", " improvement of knowledge of industrial processes", and "basic working skills such as leadership and communication skills", which is in line with the previous survey reports mentioned above.

2-2-2 Basic Plan

(1) Overall Plan

The planned equipment for this project will be installed at the existing facilities of the three target institutes. The planned equipment and the facilities to be installed are summarized below.

Table 2 Summary of Equipment and Target Areas

Site	Technology	Main Equipment	Room
DPI	Electric	Transformer Trainer, Motor-Generator Set, Transformer Trainer	Electrical Power Shop, Switch Gear Lab
	Electronics	Satellite Communication Trainer, Arbitrary Function Generator, Biomedical Measurement System	Communication Lab, Digital Electronics Lab, Instrumentation & Electromedical Lab
	Mechanical	CNC Lathe Machine, Centrifugal Pump Module, Universal Testing Machine	Manufacturing Process Lab, Fluid Mechanics Lab, Material Testing Lab
	Computer	28-port Gigabit Managed SFP Switch, Data Communication Traine, VPN Router	Software La, Network Lab, CISCO Network Lab
DMPI	Electronics	LVDT Trainer, Robot Station with Artificial Vision, X-Ray Machine	Advanced Electronics & Communication Lab, Digital Multimedia Lab, Bio-Medical Lab
	Computer	28-port Gigabit Managed SFP Switch, Data Communication Trainer	Software Lab, Network Lab
TTTC	Electric	Motor-Generator Set, Electrical Power System Simulator, VFD/PLC Wiring Learning System	Electrical Machine & Circuit Lab, Electrical Installation & Maintenance Lab
	Electronics	Industrial Power Electronics Trainer with	Advance Electronics Lab,

		Different Module, Power Electronics Trainer, Robot Trainer	Basic/Advance Electronics Lab, Microcontroller & Microprocessor Lab
	Mechanical	CNC Lathe Machine, Centrifugal Pump Module, Universal Testing Machine	Manufacturing Process Lab, Fluid Mechanics Lab, Material Testing Lab
	Computer	Router, Router with Network Security Function	ICT Lab

(2) Equipment Plan

1) Examination of Requested Equipment

The status of equipment at the three institutes at the start of the survey is as follows.

- There is basic experimental/practical equipment, but the quantity is insufficient for the number of students. Especially, at Dhaka Institute of Technology, the number of students is large, and the class system is two-shift, so the lack seems to be more prominent.
- Almost no experimental or practical equipment required for the diploma course of TTTC is installed.

Based on this information, the consultant finalized the requested equipment by the following process.

① Confirmation of the curriculum and syllabus currently in operation in Bangladesh
② Discussion with instructors
③ Confirmation of requests from each institute and technology
④ Survey of industry needs
⑤ Confirmation of the quantity, usage status and status of existing equipment, and maintenance status.
⑥ Proposal for equipment package
⑦ Finalization of requested equipment
⑧ Confirmation of proposed specification for each piece of equipment
⑨ Confirmation of requested quantity according to the usage such as demonstration, group learning, individual use, etc.

[Proposal for formulating equipment package]

This project has common technologies in all three institutes, and those institutes are targeted for technical cooperation. To achieve the purpose of "developing a technical education model by improving teaching materials for technical education and strengthening teachers' and instructors' abilities", it is considered that creating common equipment packages for all three institutes would enhance the effectiveness and contribution of this project. The structure of the requested equipment list is as follows.

<Technical Cooperation Program Package>

"Training of technical education instructors" is the most important article in the construction of the "technical education improvement model" implemented in technical cooperation. The equipment required for the program will be given the top priority. The specifications of the equipment and the quantity to be allocated to the three institutes will be decided in a discussion with the technical cooperation team. Duplication of the equipment currently procured with the technical cooperation budget will be avoided.

<Common package>

In this project, since there are technologies common to all three institutes, common equipment packages are created. By having common packages (procuring the same equipment to the three institutes), "training of technical education instructors" by TTTC can be carried out smoothly and efficiently.

<Package by institute>

- DPI

DPI has considered the No. 1 polytechnic institute in Bangladesh and the number of students is large. Expectations from the technical education field and industry for this project are also high. In consideration of these points, the equipment specialized for the institute (Specific & Iconic) is considered within the range of not pursuing excessive advancement and based on the current and future level of instructors and the operation/maintenance system. The quantity will be set to contribute to efficient and effective technical education of a small number of students. Through these efforts, an increase in the attractiveness to the industrial sector and improvement of corporate collaboration and the employment rate is expected. In addition, the experimental and practical equipment that can support the establishment of the Project-Based Laboratory (PBL) requested by the institute are considered.

- DMPI

Since many career paths of graduates are employment or entrepreneurship[3], students need to acquire knowledge and abilities that can be put into practice immediately. In particular, the equipment used in the industry is considered, such as: in the case of female students, ICT-related office work, accounting work using a computer/software, programming, software development, etc. The equipment for PBL is considered. In addition, a gender perspective should be considered when planning equipment.

- TTTC

Because of the institute's purpose of training technical instructors at polytechnic institutes nationwide, the equipment for practical training/learning and the equipment for making theoretical learning more effective are considered. The equipment is planned more in a variety

[3] Employment rate of 2019 graduates: 44%(Electronics), 51%(Computer)

and quantity compared with other two institutes to increase the opportunity of the student. In addition, since the training of instructors of DPI and DMPI which represent the country is the core of the technical cooperation, it is considered to procure the same equipment as the equipment owned by both institutes.

- Equipment that reflects the circumstances of the three institutes

  If the necessary training/experiments are not carried out effectively and efficiently due to aging of existing equipment, lack of quantity, etc., replenishment is considered for each institute.

2) Examination of Equipment Quantity

The quantity of equipment is set according to the purpose such as presentation, personal use, or group use. Based on the estimated budget of the project, the appropriate quantity is calculated from the number of students by institute and technology, the number of students per class, and the area of the rooms where the equipment will be installed.

Number of the Students at Three Institutes

Technology	DPI	No.	DMPI	No.	TTTC	No.
Electric	●	1,131	－	－	● (Electric & Electronics incl. Computer)	27
Electronics	●	762	●	336		
Mechanical	●	1,138	－	－	●	35
Computer	●	755	●	336	－	－
Total		3,786		672		62

☆ The number of students per class at DPI and DMPI is 40 to 50.

3) Basic Specifications of Equipment

Regarding the examination of specifications, the assumed equipment specifications based on the curriculum and syllabus "Bangladesh Technical Education Board, 4-Year Diploma-in-Engineering Program Syllabus" are used as a starting point, and the opinions of the technical cooperation are considered. At the same time, information on reference specifications or reference models from the three institutes is requested and it will be confirmed that they are not overly advanced or that actual machines are not requested for technical education. Specifically, the basic specifications are set with the following items in mind.

① Status of 3 institutes (facility, condition of existing equipment)
② Technical level and organizational structure of teachers and instructors (operation and maintenance of equipment)
③ Consistency with the current curriculum and syllabus
④ Equipment specifications that contribute to the achievement of the goals of the technical

cooperation

⑤ Plan (update of the curriculum, budget provision for equipment operation)

⑥ Consistency with Bangladesh's industrial needs

4) Survey of Existing Equipment

The current use status of the equipment procured by other donors and equipment procured with the Bangladesh budget is investigated whether it is usable, not obsolete, and in sufficient quantity. Then, making recommendations to the Bangladesh side regarding the setting of priorities and quantities so that there will be no duplication between the existing equipment and the planned equipment, and reflect this in the equipment plan. In addition, the causes of non-operating equipment (aging, breakdown, shortage of replacement parts/consumables, installation environment, etc.) will be clarified, reflected in the equipment plan, and recommendations will be made to the Bangladesh side.

5) Planned Equipment

As a result of the above examination and project cost estimation, the equipment list is finalized.

The planned equipment is shown below.

Table 3 Planned Equipment List

No.	Request No.	Equipment Name	Q'ty	Priority
1	DPI-ET-12	Advanced Maintenance Electrician Training Equipment	2	A
2	DPI-ET-24	Magnetic Contactor	4	A
3	DPI-ET-31	Single Phase Analog Power Factor Meter	3	A
4	DPI-ET-48	Stepper Motor (Uni-polar Stepper Motor)	2	A
5	DPI-ET-58	Washing Machine	1	A
6	DPI-ET-60	Air Conditioner, Split Type, 3 Ton	1	A
7	DPI-ET-23	Automatic-Star Delta Starter	2	A
8	DPI-ET-32	Microwave Oven	1	A
9	DPI-ET-36	Wheatstone Bridge Trainer Kit	5	A
10	DPI-ET-07	Transformer Trainer	1	A
11	DPI-ET-11	Complete Renewable Energy Lab (Trainer)	1	A
12	DPI-ET-08	Drill Press	2	A
13	DPI-ET-13	Speed Control of AC Motor (Trainer)	1	A
14	DPI-ET-14	Synchroscope	1	A
15	DPI-ET-15	Multiple Terminals for Varying Speed for Three Phase Motors	2	A
16	DPI-ET-16	3 Point / 04 Point Starter with DC Motor	1	A
17	DPI-ET-17	VFD-M AC Drives	2	A
18	DPI-ET-21	Hammer Drill	2	A
19	DPI-ET-22	Tool Set for Electrical Works	10	A
20	DPI-ET-27	Motor-Generator Set	1	A
21	DPI-ET-28	Low-Transmission Panel Equipment	1	A
22	DPI-ET-29	High-Transmission Panel Equipment	1	A

No.	Request No.	Equipment Name	Q'ty	Priority
23	DPI-ET-33	Rechargeable Battery (Lead Acid)	2	A
24	DPI-ET-38	Bench Drill Machine	2	A
25	DPI-ET-39	Industrial Scope Meter	1	A
26	DPI-ET-40	High Resolution Projector (Multimedia)	2	A
27	DPI-ET-44	LCR Meter	5	A
28	DPI-ET-47	Universal Motor (Transparent)	2	A
29	DPI-ET-53	Thermocouple	2	A
30	DPI-EnT-47	Basic Energy Conversion Trainer	4	A
31	DPI-EnT-48	Power Electronics Trainer (A)	2	A
32	DPI-EnT-49	Power Electronics Trainer (B)	1	A
33	DPI-EnT-65	Pattern Generator	2	A
34	DPI-EnT-66	Digital HD TV Camera	1	A
35	DPI-EnT-67	HD Video Recording Camcorder (Black)	1	A
36	DPI-EnT-10	DC Milli Voltmeter	10	A
37	DPI-EnT-40	AC Milliamp meter	4	A
38	DPI-EnT-55	Q Meter	4	A
39	DPI-EnT-12	Analog Trainer	4	A
40	DPI-EnT-11	DC Milliamp Meter	10	A
41	DPI-EnT-143	Optical Fiber Trainer	2	A
42	DPI-EnT-145	Satellite Communication Trainer	1	A
43	DPI-EnT-151	Frequency Division Multiplexing Trainer Board	4	A
44	DPI-EnT-154	Digital Communication Trainer	4	A
45	DPI-EnT-156	PCM Trainer	4	A
46	DPI-EnT-157	Frequency Modulation Trainer	4	A
47	DPI-EnT-158	Fiber Optics Educational Kit	4	A
48	DPI-EnT-159	Wireless HDMI Transmitter and Receiver Kit	2	A
49	DPI-EnT-160	Mini PABX Intercom System with 6 Telephone Set	1	A
50	DPI-EnT-155	Microwave Trainer	1	A
51	DPI-EnT-153	Antenna Trainer	4	A
52	DPI-EnT-152	Amplitude Modulation Trainer	4	A
53	DPI-EnT-150	Cellular Mobile Communication System	2	A
54	DPI-EnT-144	Computer with Optical Fiber, HUB, Router and Switch	2	A
55	DPI-EnT-142	RF Power Meter	2	A
56	DPI-EnT-81	Analog and Digital Trainer	4	A
57	DPI-EnT-84	DSP Trainer	2	A
58	DPI-EnT-85	Advanced Analog & Digital Design Trainer	4	A
59	DPI-EnT-86	Advanced Digital Logic Circuits Trainer	4	A
60	DPI-EnT-83	Digital IC Trainer	4	A
61	DPI-EnT-180	Operational Amplifier Trainer	4	A
62	DPI-EnT-195	Sensor Trainer	4	A
63	DPI-EnT-197	Biomedical Measurement System	1	A
64	DPI-EnT-198	ECG Machine	1	A
65	DPI-EnT-199	X-Ray Machine (Portable Type)	1	A
66	DPI-EnT-200	Digital Color Doppler 3D/4D	1	A
67	DPI-EnT-201	Colorimeter	2	A
68	DPI-EnT-211	LVDT Trainer	2	A
69	DPI-EnT-214	Scintillation Counter	1	A

No.	Request No.	Equipment Name	Q'ty	Priority
70	DPI-EnT-215	Geiger–Muller Counter	1	A
71	DPI-EnT-All1	AVO Meter (Analog)	85	A
72	DPI-EnT-All2	AVO Meter (Digital)	85	A
73	DPI-EnT-All3	Function Generator	16	A
74	DPI-EnT-All4	Digital IC Tester	6	A
75	DPI-EnT-All5	Dual Trace Digital Storage Oscilloscope 200MHz	16	A
76	DPI-EnT-All6	AF Signal Generator	12	A
77	DPI-EnT-All7	Dual power supply (AC/DC)	10	A
78	DPI-EnT-All8	Transistor Tester	6	A
79	DPI-EnT-All9	Digital Frequency Counter	10	A
80	DPI-EnT-All10	Dual Trace Digital Storage Oscilloscope 100MHz	10	A
81	DPI-EnT-All11	Power Factor Meter	10	A
82	DPI-EnT-All12	Photo Meter	8	A
83	DPI-EnT-All13	RX Meter	8	A
84	DPI-EnT-All14	RF Signal Generator	8	A
85	DPI-EnT-All15	DC Power Supply	20	A
86	DPI-EnT-All16	Spectrum Analyzer	7	A
87	DPI-EnT-All17	Electronics VOM	8	A
88	DPI-EnT-All18	Energy Meter	10	A
89	DPI-EnT-All20	Soldering Iron	50	A
90	DPI-EnT-All21	AC Millivolt Meter	4	A
91	DPI-EnT-All24	Analog & Digital Electronics Trainer	8	A
92	DPI-EnT-All26	Solar Trainer (Portable Type)	8	A
93	DPI-EnT-All27	LCR Meter	18	A
94	DPI-EnT-All30	Microwave Power Meter	2	A
95	DPI-EnT-All32	Arbitrary Function Generator	2	A
96	DPI-EnT-All33	Virtual Reality Kit with Headset	2	A
97	DPI-EnT-All34	Frequency Meter	8	A
98	DPI-EnT-All35	Watt Meter	2	A
99	DPI-EnT-All36	Basic Communication Trainer	8	A
100	DPI-MT-188	CNC Lathe Machine	1	A
101	DPI-MT-194	Desktop Milling Machine	10	A
102	DPI-MT-198	3D Printer -Plastic	2	A
103	DPI-MT-12	Digital Hydraulic Bench	2	A
104	DPI-MT-04	Pelton Turbine	2	A
105	DPI-MT-03	Francis Turbine	2	A
106	DPI-MT-25	Centrifugal Pump Module	2	A
107	DPI-MT-05	Fluid Friction Apparatus	2	A
108	DPI-MT-32	Piston Pump	2	A
109	DPI-MT-01	Two Stage Series and Parallel Pumps	2	A
110	DPI-MT-08	Flow Measurement Methods	2	A
111	DPI-MT-06	Bernoulli's Theorem	2	A
112	DPI-MT-15	Flow Meter Calibration	2	A
113	DPI-MT-16	Pitot Tube	2	A
114	DPI-MT-17	Venturi Flow Meter	2	A
115	DPI-MT-18	Orifice Flow Meter	2	A
116	DPI-MT-37	Impact of a Jet	2	A

No.	Request No.	Equipment Name	Q'ty	Priority
117	DPI-MT-76	Universal Testing Machine	2	A
118	DPI-CmT-03	Server for Software Lab Management with Server Rack	2	A
119	DPI-CmT-10	Server for Networking Practices with Server Rack	2	A
120	DPI-CmT-18	Basic Fiber Optics Trainer	2	A
121	DPI-CmT-19	Fiber Tool Kits Including F7 Fusion Splicer	4	A
122	DPI-CmT-20	Optical Power Meter	5	A
123	DPI-CmT-21	Data Communication Trainer	2	A
124	DPI-CmT-25	Digital Electronics Educational Trainer Kit	8	A
125	DPI-CmT-26	8086 Microprocessor Training Kit	8	A
126	DPI-CmT-27	Educational Microcontroller Trainer Kit	8	A
127	DPI-CmT-29	Handheld Mini–PCB Drill Machine	5	A
128	DPI-CmT-33	Laser Color Printer	3	A
129	DPI-CmT-38	Server for NTVQF Lab Management with Server Rack	1	A
130	DPI-CmT-45	Server for NTVQF Networking Practices with Server Rack	1	A
131	DPI-CmT-53	Server for IoT Lab with Server Rack	1	A
132	DPI-CmT-57	Sensor Package	8	A
133	DPI-CmT-58	Sensor Trainer Kit	4	A
134	DPI-CmT-59	Single Board Computer	10	A
135	DPI-CmT-60	Single-Board Microcontroller	10	A
136	DPI-CmT-62	Lynxmotion AL5D PLTW Robotic Arm Kit	5	A
137	DPI-CmT-63	Personal Writing & Drawing Robot	1	A
138	DPI-CmT-64	Educational Programmable Robot	5	A
139	DPI-CmT-65	Humanoid Robot	5	A
140	DPI-CmT-71	Server for CISCO Network Lab Practices with Server Rack	1	A
141	DPI-CmT-77	Wireless Controller / Access Point	2	A
142	DPI-CmT-78	24 Port Switch	5	A
143	DPI-CmT-79	POE Managed Switch	5	A
144	DPI-CmT-80	VPN ROUTER	4	A
145	DPI-CmT-81	Cisco Firepower	2	A
146	DPI-CmT-All1	28-port Gigabit Managed SFP Switch	22	A
147	DPI-CmT-All2	72" Smart TV	7	A
148	DPI-CmT-All3	CISCO Access Point	14	A
149	DPI-CmT-All4	Laptop Computer (DPI)	100	A
150	DPI-CmT-All5	Desktop Computer (DPI)	40	A
151	DMPI-EnT-02	Digital Multimeter (AVO Meter)	5	A
152	DMPI-EnT-03	Dual Trace Digital Storage Oscilloscope 100MHz	2	A
153	DMPI-EnT-07	IPS	1	A
154	DMPI-EnT-09	Dual Trace Digital Storage Oscilloscope 200MHz	2	A
155	DMPI-EnT-12	Digital Frequency Counter	2	A
156	DMPI-EnT-13	Power Electronics Trainer	2	A
157	DMPI-EnT-14	Basic Communication Trainer	2	A
158	DMPI-EnT-15	Antenna Trainer	5	A
159	DMPI-EnT-20	Oxygen Concentrator	1	A
160	DMPI-EnT-21	Transistor Tester	5	A
161	DMPI-EnT-22	Solar Trainer (Portable Type)	4	A
162	DMPI-EnT-23	PCM Trainer	5	A
163	DMPI-EnT-24	Frequency Modulation Trainer	5	A

No.	Request No.	Equipment Name	Q'ty	Priority
164	DMPI-EnT-25	Fiber Optics Educational Kit	5	A
165	DMPI-EnT-32	Raspberry Pi Arduino IOT Sensor Lab	5	A
166	DMPI-EnT-33	Arduino Starter Kit	5	A
167	DMPI-EnT-36	Laptop	2	A
168	DMPI-EnT-37	Desktop Computer	2	A
169	DMPI-EnT-38	Wireless HDMI Transmitter and Receiver Kit	2	A
170	DMPI-EnT-41	Robot Station with Artificial Vision System	1	A
171	DMPI-EnT-45	Tools BOX	1	A
172	DMPI-EnT-46	X-Ray Machine	1	A
173	DMPI-EnT-48	Fingertip Pulse Oximeter	5	A
174	DMPI-EnT-49	Handheld Pulse Oximeter	2	A
175	DMPI-EnT-50	Wiselion Infrared Thermometer	10	A
176	DMPI-EnT-53	ECG Machine	1	A
177	DMPI-EnT-All1	LCR Meter	7	A
178	DMPI-EnT-All2	Dehumidifier	2	A
179	DMPI-EnT-All3	AC DC Dual Tracking Power Supply	4	A
180	DMPI-EnT-All4	Stepper Motor Trainer	1	A
181	DMPI-EnT-All5	AF Signal Generator	3	A
182	DMPI-EnT-All6	LVDT Trainer	2	A
183	DMPI-EnT-All7	Analog Multimeter (AVO Meter)	10	A
184	DMPI-CmT-01	Laptop PC for Software Lab	30	A
185	DMPI-CmT-03	Server (for Lab Management)	1	A
186	DMPI-CmT-22	Server for Networking Practices	1	A
187	DMPI-CmT-28	16 Channel NVR/DVR for Lab Practices	5	A
188	DMPI-CmT-29	IP Camera for Lab Practices	20	A
189	DMPI-CmT-31	TV Monitor for NRV/DVR	5	A
190	DMPI-CmT-32	Basic Fiber Optics Trainer	4	A
191	DMPI-CmT-33	Fiber Tool Kits Including F7 Fusion Splicer	2	A
192	DMPI-CmT-35	Data Communication Trainer	4	A
193	DMPI-CmT-44	Copper SFP module 1000base-t SFP	120	A
194	DMPI-CmT-47	8086 Microprocessor Training Kit	12	A
195	DMPI-CmT-48	Educational Microcontroller Trainer Kit	10	A
196	DMPI-CmT-57	Robot Station with Artificial Vision	1	A
197	DMPI-CmT-58	ELECROW CrowPi Raspberry Pi 4 3b 3b+ Kit for Learning Coding - Advanced Kit	10	A
198	DMPI-CmT-59	Kuman Compatible for Arduino Raspberry pi Sensor kit	20	A
199	DMPI-CmT-62	Server for NTVQF Networking Practices	1	A
200	DMPI-CmT-68	Alienware Aurora R8 Gaming Desktop	5	A
201	DMPI-CmT-73	Sensor Package	10	A
202	DMPI-CmT-74	Sensor Trainer Kit	10	A
203	DMPI-CmT-75	Single Board Computer	5	A
204	DMPI-CmT-76	Single-Board Microcontroller	5	A
205	DMPI-CmT-All1	Server Rack	1	A
206	DMPI-CmT-All2	28-port Gigabit Managed SFP Switch	6	A
207	DMPI-CmT-All3	Desktop PC	30	A
208	TTTC-ET-23	Automatic-Star Delta Starter	4	A
209	TTTC-ET-27	Motor-Generator Set	1	A
210	TTTC-ET-30	Auto - Transformer	8	A

No.	Request No.	Equipment Name	Q'ty	Priority
211	TTTC-ET-32	Micro-wave Oven	8	A
212	TTTC-ET-36	Wheatstone Bridge Trainer Kit	8	A
213	TTTC-ET-37	Electrical Power System Simulator	1	A
214	TTTC-ET-42	Electrical Circuits & Network Total Lab	4	A
215	TTTC-ET-61	3-Phase Variac	2	A
216	TTTC-ET-62	Single-Phase Variac	2	A
217	TTTC-ET-64	Single Phase Transformer Trainer	2	A
218	TTTC-ET-65	VFD/PLC Wiring Learning System	2	A
219	TTTC-ET-04	Laboratory DC Power Supply	8	A
220	TTTC-ET-13	Speed Control of AC Motor	2	A
221	TTTC-ET-14	Synchroscope	4	A
222	TTTC-ET-02	Earth Tester	8	A
223	TTTC-ET-All1	3-Phase Transformer Trainer	3	A
224	TTTC-EnT-36	Arduino Microcontroller Trainer Board	10	A
225	TTTC-EnT-27	Operational Amplifier Trainer	4	A
226	TTTC-EnT-26	Industrial Power Electronics Trainer with Different Module	4	A
227	TTTC-EnT-20	Digital IC Tester	10	A
228	TTTC-EnT-04	Dual Power Supply (AC/DC)	10	A
229	TTTC-EnT-05	Variable DC Power Supply	10	A
230	TTTC-EnT-23	Solar Trainer (Portable Type)	4	A
231	TTTC-EnT-21	Transistor Tester	10	A
232	TTTC-EnT-22	Pattern Generator	4	A
233	TTTC-EnT-31	Programable Logic Control Trainer with Modules	2	A
234	TTTC-EnT-39	Microwave Power Meter	10	A
235	TTTC-EnT-40	Optical Fiber Trainer	4	A
236	TTTC-EnT-43	Frequency Division Multiplexing Trainer Board	4	A
237	TTTC-EnT-48	PCM Trainer	4	A
238	TTTC-EnT-65	LVDT Trainer	2	A
239	TTTC-EnT-64	Stepper Motor Trainer	2	A
240	TTTC-EnT-55	Megger	10	A
241	TTTC-EnT-52	Wheatstone Bridge Trainer	2	A
242	TTTC-EnT-51	Wein Bridge Trainer	5	A
243	TTTC-EnT-50	Analog Communication Trainer	4	A
244	TTTC-EnT-49	Frequency Modulation Trainer	4	A
245	TTTC-EnT-41	Satellite Communication Trainer	1	A
246	TTTC-EnT-42	Cellular Mobile Communication System	4	A
247	TTTC-EnT-45	Antenna Trainer	4	A
248	TTTC-EnT-44	Amplitude Modulation Trainer	4	A
249	TTTC-EnT-46	Digital Communication Trainer	4	A
250	TTTC-EnT-56	Sensor Trainer with Different Module	2	A
251	TTTC-EnT-47	Microwave Trainer	1	A
252	TTTC-EnT-10	Digital Frequency Counter	10	A
253	TTTC-EnT-25	Basic Energy Conversion Trainer	4	A
254	TTTC-EnT-28	Power Electronics Trainer with Different Module	2	A
255	TTTC-EnT-29	Basic Communication Trainer with Different Module	4	A
256	TTTC-EnT-32	Microcontroller Trainer 8051	4	A
257	TTTC-EnT-33	Robot Trainer	4	A

No.	Request No.	Equipment Name	Q'ty	Priority
258	TTTC-EnT-All1	DC Servo System Trainer	2	A
259	TTTC-MT-189	CNC Lathe Machine	1	A
260	TTTC-MT-195	Desktop Milling Machine	7	A
261	TTTC-MT-199	3D Printer -Plastic	1	A
262	TTTC-MT-12	Digital Hydraulic Bench	3	A
263	TTTC-MT-04	Pelton Turbine	1	A
264	TTTC-MT-03	Francis Turbine	1	A
265	TTTC-MT-25	Centrifugal Pump Module	1	A
266	TTTC-MT-05	Fluid Friction Apparatus	1	A
267	TTTC-MT-32	Piston Pump	1	A
268	TTTC-MT-01	Two Stage Series and Parallel Pumps	1	A
269	TTTC-MT-08	Flow Measurement Methods	1	A
270	TTTC-MT-06	Bernoulli's Theorem	1	A
271	TTTC-MT-15	Flow Meter Calibration	1	A
272	TTTC-MT-16	Pitot Tube	1	A
273	TTTC-MT-17	Venturi Flow Meter	1	A
274	TTTC-MT-18	Orifice Flow Meter	1	A
275	TTTC-MT-37	Impact of a Jet	1	A
276	TTTC-MT-86	Universal Hardness Tester	1	A
277	TTTC-MT-76	Universal Testing Machine	1	A
278	TTTC-MT-85	Energy Absorbed at Fracture	1	A
279	TTTC-MT-92	Torsion Testing Machine (30 Nm)	1	A
280	TTTC-MT-68	Engineering Science Full Set	2	A
281	TTTC-MT-60	Structures Test Frame	3	A
282	TTTC-MT-62	Automatic Data Acquisition Unit	3	A
283	TTTC-MT-63	Bending Moments in a Beam	1	A
284	TTTC-MT-64	Shear Force in a Beam	1	A
285	TTTC-MT-65	Deflection of Beams and Cantilevers	1	A
286	TTTC-MT-72	Hooke's Law and Spring Rate	1	A
287	TTTC-MT-146	Static and Dynamic Balancing	1	A
288	TTTC-MT-147	Gyroscope	1	A
289	TTTC-MT-148	Centrifugal Force	1	A
290	TTTC-MT-149	Geared Systems	1	A
291	TTTC-MT-150	Toothed Belt Drive Unit	1	A
292	TTTC-MT-154	Governors	1	A
293	TTTC-MT-105	Refrigeration Cycle	1	A
294	TTTC-MT-106	Air Conditioning Trainer	1	A
295	TTTC-MT-108	Cooling Towers	1	A
296	TTTC-MT-48	Small Engine Test Set	2	A
297	TTTC-MT-49	Modified 4 Stroke Petrol Engine	1	A
298	TTTC-MT-50	Modified 4 Stroke Diesel Engine	1	A
299	TTTC-MT-53	Cylinder Head Pressure Transducer	2	A
300	TTTC-CmT-02	3D Printer	2	A
301	TTTC-CmT-04	All in One PC (A)	10	A
302	TTTC-CmT-05	All in One PC (B)	10	A
303	TTTC-CmT-06	Laptop PC	10	A
304	TTTC-CmT-08	Server	2	A

No.	Request No.	Equipment Name	Q'ty	Priority
305	TTTC-CmT-09	Router (A)	2	A
306	TTTC-CmT-10	Router (B)	8	A
307	TTTC-CmT-11	Network Switch (A)	8	A
308	TTTC-CmT-12	Network Switch (B)	8	A
309	TTTC-CmT-13	Access Point	8	A
310	TTTC-CmT-14	Raspberry Pi 4 Model B	10	A
311	TTTC-CmT-30	Server Rack	2	A
312	TTTC-CmT-32	Multimedia Projector	2	A
313	TTTC-CmT-35	Basic Fiber Optics Trainer	2	A
314	TTTC-CmT-36	Fiber Tool Kits Including F7 Fusion Splicer	2	A
315	TTTC-CmT-37	Optical Power Meter	8	A
316	TTTC-CmT-38	Educational Microcontroller Trainer Kit	8	A
317	TTTC-CmT-42	Sensor Package	8	A
318	TTTC-CmT-43	Sensor Trainer Kit	8	A
319	TTTC-CmT-44	Single Board Computer	8	A
320	TTTC-CmT-45	Single-board microcontroller	8	A
321	TTTC-CmT-46	Lynxmotion AL5D PLTW Robotic Arm Kit	3	A
322	TTTC-CmT-47	Personal Writing & Drawing Robot	3	A
323	TTTC-CmT-48	Educational Programmable Robot	3	A
324	TTTC-CmT-49	Humanoid Robot	3	A
325	TTTC-CmT-50	VPN ROUTER	5	A
326	TTTC-CmT-51	Cisco Firepower	5	A

Note:

For Equipment No.65 and 172, X-Ray Machine, it is necessary to allocate the instructor(s) those who have completed the related course regulated in Bangladesh under the responsibility of target institutes by the time of the delivery.

(3) Plan for Natural Environment Conditions

The climate of Bangladesh is referred to as subtropical monsoon and is characterized by large seasonal fluctuations in rainfall, high temperature, and humidity. It is divided into three seasons: hot and humid summer (March-June), cool and rainy monsoon season (June-October), and cool and dry winter (October-March). The annual rainfall is 2,143.7 mm and about 80% of Bangladesh's rainfall is concentrated in the monsoon season. From April to May and October to November, cyclones attack and cause flood damage. When the equipment procurement plan is made, the road conditions due to the rainy season will be considered.

(4) Plan for Procurement Conditions

The planned equipment for this project will be procured from Japan, Bangladesh, and third countries according to the equipment contents. Third-country manufacturers of training equipment, especially European manufacturers, have authorized distributors in Dhaka and it has been confirmed that they have business results of projects carried out by other donors. During the equipment discussion at the time of the DOD survey, TTTC requested for considering the equipment manufacturers

and models to be procured to other polytechnic institutes. This is because effective guidance can be expected by using the same type of equipment. It is confirmed the local distributor of the manufacturer is adequate as a possible supplier by visiting their office and having a meeting.

As for the general-purpose equipment such as ICT equipment, there are several dealers in Dhaka that can handle installation work and they have business results of projects carried out by other donors. Regarding the transportation method, the equipment procured from Japan, or a third country will be unloaded at Chittagong Port and will arrive at each site in Dhaka via inland transportation of about 250km.

(5) Utilization of Local Suppliers Plan

For the utilization of local suppliers, it is expected that they will handle ICT equipment and operation and maintenance regarding matters such as how to maintain, procure consumables and replacement parts, etc. by manufacturer agents.

(6) Utilization of Japanese Companies Plan

Since the purpose of this project is to procure equipment through grant aid for facilities and equipment procurement, the equipment procurement company is expected to be a trading company with its head office registered in Japan. In addition, measuring instruments, machine tools, and metal processing equipment will be procured in Japan. Japanese companies will be utilized on a certain scale.

(7) Operation and Maintenance Plan

It is expected that this project will increase the cost of equipment maintenance at each institute. Therefore, the initial operation guidance will be done while taking enough time to prevent unnecessary costs from being incurred due to erroneous operation of equipment by instructors after handing over and erroneous ordering of replacement parts and consumables. In addition, the guidance will include the contents of normal maintenance and simple repairs for possible minor failures and aim for the understanding of each instructor. In this project, the focus is on the improvement of the equipment and updating the malfunctioning equipment. Thus, operation and maintenance under the current system of the three institutes are adequate.

(8) Procurement Method and Period Plan

The country of procurement of the equipment planned for the project will be set as Japan, Bangladesh, or a third country for each piece of equipment. In addition, the procurement plan and period of the planned equipment will be set after considering the period for repair work of the existing facilities, which will be an expense incurred by the Bangladeshi side, the equipment

production period, shipping/transportation period, installation work and so on.

2-2-3 Outline Design Drawing

Omitted due to the equipment supply project, not the building construction project.

2-2-4 Implementation Plan

2-2-4-1 Implementation Policy

Implementation of this Project shall be initiated officially only after it is approved by the Governments of both countries and the exchange of notes (E/N) and the grant agreement (G/A) is signed. Immediately after the signing of the E/N and the G/A, the Bangladesh organization that is responsible for the implementation of this Project and the Japanese consultant firms shall enter an agreement and initiate the detailed design work of the Project. When the detailed design is completed, the Japanese companies will participate in the tender for their works. The successful tenderers and the Bangladesh organization shall enter a contract and proceed with the supply and installation of the equipment.

(1) Implementing Organizations

1) Executing Agency

The line ministry is Technical and Madrasa Education Division (TMED), Ministry of Education (MOE) of Bangladesh. The Executing Agency for this Project is the Directorate of Technical Education (DTE). Target institutes and a college are Dhaka Polytechnic Institute (DPI), Dhaka Mohila Polytechnic Institute (DMPI), and Technical Teachers Training College (TTTC). DTE will be responsible for undertakings born by the Bangladesh side.

2) Japan International Cooperation Agency (JICA)

JICA will sign a G/A with the Government of Bangladesh and will review and monitor the Project for proper implementation following the Japanese Grant schemes.

3) Consultant

After the signing of the E/N and G/A for the Project, the Executing Agency of the Project and a Consultant in Japan will sign an agreement for the consulting services. The Consultant will carry out the following works.

a. Detailed Design Stage

Final confirmation of the project, preparation of design documents (specifications and technical reference materials on the medical equipment included in this Project)

b. Bidding Stage

Assistance to the Executing Agency in the bidding and contractual procedures (including preparation of bidding documents, bid openings, bid evaluation, contracts with Contractor and the Supplier)

c. Procurement Supervision

Supervisory works for equipment procurement, delivery, installation, operational, and maintenance guidance of equipment

The detailed design involves determining the details of the equipment plans according to the Preparatory Survey Report, compiling the tender documents that will include the specifications, tender conditions, and draft conditions of contracts for supply and installation of medical equipment, and estimating equipment costs. The tender and contract assistance include attendance in the tendering for the selection of the technical education equipment supplier, assistance in the procedures for concluding a contract, reporting to JICA, etc.

Although the weight of the equipment and the vibration generated during the operation of the equipment which will be procured in this project does not affect the existing facilities, these will also be reconfirmed at the time of bid evaluation.

The supervision of the equipment work involves ensuring that the supplier has effectively carried out the technical education equipment supply and installation work following the contractual terms and confirming that they have properly met their contractual obligations. For the successful completion of the Project, the Consultant will: from a true and fair perspective, extend advice and instructions, and coordinate the persons concerned. Specifically, the supervisory services of the consultant include the followings:

- Review and approve of the work program, equipment specifications, and other documents prepared and submitted by the medical equipment supplier.
- Inspection and approval of the pre-shipment inspection and approval of the quality, quantity, and performance of technical education equipment.
- Confirmation of the delivery and installation of equipment for the technical education equipment, and the equipment operation manuals.
- Supervision of the work progress and reporting.
- Final inspections of the technical education equipment, and attendance during the handover.

In addition to those services, the Consultant will report to the Japanese authorities concerned regarding the progress of the Project, payment procedures, completion of the Project and handing-over, etc.

4) Equipment Suppliers

The work orders of the Japanese assistance will be limited to Japanese companies satisfying the eligibility requirements. Suppliers will be selected by public tender with restricted eligibility.

Based on the contract, the selected equipment suppliers will procure, supply, and install technical education equipment. They will also give technical instructions to the Bangladesh side concerning the operation and maintenance of the supplied equipment. Once the equipment is handed over, in cooperation with the agency of the equipment manufacturers, the equipment suppliers will support the continuous supply of spare parts and consumables for major equipment during the guarantee period, either free of charge or on a chargeable basis.

(2) Project Implementation Diagram

The consultant will form a project team to conduct the above-mentioned services in Japan and Bangladesh.

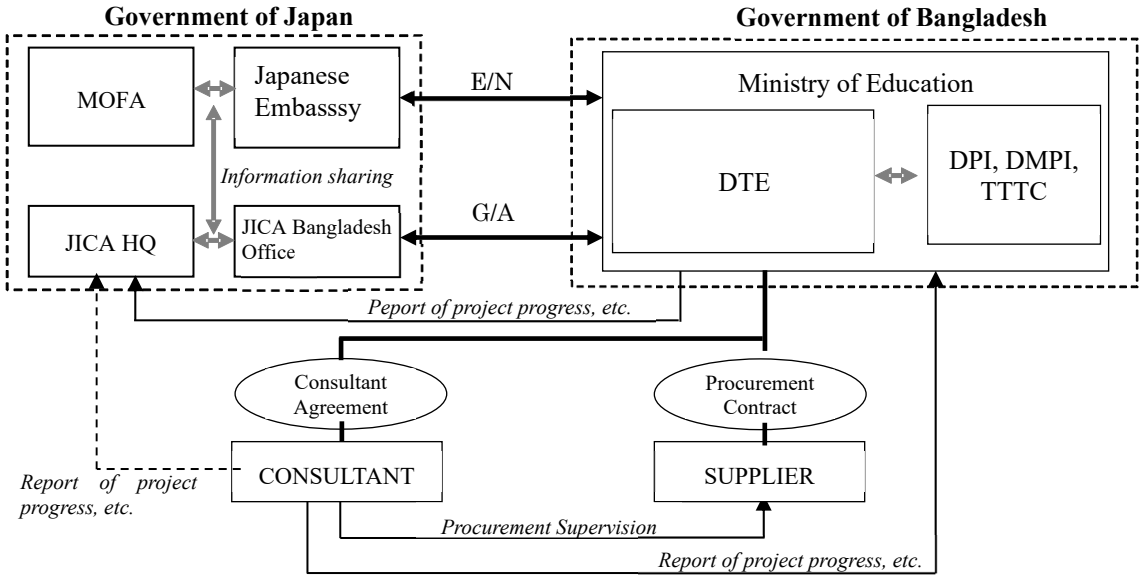


Figure 2 Project Implementation Diagram

2-2-4-2 Implementation Conditions

1) Schedule Management

Under COVID-19, there have been shortages of chips, and electronic parts to the manufacturers, the large increase of shipping costs, and the shipping schedule are now significantly affected. The accuracy of schedule management is improved by updating related information.

2) Dispatch of Technicians, Engineers, and Supervisors for Equipment Installation

It is extremely important to impart knowledge and skills regarding appropriate operation and maintenance of the equipment to contribute to technical education services through continuous proper operation of the procured equipment after implementation of the project. That being the case, technicians who are thoroughly familiar with the operation of each piece of equipment will be selected as the equipment installation technicians, and sufficient time will be allotted for them to explain the operation thereof (operation techniques, simple repair techniques, inspection methods, etc.) and to make sure that those concerned on the receiving side acquire sufficient understanding of the equipment's operation and maintenance.

3) Tax Exemption

By collecting information from the Ministry of Finance of Bangladesh, related organizations such as donors from other countries, and past grant aid projects, the reliable implementation method will be confirmed. Since this is an ODA project to procure equipment, the related taxes are value-added tax (VAT) and import duty. Both taxes can be exempted according to the information on the tax exemption information sheet. For that purpose, the executing agency needs to prepare a DPP (Development Project Proposal), specify the necessary expenses to secure the budget for the next fiscal year, and must obtain approval of the DPP.

4) DPP

Approval from higher-ranking ministries, planning committees, the Ministry of Finance, etc. is required for budgetary measures for establishing a system for implementing the project and the scope of works of the Bangladesh side. A PDPP (Preliminary DPP) must be submitted before DPP, and it must be submitted in December 2021, considering the implementation of this project and the fiscal year of Bangladesh (from July to June of the following year) (the review process is ongoing).

Table 4 Requested items for PDPP

a	Project name
b	Supporting ministries/departments and executing agencies
c	Project start/completion schedule
d	Relationship between the proposal and related sector allocation
e	The main purpose and outline of the project and its legitimacy
f	Relationship between projects and short-term / medium-term / long-term policies/plans
g	Relevance to other development programs in relevant sectors
h	Expected socio-economic benefits and outcomes of the proposed project, approximate number of beneficiaries

i	1) Project total budget (OD estimation result) and its breakdown (Japanese side, Bangladesh side) Note: The Bangladeshi side's scope of works are described by the Bangladeshi side based on M/D 2) Types of overseas support (loan/grant aid/others)
j	The donor of overseas support
k	Whether or not there is a proposal to conduct a project feasibility study (Estimated costs, characteristics, and institutional arrangements for the survey, if any)
l	Other related information

Table 5 Requested items for DPP

Part A	**Project Summary**
a	Project name
b	Supporting ministries/departments and executing agencies
c	Objectives and targets of the project
d	Project start/completion schedule
e	Estmated cost of the project
f	Mode of financing
g	Location of the project
h	Locationwise cost breakdown
i	Estmated cost summary
j	Logical framework of the project
k	Project management (administration and implementation structure)
l	Financial and Procurement Plan(annual target plan)
m	After completion, whether the output of the project needs to be transferred to the revenue budget:
Part B	**Project Details**
n	Background Information: Background with Problem Statement Linkages (to Other Projects & Institutions) Poverty Situation
o	Project Description: Objectives Outcomes Outputs Activities Sex disaggregated data for target population & constraints faced by women Population Coverage
p	Whether any pre-appraisal/feasibility study/pre-investment study was done before formulation of this project?
q	Financial Analysis: Net Present Value (NPV) Benefit-Cost Ratio (BCR) Internal Rate of Return (IRR)
r	Lessons Learnt from Similar Nature of Project(s): successful, unsucessful
s	Basis of Itemwise Cost Estimate and Date
t	Comparative Cost of Major Items of Similar Other Projects

u	Detailed Annual Phasing of Cost
v	Specification/Design of Major Items
w	Amortization Schedule for Projects having Involvement of Loan from Government
x	The effect/impact, adaptation and specific mitigation measures thereof, if any, on other projects/existing installations environmental sustainability like land, water, air, bio-diversity, ecosystem services (If the project is 'Red Category' attach the EIA document) future disaster management, climate change gender, women, children, person with disability/excluded groups' needs employments poverty situation organizational arrangement/setup institutional productivity regional disparities populations
y	Whether environmental clearance under the ECA 1995 (Revised 2010) has been obtained?
z	Specific linkage with Perspective Plan/Five Years Plan/SDGs/Ministry/ Sector Priority
aa	Contribution of the Project in achieving the Vision, Mission of the Ministry/Division and Implementing Agency.
bb	Relation of the Project with the *Allocation of Business* of the Sponsoring Ministry/Division.
cc	Whether private sector/local government or NGO's participation is considered?
dd	Major Conditionality (ies) for Foreign Aid
dd	Involvement of Compensation, Rehabilitation/ Resettlement
ff	Risk Analysis and Mitigation Measures
gg	Other Important Details Sustainability of the Project Benefit Project Steering Committee (PSC) Formation and TOR Project Implementation Committee (PIC) Formation and TOR Others, If any.

2-2-4-3 Scope of Works

It is the cooperation between Japan and Bangladesh that makes the implementation of this Project successful. As this Project is implemented under Japan's grant aid, the scopes of works undertaken by the governments of both countries are as described below.

Table 6 Scope of Works

Items	Japan	Bangladesh
□ Equipment work		
- Procurement	○	
- Installation work	○	
- Commissioning and adjustment	○	
- Operation guidance	○	
- Legal procedures and inspections concerning installation		○
□ Utility work		
- Utility systems work in the building	○	○
- Connection of power, etc. to the procured equipment	○	
□ Securing space for equipment storage		○
□ Discarding unnecessary equipment		○
□ Transportation and customs clearance		
- Transportation of equipment to the site	○	
- Customs clearance	○	○
- Tax exemption		○
□ Procedures for B/A and payment of commission fees		○
□ Provision of facilities to the Japanese and/or physical persons of third countries concerned with the Project necessary for their embarkation, disembarkation, and stay in Bangladesh		○
□ Effective use and management of the procured equipment		○
□ Application for and acquisition of permits necessary for the Project implementation		○
□ Payment of all the costs of related tasks that are not covered by the Japanese grant Aid		○

2-2-4-4 Consultant Supervision

(1) Procurement Supervision Policy

Under the grant aid policy of the government of Japan, based on the concept of the outline design, the consultant forms a team that has continuous responsibility to execute the project including preparation of the detailed design to achieve smooth and successful implementation. The procurement supervision policy for this Project is outlined below.

① To keep close contact with those persons in charge of the Project who represent related organizations of both countries, so that installation of the equipment will be completed without delay.
② To provide quick and appropriate advice and suggestions from a neutral standpoint to the supplier(s) and others concerned.
③ To provide appropriate guidance and suggestions regarding operation and management after handing over.
④ To confirm that procurement work has been completed and the terms of the contract are fulfilled and to observe handing over of the equipment and obtain approval of receipt from the Bangladesh side.

(2) Procurement Supervision Plan

The countries of procurement of this Project are Japan, Bangladesh, and a third country. When shipping in Japan or a third country, the pre-shipment inspection(s) will be conducted by the third-party inspection agent at the port of embarkation. The Consultant will confirm the contents of the inspection certificate submitted by the inspection agent in writing. The consultant will issue the inspection report and report to DTE immediately after the completion of the pre-shipment inspection(s). The person in charge of DTE, Suppliers, and the consultant will conduct the acceptance inspection for all procured equipment after installation and initial operation training and hand them over. The model's name, country of origin, manufacturer name, ODA sticker, and appearance of the equipment will be checked during the acceptance inspection(s).

2-2-4-5 Quality Control Plan

Under this Project, in addition to Japanese manufacturers, the scope of procurement will be expanded to a third country. However, elements and factors such as versatility and after-sales service will be considered essential to avoid lazy selection of equipment based only on low price. The quality of the equipment will be ensured by putting in place certain restrictions, such as limiting products to those from DAC or OECD member countries and/or designated countries and limiting the equipment to those complying with JIS, CE, and other international standards.

As ready-made equipment will be procured for this Project, the quality control of procured equipment will be also secured through factory acceptance inspections and pre-shipment

inspections. The factory acceptance inspections will be carried out on the equipment that requires specific packaging, precision machinery, and large/heavy machines that cannot be fully checked for their quality at the pre-shipment inspections. The pre-shipment inspection will be conducted at designated warehouses at the seaport (or airport) for equipment procured in Japan and a third country.

2-2-4-6 Procurement Plan

Since there are no equipment manufacturers in Bangladesh, Japanese or third-country products will be procured. In Dhakka, there are some local agencies specialized in dealing with the equipment. A survey conducted on the agencies showed that they have experience in procuring the equipment and they do not seem to have any problems regarding the procurement of spare parts and the like. In the same manner, it has been confirmed that after-sales services can also be handled in Dhakka by making requests to each manufacturer directly or via the local agency. It was confirmed that the local distributors of manufacturers that are expected to be procured under this project have delivered to DPI, DMPI, or TTTC in the past, or deliver equipment and/or provide maintenance service to technical colleges in Bangladesh that utilize more advanced equipment.

2-2-4-7 Operational Guidance Plan

It is essential to provide adequate instruction and training of operation and maintenance of the equipment by sending a skillful engineer from the equipment maker or its local agent at the time of delivery. The Consultant will check if the guidance is properly performed. The Consultant shall also confirm if the persons in charge at each institute understand the equipment sufficiently through the guidance.

2-2-4-8 Soft Component Plan

The Soft Component Plan is not included in the Project because the equipment which will be procured in the Project does not require knowledge or skills for the operation that Bangladesh does not have. The plan is not included in the Project. Some of the equipment may be new to the institutes. Special attention is paid to the above work. Also, equipment related to the model class of technical cooperation will be utilized by its experts in TOT of the 2nd phase (May 2022 ~ Feb. 2024)

2-2-4-9 Implementation Schedule

The period needed for the detailed design (from the filed survey to the approval and concurrence of the bidding documents) is estimated as 4 months, and the bidding period (from the bid notice to the contract with the Supplier) is 2 months, and the procurement period after the contract with the Supplier is 8 months. The provisional Project implementation schedule is shown below.

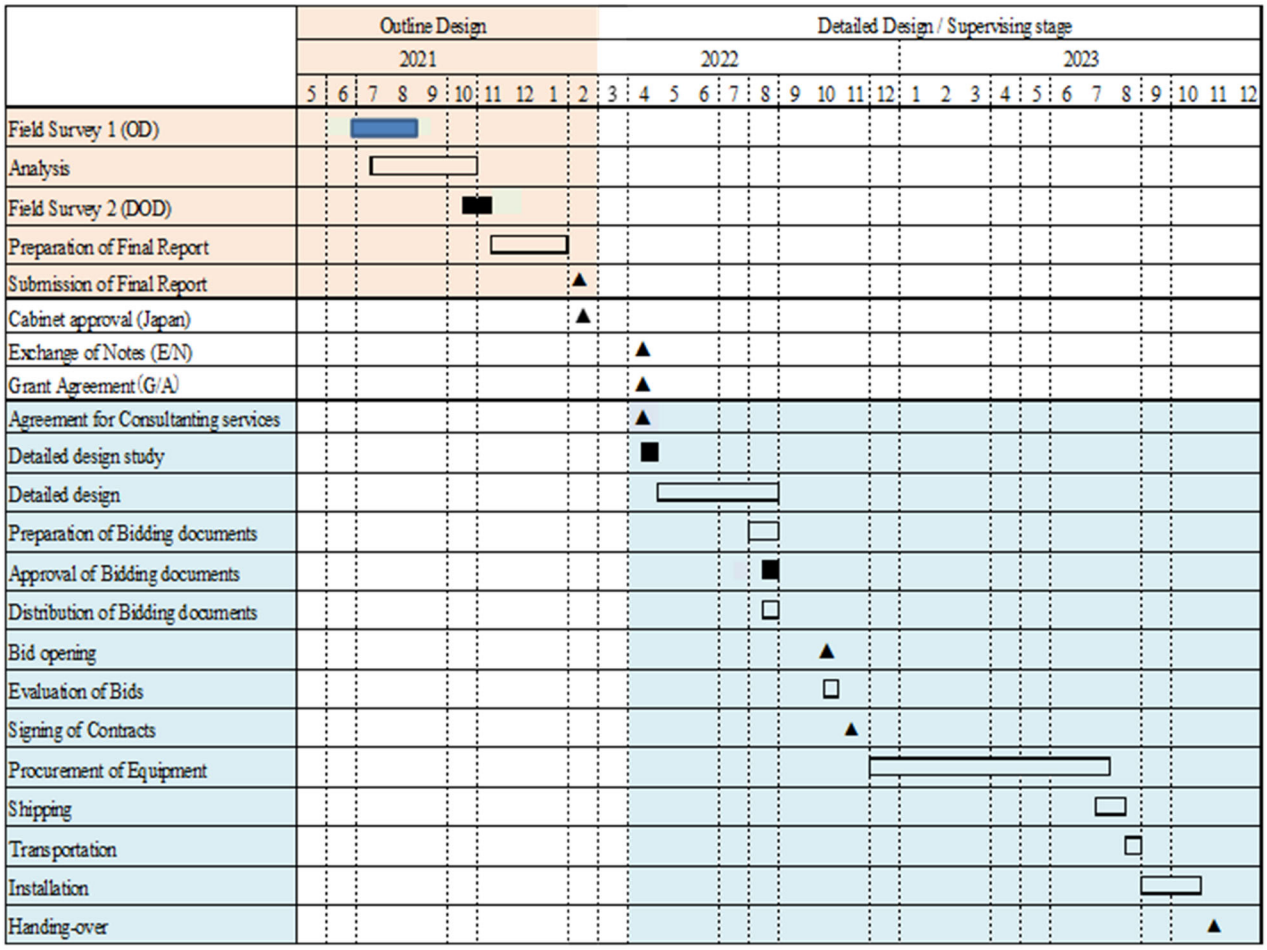


Figure 3 Project Implementation Schedule

2-3 Security Plan

The Project shall take safety measures according to the JICA's safety rules. As of November 2021, all the Project sites in the Dhaka district are located as "Level 1 (be cautious)" areas of danger according to the overseas safety information by the Ministry of Foreign Affairs of Japan. In 2019 and 2020, small-scale terrorist explosions occurred. Other things attended are thefts, public protests against Politics, Economics, and Societies. Thus, all the Project staff shall take overnight curfew and necessary safety measures to avoid petty, street crimes, and public protest gatherings.

2-4 Obligations of the Recipient Country

(1) Work Borne by the Bangladesh Side

Specific obligations of the Bangladesh side which are confirmed during the site survey are described below.

Table 7 Work Borne by the Bangladesh side

Before Bidding	▪ To open a bank account (B/A) ▪ To issue A/P to a bank in Japan (the Agent Bank) for the payment to the consultant. ▪ To bear the following commissions paid to a bank in Japan for the banking services based upon the B/A. ➢ Advising commission of A/P ➢ Payment commission for A/P
During the Project Implementation until handing-over	▪ To issue A/P to a bank in Japan (the Agent Bank) for the payment to the Supplier(s). ▪ To bear the following commissions paid to a bank in Japan for the banking services based upon the B/A. ➢ Advising commission of A/P ➢ Payment commission for A/P ▪ To ensure prompt unloading and customs clearance at ports of disembarkation and to assist the Supplier(s) with internal transportation therein. ▪ To accord Japanese nationals and/or physical persons of third countries whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the country of the Recipient and stay therein for the performance of their work. ▪ To ensure that customs duty, internal taxes, and other fiscal levies which may be imposed in the country of the Recipient for the purchase of the products and/or the services are exempted. ▪ To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project, such as tables and chairs for general use, etc. ▪ To remove existing equipment and to rehabilitate facilities and utilities (electricity, water supply, drainage system, and LAN network). ▪ To prepare and submit Project Monitoring Report (PMR). ▪ To prepare and submit the final PMR upon completion of the works. ▪ To allocate necessary staff.
After the Project	▪ To secure maintenance costs for proper use and management of procured equipment. ▪ To organize operation and maintenance structure. ▪ To implement a daily check and regular inspection of procured equipment.

2-5 Project Operation Plan

Each institute makes a list of necessary consumables and spare parts of equipment annually and submits its procurement plan and costs to DTE. Instructors are essentially in charge of equipment maintenance and changing spare parts. Since planned equipment for the project including machinery has been used in each institute, there seem to be no technical problems. As for the after-sales service for practical equipment, we put the condition in the tender document that such equipment needs an authorized agent of a manufacturer in Dhaka.

Table 8 Budget Application Process

Fiscal Year (July to June-next year)		
July	Budget application to DTE	Current year's application, not next year
August~September	Review and evaluation by DTE	-
〃	Notification of result (budget allocation)	APP (Annual procurement plan) is submitted to DTE upon notification
October~November	Approval of APP	1~2 months after APP
〃	Start of procurement	Procurement method: ① Cash purchase, ②RFQ（Request for Proposal）, ③Open tender

2-6 Project Cost Estimation

2-6-1 Initial Cost Estimation

The breakdown of the expenditure borne by Bangladesh can be estimated as follows. This cost estimation is provisional.

(1) Costs borne by the Bangladesh Side

No.	Items	Approx. costs	
		(mil BDT)	(mil JPY)
1	Advising/payment commission of A/P	1.15	1.5
2	Rehabilitation of buildings	2.70	3.5
3	Discarding unnecessary equipment	0.75	1.0
	Total	4.60	6.0

Note:

The cost for rehabilitation of existing buildings (repair cost) borne by the Bangladesh side[4] estimated by the survey is 3.5 mil JPY as mentioned above. On the other hand, according to the estimation on the Bangladesh side[5] (including general rehabilitation that is not related to the equipment provided by the Project, the cost is 6.1 mil JPY for DPI, 0.9 mil JPY for DMPI, and a totally of 7.0 mil JPY (not necessary for TTTC). On the Bangladesh side, the budget application process is underway based on this estimation. The breakdown of the estimated cost for each institute is as follows.

[4] Building/Facilities Rehabilitations for the installation of equipment provided by the project
[5] The rehabilitations that the general repair works for improvement of educational environment are added to above "4".

Estimation for Rehabilitation of Buildings for DPI (Est. by Bangladesh side)

Building (Related Technology)	Necessary Parts for Repair	Items of Work and Costs (JPY)
Workshop North (Electric)	Roof of corridor	Replacement of Galvanized Roof Plate Total 858,000 (330sq.m, approx. x 2,600JPY/sq.m)
	Windowpanes of each Room on G.F.	Replacement of 45 Windowpanes Total 315,900 (81sq.m,approx. x 3,900JPY/sp.m)
Workshop South (Mechanical)	Roof of corridor	Replacement of Galvanized Roof Plate Total 4,420,000 (1700sq.m, approx. x 2,600JPY/sq.m)
	Windowpanes of each Room on G.F.	Replacement of 70 Windowpanes Total 491,400 (126sq.m,approx. x 3,900JPY/sp.m)
G.Total 6,085,300		

Estimation for Rehabilitation of Buildings for DMPI (Est. by Bangladesh side)

Building (Related Technology)	Necessary Parts for Repair	Items of Work and Costs (JPY)
Building No.1 (Electronics)	Windowpanes of each Room on 2nd FL.	Replacement of 24 Windowpanes Total 530,400 (136sq.m,approx. x 3,900JPY/sp.m)
Building No.2 (Computer)	Windowpanes of each Room on 2nd FL.	Replacement of 17 Windowpanes Total 378,300 (97sq.m,approx. x 3,900JPY/sp.m)
G.Total 908,700		

(2) Calculation Conditions

1) Time of Estimation : as of September 2021

2) Conversion Rate : US$1.00 = JPY 110.51

€1.00＝JPY 133.43

1BDT = JPY1.2910

3) Procurement Period : As shown in the Project Implementation Schedule

4) Others

①Project implementation intended to comply with the Grant Aid scheme of the Government of Japan GOJ.

② The application of the contingency and its ratio will be determined by the GOJ.

2-6-2 Operation and Maintenance Costs

The Costs borne by the Recipient for this project are as described in (1) above. It has been agreed that the executing agency will secure the costs. In addition, regarding the facilities and building rehabilitations for the existing buildings, it has been confirmed that the process of the budget proposal has already started, and there is no problem securing the proposed costs. Annual operation and maintenance costs are estimated below.

Technologies	Spare parts, consumables	DPI (BDT) *(JPY)*	DMPI (BDT) *(JPY)*	TTTC (BDT) *(JPY)*
【Electric】 Drilling MC	Cutting tools	78,000 *100,000*	-	78,000 *100,000*
【Electronics】 Electrocardiograph, Color doppler	Electrocardiograph probe, color doppler probe, gel	233,000 *300,000*	233,000 *300,000*	-
【Machinery】 CNC lathe, other machining tools	Cutting tool, cutting oil, fuse, lamp	310,000 *400,000*	-	310,000 *400,000*
【Computer】 3D printer	Resin powder and other consumables for 3D printer	-	-	233,000 *300,000*
Total		BDT 621,000 *¥800,000*	BDT 233,000 *¥300,000*	BDT 621,000 *¥800,000*

Chapter 3 Project Evaluation

Chapter 3 Project Evaluation

3-1 Preconditions

The preconditions of the implementation of the project are that the following obligations borne by the 3 target institutes and DTE will advance and complete them.

(1) All described in 3. Obligations of the Recipient Country

(2) All described in 4. Project Operation Plan

(3) All are described in 5. Project Cost Estimation

3-2 Necessary Inputs by Recipient Country

The Bangladesh side, DTE, will ensure the following to generate and sustain the outcomes of the Project.

(1) Allocate experienced instructors to target institutes to have them acquire the essential skills and know-how for practical education.

(2) Ensure the facilities and building rehabilitations for the Project equipment as shown in Table 10. DTE shall start such works immediately upon FY2021 budget allocation

(3) Ensure the tax exemption procedures for the smooth implementation of the Project

(4) Ensure the budget for sustainable operation and maintenance for the Project equipment

(5) Ensure the appropriate instructors and personnel for the proper operation and management

(6) Keep a close relationship with Technical Cooperation Project Team to make the best use of the target equipment

Table 9 Details of the Facilities and Building Rehabilitations

Site	Building (Related Technology)	Items of Work
DPI	Workshop North (Electric)	For the Roof of the corridor Replacement of Galvanized Roof Plate (Total 330sq.m, approx.) For Windowpanes of each Room on G.F. Replacement of Windowpanes (Total 81sq.m, approx. for 45 Windowpanes)
DPI	Workshop South (Mechanical)	For the Roof of the corridor Replacement of Galvanized Roof Plate (Total 1700sq.m, approx.) For Windowpanes of each Room on G.F. Replacement of Windowpanes (Total 126sq.m, approx. for 70 Windowpanes)
DMPI	Building No.1 (Electronics)	For Windowpanes of each Room on 2nd FL. Replacement of Windowpanes (Total 136sq.m, approx. for 24 Windowpanes)
DMPI	Building No.2 (Computer)	For Windowpanes of each Room on 2nd FL. Replacement of Windowpanes (Total 97sq.m, approx. for 17 Windowpanes)

TTTC	Nil	Nil

3-3 Important Assumptions

Important assumptions to maintain the effectiveness of the Project are as follows:

- That the NSDP will be strengthened in the context of the efforts being made to achieve the Vision 2041 of becoming a middle and high-income country by 2031. That the measures to achieve this goal will be promoted by the relevant ministries and government agencies in Bangladesh.
- That the rate of economic growth in Bangladesh will be maintained or increased at a constant level and that the performance of the companies that the graduates of the three institutes are employed in advance strongly. Also, the demand for labor and the required skills will be maintained and the number of candidates will be maintained or increased.
- That the political and security situation in Bangladesh will not deteriorate significantly.

3-4 Project Evaluation

3-4-1 Relevance

(1) Beneficiaries of the Project

The direct beneficiaries of the Project are the students, teachers, and instructors of the three target institutes. Indirectly, the project will benefit the people of Bangladesh in the target area, since it is expected that the production of the large number of human resources required by the relevant industries in Bangladesh will lead to Bangladeshi industrial development and the generation of further employment.

(2) Contribution to the achievement of medium-long-term development goals

The human resource development strategy of the Perspective Plan 2021-2041 (PP2041) includes "To mainstream the technical education and vocational training (TVET) for the fourth industrial revolution" and "To provide the flexible training institutions for all people seeking to acquire vocational skills". To achieve these objectives, there are specific strategies such as "Strengthening National Skills Development Policy (NSDP 2011)", "To promote the women's participation in the technical education and training" and "Strengthen the partnership between public-private in the technical education and training". The contribution of this project is significant as it aims to bridge the gap between the needs of industry and the needs of the government through strengthening the functioning of industrial human resource development in the three target institutes.

(3) Consistency with Japanese Government Country Development Cooperation Policy

It is consistent with the Japanese "Country Development Cooperation Policy for the People's Republic of Bangladesh (February 2008)" for which the assistance policy is "GDP Growth acceleration, employment generation, and rapid poverty reduction", "A broad-based strategy of inclusiveness to empower every citizen to participate fully and benefit from the development process" and "Overcoming social vulnerabilities (improving the quality of primary education, improving technical education and promoting research and development in the field of science and technology).

3-4-2 Effectiveness

The expected effects of the implementation of the Project are as follows.

(1) Quantitative Effect

The BTEB (Bangladesh Technical Education Board) sets the common ratio in all institutes regarding theory and practice as 5:5 for all courses. However, practical training is not being conducted due to inadequate and aging equipment and insufficient equipment quantity. Based on this situation, we propose the following effectiveness indicators.

1) Cumulative number of students

	Baseline (Actual figure in 2021)	Target (2026) 【3 years after the project completion】
Dhaka Polytechnic Institute (no. of the student)	-	1,100
Dhaka Mohila Polytechnic Institute (no. of the student)	-	200
Technical Teachers Training College (no. of the student)	-	40

2) Cumulative number of subjects conducted by using the main equipment

	Baseline (Actual figure in 2021)	Target (2026) 【3 years after the project completion】
Electrical and Electronics Technology (Subject)	-	20
Mechanical Technology (Subject)	-	10
Computer Technology (Subject)	-	10

(2) Qualitative Effect

- To improve the skills and know-how for practical education by using the equipment.
- To improve the students' proficiency.
- To produce qualified human resources to meet the needs of industry.
- To develop the Bangladeshi industry in the areas covered by the Project.

It is assumed that these qualitative effects will be measured through questionnaire surveys and interviews with local teachers and students, and interviews with companies.

As stated above, the Project is determined to be highly relevant and effective.

end

Appendix

1. Member List of the Survey Team
2. Survey Schedule
3. List of Parties Concerned in the Recipient Country
4. Minutes of Discussions (M/D)
5. Major Equipment List
6. Project Monitoring Report (PMR)

Appendix 1 Member List of the Survey Team

1-1 Field Survey 1 (Conducted remotely due to the outbreak of COVID-19)

Name	Position	Organization
SAHEKI Takeshi	Team Leader	Senior Representative JICA Bangladesh Office
IMAI Seiju	Sub Team Leader	Director Human Development Dep., Higher Education and Social Security Group, Social Security Team, JICA
IWAI Yuta	Project Coordinator 1	Deputy Director Human Development Dep., Higher Education and Social Security Group, Social Security Team, JICA
WATANABE Sara	Project Coordinator 2	Representative Bangladesh Office, JICA
TAJIMA Kaoru	Chief Consultant/ Technical Education Plan 1	INTEM Consulting, Inc.
MORI Yusuke	Deputy Chief Consultant/ Technical Education Plan 2	IC Net Limited
OKAMOTO Ryoji	Operation and Maintenance Plan/ Equipment Plan 1	INTEM Consulting, Inc.
HARA Hiroyuki	Procurement Plan/ Cost Estimate/ Equipment Plan 2	INTEM Consulting, Inc.
NIIMURA Masahide	Equipment Utilities Plan	INTEM Consulting, Inc. (Earth & Human Corporation)

1-2 Field Survey 2 (26 September – 13 November, 2021)

Name	Position	Organization
KOMORI Takashi	Team Leader	Senior Representative JICA Bangladesh Office
IMAI Seiju	Sub Team Leader	Director Human Development Dep., Higher Education and Social Security Group, Social Security Team, JICA
MURATA Takuya	Project Coordinator 1	Deputy Director Human Development Dep., Higher Education and Social Security Group, Social Security Team, JICA
WATANABE Sara	Project Coordinator 2	Representative Bangladesh Office, JICA
TAJIMA Kaoru	Chief Consultant/ Technical Education Plan 1	INTEM Consulting, Inc.
MORI Yusuke	Deputy Chief Consultant/ Technical Education Plan 2	IC Net Limited
OKAMOTO Ryoji	Operation and Maintenance Plan/ Equipment Plan 1	INTEM Consulting, Inc.
HARA Hiroyuki	Procurement Plan/ Cost Estimate/ Equipment Plan 2	INTEM Consulting, Inc.
NIIMURA Masahide	Equipment Utilities Plan	INTEM Consulting, Inc. (Earth & Human Corporation)

Appendix 2 Survey Schedule

2-1 Field Survey 1

The survey schedule of Field Survey 1 is omitted because it was conducted remotely through online meetings, e-mails and phone calls due to the outbreak of COVID-19.

2-2 Field Survey 2

			JICA Project Coordinator 1	(1) Chief Consultant/ Technical Education Plan 1	(2) Deputy Chief Consultant/ Technical Education Plan 2	(3) Operation and Maintenance Plan/ Equipment Plan 1	(4) Procurement Plan/ Cost Estimate/ Equipment Plan 2	(5) Equipment Utilities Plan
			MURATA Takuya	TAJIMA Kaoru	MORI Yusuke	OKAMOTO Ryoji	HARA Hiroyuki	NIIMURA Masahide
1	26-Sep	Sun			Budget survey			
	27-Sep	Mon			Survey for another project			
	28-Sep	Tue						
	29-Sep	Wed						
	30-Sep	Thu			Following up on OD survey			
2	1-Oct	Fri			Documentation			
3	2-Oct	Sat			Documentation			
4	3-Oct	Sun			Following up on OD survey			
5	4-Oct	Mon			Survey regarding questionnaires			
6	5-Oct	Tue			Survey regarding questionnaires			
7	6-Oct	Wed			DPP, Pre-DPP survey			
8	7-Oct	Thu			Industrial trend, needs survey			
9	8-Oct	Fri			Documentation			
10	9-Oct	Sat			Documentation			
11	10-Oct	Sun			DPP, Pre-DPP survey			
12	11-Oct	Mon			Industrial trend, needs survey			
13	12-Oct	Tue			Gender survey			
14	13-Oct	Wed			DPP, Pre-DPP survey			
15	14-Oct	Thu			Other donors survey			
16	15-Oct	Fri	TYO-DOH	←Project Coordinator 1	Documentation	←Project Coordinator 1	←Project Coordinator 1	←Project Coordinator 1
17	16-Oct	Sat	DOH-DAC	←Project Coordinator 1	Documentation	←Project Coordinator 1	←Project Coordinator 1	←Project Coordinator 1
18	17-Oct	Sun		Security Briefing Meeting with local counsultant members	Meeting with local counsultant members	←Chief Consultant	←Chief Consultant	←Chief Consultant
19	18-Oct	Mon		Following up on OD survey				
20	19-Oct	Tue		Following up on OD survey				
21	20-Oct	Wed		Eid-e-Miladunnabi				
22	21-Oct	Thu		Equipment & Utility meeting with Computer Technology		←Chief Consultant	←Chief Consultant	←Chief Consultant
23	22-Oct	Fri		Documentation		←Chief Consultant	←Chief Consultant	←Chief Consultant
24	23-Oct	Sat		Documentation		←Chief Consultant	←Chief Consultant	←Chief Consultant
25	24-Oct	Sun		Equipment & Utility meeting with Mechanical Technology		←Chief Consultant	←Chief Consultant	←Chief Consultant
26	25-Oct	Mon	DOD survey policy meeting	DOD survey policy meeting Equipment & Utility meeting with Electronics Technology		←Chief Consultant	←Chief Consultant	Site Survey @ DPI
27	26-Oct	Tue		Equipment & Utility meeting with Electric Technology		←Chief Consultant	←Chief Consultant	Site Survey @ DPI
28	27-Oct	Wed		Site Survey @ DPI		←Chief Consultant	←Chief Consultant	Site Survey @ DPI
29	28-Oct	Thu		Site Survey @ DMPI		←Chief Consultant	←Chief Consultant	←Chief Consultant
30	29-Oct	Fri		Internal meeting	Surevey for another project	←Chief Consultant	←Chief Consultant	←Chief Consultant
31	30-Oct	Sat		Documentation		Site Survey @ DPI, TTTC	←Chief Consultant	←Operation and Maintenance Plan/ Equipment Plan 1
32	31-Oct	Sun		Site Survey @ TTTC		Site Survey @ TTTC Meeting with local supplier	←Operation and Maintenance Plan/ Equipment Plan 1	Site Survey @ DPI, TTTC
33	1-Nov	Mon	Kick-off meeting with DTE	←Project Coordinator 1		Site Survey @ DMPI	←Project Coordinator 1	←Operation and Maintenance Plan/ Equipment Plan 1
34	2-Nov	Tue		Analyzing collected information		Analyzing collected information	Meeting with local supplier	Site Survey @ DPI, DMPI
35	3-Nov	Wed		Meeting with DTE, TTTC		Meeting with TTTC	Survey on tax information	Analyzing collected information
36	4-Nov	Thu		Meeting with DMPI, TTTC		←Chief Consultant	Meeting with local supplier	Analyzing collected information
37	5-Nov	Fri		Documentation		←Chief Consultant	Meeting with local forwarder	DAC-DOH
38	6-Nov	Sat		Meeting with DPI, TTTC	DAC-DOH	←Chief Consultant	Documentation	DOH-TYO
39	7-Nov	Sun	Discussion on M/D	←Project Coordinator 1	DOH-TYO	Meeting with local supplier	←Operation and Maintenance Plan/ Equipment Plan 1	
40	8-Nov	Mon	Discussion on M/D	←Project Coordinator 1		Making allocation map	←Project Coordinator 1	
41	9-Nov	Tue	Discussion on M/D	←Project Coordinator 1		Meeting with local supplier	←Operation and Maintenance Plan/ Equipment Plan 1	
42	10-Nov	Wed	Discussion on M/D	←Project Coordinator 1		Meeting with local supplier	Discussion on M/D Meeting with local supplier	
43	11-Nov	Thu	Discussion on M/D Courtesy call on JICA Banglaesh	←Project Coordinator 1		Meeting with local supplier	←Project Coordinator 1	
44	12-Nov	Fri		DAC-DOH		←Chief Consultant	←Chief Consultant	
45	13-Nov	Sat		DOH-TYO		←Chief Consultant	←Chief Consultant	
46	14-Nov	Sun	Signing of M/D	Signing of M/D (Attending online)		←Chief Consultant	←Chief Consultant	
46	15-Nov	Mon	DAC-DOH					
47	16-Nov	Tue	DOH-TYO					

Appendix 3 List of Parties Concerned in the Recipient Country

Technical and Madrasah Education Division, Ministry of Education	
Md. Aminul Islam Khan	Secretary
Md. Mohsin	Additional Secretary (Technical)
Directorate of Technical Education, Technical and Madrasah Education Division, Ministry of Education	
Md. Helal Uddin, ndc	Director General
Md. Jahangir Alam	Former Director (Planning and Development)
Mohammad Aktaruzzaman	Director (Planning and Development)
Mofizul Islam	Assistant Director
Economic Relations Division, Ministry of Finance	
Muhammad Ashraf Ali Faruk	Joint Secretary
Dhaka Polytechnic Institute (DPI)	
Kazi Zakir Hossain	Principal
Shiuly Rani Biswas	Head of Department (Electrical)
Nuruzzaman	Head of Department (Electronics)
Abu Hena Md Shamim	Head of Department (Mechanical)
Zahed Ahmed Chowdhury	Head of Department (Computer)
Jannatul Ferdousy	Former Head of Department (Mechanical)
Nargis Sultana	Workshop super (Electrical)
Nurul Abser Chowdhury	Workshop super (Electronics)
Siddiqur Rahman	Workshop super (Mechanical)
Dhaka Mohila Polytechnic Institute (DMPI)	
Shahana Begum	Principal
Saida Momtaz Zubaida Iqbal	Head of Department (Electronics)
Khorshed Alam	Head of Department (Computer)
Mohammad Ashraf	Former Head of Department (Computer)
Bharati Biswas	Instructor (Electronics)
Technical Teachers Training College (TTTC)	
Md. Ramjan Ali	Principal
Abu Hena Md Shamim	Head of Department (Mechanical)
Tapas Kumer	Assistant Professor (Electrical)
Shanjida Shanaz	Assistant Professor (Electronics)
Sujit Bikash Chakma	Lecturer (Computer)
Sharifur Rahman	Lecturer (Electrical)
Shuvo Das Gupta	Lecturer (Electronics)
Siam Sarwar	Lecturer (Mechanical)
Bodiuzzaman	Lecturer (Mechanical)
NIPPON EXPRESS BANGLADESH LTD.	
OCHIAI Yasuyori	General Manager
JETRO Bangladesh	
YAMADA Kazunori	Officer
BLC International (BD.) LTD.	
Md. Mosharaf Hossain	Managing Director
ADVANCE TECHNOLOGY CONSORTIUM LTD.	
Mohammad Salim	Managing Director
Tanvir Ahmed Siddiki	Executive Director

Tarek Rahman	Marketing Executive
Anowar Hossan	Executive (Survey Division)
Sydul Islam	Executive (Survey Division)
BATTCO ENGINEERING	
Iftikhar Ahmed	Owner
Rafiqul Islam	Marketing Assistant
PARTICLES BANGLADESH LTD.	
Ahsan Habib	Head of Slaes & Marketing
Md.Shahnewaz Masud Ashiq	Director (Technical Sales)
Multi Tech Engineering	
Shibaji Biswas	CEO
BRACNet Limited	
Iffat Ahmed Shushmit	Senior Executive (Sales & Marketing)
Md. Shamsul Haque	General Manager, Head of Technology
Sohayel Arman Joarder	Deputy Manager
Mohammad Muhibur Rahman	Senior Executive
Flora Limited	
Md. Ferozol Islam	Executive, Sales
JICA Bangladesh Office	
HAYAKAWA Yuho	Chief Representative
Alimul Hasan	Program Officer

Appendix 4 Minutes of Discussions (M/D)

4-1 Field Survey 1 (M/D)

Minutes of Discussions
on the Preparatory Survey for
the Project for Modernization of Polytechnic Institutes

Based on the several preliminary discussions between the Government of the People's Republic of Bangladesh (hereinafter referred to as "Bangladesh") and Japan International Cooperation Agency (hereinafter referred to as "JICA") Bangladesh Office, JICA dispatched the Preparatory Survey Team for the Outline Design (hereinafter referred to as "the Team") of the Project for Modernization of Polytechnic Institutes (hereinafter referred to as "the Project") to Bangladesh. The Team held a series of discussions with the officials of the Government of Bangladesh (hereinafter referred to as "the Bangladesh side") and conducted a field survey. In the course of the discussions, both sides have confirmed the main items described in the attached sheets.

Dhaka, 29 July 2021

SAHEKI Takeshi
Senior Representative
Japan International Cooperation Agency
Japan

Md. Helal Uddin, ndc
Director General
Directorate of Technical Education
Technical and Madrasah Education Division
Ministry of Education
Bangladesh

Md. Aminul Islam Khan
Secretary
Technical and Madrasah Education Division
Ministry of Education
Bangladesh

ATTACHMENT

1. Objective of the Project

Both sides agreed that the objective of the Project is to develop the human resources that meet the needs of industry by/through providing equipment for electrical, electronics, mechanical and computer technologies education to Dhaka Polytechnic Institute, Dhaka Mohila Polytechnic Institute and Technical Teachers Training College, thereby contributing to the economic growth of Bangladesh.

2. Title of the Preparatory Survey

Both sides confirmed the title of the Preparatory Survey as "the Preparatory Survey for the Project for Modernization of Polytechnic Institutes".

The Bangladesh side suggested to change the name of the Project because "the Project for Modernization of Polytechnic Institutes" does not specify the objective of the Project and Technical Teachers Training College is not a Polytechnic Institute. The Team took note of the suggestion and confirmed to discuss with related Departments of JICA and Japanese Government about the Project name. Both sides confirmed that "The Project for Improvement of Workshop Equipment for Electrical, Electronics, Mechanical and Computer Technologies Education" will be the candidate of the name for the Project.

3. Project site

Both sides confirmed that the sites of the Project are all in Dhaka, which is shown in Annex 1.

4. Responsible authority for the Project

Both sides confirmed the authorities responsible for the Project are as follows:

4-1. The Directorate of Technical Education, Technical and Madrasah Education Division, Ministry of Education, will be the executing agency for the Project (hereinafter referred to as "the Executing Agency"). The Executing Agency shall coordinate with all the relevant authorities to ensure smooth implementation of the Project and ensure that the undertakings for the Project shall be managed by relevant authorities properly and on time. The organization charts are shown in Annex 2.

4-2. The line ministry of the Executing Agency is the Technical and Madrasah Education

Division, the Ministry of Education. The Technical and Madrasah Education Division, the Ministry of Education shall be responsible for supervising the Executing Agency on behalf of the Government of Bangladesh.

5. Items requested by the Government of Bangladesh

5-1. As a result of the discussions, both sides confirmed that the items requested by the Government of Bangladesh are shown as Annex 3.

5-2. JICA will assess the feasibility of the above requested items through the survey and will report the findings to the Government of Japan. The final scope of the Project will be decided by the Government of Japan.

5-3. The Government of Bangladesh shall submit an official request, based on the format which was shared by JICA Bangladesh office, to the Government of Japan through the diplomatic channel before the appraisal of the Project, which is scheduled at the end of September 2021.

6. Procedures and Basic Principles of Japanese Grant

6-1. The Bangladesh side agreed that the procedures and basic principles of Japanese Grant (hereinafter referred to as "the Grant") as described in Annex 4 shall be applied to the Project.

As for the monitoring of the implementation of the Project, JICA required Bangladesh side to submit the Project Monitoring Report, the form of which is attached as Annex 5, and the Bangladesh side agreed on it.

6-2. The Bangladesh side agreed to take the necessary measures, as described in Annex 6, for smooth implementation of the Project. The contents of the Annex 6 will be elaborated and refined during the Preparatory Survey and be agreed during the mission dispatched for explanation of the Draft Preparatory Survey Report.

The contents of Annex 6 will be updated as the Preparatory Survey progresses, and eventually, will be used as an attachment of the Grant Agreement.

7. Schedule of the Survey

7-1. The Team will proceed with further survey in Bangladesh until the end of August, 2021.

7-2. An official request to the Government of Japan will be submitted before the end of September, 2021.

7-3. JICA will prepare a draft Preparatory Survey Report in English and dispatch a

mission to Bangladesh in order to explain its contents around November 2021.

7-4. If the contents of the draft Preparatory Survey Report are accepted and the undertakings for the Project are fully agreed by the Bangladesh side, JICA will finalize the Preparatory Survey Report and send it to Bangladesh around February 2022.

7-5. The above schedule is tentative and subject to change.

8. Environmental and Social Considerations

8-1. The Bangladesh side confirmed to give due environmental and social considerations before and during implementation, and after completion of the Project, in accordance with the JICA Guidelines for Environmental and Social Considerations (April 2010).

8-2. The Project is categorized as "C" from the following considerations:

Not located in a sensitive area, nor has it sensitive characteristics, nor falls it into sensitive sectors under the Guidelines, and its potential adverse impacts on the environment are not likely to be significant.

9. Other Relevant Issues

9-1. Gender Mainstreaming

Both sides confirmed that the following gender elements shall be duly reflected in the scope of the Preparatory Survey.

(a) To confirm that female students and female faculty members will not suffer any disadvantages when the equipment is procured.
(b) To confirm that the content of the training for the operation of the equipment will be considered on the premise of the participation of female students and female faculty members.
(c) Collection of information and gender-disaggregated data for gender ratio of students and staff, the number of graduates, and the number of employments.
(d) Collection of the comments on existing facilities and proposals for promoting female students to school, through the inspections of existing facilities and interviews with female students and female faculty members.

9-2. Selection of Equipment

The Bangladesh side and the Team confirmed that the equipment selection criteria are shown as below.

(a) Consistency with industry needs
(b) Consistency with technical cooperation program

(c) Consistency with existing curriculum
(d) Consistency with the number of students at every department and teachers
(e) Avoiding the duplication with equipment supplied by technical cooperation programs and other donors programs
(f) Whether the equipment installation space, utility planning, and budgetary allocations will be taken
(g) Consistency with operation/maintenance system and budgetary allocation (the current and the future)
(h) The equipment which request excessive advancement is not accepted
(i) Obsolete quick equipment is not accepted
(j) Short-life equipment is not accepted
(k) The equipment for the administration is not accepted

9-3. The finalization of equipment list

The equipment list will be finalized in the draft Preparatory Survey Report with consideration of relevance, sustainability, and budget ceiling.

9-4. Obligations of the Bangladesh side

Both sides agreed that the Bangladesh side shall take the necessary measures as follows:

(a) Educational facilities and equipment which is not covered by the Project

The Bangladesh side agreed to take the necessary measures to secure the budget for providing items which is not covered by the Project. Both sides also confirmed that components which can be included in the scope of installation work, such as the work of connecting the power supply to the equipment, will be covered by the Grant.

(b) Demolition of existing structures, equipment, facilities, and/or other preparatory works

Both sides confirmed that demolition of existing structures, equipment, facilities, and/or other preparatory works to install the new equipment through the Project will be conducted by the Bangladesh side if necessary.

(c) Budget allocation for the operation and maintenance of equipment

Both sides confirmed the necessity of budget allocation to Dhaka Polytechnic Institute, Dhaka Mohila Polytechnic Institute and Technical Teachers Training College for operation and maintenance of the equipment procured by the Project. The approximate cost of those will be calculated at the analysis stage.

(d) Exemption from customs duties, taxes, and fiscal levies

Both sides confirmed that customs duties, internal taxes and other fiscal levies, which may be imposed in Bangladesh with respect to the purchase of the product

and/or services, are to be exempted.

The Method of Exemption: The Team explained that, in other Japanese grant projects in Bangladesh, executing agencies secured the all necessary budget for exemption before the project starts through Development Project Proposal (DPP) for the tax exemption, and executing agencies payed the necessary amount to the customs directly based on the documents submitted by companies. The Bangladesh side took note the Team's explanation. Both sides agreed that discussion will be continued through the survey period.

(e) Relation within the Government of Bangladesh

Both sides confirmed that the Executing Agency will take the necessary measures, communication and discussion within the Government of Bangladesh for smooth implementation of the Project especially concerning the clause 9-2 (a)-(e) of this Minutes of Discussions.

(f) Preliminary Development Project Proposal (PDPP) and Development Project Proposal (DPP)

Both sides confirmed that Preliminary Development Project Proposal (PDPP) and Development Project Proposal (DPP) will be prepared and approved by the Government of Bangladesh to secure the budget and staff for the smooth implementation of the Project. Both sides also confirmed that PDPP will be approved before December/2021 and DPP will be approved before February/2022. The Bangladesh side will prepare the DPP in parallel with the discussion between JICA and Japanese Government. DPP will be approved soon after the Approval/Pledge of Japanese Government.

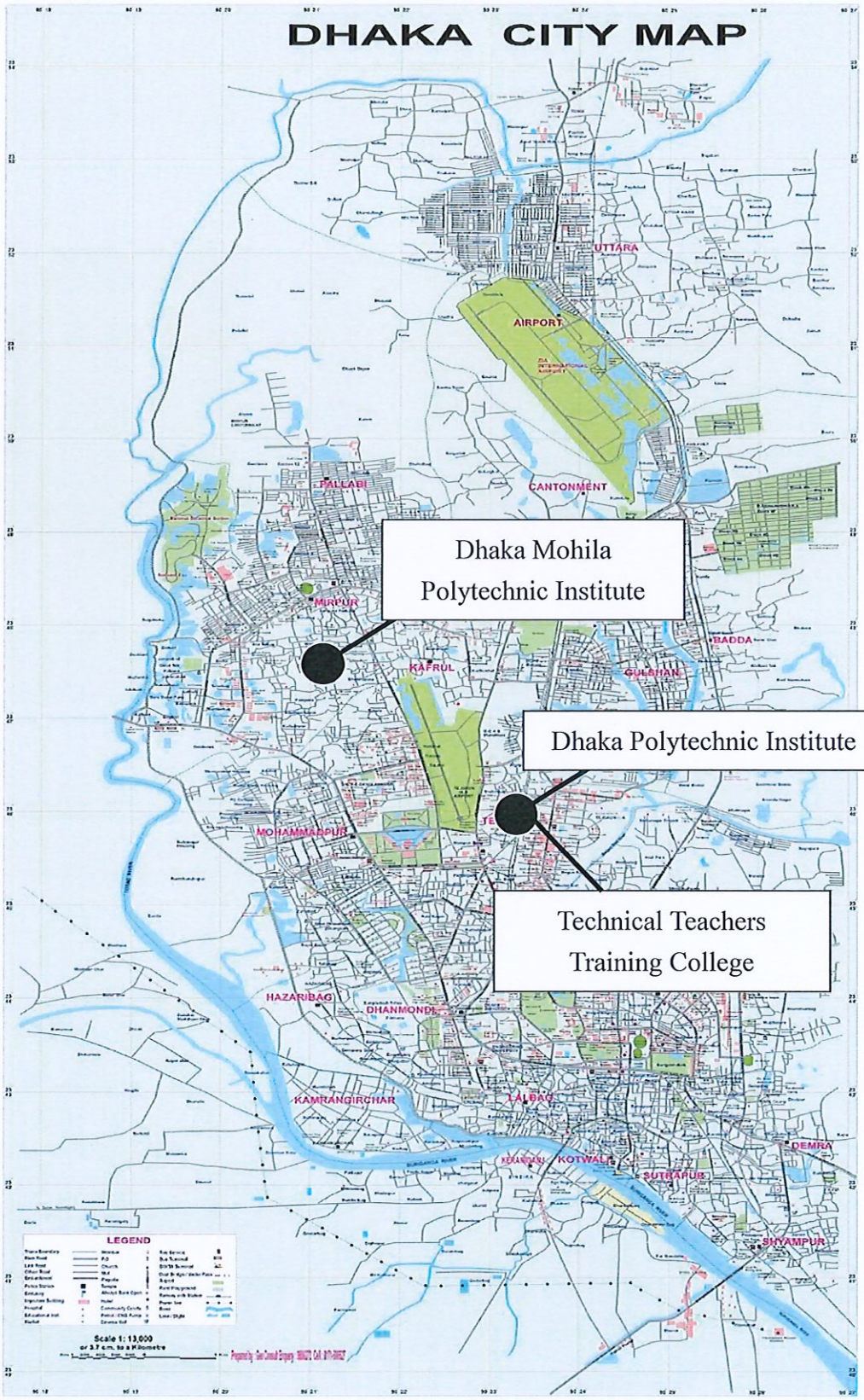
(g) The questionnaire

The Team requested that the Bangladesh side submits the answer to the questionnaire, regarding to the latest information of national policy on the human resources development, positioning of the Project, budget, staffing and cooperation with other donors, and etc., by the end of August, 2021. The Bangladesh side confirmed.

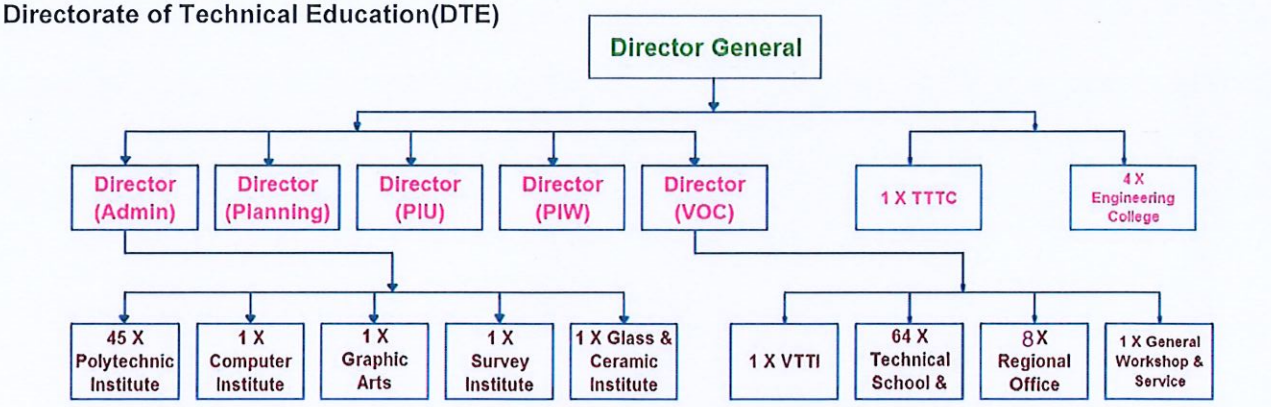
Annex 1 : Project Site
Annex 2 : Organization Chart
Annex 3 : Requested Equipment List
Annex 4 : Japanese Grant
Annex 5 : Project Monitoring Report (template)
Annex 6 : Major Undertakings to be taken by the Government of Bangladesh

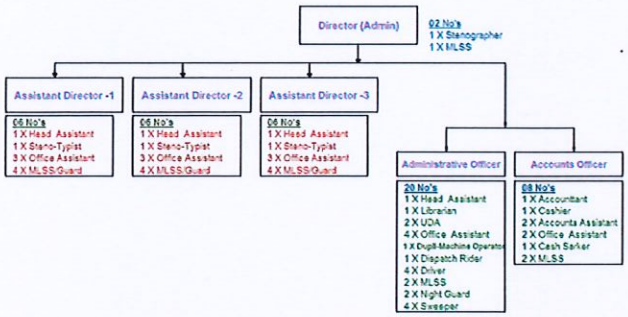
ANNEX1

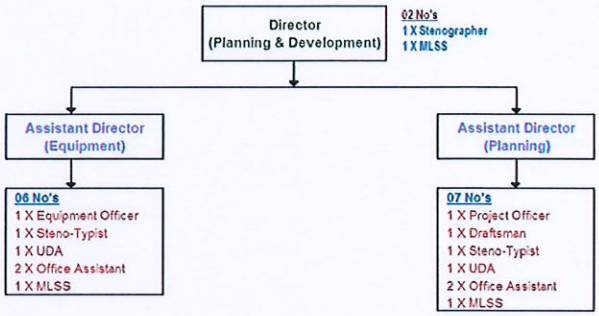
Project Sites

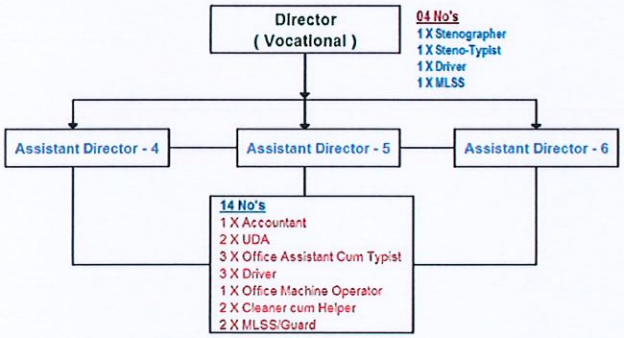


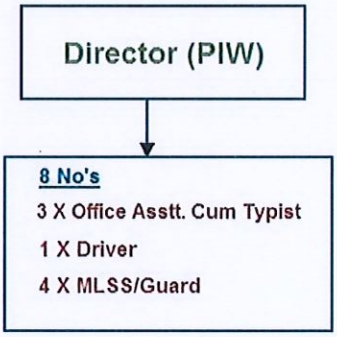
Directorate of Technical Education(DTE)

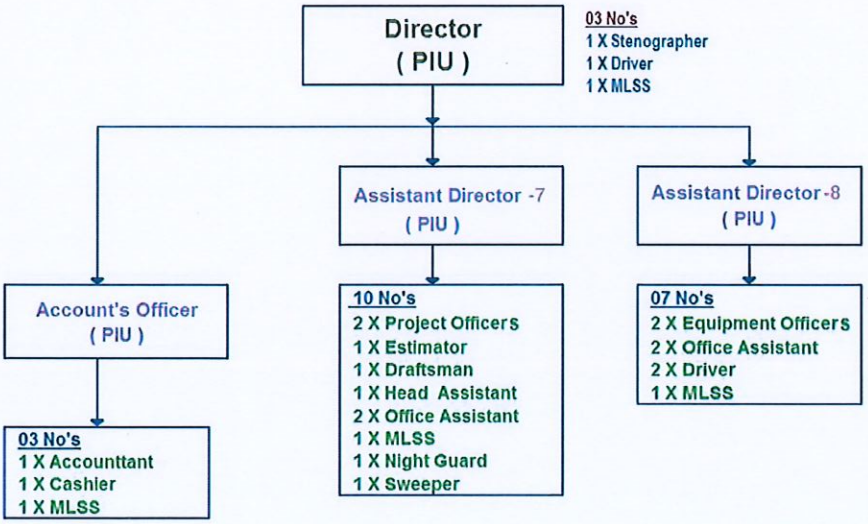












Annex 3

*Quantity
: Quantities of the items which were requested from several labs in the same institute are totaled without distinction of its priority.
: The number which is shown in () is the quantities of items categorized as priority A

**Priority
A : To be covered by the Project with higher priority (However there is possibility to be reduced the quantities or drop the item from the Project based on the budget allocation and the assessment process. Further discussion will be done between Bangladesh and Japanese side in the case to change the list)
B : Considered to be covered by the project, if the budget allocation for the Project allows and JICA acknowledged the necessity of items through the assessment process.
C : Not to be covered by the Project in consideration of the budget allocated for the Project

Ser.No.	Req.No.	Institute	Technology	Laboratory	Equipment Name	Quantity*	Priority**
1	DPI-ET-12	DPI	Electric	Project Lab(113B)	Advanced Maintenance Electrician Training Equipment	2	A
2	DPI-ET-24	DPI	Electric	Switch Gear Lab(111C), Project Lab(113B)	Magnetic Contactor	4	A
3	DPI-ET-31	DPI	Electric	Measurement Lab(113A)	Single Phase Analog Power Factor Meter	3	A
4	DPI-ET-48	DPI	Electric	Electrical Power Shop(111A)	STEPPER MOTOR (Uni-polar Stepper motor)	2	A
5	DPI-ET-58	DPI	Electric	Advance Electricity Lab(112C)	Washing Machine	1	A
6	DPI-ET-60	DPI	Electric	Advance Electricity Lab(112C)	Air Conditioner, Split Type, 3 Ton	1	A
7	DPI-ET-23	DPI	Electric	Electrical Power Shop(111A)	Automatic-Star Delta Starter	2	A
8	DPI-ET-32	DPI	Electric	Advance Electricity Lab(112C)	Micro-wave oven	1	A
9	DPI-ET-36	DPI	Electric	Circuit Lab(112B), Measurement Lab(113A)	Wheatstone Bridge Trainer Kit	5	A
10	DPI-ET-07	DPI	Electric	Electrical Power Shop(111A)	Transformer Trainer	1	A
11	DPI-ET-11	DPI	Electric	Renewable Energy Lab(111B)	Complete Renewable Energy Lab (Trainer)	1	A
12	DPI-ET-08	DPI	Electric	Project Lab(113B), Wiring Shop(113C)	Drill Press	2	A
13	DPI-ET-13	DPI	Electric	Electrical Power Shop(111A)	Speed Control of AC Motor (Trainer)	3	A
14	DPI-ET-14	DPI	Electric	Electrical Power Shop(111A)	Synchroscope	1	A
15	DPI-ET-15	DPI	Electric	Electrical Power Shop(111A)	Multiple Terminals for varing speed for three phase motor	2	A
16	DPI-ET-16	DPI	Electric	Electrical Power Shop(111A)	3 Point / 04 Point Starter with DC Motor	1	A
17	DPI-ET-17	DPI	Electric	Electrical Power Shop(111A)	VFD-M AC Drives	2	A
18	DPI-ET-21	DPI	Electric	Wiring Shop(113C)	Hammer Drill	2	A
19	DPI-ET-22	DPI	Electric	Circuit Lab(112B), Project Lab(113B), Wiring Shop(113C)	Tool Set for Electrical Works	10	A
20	DPI-ET-27	DPI	Electric	Electrical Power Shop(111A)	Motor-Generator Set	1	A
21	DPI-ET-28	DPI	Electric	Switch Gear Lab(111C)	Low-Transmission pannel Equipment	1	A
22	DPI-ET-29	DPI	Electric	Switch Gear Lab(111C)	High-Transmission pannel Equipment	1	A
23	DPI-ET-33	DPI	Electric	Electrical Power Shop(111A), Renewable Energy Lab(111B)	Re-chargeable battery (Lead Acid)	2	A
24	DPI-ET-38	DPI	Electric	Circuit Lab(112B), Wiring Shop(113C)	Bench drill Machine	2	A
25	DPI-ET-40	DPI	Electric	Electrical Power Shop(111A), Renewable Energy Lab(111B), Switch Gear Lab(111C), Computer lab(112A), Circuit Lab(112B), Advance Electricity Lab(112C), Measurement Lab(113A), Project Lab(113B), Wiring Shop(113C)	High Resolution Projector (Multimedia)	2	A
26	DPI-ET-47	DPI	Electric	Electrical Power Shop(111A)	Universal Motor (Transparent)	2	A
27	DPI-ET-53	DPI	Electric	Measurement Lab(113A), Project Lab(113B)	Thermocoupler	2	A
28	DPI-ET-01	DPI	Electric	Measurement Lab(113A)	Galvanometer	5	B
29	DPI-ET-02	DPI	Electric	Measurement Lab(113A), Wiring Shop(113C)	Earth Tester	10	B
30	DPI-ET-03	DPI	Electric	Electrical Power Shop(111A), Renewable Energy Lab(111B), Switch Gear Lab(111C), Circuit Lab(112B), Advance Electricity Lab(112C), Measurement Lab(113A), Project Lab(113B), Wiring Shop(113C)	Ampere Meter	15	B
31	DPI-ET-04	DPI	Electric	Electrical Power Shop(111A), Renewable Energy Lab(111B), Switch Gear Lab(111C), Circuit Lab(112B), Advance Electricity Lab(112C), Measurement Lab(113A), Project Lab(113B), Wiring Shop(113C)	Laboratory DC power supply	15	B
32	DPI-ET-05	DPI	Electric	Electrical Power Shop(111A), Renewable Energy Lab(111B), Switch Gear Lab(111C), Circuit Lab(112B), Advance Electricity Lab(112C), Measurement Lab(113A), Project Lab(113B), Wiring Shop(113C)	Digital AC Voltmeter	15	B
33	DPI-ET-06	DPI	Electric	Electrical Power Shop(111A) Renewable Energy Lab(111B)	Battery Charger	10	C
34	DPI-ET-09	DPI	Electric	Project Lab(113B), Wiring Shop(113C)	Grinding Machine	1	C
35	DPI-EnT-47	DPI	Electronics	Advanced Electronics	Basic Energy Conversion Trainer	4	A
36	DPI-EnT-48	DPI	Electronics	Advanced Electronics	Power Electronics Trainer (A)	2	A
37	DPI-EnT-49	DPI	Electronics	Advanced Electronics	Power Electronics Trainer (B)	1	A
38	DPI-EnT-65	DPI	Electronics	Advanced Electronics	Pateren generator	2	A
39	DPI-EnT-66	DPI	Electronics	Advanced Electronics	Digital HD TV camera	1	A
40	DPI-EnT-67	DPI	Electronics	Advanced Electronics	HD Video Recording Camcorder (Black)	1	A
41	DPI-EnT-10	DPI	Electronics	Basic Electronics	DC Milli Volt meter	10	A
42	DPI-EnT-40	DPI	Electronics	Advanced Electronics	AC Milli Amp meter	4	A
43	DPI-EnT-55	DPI	Electronics	Advanced Electronics	Q Meter	4	A
44	DPI-EnT-12	DPI	Electronics	Basic Electronics	Analog Trainer	4	A
45	DPI-EnT-11	DPI	Electronics	Basic Electronics	DC Milli amp meter	10	A
46	DPI-EnT-143	DPI	Electronics	Communication	Optical Fiber Trainer	2	A
47	DPI-EnT-145	DPI	Electronics	Communication	Satellite Communication Trainer	1	A
48	DPI-EnT-151	DPI	Electronics	Communication	Frequency Division Multiplexing Trainer Board	4	A
49	DPI-EnT-154	DPI	Electronics	Communication	Digital Communication Trainer	4	A
50	DPI-EnT-155	DPI	Electronics	Communication	PCM Trainer	4	A
51	DPI-EnT-157	DPI	Electronics	Communication	Frequency Modulation Trainer	4	A
52	DPI-EnT-158	DPI	Electronics	Communication	Fiber optics educational kit	4	A
53	DPI-EnT-159	DPI	Electronics	Communication	Wireless HDVI Transmitter and Receiver Kit	2	A
54	DPI-EnT-160	DPI	Electronics	Communication	Mini PABX intercom system with 6 telephone set	1	A
55	DPI-EnT-155	DPI	Electronics	Communication	Microwave Trainer	1	A
56	DPI-EnT-153	DPI	Electronics	Communication	Antenna Trainer	4	A
57	DPI-EnT-152	DPI	Electronics	Communication	Amplitude Modulation Trainer	4	A
58	DPI-EnT-150	DPI	Electronics	Communication	Cellular Mobile Communication System	2	A
59	DPI-EnT-144	DPI	Electronics	Communication	Computer with optic fiber ,HUB,Router and Switch	2	A
60	DPI-EnT-142	DPI	Electronics	Communication	RF Power Meter	2	A
61	DPI-EnT-81	DPI	Electronics	Digital Electronics	Analog and Digital Trainer	4	A
62	DPI-EnT-84	DPI	Electronics	Digital Electronics	DSP Trainer	2	A
63	DPI-EnT-85	DPI	Electronics	Digital Electronics	Advanced Analog & Digital Design Trainer	4	A
64	DPI-EnT-86	DPI	Electronics	Digital Electronics	Advanced Digital Logic Circuits Trainer	4	A
65	DPI-EnT-83	DPI	Electronics	Digital Electronics	Digital IC Trainer	4	A
66	DPI-EnT-180	DPI	Electronics	Instrumentation & Electromedical	Operational Amplifier Trainer	4	A
67	DPI-EnT-195	DPI	Electronics	Instrumentation & Electromedical	Sensor Trainer	4	A
68	DPI-EnT-197	DPI	Electronics	Instrumentation & Electromedical	Bio Medical Measurement System	1	A
69	DPI-EnT-198	DPI	Electronics	Instrumentation & Electromedical	ECG Machine	1	A
70	DPI-EnT-199	DPI	Electronics	Instrumentation & Electromedical	X-Ray Machine (Portable Type)	1	A
71	DPI-EnT-200	DPI	Electronics	Instrumentation & Electromedical	Digital colordoppler 3D/4D	1	A
72	DPI-EnT-201	DPI	Electronics	Instrumentation & Electromedical	Colorimeter	2	A
73	DPI-EnT-211	DPI	Electronics	Instrumentation & Electromedical	LVDT Trainer	2	A
74	DPI-EnT-214	DPI	Electronics	Instrumentation & Electromedical	scintillation counter	1	A
75	DPI-EnT-215	DPI	Electronics	Instrumentation & Electromedical	Geiger–Muller counter	1	A
76	DPI-EnT-163	DPI	Electronics	Instrumentation & Electromedical	Dual Trace Digital Storage Oscilloscope 20MHz	2	A
77	DPI-EnT-172	DPI	Electronics	Instrumentation & Electromedical	Wein Bridge Trainer	4	B
78	DPI-EnT-173	DPI	Electronics	Instrumentation & Electromedical	Wheatstone Bridge Trainer	4	C
79	DPI-EnT-189	DPI	Electronics	Instrumentation & Electromedical	Energy Meter , Single phase	4	C

Ser.No.	Req.No.	Institute	Technology	Laboratory	Equipment Name	Quantity*		Priority**
80	DPI-EnT-191	DPI	Electronics	Instrumentation & Electromedical	Megger	4		C
81	DPI-EnT-192	DPI	Electronics	Instrumentation & Electromedical	Psopho meter	4		C
82	DPI-EnT-193	DPI	Electronics	Instrumentation & Electromedical	TVM meter	4		C
83	DPI-EnT-194	DPI	Electronics	Instrumentation & Electromedical	RLC Bridge	4		C
84	DPI-EnT-216	DPI	Electronics	Instrumentation & Electromedical	Digital Blood Pressure Monitor	2		C
85	DPI-EnT-111	DPI	Electronics	Microcontroller & PLC	Robort Trainer	4		C
86	DPI-EnT-127	DPI	Electronics	Microcontroller & PLC	VFD Trainer	4		C
87	DPI-EnT-128	DPI	Electronics	Microcontroller & PLC	PLC and HMI Training Kit	2		C
88	DPI-EnT-106	DPI	Electronics	Microcontroller & PLC	Automatic Control Trainer Control	1		C
89	DPI-EnT-107	DPI	Electronics	Microcontroller & PLC	Programable Logic Control Trainer	1		C
90	DPI-EnT-108	DPI	Electronics	Microcontroller & PLC	Labtop Computer	4		C
91	DPI-EnT-109	DPI	Electronics	Microcontroller & PLC	Micro controller Trainst	3		C
92	DPI-EnT-118	DPI	Electronics	Microcontroller & PLC	Developer kit	4		C
93	DPI-EnT-119	DPI	Electronics	Microcontroller & PLC	Embedded vision starter kit	4		C
94	DPI-EnT-120	DPI	Electronics	Microcontroller & PLC	Development board	4		C
95	DPI-EnT-121	DPI	Electronics	Microcontroller & PLC	Microcomputer kit	4		C
96	DPI-EnT-126	DPI	Electronics	Microcontroller & PLC	Ardino Trainer with input sensor and outputs	4		C
97	DPI-EnT-240	DPI	Electronics	Project Based Learing Lab	Micro ovenTrainer	2		C
98	DPI-EnT-241	DPI	Electronics	Project Based Learing Lab	Induction cooker	2		C
99	DPI-EnT-242	DPI	Electronics	Project Based Learing Lab	Washing Machine Trainer	2		C
100	DPI-EnT-243	DPI	Electronics	Project Based Learing Lab	Refrigerator lab equipment	2		C
101	DPI-EnT-244	DPI	Electronics	Project Based Learing Lab	Domestic Air Conditioning Trainer	2		C
102	DPI-EnT-245	DPI	Electronics	Project Based Learing Lab	Laser Printer Trainer	2		C
103	DPI-EnT-246	DPI	Electronics	Project Based Learing Lab	DC motor control Trainer	2		C
104	DPI-EnT-A01	DPI	Electronics		AVO meter(analog)	115	(65)	A
105	DPI-EnT-A02	DPI	Electronics		AVO meter(digital)	115	(65)	A
106	DPI-EnT-A03	DPI	Electronics		Function generator	20	(16)	A
107	DPI-EnT-A04	DPI	Electronics		Digital IC Tester	10	(6)	A
108	DPI-EnT-A05	DPI	Electronics		Dual Trace Digital Storage Oscilloscope 200MHz	16	(14)	A
109	DPI-EnT-A06	DPI	Electronics		AF Signal generator	14	(12)	A
110	DPI-EnT-A07	DPI	Electronics		Dual power supply(AC/DC)	14	(10)	A
111	DPI-EnT-A08	DPI	Electronics		Transistor Tester	10	(6)	A
112	DPI-EnT-A09	DPI	Electronics		Digital Frequency Counter	12	(10)	A
113	DPI-EnT-A010	DPI	Electronics		Dual Trace Digital Storage Oscilloscope 100MHz	12	(10)	A
114	DPI-EnT-A011	DPI	Electronics		Power Factor Meter	12	(8)	A
115	DPI-EnT-A012	DPI	Electronics		Photo Meter	12	(8)	A
116	DPI-EnT-A013	DPI	Electronics		RX Meter	12	(8)	A
117	DPI-EnT-A014	DPI	Electronics		RF Signal generator	10	(8)	A
118	DPI-EnT-A015	DPI	Electronics		DC Power supply	22	(20)	A
119	DPI-EnT-A016	DPI	Electronics		Spectrum Analyzer	9	(7)	A
120	DPI-EnT-A017	DPI	Electronics		Electronics VOM	12	(8)	A
121	DPI-EnT-A018	DPI	Electronics		Enrgy Meter	10		A
122	DPI-EnT-A019	DPI	Electronics		De-Soldering Pump	75	(50)	A
123	DPI-EnT-A020	DPI	Electronics		Soldering Iron	75	(50)	A
124	DPI-EnT-A021	DPI	Electronics		AC Milli Volt meter	8	(4)	A
125	DPI-EnT-A022	DPI	Electronics		cosØ meter	6	(2)	A
126	DPI-EnT-A023	DPI	Electronics		DC Servo System Trainer	4		C
127	DPI-EnT-A024	DPI	Electronics		Analog & Digital Electronics Trainer	8		A
128	DPI-EnT-A025	DPI	Electronics		Industrial Scope Meter	3	(1)	A
129	DPI-EnT-A026	DPI	Electronics		Solar Trainer (Portable Type)	8		A
130	DPI-EnT-A027	DPI	Electronics		LCR Meter	14		A
131	DPI-EnT-A028	DPI	Electronics		Digital LCR Meter	9		A
132	DPI-EnT-A029	DPI	Electronics		Soldering Station	9	(4)	A
133	DPI-EnT-A030	DPI	Electronics		Microwave Power Meter	6	(2)	A
134	DPI-EnT-A031	DPI	Electronics		Stepper Motor Trainer	6		C
135	DPI-EnT-A032	DPI	Electronics		Arbitrary function generator	4	(2)	A
136	DPI-EnT-A033	DPI	Electronics		Virtual reality kit with head set	6	(2)	A
137	DPI-EnT-A034	DPI	Electronics		Frequency Meter	8		A
138	DPI-EnT-A035	DPI	Electronics		Watt meter	6	(2)	A
139	DPI-EnT-A036	DPI	Electronics		Basic Communication Trainer	8		A
140	DPI-MT-183	DPI	Mechanical	Manufacturing Process Laboratory	CNC Lathe Machine	1		A
141	DPI-MT-194	DPI	Mechanical	Manufacturing Process Laboratory	Desktop Milling Machine	10		A
142	DPI-MT-193	DPI	Mechanical	Manufacturing Process Laboratory	3D Printer -Plastic	2		A
143	DPI-MT-12	DPI	Mechanical	Fluid Mechanics Lab	Digital Hydraulic Bench	2		A
144	DPI-MT-04	DPI	Mechanical	Fluid Mechanics Lab	Pelton Turbine	2		A
145	DPI-MT-03	DPI	Mechanical	Fluid Mechanics Lab	Francis Turbine	2		A
146	DPI-MT-25	DPI	Mechanical	Fluid Mechanics Lab	Centrifugal Pump Module	2		A
147	DPI-MT-31	DPI	Mechanical	Fluid Mechanics Lab	Positive Displacement Pump Module	2		A
148	DPI-MT-26	DPI	Mechanical	Fluid Mechanics Lab	Universal Dynamometer	2		A
149	DPI-MT-05	DPI	Mechanical	Fluid Mechanics Lab	Fluid Friction Apparatus	2		A
150	DPI-MT-32	DPI	Mechanical	Fluid Mechanics Lab	Piston Pump	2		A
151	DPI-MT-01	DPI	Mechanical	Fluid Mechanics Lab	Two Stage Series and Parallel Pumps	2		A
152	DPI-MT-02	DPI	Mechanical	Fluid Mechanics Lab	Analogue Pressure Display	2		A
153	DPI-MT-03	DPI	Mechanical	Fluid Mechanics Lab	Flow Measurement Methods	2		A
154	DPI-MT-06	DPI	Mechanical	Fluid Mechanics Lab	Bernoulli's Theorem	2		A
155	DPI-MT-15	DPI	Mechanical	Fluid Mechanics Lab	Flow Meter Calibration	2		A
156	DPI-MT-16	DPI	Mechanical	Fluid Mechanics Lab	Pitot Tube	2		A
157	DPI-MT-17	DPI	Mechanical	Fluid Mechanics Lab	Venturi Flow Meter	2		A
158	DPI-MT-18	DPI	Mechanical	Fluid Mechanics Lab	Orifice Flow Meter	2		A
159	DPI-MT-37	DPI	Mechanical	Fluid Mechanics Lab	Impact of A Jet	2		A
160	DPI-MT-76	DPI	Mechanical	Material Testing Laboratory	Universal Testing Machine	2		A
161	DPI-MT-86	DPI	Mechanical	Material Testing Laboratory	Universal Hardness Tester	2		B
162	DPI-MT-77	DPI	Mechanical	Material Testing Laboratory	Double Shear	2		B
163	DPI-MT-80	DPI	Mechanical	Material Testing Laboratory	Coil Spring	2		B
164	DPI-MT-81	DPI	Mechanical	Material Testing Laboratory	Beam and Leaf Spring	2		B
165	DPI-MT-82	DPI	Mechanical	Material Testing Laboratory	Extensometer	2		B
166	DPI-MT-84	DPI	Mechanical	Material Testing Laboratory	Tensile Specimens (TH)	2		C
167	DPI-MT-85	DPI	Mechanical	Material Testing Laboratory	Energy Absorbed at Fracture	2		C
168	DPI-MT-91	DPI	Mechanical	Material Testing Laboratory	Torsion Testing Machine (30 Nm)	2		C
169	DPI-MT-92	DPI	Mechanical	Material Testing Laboratory	Torsiometer	2		C
170	DPI-MT-93	DPI	Mechanical	Material Testing Laboratory	Test Specimen (TR)	2		C
171	DPI-MT-68	DPI	Mechanical	Mechanics Laboratory	Engineering Science Full Set	2		C
172	DPI-MT-69	DPI	Mechanical	Mechanics Laboratory	Spare Parts (ESX)	2		C
173	DPI-MT-70	DPI	Mechanical	Mechanics Laboratory	Weight Sets (WT and WTL)	2		C
174	DPI-MT-71	DPI	Mechanical	Mechanics Laboratory	Tensile Test Specimen (MTT)	2		C
175	DPI-MT-61	DPI	Mechanical	Mechanics Laboratory	Digital Force Display	2		C
176	DPI-MT-62	DPI	Mechanical	Mechanics Laboratory	Automatic Data Acquisition Unit	2		C
177	DPI-MT-63	DPI	Mechanical	Mechanics Laboratory	Bending Moments in a Beam	2		C
178	DPI-MT-64	DPI	Mechanical	Mechanics Laboratory	Shear Force in A Beam	2		C
179	DPI-MT-65	DPI	Mechanical	Mechanics Laboratory	Deflection of Beams and Cantilevers	2		C
180	DPI-MT-72	DPI	Mechanical	Mechanics Laboratory	Hooke's Law and Spring Rate	2		C

Ser.No.	Req.No.	Institute	Technology	Laboratory	Equipment Name	Quantity*	Priority**
181	DPI-MT-145	DPI	Mechanical	Mechanics of Mchinery Lab	Static and Dynamic Balancing	2	C
182	DPI-MT-146	DPI	Mechanical	Mechanics of Mchinery Lab	Gyroscope	2	C
183	DPI-MT-147	DPI	Mechanical	Mechanics of Mchinery Lab	Centrifugal Force	2	C
184	DPI-MT-148	DPI	Mechanical	Mechanics of Mchinery Lab	Geared Systems	2	C
185	DPI-MT-149	DPI	Mechanical	Mechanics of Mchinery Lab	Toothed Belt Drive Unit	2	C
186	DPI-MT-153	DPI	Mechanical	Mechanics of Mchinery Lab	Governors	2	C
187	DPI-MT-162	DPI	Mechanical	Mechanics of Mchinery Lab	Wall Jib Crane	2	C
188	DPI-MT-164	DPI	Mechanical	Mechanics of Mchinery Lab	Force Plate	2	C
189	DPI-MT-104	DPI	Mechanical	Refrigeration Lab	Refrigeration Cycle	2	C
190	DPI-MT-105	DPI	Mechanical	Refrigeration Lab	Air Conditioning Trainer	2	C
191	DPI-MT-106	DPI	Mechanical	Refrigeration Lab	Humidity Measurement	2	C
192	DPI-MT-107	DPI	Mechanical	Refrigeration Lab	Cooling Towers	2	C
193	DPI-MT-48	DPI	Mechanical	Heat Engine Laboratory	Small Engine Test Set	2	C
194	DPI-MT-49	DPI	Mechanical	Heat Engine Laboratory	Modified 4 Stroke Petrol Engine	2	C
195	DPI-MT-50	DPI	Mechanical	Heat Engine Laboratory	Modified 4 Stroke Diesel Engine	2	C
196	DPI-MT-51	DPI	Mechanical	Heat Engine Laboratory	Manual Volumetric Fuel Gauge	2	C
197	DPI-MT-55	DPI	Mechanical	Heat Engine Laboratory	Exhaust Gas Calorimeter	2	C
198	DPI-MT-52	DPI	Mechanical	Heat Engine Laboratory	Engine Cycle Analyzer	2	C
199	DPI-MT-53	DPI	Mechanical	Heat Engine Laboratory	Cylinder Head Pressure Transducer	2	C
200	DPI-MT-54	DPI	Mechanical	Heat Engine Laboratory	Crank Angle Shaft Encoder	2	C
201	DPI-MT-173	DPI	Mechanical	Metallurgy Laboratory	Benchtop OES Metal Analyzer	2	C
202	DPI-MT-132	DPI	Mechanical	Heat Transfer and Thermodynamics Laboratory	Ideal Gases - Boyle's Law	2	C
203	DPI-MT-133	DPI	Mechanical	Heat Transfer and Thermodynamics Laboratory	Ideal Gases - Gay-Lussac's Law	2	C
204	DPI-MT-141	DPI	Mechanical	Heat Transfer and Thermodynamics Laboratory	Data Acquisition system (Frame Mounted)	2	C
205	DPI-MT-210	DPI	Mechanical	Welding Laboratory	Flat Bar Shear Machine	2	C
206	DPI-MT-101	DPI	Mechanical	Material Testing Laboratory	Standard Laptop	2	C
207	DPI-MT-123	DPI	Mechanical	Heat Transfer and Thermodynamics Laboratory	Heat Transfer Experiment Base Unit	2	C
208	DPI-MT-124	DPI	Mechanical	Heat Transfer and Thermodynamics Laboratory	Linear Heat Conduction Experiment	2	C
209	DPI-MT-128	DPI	Mechanical	Heat Transfer and Thermodynamics Laboratory	Water to Air Heat Exchangers	2	C
210	DPI-MT-130	DPI	Mechanical	Heat Transfer and Thermodynamics Laboratory	16 Tube Finned Heat Exchanger	2	C
211	DPI-MT-204	DPI	Mechanical	Welding Laboratory	Multi-Function Ultrasonic Metal Welding Machine	2	C
212	DPI-MT-206	DPI	Mechanical	Welding Laboratory	Submerged Arc Welding Machine	2	C
213	DPI-MT-205	DPI	Mechanical	Welding Laboratory	Three Phase MMA- 601Cellulosic Electronic Arc Welding Machine	2	C
214	DPI-MT-207	DPI	Mechanical	Welding Laboratory	Optical Pyrometer	2	C
215	DPI-MT-33	DPI	Mechanical	Fluid Mechanics Lab	Gear Pump	2	C
216	DPI-MT-27	DPI	Mechanical	Fluid Mechanics Lab	Optical Tachometer	2	C
217	DPI-MT-29	DPI	Mechanical	Fluid Mechanics Lab	Water Velocity Meter	2	C
218	DPI-MT-33	DPI	Mechanical	Fluid Mechanics Lab	Additional Impact Plates	2	C
219	DPI-MT-78	DPI	Mechanical	Material Testing Laboratory	Brinell Indenter	2	C
220	DPI-MT-79	DPI	Mechanical	Material Testing Laboratory	Hardness Specimens (HTP)	2	C
221	DPI-MT-83	DPI	Mechanical	Material Testing Laboratory	Support Table and Cupboard	2	C
222	DPI-MT-203	DPI	Mechanical	Welding Laboratory	Laser Welding Machine	1	C
223	DPI-MT-103	DPI	Mechanical	Refrigeration Lab	Cooling Column Type A	2	C
224	DPI-MT-110	DPI	Mechanical	Refrigeration Lab	Empty Cooling Column	2	C
225	DPI-MT-All	DPI	Mechanical		Data Acquisition system (Bench Mounted)	8	C
226	DPI-CmT-01	DPI	Computer	Software Lab-1 & Software Lab-2	Laptop PC for Software Lab (1)	20	A
227	DPI-CmT-02	DPI	Computer	Software Lab-1 & Software Lab-2	Laptop PC for Software Lab (2)	20	A
228	DPI-CmT-03	DPI	Computer	Software Lab-1 & Software Lab-2	Server for Software Lab Management with Server Rack	2	A
229	DPI-CmT-09	DPI	Computer	Network Lab	Laptop PC for Network Lab	20	A
230	DPI-CmT-10	DPI	Computer	Network Lab	Server for Networking Practices with Server Rack	2	A
231	DPI-CmT-18	DPI	Computer	Network Lab	Basic Fiber Optics Trainer	2	A
232	DPI-CmT-19	DPI	Computer	Network Lab	Fiber tool Kits including F7 Fusion Spficer	4	A
233	DPI-CmT-20	DPI	Computer	Network Lab	Optical Power Meter	5	A
234	DPI-CmT-21	DPI	Computer	Network Lab	Data Communication Trainer	2	A
235	DPI-CmT-25	DPI	Computer	Hardware & Microprocessor Lab	Digital Electronics Educational Trainer Kit	8	A
236	DPI-CmT-26	DPI	Computer	Hardware & Microprocessor Lab	8086 Microprocessor Training Kit	8	A
237	DPI-CmT-27	DPI	Computer	Hardware & Microprocessor Lab	Educational Microcontroller Trainer Kit	8	A
238	DPI-CmT-29	DPI	Computer	Hardware & Microprocessor Lab	Handheld mini PCB Drill machine	5	A
239	DPI-CmT-33	DPI	Computer	Hardware & Microprocessor Lab	Laser Color Printer	3	A
240	DPI-CmT-37	DPI	Computer	Hardware & Microprocessor Lab	Laptop PC for NTVQF Software Lab	20	A
241	DPI-CmT-38	DPI	Computer	NTVQF Software Lab	Server for NTVQF Lab Management with Server Rack	1	A
242	DPI-CmT-44	DPI	Computer	NTVQF Software Lab	Desktop PC for NTVQF Hardware Lab	20	A
243	DPI-CmT-45	DPI	Computer	NTVQF Hardware Lab	Server for NTVQF Networking Practices with Server Rack	1	A
244	DPI-CmT-53	DPI	Computer	NTVQF Hardware Lab	Server for IoT Lab with Server Rack	1	A
245	DPI-CmT-54	DPI	Computer	IoT Lab	Laptop for IoT Lab	20	A
246	DPI-CmT-57	DPI	Computer	IoT Lab	Sensor Package	8	A
247	DPI-CmT-58	DPI	Computer	IoT Lab	Sensor Trainer Kit	4	A
248	DPI-CmT-59	DPI	Computer	IoT Lab	Single Board Computer	10	A
249	DPI-CmT-60	DPI	Computer	IoT Lab	Single-board microcontroller	10	A
250	DPI-CmT-62	DPI	Computer	IoT Lab	Lynxmotion AL5D FLTW Robotic Arm Kit	5	A
251	DPI-CmT-63	DPI	Computer	IoT Lab	Personal Writing & Drawing Robot	1	A
252	DPI-CmT-64	DPI	Computer	IoT Lab	Educational Programmable Robot	5	A
253	DPI-CmT-65	DPI	Computer	IoT Lab	Humanoid Robot	5	A
254	DPI-CmT-70	DPI	Computer	IoT Lab	Desktop PC for CISCO Network Lab	20	A
255	DPI-CmT-71	DPI	Computer	IoT Lab	Server for CISCO Network Lab Practices with Server Rack	1	A
256	DPI-CmT-77	DPI	Computer	CISCO Network Lab	Wireless Controller / Access Point	2	A
257	DPI-CmT-78	DPI	Computer	CISCO Network Lab	24 port Switch	5	A
258	DPI-CmT-79	DPI	Computer	CISCO Network Lab	POE Managed Switch	5	A
259	DPI-CmT-80	DPI	Computer	CISCO Network Lab	VPN ROUTER	4	A
260	DPI-CmT-81	DPI	Computer	CISCO Network Lab	Cisco Firepower	2	A
261	DPI-CmT-05	DPI	Computer	Software Lab-1 & Software Lab-2	Digital Interactive Whiteboard	2	B
262	DPI-CmT-13	DPI	Computer	Network Lab	PC & Network Maintenance Tools	2	B
263	DPI-CmT-17	DPI	Computer	Network Lab	TV Monitor for NRV	5	B
264	DPI-CmT-34	DPI	Computer	Hardware & Microprocessor Lab	Laser Printer	5	B
265	DPI-CmT-35	DPI	Computer	Hardware & Microprocessor Lab	High Resolution Scanner	4	B
266	DPI-CmT-All	DPI	Computer		28-port Gigabit Managed SFP Switch	22	A
267	DPI-CmT-All2	DPI	Computer		72" Smart TV	7	A
268	DPI-CmT-All3	DPI	Computer		CISCO Access Point	14	A
269	DMPI-EnT-02	DMPI	Electronics	Basic Electronics(R-1303)	Digital Multimeter(AVO Meter)	5	A
270	DMPI-EnT-03	DMPI	Electronics	Basic Electronics(R-1303)	Dual Trace Digital Storage Oscilloscope 100MHz	2	A
271	DMPI-EnT-07	DMPI	Electronics	Basic Electronics(R-1303)	IPS	1	A
272	DMPI-EnT-09	DMPI	Electronics	Advanced Electronics & Communication Lab(R-1305)	Dual Trace Digital Storage Oscilloscope 200MHz	2	A
273	DMPI-EnT-12	DMPI	Electronics	Advanced Electronics & Communication Lab(R-1305)	Digital Frequency Counter	2	A
274	DMPI-EnT-13	DMPI	Electronics	Advanced Electronics & Communication Lab(R-1305)	Power Electronics Trainer	2	A
275	DMPI-EnT-14	DMPI	Electronics	Advanced Electronics & Communication Lab(R-1305)	Basic Communication Trainer	2	A
276	DMPI-EnT-15	DMPI	Electronics	Advanced Electronics & Communication Lab(R-1305)	Antenna Trainer	5	A
277	DMPI-EnT-20	DMPI	Electronics	Advanced Electronics & Communication Lab(R-1305)	Oxygen Concentrator	1	A
278	DMPI-EnT-21	DMPI	Electronics	Advanced Electronics & Communication Lab(R-1305)	Transistor Tester	5	A
279	DMPI-EnT-22	DMPI	Electronics	Advanced Electronics & Communication Lab(R-1305)	Solar Trainer(Portable Type)	4	A
280	DMPI-EnT-23	DMPI	Electronics	Advanced Electronics & Communication Lab(R-1305)	PCM Trainer	5	A
281	DMPI-EnT-24	DMPI	Electronics	Advanced Electronics & Communication Lab(R-1305)	Frequency Modulation Trainer	5	A

Ser.No.	Req.No.	Institute	Technology	Laboratory	Equipment Name	Quantity*		Priority**
282	DVPI-EnT-25	DVPI	Electronics	Advanced Electronics & Communication Lab(R-1305)	Fiber optics educational kit	5		A
283	DVPI-EnT-32	DVPI	Electronics	Microcontroller & PLC Lab(R-1336)	Raspberry Pi Arduino IOT Sensor Lab	5		A
284	DVPI-EnT-33	DVPI	Electronics	Microcontroller & PLC Lab(R-1336)	Arduino Starter Kit	5		A
285	DVPI-EnT-36	DVPI	Electronics	Computer & Communication(R-1306)	Laptop	2		A
286	DVPI-EnT-37	DVPI	Electronics	Computer & Communication(R-1306)	Desktop Computer	2		A
287	DVPI-EnT-38	DVPI	Electronics	Computer & Communication(R-1306)	Wireless HDMI Transmitter and Receiver Kit	2		A
288	DVPI-EnT-41	DVPI	Electronics	Digital Multimed a Lab (R-1307)	Robot station with artificial vision system	1		A
289	DVPI-EnT-45	DVPI	Electronics	Digital Multimed a Lab (R-1307)	Tools BOX	1		A
290	DVPI-EnT-46	DVPI	Electronics	Bio-Medical Lab (1305)	X-Ray Machine	1		A
291	DVPI-EnT-48	DVPI	Electronics	Bio-Medical Lab (1305)	Fingertip Pulse Oximeter	5		A
292	DVPI-EnT-49	DVPI	Electronics	Bio-Medical Lab (1305)	Handheld Pulse Oximeter	2		A
293	DVPI-EnT-50	DVPI	Electronics	Bio-Medical Lab (1305)	Wireless Infrared Thermometer	10		A
294	DVPI-EnT-53	DVPI	Electronics	Bio-Medical Lab (1305)	ECG Machine	1		A
295	DVPI-EnT-55	DVPI	Electronics	Bio-Medical Lab (1305)	Digital Colordoppler 3D/4D	1		B
296	DVPI-EnT-57	DVPI	Electronics	Bio-Medical Lab (1305)	DC Servo System Trainer	1		B
297	DVPI-EnT-60	DVPI	Electronics	Bio-Medical Lab (1305)	Sensor Trainer with Different Modulledule	4		B
298	DVPI-EnT-AN1	DVPI	Electronics		LCR Meter	7		A
299	DVPI-EnT-AN2	DVPI	Electronics		Dehumidifier	2		A
300	DVPI-EnT-AN3	DVPI	Electronics		AC DC Dual Tracking Power Supply	4		A
301	DVPI-EnT-AN4	DVPI	Electronics		Stepper Motor Trainer	2	(1)	A
302	DVPI-EnT-AN5	DVPI	Electronics		AF Signal generator	3		A
303	DVPI-EnT-AN6	DVPI	Electronics		LVDT Trainer	4	(2)	A
304	DVPI-EnT-AN7	DVPI	Electronics		Analog Multimeter(AVO Meter)	10		A
305	DVPI-CmT-01	DVPI	Computer	Software Lab-1	Laptop PC for Software Lab	30		A
306	DVPI-CmT-03	DVPI	Computer	Software Lab-1	Server (for Lab Management)	1		A
307	DVPI-CmT-22	DVPI	Computer	Network Lab	Server for Networking Practices	1		A
308	DVPI-CmT-28	DVPI	Computer	Network Lab	16 Channel NVR/DVR for Lab Pactices	5		A
309	DVPI-CmT-29	DVPI	Computer	Network Lab	IP Camera for Lab Practices	20		A
310	DVPI-CmT-31	DVPI	Computer	Network Lab	TV Monitor for NRV/DVR	5		A
311	DVPI-CmT-32	DVPI	Computer	Network Lab	Basic Fiber Optics Trainer	4		A
312	DVPI-CmT-33	DVPI	Computer	Network Lab	Fiber tool kits including F7 Fusion Splicer	2		A
313	DVPI-CmT-35	DVPI	Computer	Network Lab	Data Communication Trainer	4		A
314	DVPI-CmT-44	DVPI	Computer	Network Lab	Copper sfp module 100Xbase-t sfp	120		A
315	DVPI-CmT-47	DVPI	Computer	Hardware & Microprocessor Lab	8086 Microprocessor Training Kit	12		A
316	DVPI-CmT-48	DVPI	Computer	Hardware & Microprocessor Lab	Educational Microcontroller Trainer Kit	10		A
317	DVPI-CmT-57	DVPI	Computer	Hardware & Microprocessor Lab	Robot Station with Artificial Vision	1		A
318	DVPI-CmT-58	DVPI	Computer	Hardware & Microprocessor Lab	ELECROW Crowpi Raspberry Pi 4 3b 3b+ Kit for Learning Coding - Advanced Kit	10		A
319	DVPI-CmT-59	DVPI	Computer	Hardware & Microprocessor Lab	Human Compatible For Arduino Raspberry pi Sensor kit	20		A
320	DVPI-CmT-62	DVPI	Computer	Hardware & Microprocessor Lab	Server for NTVQF Networking Practices	1		A
321	DVPI-CmT-68	DVPI	Computer	IoT Lab	ALIENWARE AURORA R8 GAMING DESKTOP	5		A
322	DVPI-CmT-73	DVPI	Computer	IoT Lab	Sensor Package	10		A
323	DVPI-CmT-74	DVPI	Computer	IoT Lab	Sensor Trainer Kit	10		A
324	DVPI-CmT-75	DVPI	Computer	IoT Lab	Single Board Computer	5		A
325	DVPI-CmT-76	DVPI	Computer	IoT Lab	Single-board microcontroller	5		A
326	DVPI-CmT-30	DVPI	Computer	Network Lab	HDD for NVR	20		B
327	DVPI-CmT-34	DVPI	Computer	Network Lab	Optical Fiber MeterCombination Tool Tester Kit	3		B
328	DVPI-CmT-50	DVPI	Computer	Hardware & Microprocessor Lab	Handheld mini PCB Drill machine	5		B
329	DVPI-CmT-54	DVPI	Computer	Hardware & Microprocessor Lab	Leaser Color Printer	2		C
330	DVPI-CmT-55	DVPI	Computer	Hardware & Microprocessor Lab	Leaser Printer	2		C
331	DVPI-CmT-67	DVPI	Computer	IoT Lab	Server for IoT Lab	1		C
332	DVPI-CmT-69	DVPI	Computer	IoT Lab	Laptop for IoT Lab	30		C
333	DVPI-CmT-AN1	DVPI	Computer		Server Rack	3	(1)	A
334	DVPI-CmT-AN2	DVPI	Computer		28-port Gigabit Managed SFP Switch	6		A
335	DVPI-CmT-AN3	DVPI	Computer		Desktop PC	50	(30)	A
336	DVPI-CmT-AN4	DVPI	Computer		PC & Network Maintenance Tools	15		B
337	TTTC-ET-23	TTTC	Electric	Electrical Machine & Circuit Lab	Automatic-Star Delta Starter	4		A
338	TTTC-ET-27	TTTC	Electric	Electrical Machine & Circuit Lab	Motor-Generator Set	1		A
339	TTTC-ET-30	TTTC	Electric	Electrical Machine & Circuit Lab	Auto-Transformer	8		A
340	TTTC-ET-32	TTTC	Electric	Electrical Installation & Maintenance Lab	Micro-wave oven	8		A
341	TTTC-ET-36	TTTC	Electric	Electrical Machine & Circuit Lab	Wheatstone Bridge Trainer Kit	8		A
342	TTTC-ET-37	TTTC	Electric	Electrical Machine & Circuit Lab	Electrical Power System Simulator	1		A
343	TTTC-ET-42	TTTC	Electric	Electrical Machine & Circuit Lab	Electrical Circuits & Network Total Lab	4		A
344	TTTC-ET-61	TTTC	Electric	Electrical Machine & Circuit Lab	3-Phase Variac	2		A
345	TTTC-ET-62	TTTC	Electric	Electrical Machine & Circuit Lab	Single-Phase Variac	2		A
346	TTTC-ET-63	TTTC	Electric	Electrical Machine & Circuit Lab	3-Phase Transformer Trainer	2		A
347	TTTC-ET-64	TTTC	Electric	Electrical Machine & Circuit Lab	Single Phase Transformer Trainer	2		A
348	TTTC-ET-65	TTTC	Electric	Electrical Installation & Maintenance Lab	VFD/PLC Wiring Learning System	2		A
349	TTTC-ET-04	TTTC	Electric	Electrical Machine & Circuit Lab	Laboratory DC power supply	8		A
350	TTTC-ET-13	TTTC	Electric	Electrical Machine & Circuit Lab	Speed Control of AC Motor	2		A
351	TTTC-ET-14	TTTC	Electric	Electrical Machine & Circuit Lab	Synchroscope	4		A
352	TTTC-ET-07	TTTC	Electric	Electrical Machine & Circuit Lab	Transformer Trainer (3Φ)	1		A
353	TTTC-ET-02	TTTC	Electric	Electrical Installation & Maintenance Lab	Earth Tester	6		A
354	TTTC-ET-16	TTTC	Electric	Electrical Machine & Circuit Lab	3 Point / 04 Point Starter	4		B
355	TTTC-ET-17	TTTC	Electric	Electrical Machine & Circuit Lab	VFD-M AC Drives	4		B
356	TTTC-ET-18	TTTC	Electric	Electrical Installation & Maintenance Lab	PLC- Siemens (S7-200)	4		B
357	TTTC-ET-19	TTTC	Electric	Electrical Installation & Maintenance Lab	Arduino, UNO	8		B
358	TTTC-ET-33	TTTC	Electric	Electrical Machine & Circuit Lab	Re-chargeable battery (Lead Acid)	8		B
359	TTTC-ET-35	TTTC	Electric	Electrical Machine & Circuit Lab	Digital Insulation Tester	8		C
360	TTTC-ET-38	TTTC	Electric	Electrical Installation & Maintenance Lab	Bench drill Machine	4		C
361	TTTC-ET-39	TTTC	Electric	Electrical Machine & Circuit Lab	Industrial Scope Meter	2		C
362	TTTC-ET-44	TTTC	Electric	Electrical Machine & Circuit Lab	Digital LCR meter	4		C
363	TTTC-ET-68	TTTC	Electric	Electrical Installation & Maintenance Lab	Electric Blower	10		C
364	TTTC-ET-01	TTTC	Electric	Electrical Machine & Circuit Lab	Galvanometer	8		C
365	TTTC-ET-05	TTTC	Electric	Electrical Machine & Circuit Lab	Digital AC Voltmeter	8		C
366	TTTC-ET-10	TTTC	Electric	Electrical Machine & Circuit Lab	Multimeter (Digital)	16		C
367	TTTC-EnT-36	TTTC	Electronics	Microcontroller & Microprocessor	Arduino Microcontroller Trainer Board	10		A
368	TTTC-EnT-27	TTTC	Electronics	Basic /Advanced Electronics Lab	Operational Amplifier Trainer	4		A
369	TTTC-EnT-26	TTTC	Electronics	Advance Electronics lab	Industrial Power Electronics Trainer with Different Module	4		A
370	TTTC-EnT-20	TTTC	Electronics	Microprocessor lab	Digital IC Tester	10		A
371	TTTC-EnT-04	TTTC	Electronics	Basic Electronics ,Advance Electronics lab	Dual power supply(AC/DC)	10		A
372	TTTC-EnT-05	TTTC	Electronics	Basic Electronics ,Microprocessor,Advance Electronics lab	Variable DC Power Supply	10		A
373	TTTC-EnT-23	TTTC	Electronics	Advance Electronics lab	Solar Trainer(Portable Type)	4		A
374	TTTC-EnT-21	TTTC	Electronics	Basic Electronics ,Advance Electronics lab	Transistor Tester	10		A
375	TTTC-EnT-22	TTTC	Electronics	Basic Electronics ,Advance Electronics lab	Patterrn Generator	4		A
376	TTTC-EnT-31	TTTC	Electronics	Microcontroller & Microprocessor	Programmable Logic Control Trainer with Modules	2		A
377	TTTC-EnT-39	TTTC	Electronics	Advance Electronics lab	Microwave Power Meter	10		A
378	TTTC-EnT-40	TTTC	Electronics	Advance Electronics lab	Optical Fiber Trainer	4		A
379	TTTC-EnT-43	TTTC	Electronics	Advance Electronics lab	Frequency Division Multiplexing Trainer Board	4		A
380	TTTC-EnT-48	TTTC	Electronics	Advance Electronics lab	PCM Trainer	4		A
381	TTTC-EnT-65	TTTC	Electronics	Advance Electronics lab	LVDT Trainer	2		A

Ser.No.	Req.No.	Institute	Technology	Laboratory	Equipment Name	Quantity*	Priority**
382	TTTC-EnT-64	TTTC	Electronics	Advance Electronics lab	Stepper Motor Trainer	7	A
383	TTTC-EnT-55	TTTC	Electronics	Advance Electronics lab	Magger	10	A
384	TTTC-EnT-52	TTTC	Electronics	Advance Electronics lab	Wheatstone Bridge Trainer	2	A
385	TTTC-EnT-51	TTTC	Electronics	Advance Electronics lab	Wein Bridge Trainer	5	A
386	TTTC-EnT-50	TTTC	Electronics	Advance Electronics lab	Analog Communication Trainer	4	A
387	TTTC-EnT-49	TTTC	Electronics	Advance Electronics lab	Frequency Modulation Trainer	4	A
388	TTTC-EnT-41	TTTC	Electronics	Advance Electronics lab	Satellite Communication Trainer	1	A
389	TTTC-EnT-42	TTTC	Electronics	Advance Electronics lab	Cellular Mobile Communication System	4	A
390	TTTC-EnT-45	TTTC	Electronics	Advance Electronics lab	Antenna Trainer	4	A
391	TTTC-EnT-44	TTTC	Electronics	Advance Electronics lab	Amplitude Modulation Trainer	4	A
392	TTTC-EnT-46	TTTC	Electronics	Advance Electronics lab	Digital Communication Trainer	4	A
393	TTTC-EnT-56	TTTC	Electronics	Advance Electronics lab	Sensor Trainer with Different Moduledule	2	A
394	TTTC-EnT-47	TTTC	Electronics	Advance Electronics lab	Microwave Trainer	1	A
395	TTTC-EnT-10	TTTC	Electronics	Basic Electronics ,Advance Electronics lab	Digital Frequency Counter	10	A
396	TTTC-EnT-25	TTTC	Electronics	Advance Electronics lab	Basic Energy Conversion Trainer	4	A
397	TTTC-EnT-28	TTTC	Electronics	Basic/Advance Electronics lab	Power Electronics Trainer with different module	2	A
398	TTTC-EnT-29	TTTC	Electronics	Advanced Electronics	Basic Communication Trainer with Different Module	4	A
399	TTTC-EnT-32	TTTC	Electronics	Microcontroller & Microprecessor	Micro controller Trainer 8051	4	A
400	TTTC-EnT-33	TTTC	Electronics	Microcontroller & Microprecessor	Robot Trainer	4	A
401	TTTC-EnT-35	TTTC	Electronics	Microcontroller & Microprecessor	PIC Microcontroller Trainer Board	4	B
402	TTTC-EnT-38	TTTC	Electronics	Advance Electronics lab	Digital Function Generator	10	B
403	TTTC-EnT-19	TTTC	Electronics	Microprocessor lab	Analog & Digital Electronics Trainer	4	B
404	TTTC-EnT-13	TTTC	Electronics	Basic Electronics ,Advance Electronics lab	Analog Electronics Trainer with Different Module	4	C
405	TTTC-EnT-09	TTTC	Electronics	Basic Electronics ,Advance Electronics lab	Function Generator	10	C
406	TTTC-EnT-07	TTTC	Electronics	Basic Electronics ,Advance Electronics lab	AF Signal Generator	4	C
407	TTTC-EnT-06	TTTC	Electronics	Basic Electronics ,Microprocessor,Advance Electronics lab	Dual Trace Digital Storage Oscilloscope 100MHz	10	C
408	TTTC-EnT-03	TTTC	Electronics	Basic Electronics ,Microprocessor,Advance Electronics lab	Dual Trace Digital Storage Oscilloscope 200MHz	10	C
409	TTTC-EnT-58	TTTC	Electronics	Advance Electronics lab	ECG Machine	1	C
410	TTTC-EnT-59	TTTC	Electronics	Advance Electronics lab	X-Ray Machine	1	C
411	TTTC-EnT-60	TTTC	Electronics	Advance Electronics lab	Digital Colordoppler 3D/4D	1	C
412	TTTC-EnT-61	TTTC	Electronics	Advance Electronics lab	Calorimeter	2	C
413	TTTC-EnT-01	TTTC	Electronics	Basic Electronics,Advance Electronics lab	AVO meter(analog)	25	C
414	TTTC-EnT-AIII	TTTC	Electronics		DC Servo System Trainer	4 (2)	A
415	TTTC-EnT-AII2	TTTC	Electronics		RF Signal generator	8	B
416	TTTC-MT-189	TTTC	Mechanical	Manufacturing Process Laboratory	CNC Lathe Machine	1	A
417	TTTC-MT-195	TTTC	Mechanical	Manufacturing Process Laboratory	Desktop Milling Machine	7	A
418	TTTC-MT-199	TTTC	Mechanical	Manufacturing Process Laboratory	3D Printer -Plastic	1	A
419	TTTC-MT-12	TTTC	Mechanical	Fluid Mechanics Lab	Digital Hydraulic Bench	3	A
420	TTTC-MT-04	TTTC	Mechanical	Fluid Mechanics Lab	Pelton Turbine	1	A
421	TTTC-MT-03	TTTC	Mechanical	Fluid Mechanics Lab	Francis Turbine	1	A
422	TTTC-MT-25	TTTC	Mechanical	Fluid Mechanics Lab	Centrifugal Pump Module	1	A
423	TTTC-MT-31	TTTC	Mechanical	Fluid Mechanics Lab	Positive Displacement Pump Module	1	A
424	TTTC-MT-26	TTTC	Mechanical	Fluid Mechanics Lab	Universal Dynamometer	2	A
425	TTTC-MT-05	TTTC	Mechanical	Fluid Mechanics Lab	Fluid Friction Apparatus	1	A
426	TTTC-MT-32	TTTC	Mechanical	Fluid Mechanics Lab	Piston Pump	1	A
427	TTTC-MT-01	TTTC	Mechanical	Fluid Mechanics Lab	Two Stage Series and Parallel Pumps	1	A
428	TTTC-MT-02	TTTC	Mechanical	Fluid Mechanics Lab	Analogue Pressure Display	1	A
429	TTTC-MT-08	TTTC	Mechanical	Fluid Mechanics Lab	Flow Measurement Methods	1	A
430	TTTC-MT-06	TTTC	Mechanical	Fluid Mechanics Lab	Bernoulli's Theorem	1	A
431	TTTC-MT-15	TTTC	Mechanical	Fluid Mechanics Lab	Flow Meter Calibration	1	A
432	TTTC-MT-16	TTTC	Mechanical	Fluid Mechanics Lab	Pitot Tube	1	A
433	TTTC-MT-17	TTTC	Mechanical	Fluid Mechanics Lab	Venturi Flow Meter	1	A
434	TTTC-MT-18	TTTC	Mechanical	Fluid Mechanics Lab	Orifice Flow Meter	1	A
435	TTTC-MT-37	TTTC	Mechanical	Fluid Mechanics Lab	Impact of A Jet	1	A
436	TTTC-MT-86	TTTC	Mechanical	Material Testing Laboratory	Universal Hardness Tester	1	A
437	TTTC-MT-76	TTTC	Mechanical	Material Testing Laboratory	Universal Testing Machine	1	A
438	TTTC-MT-77	TTTC	Mechanical	Material Testing Laboratory	Double Shear	1	A
439	TTTC-MT-80	TTTC	Mechanical	Material Testing Laboratory	Coil Spring	1	A
440	TTTC-MT-81	TTTC	Mechanical	Material Testing Laboratory	Beam and Leaf Spring	1	A
441	TTTC-MT-82	TTTC	Mechanical	Material Testing Laboratory	Extensometer	2	A
442	TTTC-MT-84	TTTC	Mechanical	Material Testing Laboratory	Tensile Specimens (TH)	3	A
443	TTTC-MT-85	TTTC	Mechanical	Material Testing Laboratory	Energy Absorbed at Fracture	1	A
444	TTTC-MT-92	TTTC	Mechanical	Material Testing Laboratory	Torsion Testing Machine (30 Nm)	1	A
445	TTTC-MT-93	TTTC	Mechanical	Material Testing Laboratory	Torsiometer	2	A
446	TTTC-MT-94	TTTC	Mechanical	Material Testing Laboratory	Test Specimen (TR)	2	A
447	TTTC-MT-68	TTTC	Mechanical	Mechanics Laboratory	Engineering Science Full Set	2	A
448	TTTC-MT-69	TTTC	Mechanical	Mechanics Laboratory	Spare Parts (ESX)	2	A
449	TTTC-MT-70	TTTC	Mechanical	Mechanics Laboratory	Weight Sets (WT and WTL)	2	A
450	TTTC-MT-71	TTTC	Mechanical	Mechanics Laboratory	Tensile Test Specimen (MTT)	2	A
451	TTTC-MT-60	TTTC	Mechanical	Mechanics Laboratory	Structures Test Frame	3	A
452	TTTC-MT-61	TTTC	Mechanical	Mechanics Laboratory	Digital Force Display	3	A
453	TTTC-MT-62	TTTC	Mechanical	Mechanics Laboratory	Automatic Data Acquisition Unit	3	A
454	TTTC-MT-63	TTTC	Mechanical	Mechanics Laboratory	Bending Moments in a Beam	1	A
455	TTTC-MT-64	TTTC	Mechanical	Mechanics Laboratory	Shear Force in A Beam	1	A
456	TTTC-MT-65	TTTC	Mechanical	Mechanics Laboratory	Deflection of Beams and Cantilevers	1	A
457	TTTC-MT-72	TTTC	Mechanical	Mechanics Laboratory	Hooke's Law and Spring Rate	1	A
458	TTTC-MT-146	TTTC	Mechanical	Mechanics of Mchinery Lab	Static and Dynamic Balancing	1	A
459	TTTC-MT-147	TTTC	Mechanical	Mechanics of Mchinery Lab	Gyroscope	1	A
460	TTTC-MT-148	TTTC	Mechanical	Mechanics of Mchinery Lab	Centrifugal Force	1	A
461	TTTC-MT-149	TTTC	Mechanical	Mechanics of Mchinery Lab	Geared Systems	1	A
462	TTTC-MT-150	TTTC	Mechanical	Mechanics of Mchinery Lab	Toothed Belt Drive Unit	1	A
463	TTTC-MT-154	TTTC	Mechanical	Mechanics of Mchinery Lab	Governors	1	A
464	TTTC-MT-165	TTTC	Mechanical	Refrigeration Lab	Refrigeration Cycle	1	A
465	TTTC-MT-106	TTTC	Mechanical	Refrigeration Lab	Air Conditioning Trainer	1	A
466	TTTC-MT-168	TTTC	Mechanical	Refrigeration Lab	Cooling Towers	1	A
467	TTTC-MT-169	TTTC	Mechanical	Refrigeration Lab	Cooling Column Type A	1	A
468	TTTC-MT-48	TTTC	Mechanical	Heat Engine Laboratory	Small Engine Test Set	2	A
469	TTTC-MT-49	TTTC	Mechanical	Heat Engine Laboratory	Modified 4 Stroke Petrol Engine	1	A
470	TTTC-MT-50	TTTC	Mechanical	Heat Engine Laboratory	Modified 4 Stroke Diesel Engine	1	A
471	TTTC-MT-51	TTTC	Mechanical	Heat Engine Laboratory	Manual Volumetric Fuel Gauge	2	A
472	TTTC-MT-55	TTTC	Mechanical	Heat Engine Laboratory	Exhaust Gas Calorimeter	2	A
473	TTTC-MT-52	TTTC	Mechanical	Heat Engine Laboratory	Engine Cycle Analyzer	2	A
474	TTTC-MT-53	TTTC	Mechanical	Heat Engine Laboratory	Cylinder Head Pressure Transducer	2	A
475	TTTC-MT-54	TTTC	Mechanical	Heat Engine Laboratory	Crank Angle Shaft Encoder	2	A
476	TTTC-MT-174	TTTC	Mechanical	Metallurgy Laboratory	Benchtop OES Metal Analyzer	1	B
477	TTTC-MT-133	TTTC	Mechanical	Heat Transfer and Thermodynamics Laboratory	Ideal Gases - Boyle's Law	1	B
478	TTTC-MT-134	TTTC	Mechanical	Heat Transfer and Thermodynamics Laboratory	Ideal Gases - Gay-Lussac's Law	1	B
479	TTTC-MT-45	TTTC	Mechanical	Fluid Mechanics Lab	Standard Laptop (A)	4	B
480	TTTC-MT-73	TTTC	Mechanical	Mechanics Laboratory	Standard Laptop (B)	3	B
481	TTTC-MT-102	TTTC	Mechanical	Material Testing Laboratory	Standard Laptop ©	3	C
482	TTTC-MT-124	TTTC	Mechanical	Heat Transfer and Thermodynamics Laboratory	Heat Transfer Experiment Base Unit	1	C

Ser.No.	Req.No.	Institute	Technology	Laboratory	Equipment Name	Quantity*	Priority**
483	TTTC-MT-125	TTTC	Mechanical	Heat Transfer and Thermodynamics Laboratory	Linear Heat Conduction Experiment	1	C
484	TTTC-MT-129	TTTC	Mechanical	Heat Transfer and Thermodynamics Laboratory	Water to Air Heat Exchangers	1	C
485	TTTC-MT-131	TTTC	Mechanical	Heat Transfer and Thermodynamics Laboratory	16 Tube Finned Heat Exchanger	1	C
486	TTTC-MT-142	TTTC	Mechanical	Heat Transfer and Thermodynamics Laboratory	Data Acquisition system (Frame Mounted)	2	C
487	TTTC-MT-205	TTTC	Mechanical	Welding Laboratory	Multi-Function Ultrasonic Metal Welding Machine	1	C
488	TTTC-MT-207	TTTC	Mechanical	Welding Laboratory	Submerged Arc Welding Machine	2	C
489	TTTC-MT-206	TTTC	Mechanical	Welding Laboratory	Three Phase MMA- 601Cellulosic Electronic Arc Welding Machine	5	C
490	TTTC-MT-208	TTTC	Mechanical	Welding Laboratory	Optical Pyrometer	2	C
491	TTTC-MT-33	TTTC	Mechanical	Fluid Mechanics Lab	Gear Pump	1	C
492	TTTC-MT-27	TTTC	Mechanical	Fluid Mechanics Lab	Optical Tachometer	2	C
493	TTTC-MT-29	TTTC	Mechanical	Fluid Mechanics Lab	Water Velocity Meter	1	C
494	TTTC-MT-38	TTTC	Mechanical	Fluid Mechanics Lab	Additional Impact Plates	1	C
495	TTTC-MT-78	TTTC	Mechanical	Material Testing Laboratory	Brinell Indenter	1	C
496	TTTC-MT-79	TTTC	Mechanical	Material Testing Laboratory	Hardness Specimens (HTP)	1	C
497	TTTC-MT-83	TTTC	Mechanical	Material Testing Laboratory	Support Table and Cupboard	1	C
498	TTTC-MT-87	TTTC	Mechanical	Material Testing Laboratory	Test Block	1	C
499	TTTC-MT-110	TTTC	Mechanical	Refrigeration Lab	Cooling Column Type B	1	C
500	TTTC-MT-ANI	TTTC	Mechanical		Data Acquisition system (Bench Mounted)	12	A
501	TTTC-CmT-02	TTTC	Computer	ICT Lab-202	3D Printer	2	A
502	TTTC-CmT-04	TTTC	Computer	ICT Lab-206	All in One PC (A)	10	A
503	TTTC-CmT-05	TTTC	Computer	ICT Lab-205	All in One PC (B)	10	A
504	TTTC-CmT-06	TTTC	Computer	ICT Lab-206	Laptop PC	10	A
505	TTTC-CmT-07	TTTC	Computer	ICT Lab-202	Windows Server Software	2	A
506	TTTC-CmT-08	TTTC	Computer	ICT Lab-202	Server	2	A
507	TTTC-CmT-09	TTTC	Computer	ICT Lab-202	Router (A)	2	A
508	TTTC-CmT-10	TTTC	Computer	ICT Lab-202	Router (B)	8	A
509	TTTC-CmT-11	TTTC	Computer	ICT Lab-202	Network Switch (A)	8	A
510	TTTC-CmT-12	TTTC	Computer	ICT Lab-202	Network Switch (B)	8	A
511	TTTC-CmT-13	TTTC	Computer	ICT Lab-202	Access Point	8	A
512	TTTC-CmT-14	TTTC	Computer	Microprocessor Lab-204	Raspberry Pi 4 Model B	10	A
513	TTTC-CmT-15	TTTC	Computer	Microprocessor Lab-204	Raspberry Pi 3 Model B (A)	10	A
514	TTTC-CmT-16	TTTC	Computer	Microprocessor Lab-204	Raspberry Pi 3 Model A+	10	A
515	TTTC-CmT-17	TTTC	Computer	Microprocessor Lab-204	Raspberry Pi 3 Model B+	10	A
516	TTTC-CmT-18	TTTC	Computer	Microprocessor Lab-204	Raspberry Pi 3 Model B (B)	10	A
517	TTTC-CmT-19	TTTC	Computer	Microprocessor Lab-204	Raspberry Pi 2 Model B	10	A
518	TTTC-CmT-20	TTTC	Computer	Microprocessor Lab-204	Raspberry Pi 1 Model B+	10	A
519	TTTC-CmT-21	TTTC	Computer	Microprocessor Lab-204	Raspberry Pi 1 Model A+	10	A
520	TTTC-CmT-22	TTTC	Computer	Microprocessor Lab-204	Raspberry Pi Zero W	10	A
521	TTTC-CmT-23	TTTC	Computer	Microprocessor Lab-204	Raspberry Pi Zero	10	A
522	TTTC-CmT-30	TTTC	Computer	ICT Lab-202	Server Rack	2	A
523	TTTC-CmT-32	TTTC	Computer	Room 202,206,208,313,2003, 2001, 4001,4004	Multimedia Projector	2	A
524	TTTC-CmT-35	TTTC	Computer	ICT Lab-202	Basic Fiber Optics Trainer	2	A
525	TTTC-CmT-36	TTTC	Computer	ICT Lab-202	Fiber tool kits including F7 Fusion Splicer	2	A
526	TTTC-CmT-37	TTTC	Computer	ICT Lab-202	Optical Power Meter	8	A
527	TTTC-CmT-38	TTTC	Computer	Microprocessor Lab-204	Educational Microcontroller Trainer Kit	8	A
528	TTTC-CmT-42	TTTC	Computer	Microprocessor Lab-204	Sensor Package	8	A
529	TTTC-CmT-43	TTTC	Computer	Microprocessor Lab-204	Sensor Trainer Kit	8	A
530	TTTC-CmT-44	TTTC	Computer	Microprocessor Lab-204	Single Board Computer	8	A
531	TTTC-CmT-45	TTTC	Computer	Microprocessor Lab-204	Single-board microcontroller	8	A
532	TTTC-CmT-46	TTTC	Computer	Microprocessor Lab-204	Lynxmotion AL5D PLTW Robotic Arm Kit	3	A
533	TTTC-CmT-47	TTTC	Computer	Microprocessor Lab-204	Personal Writing & Drawing Robot	3	A
534	TTTC-CmT-48	TTTC	Computer	Microprocessor Lab-204	Educational Programmable Robot	3	A
535	TTTC-CmT-49	TTTC	Computer	Microprocessor Lab-204	Humanoid Robot	3	A
536	TTTC-CmT-50	TTTC	Computer	Microprocessor Lab-204	VPN ROUTER	5	A
537	TTTC-CmT-51	TTTC	Computer	ICT Lab-202	Cisco Firepower	5	A
538	TTTC-CmT-01	TTTC	Computer	Room 202,206,208,313,2003, 2001, 4001,4004	Interactive Flat Panel / Big Touch Screen PC	4	B
539	TTTC-CmT-03	TTTC	Computer	ICT Lab-202	Professional Camcorder	1	B
540	TTTC-CmT-24	TTTC	Computer	Microprocessor Lab-204	Arduino Entry Level	10	B
541	TTTC-CmT-25	TTTC	Computer	Microprocessor Lab-204	Arduino Education	10	B
542	TTTC-CmT-26	TTTC	Computer	Microprocessor Lab-204	Arduino IoT	10	B

Annex 4

JAPANESE GRANT

The Japanese Grant is non-reimbursable fund provided to a recipient country (hereinafter referred to as "the Recipient") to purchase the products and/or services (engineering services and transportation of the products, etc.) for its economic and social development in accordance with the relevant laws and regulations of Japan. Followings are the basic features of the project grants operated by JICA (hereinafter referred to as "Project Grants").

1. Procedures of Project Grants

Project Grants are conducted through following procedures (See "PROCEDURES OF JAPANESE GRANT" for details):

(1) Preparation

- The Preparatory Survey (hereinafter referred to as "the Survey") conducted by JICA

(2) Appraisal

-Appraisal by the government of Japan (hereinafter referred to as "GOJ") and JICA, and Approval by the Japanese Cabinet

(3) Implementation

Exchange of Notes

-The Notes exchanged between the GOJ and the government of the Recipient

Grant Agreement (hereinafter referred to as "the G/A")

-Agreement concluded between JICA and the Recipient

Banking Arrangement (hereinafter referred to as "the B/A")

-Opening of bank account by the Recipient in a bank in Japan (hereinafter referred to as "the Bank") to receive the grant

Construction works/procurement

-Implementation of the project (hereinafter referred to as "the Project") on the basis of the G/A

(4) Ex-post Monitoring and Evaluation

-Monitoring and evaluation at post-implementation stage

2. Preparatory Survey

(1) Contents of the Survey

The aim of the Survey is to provide basic documents necessary for the appraisal of the the Project made by the GOJ and JICA. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of

relevant agencies of the Recipient necessary for the implementation of the Project.

- Evaluation of the feasibility of the Project to be implemented under the Japanese Grant from a technical, financial, social and economic point of view.
- Confirmation of items agreed between both parties concerning the basic concept of the Project.
- Preparation of an outline design of the Project.
- Estimation of costs of the Project.
- Confirmation of Environmental and Social Considerations

The contents of the original request by the Recipient are not necessarily approved in their initial form. The Outline Design of the Project is confirmed based on the guidelines of the Japanese Grant.

JICA requests the Recipient to take measures necessary to achieve its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the executing agency of the Project. Therefore, the contents of the Project are confirmed by all relevant organizations of the Recipient based on the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Survey, JICA contracts with (a) consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

(3) Result of the Survey

JICA reviews the report on the results of the Survey and recommends the GOJ to appraise the implementation of the Project after confirming the feasibility of the Project.

3. Basic Principles of Project Grants

(1) Implementation Stage

1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the Exchange of Notes (hereinafter referred to as "the E/N") will be singed between the GOJ and the Government of the Recipient to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Recipient to define the necessary articles, in accordance with the E/N, to implement the Project, such as conditions of disbursement, responsibilities of the Recipient, and procurement conditions. The terms and conditions generally applicable to the Japanese Grant are stipulated in the "General Terms and Conditions for Japanese Grant (January 2016)."

2) Banking Arrangements (B/A) (See "Financial Flow of Japanese Grant (A/P Type)" for details)

a) The Recipient shall open an account or shall cause its designated authority to open an account under the name of the Recipient in the Bank, in principle. JICA will disburse the Japanese Grant in Japanese yen for the Recipient to cover the obligations incurred by the Recipient under the verified contracts.

b) The Japanese Grant will be disbursed when payment requests are submitted by the Bank to JICA under an Authorization to Pay (A/P) issued by the Recipient.

3) Procurement Procedure

The products and/or services necessary for the implementation of the Project shall be procured in accordance with JICA's procurement guidelines as stipulated in the G/A.

4) Selection of Consultants

In order to maintain technical consistency, the consulting firm(s) which conducted the Survey will be recommended by JICA to the Recipient to continue to work on the Project's implementation after the E/N and G/A.

5) Eligible source country

In using the Japanese Grant disbursed by JICA for the purchase of products and/or services, the eligible source countries of such products and/or services shall be Japan and/or the Recipient. The Japanese Grant may be used for the purchase of the products and/or services of a third country as eligible, if necessary, taking into account the quality, competitiveness and economic rationality of products and/or services necessary for achieving the objective of the Project. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm, which enter into contracts with the Recipient, are limited to "Japanese nationals", in principle.

6) Contracts and Concurrence by JICA

The Recipient will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be concurred by JICA in order to be verified as eligible for using the Japanese Grant.

7) Monitoring

The Recipient is required to take their initiative to carefully monitor the progress of the Project in order to ensure its smooth implementation as part of their responsibility in the G/A, and to regularly report to JICA about its status by using the Project Monitoring Report (PMR).

8) Safety Measures

The Recipient must ensure that the safety is highly observed during the implementation of the Project.

9) Construction Quality Control Meeting

Construction Quality Control Meeting (hereinafter referred to as the "Meeting") will be held for quality assurance and smooth implementation of the Works at each stage of the Works. The member of the Meeting will be composed by the

Recipient (or executing agency), the Consultant, the Contractor and JICA. The functions of the Meeting are as followings:

a) Sharing information on the objective, concept and conditions of design from the Contractor, before start of construction.

b) Discussing the issues affecting the Works such as modification of the design, test, inspection, safety control and the Client's obligation, during of construction.

(2) Ex-post Monitoring and Evaluation Stage

1) After the project completion, JICA will continue to keep in close contact with the Recipient in order to monitor that the outputs of the Project is used and maintained properly to attain its expected outcomes.

2) In principle, JICA will conduct ex-post evaluation of the Project after three years from the completion. It is required for the Recipient to furnish any necessary information as JICA may reasonably request.

(3) Others

1) Environmental and Social Considerations

The Recipient shall carefully consider environmental and social impacts by the Project and must comply with the environmental regulations of the Recipient and JICA Guidelines for Environmental and Social Considerations (April, 2010).

2) Major undertakings to be taken by the Government of the Recipient

For the smooth and proper implementation of the Project, the Recipient is required to undertake necessary measures including land acquisition, and bear an advising commission of the A/P and payment commissions paid to the Bank as agreed with the GOJ and/or JICA. The Government of the Recipient shall ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the Recipient with respect to the purchase of the Products and/or the Services be exempted or be borne by its designated authority without using the Grant and its accrued interest, since the grant fund comes from the Japanese taxpayers.

3) Proper Use

The Recipient is required to maintain and use properly and effectively the products and/or services under the Project (including the facilities constructed and the equipment purchased), to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Japanese Grant.

4) Export and Re-export

The products purchased under the Japanese Grant should not be exported or re-exported from the Recipient.

PROCEDURES OF JAPANESE GRANT

Stage	Procedures	Remarks	Recipient Government	Japanese Government	JICA	Consultants	Contractors	Agent Bank
Official Request	Request for grants through diplomatic channel	Request shall be submitted before appraisal stage.	x	x				
1. Preparation	(1) Preparatory Survey Preparation of outline design and cost estimate		x		x	x		
2. Appraisal	(2)Preparatory Survey Explanation of draft outline design, including cost estimate, undertakings, etc.		x		x	x		
	(3)Agreement on conditions for implementation	Conditions will be explained with the draft notes (E/N) and Grant Agreement (G/A) which will be signed before approval by Japanese government.	x	x (E/N)	x (G/A)			
	(4) Approval by the Japanese cabinet			x				
3. Implementation	(5) Exchange of Notes (E/N)		x	x				
	(6) Signing of Grant Agreement (G/A)		x		x			
	(7) Banking Arrangement (B/A)	Need to be informed to JICA	x					x
	(8) Contracting with consultant and issuance of Authorization to Pay (A/P)	Concurrence by JICA is required	x			x		x
	(9) Detail design (D/D)		x			x		
	(10) Preparation of bidding documents	Concurrence by JICA is required	x			x		
	(11) Bidding	Concurrence by JICA is required	x			x	x	
	(12) Contracting with contractor/supplier and issuance of A/P	Concurrence by JICA is required	x				x	x
	(13) Construction works/procurement	Concurrence by JICA is required for major modification of design and amendment of contracts.	x			x	x	
	(14) Completion certificate		x			x	x	
4. Ex-post monitoring & evaluation	(15) Ex-post monitoring	To be implemented generally after 1, 3, 10 years of completion, subject to change	x		x			
	(16) Ex-post evaluation	To be implemented basically after 3 years of completion	x		x			

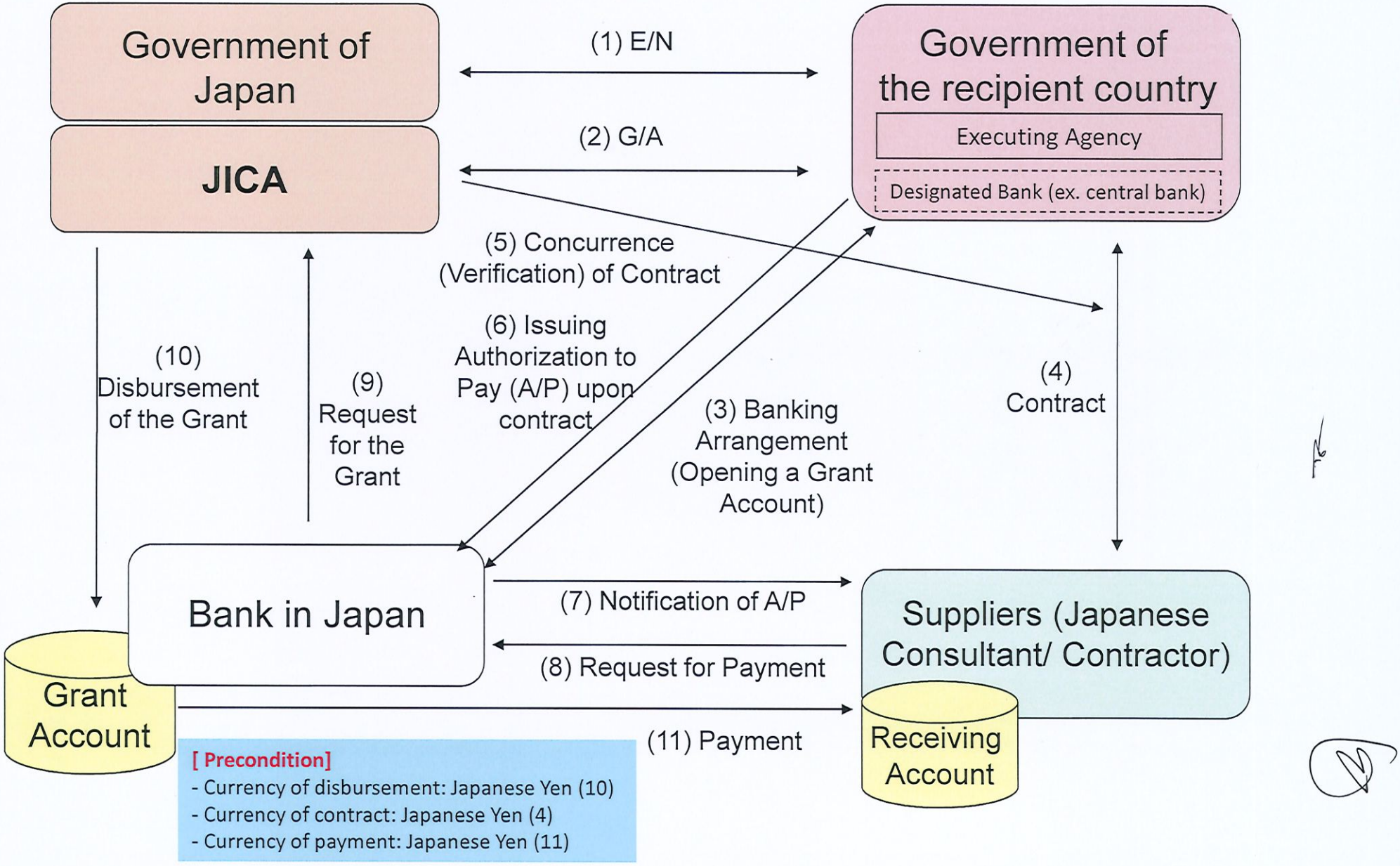
notes:

1. Project Monitoring Report and Report for Project Completion shall be submitted to JICA as agreed in the G/A.

2. Concurrence by JICA is required for allocation of grant for remaining amount and/or contingencies as agreed in the G/A.

ANNEX4_Japanese Grant_attachment2

Financial Flow of Japanese Grant (A/P Type)



Project Monitoring Report
on
Project Name
Grant Agreement No. XXXXXXX

20XX, Month

Organizational Information

Signer of the G/A (Recipient)	Person in Charge (Designation) _____ Contacts Address: _____ Phone/FAX: _____ Email: _____
Executing Agency	Person in Charge (Designation) _____ Contacts Address: _____ Phone/FAX: _____ Email: _____
Line Ministry	Person in Charge (Designation) _____ Contacts Address: _____ Phone/FAX: _____ Email: _____

General Information:

Project Title	
E/N	Signed date: Duration:
G/A	Signed date: Duration:
Source of Finance	Government of Japan: Not exceeding JPY _____ mil. Government of (_____): _____

1: Project Description

1-1 Project Objective

1-2 Project Rationale

- Higher-level objectives to which the project contributes (national/regional/sectoral policies and strategies)
- Situation of the target groups to which the project addresses

1-3 Indicators for measurement of "Effectiveness"

Quantitative indicators to measure the attainment of project objectives		
Indicators	Original (Yr)	Target (Yr)
Qualitative indicators to measure the attainment of project objectives		

2: Details of the Project

2-1 Location

Components	Original *(proposed in the outline design)*	Actual
1.		

2-2 Scope of the work

Components	Original* *(proposed in the outline design)*	Actual*
1.		

Reasons for modification of scope (if any).

(PMR)

2-3 Implementation Schedule

Items	Original		Actual
	(proposed in the outline design)	*(at the time of signing the Grant Agreement)*	

Reasons for any changes of the schedule, and their effects on the project (if any)

2-4 Obligations by the Recipient

2-4-1 Progress of Specific Obligations

See Attachment 2.

2-4-2 Activities

See Attachment 3.

2-4-3 Report on RD

See Attachment 11.

2-5 Project Cost

2-5-1 Cost borne by the Grant(Confidential until the Bidding)

Components			Cost (Million Yen)	
	Original *(proposed in the outline design)*	Actual *(in case of any modification)*	Original[1),2)] *(proposed in the outline design)*	Actual
	1.			
Total				

Note: 1) Date of estimation:
2) Exchange rate: 1 US Dollar = Yen

2-5-2 Cost borne by the Recipient

Components			Cost (1,000 Taka)	
	Original *(proposed in the outline design)*	Actual *(in case of any modification)*	Original[1),2)] *(proposed in the outline design)*	Actual
	1.			

Note: 1) Date of estimation:
2) Exchange rate: 1 US Dollar =

Reasons for the remarkable gaps between the original and actual cost, and the countermeasures (if any)

(PMR)

2-6 Executing Agency

- Organization's role, financial position, capacity, cost recovery etc,
- Organization Chart including the unit in charge of the implementation and number of employees.

Original *(at the time of outline design)* name: role: financial situation: institutional and organizational arrangement (organogram): human resources (number and ability of staff):
Actual *(PMR)*

2-7 Environmental and Social Impacts

- The results of environmental monitoring based on Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- The results of social monitoring based on in Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- Disclosed information related to results of environmental and social monitoring to local stakeholders (whenever applicable).

3: Operation and Maintenance (O&M)

3-1 Physical Arrangement

- Plan for O&M (number and skills of the staff in the responsible division or section, availability of manuals and guidelines, availability of spareparts, etc.)

Original *(at the time of outline design)*
Actual *(PMR)*

3-2 Budgetary Arrangement

- Required O&M cost and actual budget allocation for O&M

Original *(at the time of outline design)*

Actual *(PMR)*

4: Potential Risks and Mitigation Measures

- Potential risks which may affect the project implementation, attainment of objectives, sustainability
- Mitigation measures corresponding to the potential risks

Assessment of Potential Risks (*at the time of outline design)*

Potential Risks	Assessment
1. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
	Contingency Plan (if applicable):
2. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
	Contingency Plan (if applicable):
3. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:

	Contingency Plan (if applicable):
Actual Situation and Countermeasures	
(PMR)	

5: Evaluation and Monitoring Plan (after the work completion)

5-1 Overall evaluation

Please describe your overall evaluation on the project.

5-2 Lessons Learnt and Recommendations

Please raise any lessons learned from the project experience, which might be valuable for the future assistance or similar type of projects, as well as any recommendations, which might be beneficial for better realization of the project effect, impact and assurance of sustainability.

5-3 Monitoring Plan of the Indicators for Post-Evaluation

Please describe monitoring methods, section(s)/department(s) in charge of monitoring, frequency, the term to monitor the indicators stipulated in 1-3.

Attachment

1. Project Location Map
2. Specific obligations of the Recipient which will not be funded with the Grant
3. Monthly Report submitted by the Consultant

Appendix - Photocopy of Contractor's Progress Report (if any)
- Consultant Member List
- Contractor's Main Staff List

4. Check list for the Contract (including Record of Amendment of the Contract/Agreement and Schedule of Payment)
5. Environmental Monitoring Form / Social Monitoring Form
6. Monitoring sheet on price of specified materials (Quarterly)
7. Report on Proportion of Procurement (Recipient Country, Japan and Third Countries) (PMR (final)only)
8. Pictures (by JPEG style by CD-R) (PMR (final)only)
9. Equipment List (PMR (final)only)
10. Drawing (PMR (final)only)
11. Report on RD (After project)

Attachment 6

Monitoring sheet on price of specified materials

1. Initial Conditions (Confirmed)

	Items of Specified Materials	Initial Volume A	Initial Unit Price (¥) B	Initial total Price C=A×B	1% of Contract Price D	Condition of payment	
						Price (Decreased) E=C−D	Price (Increased) F=C+D
1	Item 1	●●t	●	●	●	●	●
2	Item 2	●●t	●	●	●		
3	Item 3						
4	Item 4						
5	Item 5						

2. Monitoring of the Unit Price of Specified Materials

(1) Method of Monitoring : ●●

(2) Result of the Monitoring Survey on Unit Price for each specified materials

	Items of Specified Materials	1st ●month, 2015	2nd ●month, 2015	3rd ●month, 2015	4th	5th	6th
1	Item 1						
2	Item 2						
3	Item 3						
4	Item 4						
5	Item 5						

(3) Summary of Discussion with Contractor (if necessary)

-

-

-

Report on Proportion of Procurement (Recipient Country, Japan and Third Countries)
(Actual Expenditure by Construction and Equipment each)

	Domestic Procurement (Recipient Country) A	Foreign Procurement (Japan) B	Foreign Procurement (Third Countries) C	Total D
Construction Cost	(A/D%)	(B/D%)	(C/D%)	
Direct Construction Cost	(A/D%)	(B/D%)	(C/D%)	
others	(A/D%)	(B/D%)	(C/D%)	
Equipment Cost	(A/D%)	(B/D%)	(C/D%)	
Design and Supervision Cost	(A/D%)	(B/D%)	(C/D%)	
Total	(A/D%)	(B/D%)	(C/D%)	

Annex 6

Major Undertakings to be taken by the Government of Bangladesh

1. Specific obligations of the Government of Bangladesh which will not be funded with the Grant

(1) Before the Tender

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To sign the banking arrangement (B/A) with a bank in Japan (the Agent Bank) to open bank account for the Grant	within 1 month after the signing of the G/A	MOF/ Bangladesh Bank/ DTE		
2	To issue A/P to the Agent Bank for the payment to the consultant	within 1 month after the signing of the contract(s)	MOF/ Bangladesh Bank/ DTE		
3	To bear the following commissions to the Agent Bank for the banking services based upon B/A				
4	1) Advising commission of A/P	within 1 month after the signing of the contract(s)	DTE	To be discussed	
5	2) Payment commission for A/P	every payment	DTE	To be discussed	
6	To secure and clear the land(s) for project sites as nessesity	before notice of the bidding documents	DTE		
7	To obtain the planning, zoning, building, and other required permit as nessesity	before notice of the bidding documents	DTE		
8	To submit Project Monitoring Report (with the result of Detailed Design)	before preparation of the bidding documents	DTE		
9	Prepare and approve DPP	Before the first expenditure by Bangladesh side is needed	DTE		

(2) During the Project Implementation

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To issue A/P to the Agent Bank for the payment to the supplier and the contractor	within 1 month after the signing of the contract(s)	MOF/ Bangladesh Bank/ DTE		
2	To bear the following commissions to the Agent Bank for the banking services based upon the B/A				
	1) Advising commission of A/P	within 1 month after the signing of the contract(s)	MOF/ Bangladesh Bank/ DTE		
	2) Payment commission for A/P	every payment	MOF/ Bangladesh Bank/ DTE		
3	To ensure prompt unloading and customs clearance at ports of disembarkation in the country of the Recipient and to assist the Supplier(s) with internal transportation therein	during the Project	DTE		
4	To accord Japanese physical persons and/or physical persons of third countries whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the country of the Recipient and stay therein for the performance of their work	during the Project	DTE		
5	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the products and/or the services be exempted.	during the Project	DTE		
6	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project	during the Project	DTE		
7	To notify JICA promptly of any incident or accident, which has, or is likely to have, a significant adverse effect on the environment, the affected communities, the public or workers.	during the construction	DTE		
8	To submit Project Monitoring Report after each work under the contract(s) such as shipping, hand over, installation and operational training	within 1 month after completion of each work	DTE		
	To submit Project Monitoring Report (final) (including as-built drawings, equipment list, photographs, etc.)	within 1 month after issuance of Certificate of Completion for the works under the contract(s)	DTE		
9	To submit a report concerning completion of the Project	within 6 months after completion of the Project	DTE		
10	To provide facilities for distribution of electricity, water supply and drainage and other incidental facilities necessary for the implementation of the Project outside the site(s)		DTE		

	Electricity including the distributing line to the site	before start of the construction	DTE		
	1) Water Supply The city water distribution main to the site	before start of the construction	DTE		
	2) Drainage The city drainage main (for storm, sewer and others) to the site	6 months before completion of the construction	DTE		
11	To provide equipment, furniture, facilities wchih is necessary for the implementation of the Project in the site(s) in the case it is needed	before start of the construction	DTE		
13	To ensure the safety of persons engaged in the implementation of the Project	during the Project	DTE		
14	To take necessary measures for security and safety of the Project site	during the construction	DTE		

(3) After the Project

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid 1) Allocation of maintenance cost 2) Operation and maintenance structure Routine check/Periodic inspection		DTE		

2. Other obligations of the Government of Bangladesh <u>funded with the Grant</u>

NO	Items	Deadline	Amount (Million Japanese Yen)*
1	To conduct the following transportation a) Marin (Air) transportation of the products from Japan and 3rd countries to the country of the Recipient b) Internal transportation from the port of disembarkation to the project site		
2	To procure equipment with installation and commissioning		
3	To implement detailed design, bidding support and procurement supervision (Consulting survies)		
	Total		XXX (To be updated)

* The Amount is provisional. This is subject to the approval of the Government of Japan.

4-2 Field Survey 2 (M/D)

Minutes of Discussions
on the Preparatory Survey for
the Project for Modernization of Polytechnic Institutes
(Explanation on Draft Preparatory Survey Report)

With reference to the Minutes of Discussions signed between Directorate of Technical Education, Technical and Madrasah Education Division of Ministry of Education (hereinafter referred to as "the Bangladesh side") and the Japan International Cooperation Agency (hereinafter referred to as "JICA") on 29 July 2021 and in response to the request from the Government of the People's Republic of Bangladesh (hereinafter referred to as "the Government of Bangladesh") dated 6 October 2021, JICA dispatched the Preparatory Survey Team (hereinafter referred to as "the Team") for the explanation of the Draft Preparatory Survey Report (hereinafter referred to as "the Draft Report") for the Project for Modernization of Polytechnic Institutes.

As a result of the discussions, both sides agreed on the main items described in the attached sheets.

Dhaka, 14 November 2021

KOMORI Takashi
Leader
Preparatory Survey Team
Japan International Cooperation Agency
Japan

14.11.2021

Md. Mohsin
Additional Secretary (Technical)
Technical and Madrasah Education Division
Ministry of Education
Bangladesh

14.11.2021

Dr. Md. Helal Uddin, ndc
Director General
Directorate of Technical Education
Technical and Madrasah Education Division
Ministry of Education
Bangladesh

Mr. Muhammad Ashraf Ali Faruk
Joint Secretary
Economic Relations Division
Ministry of Finance
Bangladesh

ATTACHMENT

1. Title of the Grant Project

Both sides confirmed to change the name of the grant project from "the Project for Modernization of Polytechnic Institutes" to "the Project for the Improvement of Equipment for Technical Education (hereinafter refer to as "the Project")". The reasons to change the name are that "the Project for Modernization of Polytechnic Institutes" does not specify the objective of the Project, and the Technical Teachers Training College is not a Polytechnic Institute.

Based on the above, both sides confirmed the title of the Preparatory Survey as "the Preparatory Survey for the Project for the Improvement of Equipment for Technical Education."

2. Objective of the Project

Both sides agreed that the objective of the Project is to improve technical education in Dhaka Polytechnic Institute, Dhaka Mohila Polytechnic Institute and Technical Teachers Training College by/through providing experimental practice equipment for innovative electrical, electronics, mechanical and computer technologies education, thereby contributing to develop the human resources that meet the needs of industry.

3. Project site

Both sides confirmed that the sites of the Project are all in Dhaka, which is shown in Annex 1.

4. Responsible authority for the Project

Both sides confirmed the authorities responsible for the Project are as follows:

4-1. The Directorate of Technical Education, Technical and Madrasah Education Division, Ministry of Education, will be the executing agency for the Project (hereinafter referred to as "the Executing Agency"). The Executing Agency shall coordinate with all the relevant authorities to ensure smooth implementation of the Project and ensure that the undertakings for the Project shall be managed by relevant authorities properly and on time. The organization charts are shown in Annex 2.

4-2. The line ministry of the Executing Agency is the Technical and Madrasah Education

Division, the Ministry of Education. The Technical and Madrasah Education Division, the Ministry of Education shall be responsible for supervising the Executing Agency on behalf of the Government of Bangladesh.

5. Contents of the Draft Report
After the explanation of the contents of the Draft Report by the Team, the Bangladesh side agreed to its contents. JICA will finalize the Preparatory Survey Report and the report will be sent to the Bangladesh side around February 2022. The Planned equipment is shown in Annex 3.

6. Cost estimate
Both sides confirmed that the cost estimate explained by the Team is provisional and will be examined further by the Government of Japan for its approval.

7. Confidentiality of the cost estimate and technical specifications
Both sides confirmed that the cost estimate and technical specifications of the Project should never be disclosed to any third parties until all the contracts under the Project are concluded.

8. Procedures and Basic Principles of Japanese Grant
The Bangladesh side agreed that the procedures and basic principles of the Japanese Grant (hereinafter referred to as "the Grant") as described in Annex 4 shall be applied to the Project. In addition, the Bangladesh side agreed to take necessary measures according to the procedures.

9. Timeline for the project implementation
The Team explained to the Bangladesh side that the expected timeline for the project implementation is as attached in Annex 5.

10. Expected outcomes and indicators
Both sides agreed that the key indicators for expected outcomes are as follows. The Bangladesh side will be responsible for the achievement of agreed key indicators targeted in year 2026 and shall monitor the progress for Ex-Post Evaluation based on those indicators.
[Quantitative indicators]

Indicator	Present Status(2021)	Target Year(2026) 【3 year after Project completion】
The number of students who use the major group-use equipment*(Total)		
Dhaka Polytechnic Institute (Person)	-	1,100
Dhaka Mohila Polytechnic Institute (Person)	-	200
Technical Teachers Training College(Person)	-	40
The number of subjects that use the major group-use equipment*(Total)		
Electrical/Electronics(Subjects)	-	20
Mechanical(Subjects)	-	10
Computer(Subjects)	-	10

*The major group-use equipment in the Project is shown as below.

Electrical: (DPI) Advanced Maintenance Electrician Training Equipment, Motor-Generator Set, Low-Transmission panel Equipment (TTTC include electronics) Electrical Power System Simulator, VFD/PLC Wiring Learning System, Industrial Power Electronics Trainer with Different Module

Electronics: (DPI) Power Electronics Trainer (A), Satellite Communication Trainer, Bio Medical Measurement System (DMPI) Basic Communication Trainer, Robot station with artificial vision system, X-Ray Machine

Mechanical: (DPI) Desktop Milling Machine, Two Stage Series and Parallel Pumps, Universal Testing Machine (TTTC) CNC Lathe Machine, Two Stage Series and Parallel Pumps, Air Conditioning Trainer

Computer: (DPI) Server for Networking Practices with Server Rack, Humanoid Robot, Laptop PC (DMPI) Data Communication Trainer, Sensor Trainer Kit, Desktop PC

[Qualitative indicators]

High-quality industrial personnel who meet the needs of industry are developed.

11. Ex-Post Evaluation

JICA will conduct ex-post evaluation after three (3) years from the project completion, in principle, with respect to five evaluation criteria (Relevance, Effectiveness, Efficiency, Impact, and Sustainability). The result of the evaluation will be publicized. The Bangladesh side is required to provide necessary support for the data collection.

12. Undertakings of the Project

Both sides confirmed the undertakings of the Project as described in Annex 6. With regard to exemption of customs duties, internal taxes and other fiscal levies as

stipulated in 1. (2) 5 of Annex 6, both sides confirmed that such customs duties, internal taxes and other fiscal levies, which shall be clarified in the bid documents by the Bangladesh side during the implementation stage of the Project.

The Bangladesh side assured to take the necessary measures and coordination including allocation of the necessary budget which are preconditions of implementation of the Project. It is further agreed that the costs are indicative, i.e. at Outline Design level. More accurate costs will be calculated at the Detailed Design stage.

Both sides also confirmed that the Annex 6 will be used as an attachment of the Grant Agreement (G/A).

Both sides confirmed that the Bangladesh side shall take necessary measures to ensure and maintain the security of the Project site and the persons related to the implementation of the Project, in cooperation with relevant authorities during the Project period. Such security measures shall reasonably reflect needs of the Consultant/the Contractors engaging in the Project, as shown in Annex 6.

Both sides agreed that in case the additional security cost would be necessary for the implementation of the Project, such cost shall be borne by the Government of Bangladesh without using the Grant.

13. Monitoring during the implementation

The Project will be monitored by the Executing Agency and reported to JICA by using the form of Project Monitoring Report (PMR) attached as Annex 7. The timing of submission of the PMR is described in Annex 6.

14. Project completion

Both sides confirmed that the project completes when all the equipment procured by the Grant is in operation. The completion of the Project will be reported to JICA promptly by the Executing Agency, but in any event not later than six months after completion of the Project.

15. Items and measures to be considered for the smooth implementation of the Project

Both sides confirmed the items and measures to be considered for the smooth implementation of the Project as follows:

(a) Preliminary Development Project Proposal (PDPP) and Development Project Proposal (DPP)

Both sides confirmed that Preliminary Development Project Proposal (PDPP) and Development Project Proposal (DPP) will be prepared and approved by the Government of Bangladesh to secure the budget for undertakings to be taken by the Government of Bangladesh which are shown in the Annex 6 for the smooth implementation of the Project. Both sides also confirmed that the Bangladesh side will take necessary measures to ensure the approval of the PDPP before December/2021 and approval of the DPP before February/2022. The Bangladesh side will prepare the DPP in parallel with the discussion between JICA and the Government of Japan. DPP shall be approved soon after the approval/pledge of the Government of Japan. The Bangladesh side shared status for PDPP that the Bangladesh side finished drafting the PDPP and will shortly submit to line Ministries for approval.

(b) Exemption from customs duties, taxes, and fiscal levies

Both sides confirmed that customs duties, internal taxes and other fiscal levies, which may be imposed in Bangladesh with respect to the purchase of the product and/or services, are to be exempted or borne by the Government of Bangladesh. The Method of Exemption/Payment: The Team explained that, in other Japanese grant projects in Bangladesh, executing agencies secured the all necessary budget before the project starts through DPP for the tax exemption/payment. The Bangladesh side took note of the Team's explanation. The Team also explained the Team's understanding of the process of exemption/payment of customs duties, taxes, and fiscal levies as Annex 8 based on the survey result. The Bangladesh side agreed to confirm within government about the process and report the result to JICA Bangladesh office before the signing of Grant Agreement of the Project.

(c) Educational facilities and equipment which is not covered by the Project

The Bangladesh side agreed to take the necessary measures to secure the budget for providing items that are not covered by the Project, which is shown in Annex6. Both sides agreed that DTE will be responsible to secure the suitable space for equipment, such as conducting anti dust measures, replacing windows, and putting curtains. In addition, both sides agreed that DTE will prepare the proper learning environment, such as lighting condition, furniture, and air conditioning. JICA side explain that, based on survey, total 55 rooms will be necessary for installation of all equipment. Both sides also confirmed that

components that can be included in the scope of installation work, such as the work of connecting the power supply to the equipment, will be covered by the Grant.

(d) Demolition of existing structures, equipment, facilities, and/or other preparatory works

Both sides confirmed that demolition of existing structures, equipment, facilities, and/or other preparatory works to install the new equipment through the Project, such as re-location of existing equipment, will be conducted by the Bangladesh side if necessary.

(e) Relation within the Government of Bangladesh

Both sides confirmed that the Bangladesh side will take the necessary measures, communication and discussion within the Government of Bangladesh, including Ministry of Finance, Bangladesh Bank, and Ministry of Industry for smooth implementation of the Project.

(f) Operation and maintenance of equipment

a. Budget allocation

Both sides confirmed the necessity of budget allocation by DTE to Dhaka Polytechnic Institute, Dhaka Mohila Polytechnic Institute and Technical Teachers Training College for operation and maintenance of the equipment procured by the Project. JICA explained that, based on the survey, the annual cost for operation and maintenance of newly provided equipment will be estimated $19,900 every year. JICA also explained that detail cost break down will be written in Preparatory Survey Report. The Bangladesh side took note.

b. Staffing

Both sides agreed that operation and maintenance of equipment will be conducted by existing teachers in the targeted institutions. Both sides also confirmed that the Bangladesh side shall consider hiring additional personnel in the case existing teachers are not enough to operate and maintain all equipment. The Bangladesh side explained that 96 staffs for Dhaka Polytechnic Institute and 57 staffs for Dhaka Mohila Polytechnic Institute were newly hired in recent years.

(g) Procurement

Both sides agreed that the procurement will be conducted at the time when there is no impact on the class, for instance holidays. Both sides also agreed that some of the equipment which provided by the Project will be used in the Technical Cooperation Project named "Project for Improvement of Technical Education for Industrial Human Resources Development", so the Bangladesh side will consider starting using the procured equipment in sequence with the agreement between contractor and the Bangladesh side.

15-1 General Issues

15-1-1 Environmental Guidelines and Environmental Category

The Team explained that 'JICA Guidelines for Environmental and Social Considerations (April 2010)' (hereinafter referred to as "the Guidelines") is applicable for the Project. The Project is categorized as C because the Project is likely to have minimal adverse impact on the environment under the Guidelines.

16. Other Relevant Issues

16-1. Disclosure of Information

Both sides confirmed that the Preparatory Survey Report from which project cost is excluded will be disclosed to the public after completion of the Preparatory Survey. The comprehensive report including the project cost will be disclosed to the public after all the contracts under the Project are concluded.

16-2. Gender Mainstreaming

Both sides confirmed that gender mainstreaming should be duly practiced for the Project implementation as the Project is categorized as Gender Integrated Project (GIS). In particular, both sides agreed on the following gender elements to be integrated into the Project.

(a) To confirm that female students and female faculty members will not suffer any disadvantages when they use the procured equipment.
(b) To confirm that the contents of the training for the operation of the equipment will be considered on the premise of the participation of female students and female faculty members.
(c) Collection of information and gender-disaggregated data for gender ratio of students and faculty members, the number of graduates, and the number of employments.

(d) Collection of the comments on existing facilities and proposals for promoting female students to institutions, through the inspections of existing facilities and interviews with female students and female faculty members.

16-3 Disability Mainstreaming

Both sides confirmed that disability mainstreaming should be duly practiced for the Project implementation. In particular, both sides agreed on the following disability mainstreaming element to be integrated into the Project.

(a)To confirm that students and faculty members with disabilities will not suffer any disadvantages when they use the procured equipment.

16-4 Infectious Disease Control

Both sides agreed that infectious disease control measures will be conducted during the Project by the Bangladesh side, such as waring the mask and provide hand sanitizer during the installation of equipment

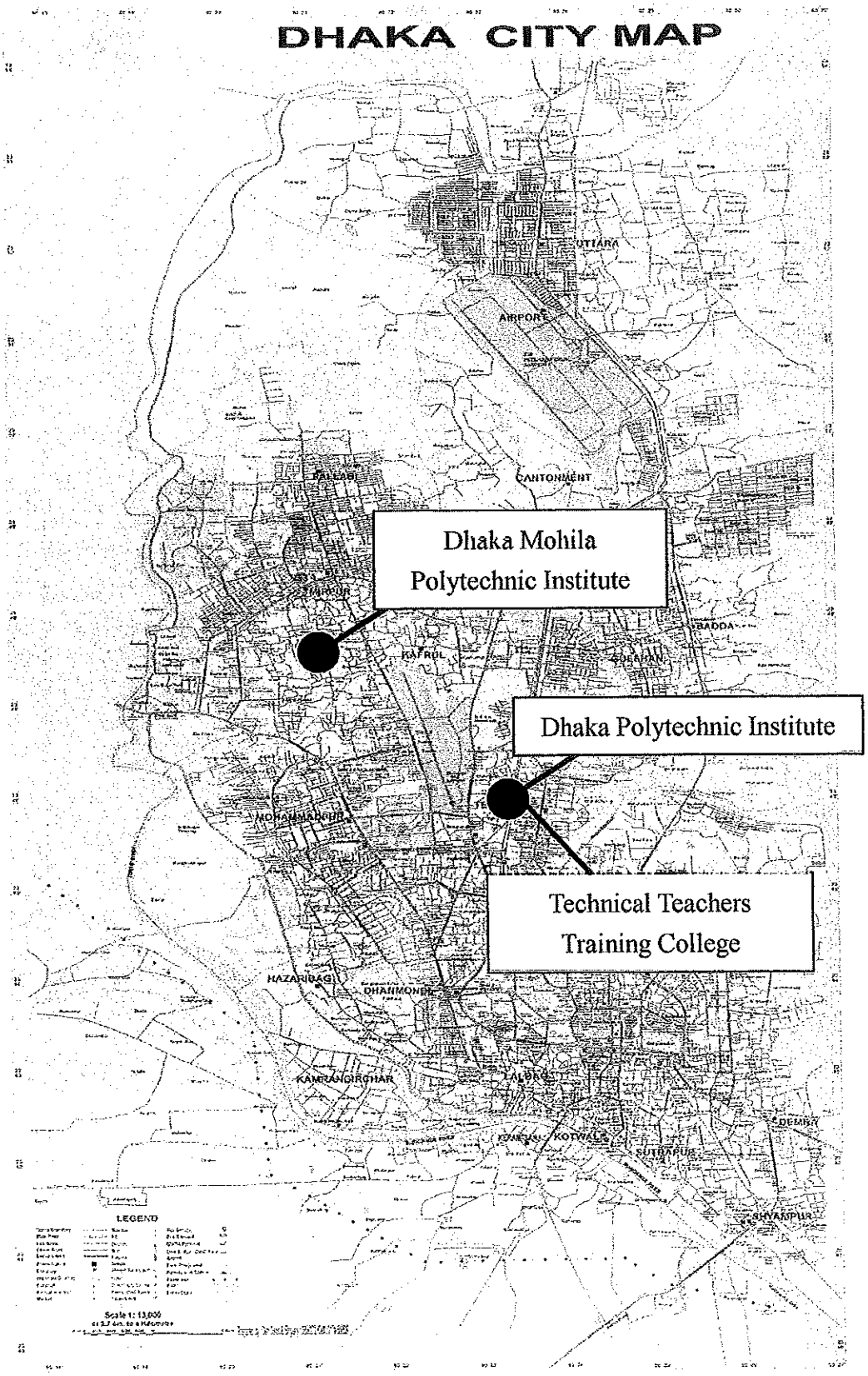
16-5 Recognition

Both side agreed to effectively publicize about both technical cooperation project and the Project through handover ceremony and/or installation of signboards that shows equipment is provided by Japanese Grant.

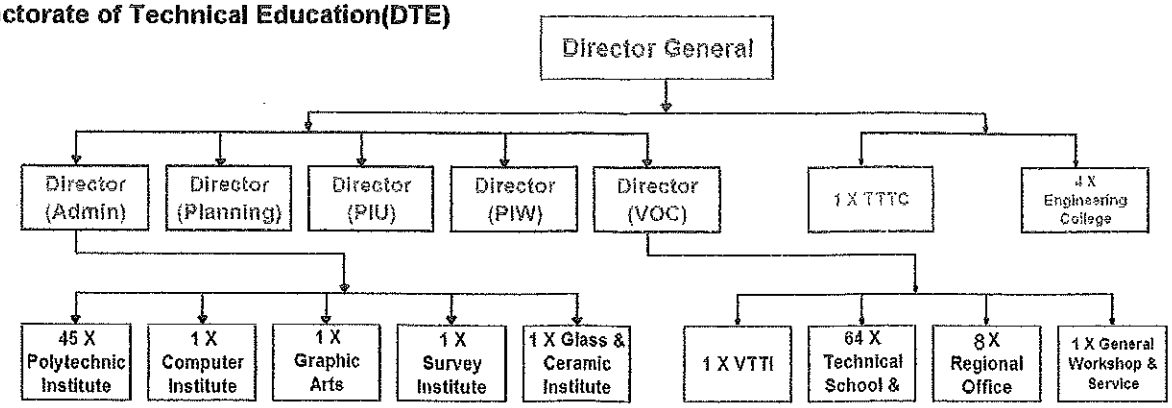
Annex 1	Project Sites
Annex 2	Organization Chart
Annex 3	Planned Equipment List
Annex 4	Procedures and Basic Principles of Japanese Grant
Annex 5	Project Implementation Schedule
Annex 6	Major Undertakings to be taken by the Government of Bangladesh
Annex 7	Project Monitoring Report (template)
Annex 8	Necessary Steps for Exemption of Customs Duties, Taxes, and Fiscal Levies

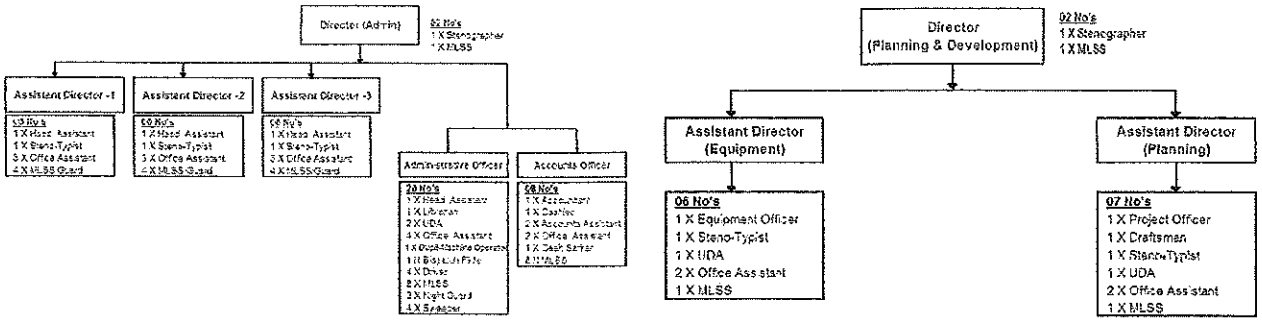
ANNEX1

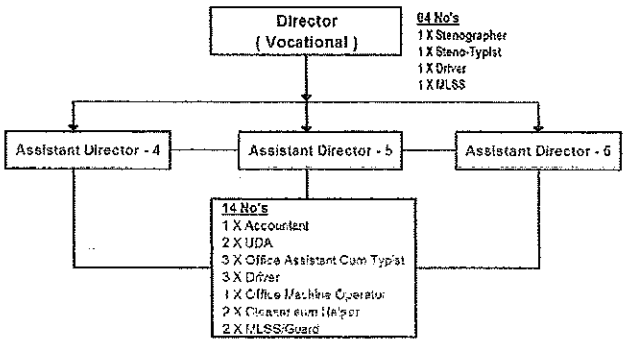
Project Sites

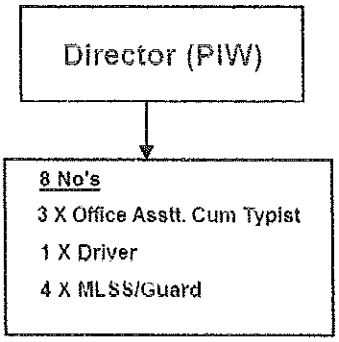


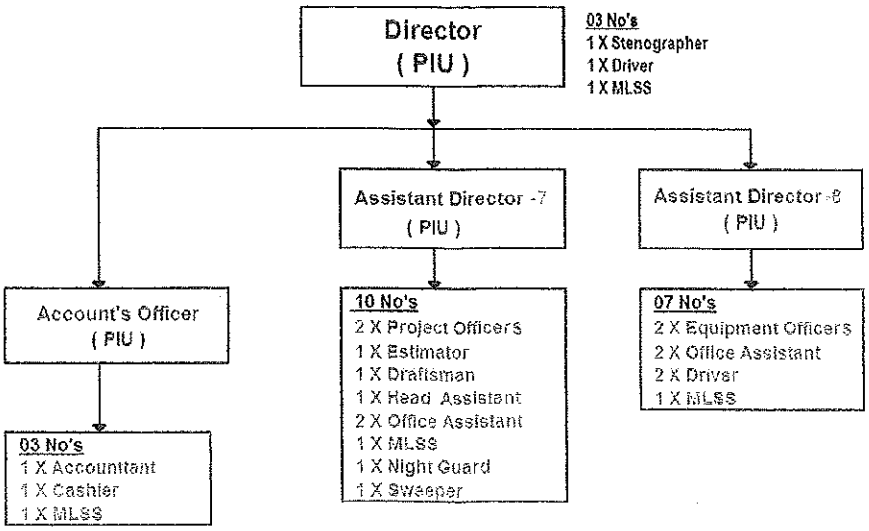
Directorate of Technical Education(DTE)











ANNEX 3

Planned Equipment List

Ser. No.	Req. No.	Equipment Name	Quantity
1	DPI-ET-12	Advanced Maintenance Electrician Training Equipment	2
2	DPI-ET-24	Magnetic Contactor	4
3	DPI-ET-31	Single Phase Analog Power Factor Meter	3
4	DPI-ET-48	Stepper Motor (Uni-polar Stepper motor)	2
5	DPI-ET-58	Washing Machine	1
6	DPI-ET-60	Air Conditioner	1
7	DPI-ET-23	Automatic-Star Delta Starter (DPI)	2
8	DPI-ET-32	Microwave Oven (DPI)	1
9	DPI-ET-36	Wheatstone Bridge Trainer Kit (DPI)	5
10	DPI-ET-07	Transformer Trainer	1
11	DPI-ET-11	Complete Renewable Energy Lab Trainer	1
12	DPI-ET-08	Drill Press	2
13	DPI-ET-13	Speed Control of AC Motor Trainer (DPI)	1
14	DPI-ET-14	Synchroscope (DPI)	1
15	DPI-ET-15	Multiple Terminals Trainer for Three Phase Motor	2
16	DPI-ET-16	3 Point / 04 Point Starter with DC Motor	1
17	DPI-ET-17	VFD-M AC Drives	2
18	DPI-ET-21	Hammer Drill	2
19	DPI-ET-22	Tool Set for Electrical Works	10
20	DPI-ET-27	Motor-Generator Set (DPI)	1
21	DPI-ET-28	Low-Transmission Pannel Equipment	1
22	DPI-ET-29	High-Transmission Pannel Equipment	1
23	DPI-ET-33	Rechargeable Battery (Lead Acid)	2
24	DPI-ET-38	Bench Drill Machine	2
25	DPI-ET-39	Industrial Scope Meter	1
26	DPI-ET-40	Multimedia Projector (DPI)	2
27	DPI-ET-44	LCR Meter (DPI-ET)	5
28	DPI-ET-47	Universal Motor (Transparent)	2
29	DPI-ET-53	Thermocoupler	2
30	DPI-EnT-47	Basic Energy Conversion Trainer (DPI)	4
31	DPI-EnT-48	Power Electronics Trainer (A)	2
32	DPI-EnT-49	Power Electronics Trainer (B)	1
33	DPI-EnT-65	Pattern Generator (DPI)	2
34	DPI-EnT-66	Digital HD TV Camera	1
35	DPI-EnT-67	HD Video Recording Camcorder (Black)	1
36	DPI-EnT-10	DC Millivoltmeter	10
37	DPI-EnT-40	AC Milliammeter	4
38	DPI-EnT-55	Q Meter	4
39	DPI-EnT-12	Analog Trainer	4
40	DPI-EnT-11	DC Milliammeter	10
41	DPI-EnT-143	Optical Fiber Trainer (DPI)	2
42	DPI-EnT-145	Satellite Communication Trainer (DPI)	1
43	DPI-EnT-151	Frequency Division Multiplexing Trainer Board (DPI)	4
44	DPI-EnT-154	Digital Communication Trainer (DPI)	4
45	DPI-EnT-156	PCM Trainer (DPI)	4
46	DPI-EnT-157	Frequency Modulation Trainer (DPI)	4
47	DPI-EnT-158	Fiber Optics Educational Kit (DPI)	4
48	DPI-EnT-159	Wireless HDMI Transmitter and Receiver Kit (DPI)	2
49	DPI-EnT-160	Mini PABX Intercom System with 6 telephone Set	1
50	DPI-EnT-155	Microwave Trainer (DPI)	1
51	DPI-EnT-153	Antenna Trainer (DPI)	4
52	DPI-EnT-152	Amplitutde Modulation Trainer (DPI)	4
53	DPI-EnT-150	Cellular Mobile Communication System (DPI)	2
54	DPI-EnT-144	Computer with Optical Fiber, HUB, Router and Switch Set	2
55	DPI-EnT-142	RF Power Meter	2
56	DPI-EnT-81	Analog and Digital Trainer	4
57	DPI-EnT-84	DSP Trainer	2
58	DPI-EnT-85	Advanced Analog & Digital Design Trainer	4
59	DPI-EnT-86	Advanced Digital Logic Circuits Trainer	4
60	DPI-EnT-83	Digital IC Trainer	4
61	DPI-EnT-180	Operational Amplifier Trainer (DPI)	4
62	DPI-EnT-195	Sensor Trainer	4
63	DPI-EnT-197	Biomedical Measurement System	1
64	DPI-EnT-198	ECG Machine (DPI)	1
65	DPI-EnT-199	Portable X-Ray Machine (DPI)	1
66	DPI-EnT-200	Digital Color Doppler 3D/4D	1
67	DPI-EnT-201	Colorimeter	2
68	DPI-EnT-211	LVDT Trainer (DPI)	2
69	DPI-EnT-214	Scintillation Counter	1
70	DPI-EnT-215	Geiger–Muller Counter	1

Ser. No.	Req. No.	Equipment Name	Quantity
71	DPI-EnT-All1	Analog AVO Meter	85
72	DPI-EnT-All2	Digital AVO Meter (DPI)	85
73	DPI-EnT-All3	Function generator	16
74	DPI-EnT-All4	Digital IC Tester (DPI)	6
75	DPI-EnT-All5	Dual Trace Digital Storage Oscilloscope (A) (DPI)	16
76	DPI-EnT-All6	AF Signal Generator (DPI)	12
77	DPI-EnT-All7	Dual Power Supply (DPI)	10
78	DPI-EnT-All8	Transistor Tester (DPI)	6
79	DPI-EnT-All9	Digital Frequency Counter (DPI)	10
80	DPI-EnT-All10	Dual Trace Digital Storage Oscilloscope (B) (DPI)	10
81	DPI-EnT-All11	Power Factor Meter	10
82	DPI-EnT-All12	Photo Meter	8
83	DPI-EnT-All13	RX Meter	8
84	DPI-EnT-All14	RF Signal Generator	8
85	DPI-EnT-All15	DC Power Supply	20
86	DPI-EnT-All16	Spectrum Analyzer	7
87	DPI-EnT-All17	Electronics VOM	8
88	DPI-EnT-All18	Energy Meter	10
89	DPI-EnT-All20	Soldering Iron Set	50
90	DPI-EnT-All21	AC Millivoltmeter	4
91	DPI-EnT-All24	Analog & Digital Electronics Trainer	8
92	DPI-EnT-All26	Portable Solar Trainer (DPI)	8
93	DPI-EnT-All27	LCR Meter (DPI-EnT)	18
94	DPI-EnT-All30	Microwave Power Meter (DPI)	2
95	DPI-EnT-All32	Arbitrary Function Generator	2
96	DPI-EnT-All33	Virtual Reality Kit With Headset	2
97	DPI-EnT-All34	Frequency Meter	8
98	DPI-EnT-All35	Watt Meter	2
99	DPI-EnT-All36	Basic Communication Trainer (DPI)	8
100	DPI-MT-188	CNC Lathe Machine (DPI)	1
101	DPI-MT-194	Desktop Milling Machine (DPI)	10
102	DPI-MT-198	3D Printer (DPI)	2
103	DPI-MT-12	Digital Hydraulic Bench (DPI)	2
104	DPI-MT-04	Pelton Turbine Module (DPI)	2
105	DPI-MT-03	Francis Turbine Module (DPI)	2
106	DPI-MT-25	Centrifugal & Positive Displacement Pump Module with Universal Dynamometer (DPI)	2
107	DPI-MT-05	Fluid Friction Trainer (DPI)	2
108	DPI-MT-32	Piston Pump Module (DPI)	2
109	DPI-MT-01	Two Stage Series and Parallel Pumps with Analogue Pressure Gauge (DPI)	2
110	DPI-MT-08	Flow Measurement Module (DPI)	2
111	DPI-MT-06	Bernoulli's Theorem (DPI)	2
112	DPI-MT-15	Flow Meter Calibration (DPI)	2
113	DPI-MT-16	Pitot Tube (DPI)	2
114	DPI-MT-17	Venturi Flow Meter (DPI)	2
115	DPI-MT-18	Orifice Flow Meter (DPI)	2
116	DPI-MT-37	Impact of a Jet Module (DPI)	2
117	DPI-MT-76	Universal Testing Machine (DPI)	2
118	DPI-CmT-03	Server for Software Lab Management with Server Rack	2
119	DPI-CmT-10	Server for Networking Practices with Server Rack	2
120	DPI-CmT-18	Basic Fiber Optics Trainer (DPI)	2
121	DPI-CmT-19	Fiber Tool Kit including F7 Fusion Splicer (DPI)	4
122	DPI-CmT-20	Optical Power Meter (DPI)	5
123	DPI-CmT-21	Data Communication Trainer (DPI)	2
124	DPI-CmT-25	Digital Electronics Educational Trainer Kit	8
125	DPI-CmT-26	8086 Microprocessor Training Kit (DPI)	8
126	DPI-CmT-27	Educational Microcontroller Trainer Kit (DPI)	8
127	DPI-CmT-29	Handheld Mini PCB Drill Machine	5
128	DPI-CmT-33	Laser Color Printer	3
129	DPI-CmT-38	Server for NTVQF Lab Management with Server Rack	1
130	DPI-CmT-45	Server for NTVQF Networking Practices with Server Rack	1
131	DPI-CmT-53	Server for IoT Lab with Server Rack	1
132	DPI-CmT-57	Sensor Package (DPI)	8
133	DPI-CmT-58	Sensor Trainer Kit (DPI)	4
134	DPI-CmT-59	Single Board Computer (DPI)	10
135	DPI-CmT-60	Single-board Microcontroller (DPI)	10
136	DPI-CmT-62	Robotic Arm Kit (DPI)	5
137	DPI-CmT-63	Personal Writing & Drawing Robot (DPI)	1
138	DPI-CmT-64	Educational Programmable Robot (DPI)	5
139	DPI-CmT-65	Humanoid Robot (DPI)	5
140	DPI-CmT-71	Server for CISCO Network Lab Practices with Server Rack	1
141	DPI-CmT-77	Wireless Controller / Access Point	2
142	DPI-CmT-78	24 Port Switch	5
143	DPI-CmT-79	POE Managed Switch	5
144	DPI-CmT-80	VPN Router (DPI)	4
145	DPI-CmT-81	Router with Network Security Function (DPI)	2

Ser. No.	Req. No.	Equipment Name	Quantity
146	DPI-CmT-All1	28-port Gigabit Managed SFP Switch	22
147	DPI-CmT-All2	Smart TV	7
148	DPI-CmT-All3	Access Point (DPI)	14
149	DPI-CmT-All4	Laptop PC (DPI)	100
150	DPI-CmT-All5	Desktop PC (A) (DPI)	40
151	DMPI-EnT-02	Digital Multimeter (AVO Meter)	5
152	DMPI-EnT-03	Dual Trace Digital Storage Oscilloscope (B) (DMPI)	2
153	DMPI-EnT-07	IPS	1
154	DMPI-EnT-09	Dual Trace Digital Storage Oscilloscope (A) (DMPI)	2
155	DMPI-EnT-12	Digital Frequency Counter (DMPI)	2
156	DMPI-EnT-13	Power Electronics Trainer	2
157	DMPI-EnT-14	Basic Communication Trainer (DMPI)	2
158	DMPI-EnT-15	Antenna Trainer (DMPI)	5
159	DMPI-EnT-20	Oxygen Concentrator	1
160	DMPI-EnT-21	Transistor Tester (DMPI)	5
161	DMPI-EnT-22	Portable Solar Trainer (DMPI)	4
162	DMPI-EnT-23	PCM Trainer (DMPI)	5
163	DMPI-EnT-24	Frequency Modulation Trainer (DMPI)	5
164	DMPI-EnT-25	Fiber Optics Educational Kit (DMPI)	5
165	DMPI-EnT-32	Raspberry Pi Arduino IOT Sensor Lab	5
166	DMPI-EnT-33	Arduino Starter Kit	5
167	DMPI-EnT-36	Laptop PC (DMPI-EnT)	2
168	DMPI-EnT-37	Desktop PC (A) (DMPI-EnT)	2
169	DMPI-EnT-38	Wireless HDMI Transmitter and Receiver Kit (DMPI)	2
170	DMPI-EnT-41	Robot Station with Artificial Vision (DMPI-EnT)	1
171	DMPI-EnT-45	Tool Set with Box	1
172	DMPI-EnT-46	Portable X-Ray Machine (DMPI)	1
173	DMPI-EnT-48	Fingertip Pulse Oximeter	5
174	DMPI-EnT-49	Handheld Pulse Oximeter	2
175	DMPI EnT-50	Wiselion Infrared Thermometer	10
176	DMPI-EnT-53	ECG Machine (DMPI)	1
177	DMPI-EnT-All1	LCR Meter (DMPI)	7
178	DMPI-EnT-All2	Dehumidifier	2
179	DMPI-EnT-All3	AC DC Dual Tracking Power Supply	4
180	DMPI-EnT-All4	Stepper Motor Trainer (DMPI)	1
181	DMPI-EnT-All5	AF Signal Generator (DMPI)	3
182	DMPI-EnT-All6	LVDT Trainer (DMPI)	2
183	DMPI-EnT-All7	Analog Multimeter (AVO Meter)	10
184	DMPI-CmT-01	Laptop PC (DMPI-CmT)	30
185	DMPI-CmT-03	Server (for Lab Management)	1
186	DMPI-CmT-22	Server for Networking Practices	1
187	DMPI-CmT-28	16 Channel NVR/DVR for Lab Pactices	5
188	DMPI-CmT-29	IP Camera for Lab Practices	20
189	DMPI-CmT-31	TV Monitor for NRV/DVR	5
190	DMPI-CmT-32	Basic Fiber Optics Trainer (DMPI)	4
191	DMPI-CmT-33	Fiber Tool Kit including F7 Fusion Splicer (DMPI)	2
192	DMPI-CmT-35	Data Communication Trainer (DMPI)	4
193	DMPI-CmT-44	1000BASE-T Copper SFP Module	120
194	DMPI-CmT-47	8086 Microprocessor Training Kit (DMPI)	12
195	DMPI-CmT-48	Educational Microcontroller Trainer Kit (DMPI)	10
196	DMPI-CmT-57	Robot Station with Artificial Vision (DMPI-CmT)	1
197	DMPI-CmT-58	Single-board Computer Learning Kit	10
198	DMPI-CmT-59	Sensor Module Kit forSingle-board Computer	20
199	DMPI-CmT-62	Server for NTVQF Networking Practices	1
200	DMPI-CmT-68	High-end Desktop Computer	5
201	DMPI-CmT-73	Sensor Package (DMPI)	10
202	DMPI-CmT-74	Sensor Trainer Kit (DMPI)	10
203	DMPI-CmT-75	Single Board Computer (DMPI)	5
204	DMPI-CmT-76	Single-board Microcontroller (DMPI)	5
205	DMPI-CmT-All1	Server Rack (DMPI)	1
206	DMPI-CmT-All2	28-port Gigabit Managed SFP Switch	6
207	DMPI-CmT-All3	Desktop PC (A) (DMPI-CmT)	30
208	TTTC-ET-23	Automatic-Star Delta Starter (TTTC)	4
209	TTTC-ET-27	Motor-Generator Set (TTTC)	1
210	TTTC-ET-30	Auto-Transformer	8
211	TTTC-ET-32	Microwave Oven (TTTC)	8
212	TTTC-ET-36	Wheatstone Bridge Trainer Kit (TTTC)	8
213	TTTC-ET-37	Electrical Power System Simulator	1
214	TTTC-ET-42	Electrical Circuits & Network Total Lab	4
215	TTTC-ET-61	3-Phase Variac	2
216	TTTC-ET-62	Single-Phase Variac	2
217	TTTC-ET-64	Single Phase Transformer Trainer	2
218	TTTC-ET-65	VFD/PLC Wiring Learning System	2
219	TTTC-ET-04	Laboratory DC Power Supply	8
220	TTTC-ET-13	Speed Control of AC Motor Trainer (TTTC)	2

Ser. No.	Req. No.	Equipment Name	Quantity
221	TTTC-ET-14	Synchroscope (TTTC)	4
222	TTTC-ET-02	Earth Tester	8
223	TTTC-ET-All1	3-Phase Transformer Trainer	3
224	TTTC-EnT-36	Arduino Microcontroller Trainer Board	10
225	TTTC-EnT-27	Operational Amplifier Trainer (TTTC)	4
226	TTTC-EnT-26	Industrial Power Electronics Trainer with Modules	4
227	TTTC-EnT-20	Digital IC Tester (TTTC)	10
228	TTTC-EnT-04	Dual Power Supply (TTTC)	10
229	TTTC-EnT-05	Variable DC Power Supply	10
230	TTTC-EnT-23	Portable Solar Trainer (TTTC)	4
231	TTTC-EnT-21	Transistor Tester (TTTC)	10
232	TTTC-EnT-22	Pattern Generator (TTTC)	4
233	TTTC-EnT-31	Programable Logic Control Trainer with Modules	2
234	TTTC-EnT-39	Microwave Power Meter (TTTC)	10
235	TTTC-EnT-40	Optical Fiber Trainer (TTTC)	4
236	TTTC-EnT-43	Frequency Division Multiplexing Trainer Board (TTTC)	4
237	TTTC-EnT-48	PCM Trainer (TTTC)	4
238	TTTC-EnT-65	LVDT Trainer (TTTC)	2
239	TTTC-EnT-64	Stepper Motor Trainer (TTTC)	2
240	TTTC-EnT-55	Megger	10
241	TTTC-EnT-52	Wheatstone Bridge Trainer	2
242	TTTC-EnT-51	Wein Bridge Trainer	5
243	TTTC-EnT-50	Analog Communication Trainer	4
244	TTTC-EnT-49	Frequency Modulation Trainer (TTTC)	4
245	TTTC-EnT-41	Satellite Communication Trainer (TTTC)	1
246	TTTC-EnT-42	Cellular Mobile Communication System (TTTC)	4
247	TTTC-EnT-45	Antenna Trainer (TTTC)	4
248	TTTC-EnT-44	Amplitutde Modulation Trainer (TTTC)	4
249	TTTC-EnT-46	Digital Communication Trainer (TTTC)	4
250	TTTC-EnT-56	Sensor Trainer with Modules	2
251	TTTC-EnT-47	Microwave Trainer (TTTC)	1
252	TTTC-EnT-10	Digital Frequency Counter (TTTC)	10
253	TTTC-EnT-25	Basic Energy Conversion Trainer (TTTC)	4
254	TTTC-EnT-28	Power Electronics Trainer with Modules	2
255	TTTC-EnT-29	Basic Communication Trainer with Modules (TTTC)	4
256	TTTC-EnT-32	8051 Microcontroller Trainer	4
257	TTTC-EnT-33	Robot Trainer	4
258	TTTC EnT-All1	DC Servo System Trainer	2
259	TTTC-MT-189	CNC Lathe Machine (TTTC)	1
260	TTTC-MT-195	Desktop Milling Machine (TTTC)	7
261	TTTC-MT-199	3D Printer (TTTC-MT)	1
262	TTTC-MT-12	Digital Hydraulic Bench (TTTC)	3
263	TTTC-MT-04	Pelton Turbine Module (TTTC)	1
264	TTTC-MT-03	Francis Turbine Module (TTTC)	1
265	TTTC-MT-25	Centrifugal & Positive Displacement Pump Module with Universal Dynamometer (TTTC)	1
266	TTTC-MT-05	Fluid Friction Trainer (TTTC)	1
267	TTTC-MT-32	Piston Pump Module (TTTC)	1
268	TTTC-MT-01	Two Stage Series and Parallel Pumps with Analogue Pressure Gauge (TTTC)	1
269	TTTC-MT-08	Flow Measurement Module (TTTC)	1
270	TTTC-MT-06	Bernoulli's Theorem Module (TTTC)	1
271	TTTC-MT-15	Flow Meter Calibration Module (TTTC)	1
272	TTTC-MT-16	Pitot Tube (TTTC)	1
273	TTTC-MT-17	Venturi Flow Meter (TTTC)	1
274	TTTC-MT-18	Orifice Flow Meter (TTTC)	1
275	TTTC-MT-37	Impact of a Jet Module (TTTC)	1
276	TTTC-MT-86	Universal Hardness Tester	1
277	TTTC-MT-76	Universal Testing Machine (TTTC)	1
278	TTTC-MT-85	Energy Absorbed at Fracture	1
279	TTTC-MT-92	Torsion Testing Machine	1
280	TTTC-MT-68	Engineering Science Full Set	2
281	TTTC-MT-60	Structures Test Frame	3
282	TTTC-MT-62	Automatic Data Acquisition Unit with Digital Force Display	3
283	TTTC-MT-63	Bending Moment Unit	1
284	TTTC-MT-64	Shear Force Unit	1
285	TTTC-MT-65	Deflection of Beams and Cantilever Unit	1
286	TTTC-MT-72	Hooke's Law and Spring Rate Trainer	1
287	TTTC-MT-146	Static and Dynamic Balancing Trainer	1
288	TTTC-MT-147	Gyroscope Trainer	1
289	TTTC-MT-148	Centrifugal Force Trainer	1
290	TTTC-MT-149	Geared System Trainer	1
291	TTTC-MT-150	Toothed Belt Drive Unit Trainer	1
292	TTTC-MT-154	Governors Trainer	1
293	TTTC-MT-105	Refrigeration Cycle Trainer	1
294	TTTC-MT-106	Air Conditioning System Trainer	1
295	TTTC-MT-108	Cooling Tower Trainer	1

Ser. No.	Req. No.	Equipment Name	Quantity
296	TTTC-MT-48	Small Engine Test Set with Manual Volumetric Fuel Gauge & Exhaust Gas Calorimeter	2
297	TTTC-MT-49	4 Stroke Petrol Engine	1
298	TTTC-MT-50	4 Stroke Diesel Engine	1
299	TTTC-MT-53	Engine Cycle Analyzer with Detectors	2
300	TTTC-CmT-02	3D Printer (TTTC-CmT)	2
301	TTTC-CmT-04	Desktop PC (A) (TTTC)	10
302	TTTC-CmT-05	Desktop PC (B)	10
303	TTTC-CmT-06	Laptop PC (TTTC)	10
304	TTTC-CmT-08	Server	2
305	TTTC-CmT-09	Router (A)	2
306	TTTC-CmT-10	Router (B)	8
307	TTTC-CmT-11	Network Switch (A)	8
308	TTTC-CmT-12	Network Switch (B)	8
309	TTTC-CmT-13	Access Point (TTTC)	8
310	TTTC-CmT-14	Single-board Computer Set	10
311	TTTC-CmT-30	Server Rack (TTTC)	2
312	TTTC-CmT-32	Multimedia Projector (TTTC)	2
313	TTTC-CmT-35	Basic Fiber Optics Trainer (TTTC)	2
314	TTTC-CmT-36	Fiber Tool Kit including F7 Fusion Splicer (TTTC)	2
315	TTTC-CmT-37	Optical Power Meter (TTTC)	8
316	TTTC-CmT-38	Educational Microcontroller Trainer Kit (TTTC)	8
317	TTTC-CmT-42	Sensor Package (TTTC)	8
318	TTTC-CmT-43	Sensor Trainer Kit (TTTC)	8
319	TTTC-CmT-44	Single Board Computer (TTTC)	8
320	TTTC-CmT-45	Single-board Microcontroller (TTTC)	8
321	TTTC-CmT-46	Robotic Arm Kit (TTTC)	3
322	TTTC-CmT-47	Personal Writing & Drawing Robot (TTTC)	3
323	TTTC-CmT-48	Educational Programmable Robot (TTTC)	3
324	TTTC-CmT-49	Humanoid Robot (TTTC)	3
325	TTTC-CmT-50	VPN Router (TTTC)	5
326	TTTC-CmT-51	Router with Network Security Function (TTTC)	5

JAPANESE GRANT

The Japanese Grant is non-reimbursable fund provided to a recipient country (hereinafter referred to as "the Recipient") to purchase the products and/or services (engineering services and transportation of the products, etc.) for its economic and social development in accordance with the relevant laws and regulations of Japan. Followings are the basic features of the project grants operated by JICA (hereinafter referred to as "Project Grants").

1. Procedures of Project Grants

Project Grants are conducted through following procedures (See "PROCEDURES OF JAPANESE GRANT" for details):

(1) Preparation

- The Preparatory Survey (hereinafter referred to as "the Survey") conducted by JICA

(2) Appraisal

-Appraisal by the government of Japan (hereinafter referred to as "GOJ") and JICA, and Approval by the Japanese Cabinet

(3) Implementation

Exchange of Notes

-The Notes exchanged between the GOJ and the government of the Recipient

Grant Agreement (hereinafter referred to as "the G/A")

-Agreement concluded between JICA and the Recipient

Banking Arrangement (hereinafter referred to as "the B/A")

-Opening of bank account by the Recipient in a bank in Japan (hereinafter referred to as "the Bank") to receive the grant

Construction works/procurement

-Implementation of the project (hereinafter referred to as "the Project") on the basis of the G/A

(4) Ex-post Monitoring and Evaluation

-Monitoring and evaluation at post-implementation stage

2. Preparatory Survey

(1) Contents of the Survey

The aim of the Survey is to provide basic documents necessary for the appraisal of the the Project made by the GOJ and JICA. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of

relevant agencies of the Recipient necessary for the implementation of the Project.

- Evaluation of the feasibility of the Project to be implemented under the Japanese Grant from a technical, financial, social and economic point of view.
- Confirmation of items agreed between both parties concerning the basic concept of the Project.
- Preparation of an outline design of the Project.
- Estimation of costs of the Project.
- Confirmation of Environmental and Social Considerations

The contents of the original request by the Recipient are not necessarily approved in their initial form. The Outline Design of the Project is confirmed based on the guidelines of the Japanese Grant.

JICA requests the Recipient to take measures necessary to achieve its self reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the executing agency of the Project. Therefore, the contents of the Project are confirmed by all relevant organizations of the Recipient based on the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Survey, JICA contracts with (a) consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

(3) Result of the Survey

JICA reviews the report on the results of the Survey and recommends the GOJ to appraise the implementation of the Project after confirming the feasibility of the Project.

3. Basic Principles of Project Grants

(1) Implementation Stage

1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the Exchange of Notes (hereinafter referred to as "the E/N") will be singed between the GOJ and the Government of the Recipient to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Recipient to define the necessary articles, in accordance with the E/N, to implement the Project, such as conditions of disbursement, responsibilities of the Recipient, and procurement conditions. The terms and conditions generally applicable to the Japanese Grant are stipulated in the "General Terms and Conditions for Japanese Grant (January 2016)."

2) Banking Arrangements (B/A) (See "Financial Flow of Japanese Grant (A/P Type)" for details)

a) The Recipient shall open an account or shall cause its designated authority to open an account under the name of the Recipient in the Bank, in principle. JICA will disburse the Japanese Grant in Japanese yen for the Recipient to cover the obligations incurred by the Recipient under the verified contracts.

b) The Japanese Grant will be disbursed when payment requests are submitted by the Bank to JICA under an Authorization to Pay (A/P) issued by the Recipient.

3) Procurement Procedure

The products and/or services necessary for the implementation of the Project shall be procured in accordance with JICA's procurement guidelines as stipulated in the G/A.

4) Selection of Consultants

In order to maintain technical consistency, the consulting firm(s) which conducted the Survey will be recommended by JICA to the Recipient to continue to work on the Project's implementation after the E/N and G/A

5) Eligible source country

In using the Japanese Grant disbursed by JICA for the purchase of products and/or services, the eligible source countries of such products and/or services shall be Japan and/or the Recipient. The Japanese Grant may be used for the purchase of the products and/or services of a third country as eligible, if necessary, taking into account the quality, competitiveness and economic rationality of products and/or services necessary for achieving the objective of the Project. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm, which enter into contracts with the Recipient, are limited to "Japanese nationals", in principle.

6) Contracts and Concurrence by JICA

The Recipient will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be concurred by JICA in order to be verified as eligible for using the Japanese Grant.

7) Monitoring

The Recipient is required to take their initiative to carefully monitor the progress of the Project in order to ensure its smooth implementation as part of their responsibility in the G/A, and to regularly report to JICA about its status by using the Project Monitoring Report (PMR).

8) Safety Measures

The Recipient must ensure that the safety is highly observed during the implementation of the Project.

9) Construction Quality Control Meeting

Construction Quality Control Meeting (hereinafter referred to as the "Meeting") will be held for quality assurance and smooth implementation of the Works at each stage of the Works. The member of the Meeting will be composed by the

Recipient (or executing agency), the Consultant, the Contractor and JICA. The functions of the Meeting are as followings:

a) Sharing information on the objective, concept and conditions of design from the Contractor, before start of construction.

b) Discussing the issues affecting the Works such as modification of the design, test, inspection, safety control and the Client's obligation, during of construction.

(2) Ex-post Monitoring and Evaluation Stage

1) After the project completion, JICA will continue to keep in close contact with the Recipient in order to monitor that the outputs of the Project is used and maintained properly to attain its expected outcomes.

2) In principle, JICA will conduct ex-post evaluation of the Project after three years from the completion. It is required for the Recipient to furnish any necessary information as JICA may reasonably request.

(3) Others

1) Environmental and Social Considerations

The Recipient shall carefully consider environmental and social impacts by the Project and must comply with the environmental regulations of the Recipient and JICA Guidelines for Environmental and Social Considerations (April, 2010).

2) Major undertakings to be taken by the Government of the Recipient

For the smooth and proper implementation of the Project, the Recipient is required to undertake necessary measures including land acquisition, and bear an advising commission of the A/P and payment commissions paid to the Bank as agreed with the GOJ and/or JICA. The Government of the Recipient shall ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the Recipient with respect to the purchase of the Products and/or the Services be exempted or be borne by its designated authority without using the Grant and its accrued interest, since the grant fund comes from the Japanese taxpayers.

3) Proper Use

The Recipient is required to maintain and use properly and effectively the products and/or services under the Project (including the facilities constructed and the equipment purchased), to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Japanese Grant.

4) Export and Re-export

The products purchased under the Japanese Grant should not be exported or re-exported from the Recipient.

PROCEDURES OF JAPANESE GRANT

Stage	Procedures	Remarks	Recipient Government	Japanese Government	JICA	Consultants	Contractors	Agent Bank
Official Request	Request for grants through diplomatic channel	Request shall be submitted before appraisal stage.	x	x				
1. Preparation	(1) Preparatory Survey Preparation of outline design and cost estimate		x		x	x		
2. Appraisal	(2)Preparatory Survey Explanation of draft outline design, including cost estimate, undertakings, etc.		x		x	x		
	(3)Agreement on conditions for implementation	Conditions will be explained with the draft notes (E/N) and Grant Agreement (G/A) which will be signed before approval by Japanese government.	x	x (E/N)	x (G/A)			
	(4) Approval by the Japanese cabinet			x				
3. Implementation	(5) Exchange of Notes (E/N)		x	x				
	(6) Signing of Grant Agreement (G/A)		x		x			
	(7) Banking Arrangement (B/A)	Need to be informed to JICA	x					x
	(8) Contracting with consultant and issuance of Authorization to Pay (A/P)	Concurrence by JICA is required	x			x		x
	(9) Detail design (D/D)		x			x		
	(10) Preparation of bidding documents	Concurrence by JICA is required	x			x		
	(11) Bidding	Concurrence by JICA is required	x			x	x	
	(12) Contracting with contractor and issuance of A/P	Concurrence by JICA is required	x				x	x
	(13) Construction works/procurement	Concurrence by JICA is required for major modification of design and amendment of contracts.	x			x	x	
	(14) Completion certificate		x			x	x	
4. Ex-post monitoring & evaluation	(15) Ex-post monitoring	To be implemented generally after 1, 3, 10 years of completion, subject to change	x		x			
	(16) Ex-post evaluation	To be implemented basically after 3 years of completion	x		x			

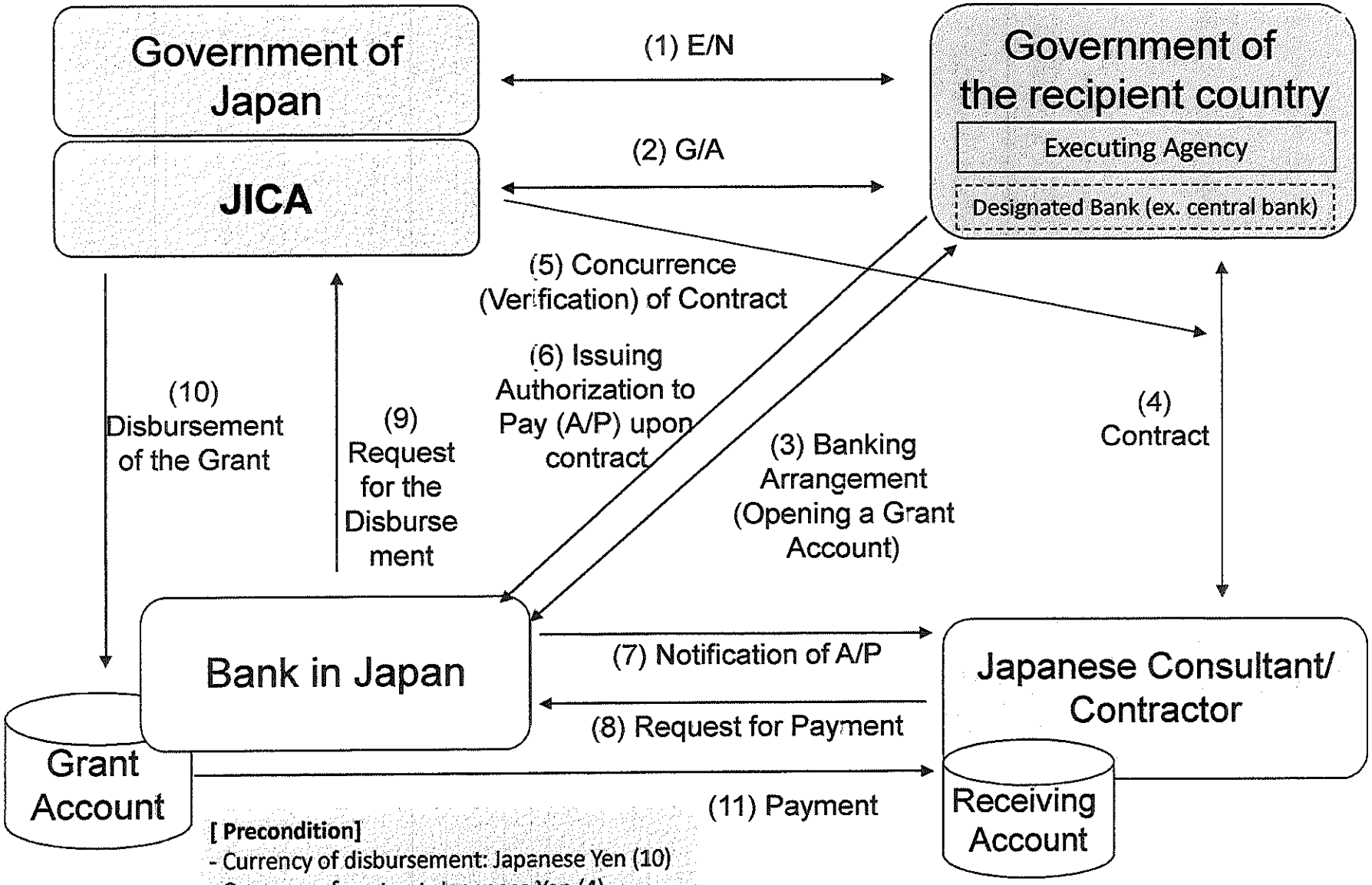
notes:

1. Project Monitoring Report and Report for Project Completion shall be submitted to JICA as agreed in the G/A.

2. Concurrence by JICA is required for allocation of grant for remaining amount and/or contingencies as agreed in the G/A.

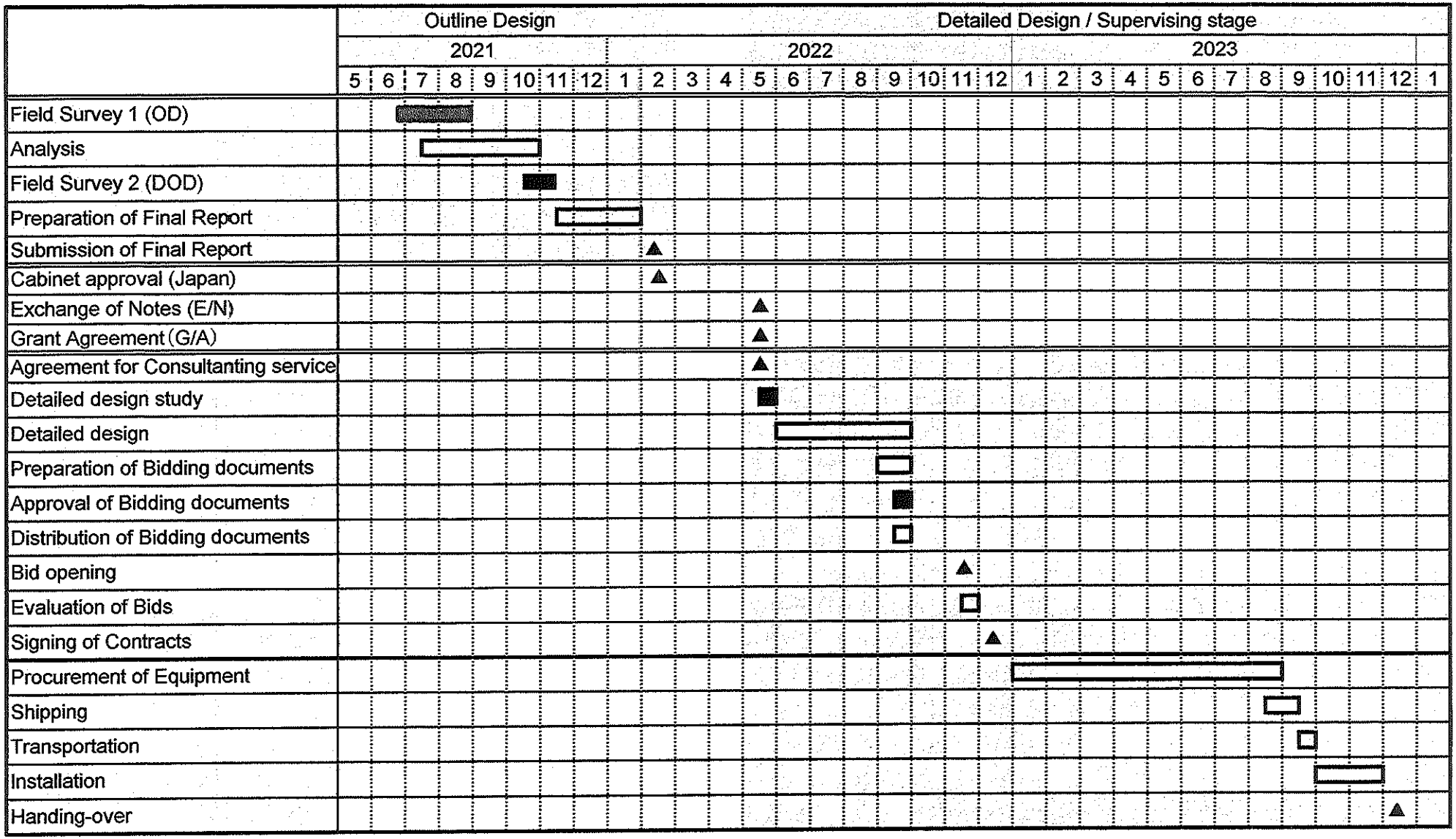
ANNEX4_Japanese Grant_attachment2

Financial Flow of Japanese Grant (A/P Type)



ANNEX 5

Provisional Progress Schedule



Annex 6

Major Undertakings to be taken by the Government of Bangladesh

1. Specific obligations of the Government of Bangladesh which will not be funded with the Grant

(1) Before the Tender

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To sign the banking arrangement (B/A) with a bank in Japan (the Agent Bank) to open a bank account for the Grant	within 1 month after the signing of the G/A	MOF/ Bangladesh Bank/ DTE/TMED		
2	To issue A/P to the Agent Bank for the payment to the consultant	within 1 month after the signing of the contract(s)	MOF/ Bangladesh Bank/ DTE/TMED		
3	To bear the following commissions to the Agent Bank for the banking services based upon B/A				
	1) Advising commission of A/P	within 1 month after the signing of the contract(s)	DTE/TMED	$100*	
	2) Payment commission for A/P	every payment	DTE/TMED	Total* $10,000	
4	To secure and clear the land(s) for project sites as necessity 1) Remove existing/unnecessary equipment 2) Secure space(s) for equipment	before notice of the bidding documents	DTE/TMED	$6,000	
5	To obtain the planning, zoning, building, and other required permit as necessity	before notice of the bidding documents	DTE/TMED		
6	To submit Project Monitoring Report (with the result of Detailed Design)	before preparation of the bidding documents	DTE/TMED		
7	Preparation and approval of PDPP	before the end of December 2021	DTE/TMED		
	Preparation and approval of DPP	before the end of February 2022	DTE/TMED		

8	Secure the suitable space for equipment and prepare the proper learning environment 1) To remove or transfer the existing equipment. (Non-operating equipment found in many existing labs and workshops. Clearing the space necessary for the appropriate layout of equipment) 2) Anti-dust measures: replacement of windows, putting curtains for appropriate operation and maintenance, long-lasting equipment, and better practicing environment. 3) Installment of Air-conditioner for appropriate operation and maintenance, long-lasting equipment, and better practicing environment. 4) Replacement of furniture for appropriate operation 5) Repair of the ceiling of DPI for appropriate operation and maintenance, long-lasting equipment. 6) Improvement of lighting conditions for appropriate operation and maintenance and better practicing environment. 7) Improvement of power supply conditions for appropriate operation and maintenance, long-lasting equipment. 8) Securing unloading area and pathway for the smooth operation of unloading, delivering to the designated rooms, and all-time safety	before the procurement starts	DTE/TMED	Total $63,000	

*B/A is a contract between the Bangladesh side and the Agent Bank. The estimated cost could be confirmed based on the discussion between the two parties.

(2) During the Project Implementation

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To issue A/P to the Agent Bank for the payment to the supplier and the contractor	within 1 month after the signing of the contract(s)	MOF/ Bangladesh Bank/ DTE/TMED		
2	To bear the following commissions to the Agent Bank for the banking services based upon the B/A				
	1) Advising commission of A/P	within 1 month after the signing of the contract(s)	MOF/ Bangladesh Bank/ DTE/TMED	$100*	
	2) Payment commission for A/P	every payment	MOF/ Bangladesh Bank/ DTE/TMED	Total* $10,000	
3	To ensure prompt unloading and customs clearance at ports of disembarkation in the country of the Recipient and to assist the Supplier(s) with internal transportation therein	during the Project	DTE/TMED		
4	To accord Japanese physical persons and/or physical persons of third countries whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the country of the Recipient and stay therein for the performance of their work	during the Project	DTE/TMED		
5	To ensure that customs duties, internal taxes, and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the products and/or the services be borne by its designated authority without using the Grant.	during the Project	DTE/TMED		
6	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project	during the Project	DTE/TMED		
7	To notify JICA promptly of any incident or accident, which has, or is likely to have, a significant adverse effect on the environment, the affected communities, the public, or workers.	during the implementation	DTE/TMED		

8	To submit Project Monitoring Report after each work under the contract(s) such as shipping, hand over, installation, and operational training	within 1 month after completion of each work	DTE/TMED		
	To submit Project Monitoring Report (final) (including as-built drawings, equipment list, photographs, etc.)	within 1 month after issuance of Certificate of Completion for the works under the contract(s)	DTE/TMED		
9	To submit a report concerning the completion of the Project	within 6 months after completion of the Project	DTE/TMED		
10	To provide facilities for distribution of electricity, water supply, and drainage, and other incidental facilities necessary for the implementation of the Project outside the site(s)		DTE/TMED		
	Electricity including the distributing line to the site	before the start of the implementation	DTE/TMED		
	1) Water Supply The city water distribution main to the site	before the start of the implementation	DTE/TMED		
	2) Drainage The city drainage main (for storm, sewer, and others) to the site	6 months before completion of the Project	DTE/TMED		
11	To provide equipment, furniture, facilities that are necessary for the implementation of the Project in the site(s) in the case it is needed	before the start of the implementation	DTE/TMED		
12	To ensure the safety of persons engaged in the implementation of the Project	during the implementation	DTE/TMED		
13	To take necessary measures for the security and safety of the Project site - maintaining the safety of workers and the general public by the thorough implementation of safety measures and immediate action in the case of an accident - traffic control around the site(s) and on transportation routes of equipment	during the implementation	DTE/TMED		
14	To provide parking area for the Consultant and Contractors.	during the implementation	DTE/TMED		

*B/A is a contract between the Bangladesh side and the Agent Bank. The estimated cost could be confirmed based on the discussion between the two parties.

(3) After the Project

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid 1) Allocation of maintenance cost and staff 2) Operation and maintenance structure Routine check/Periodic inspection		DTE/TMED		
2	To effectively publicize both the technical cooperation project and this project. Such as handover ceremony and installation of signboards that show equipment is provided by Japanese Grant.		DTE/TMED		

2. Other obligations of the Government of Bangladesh <u>funded with the Grant</u>

NO	Items	Deadline	Amount (Million Japanese Yen)*
1	To conduct the following transportation a) Marin (Air) transportation of the products from Japan and 3rd countries to the country of the Recipient b) Internal transportation from the port of disembarkation to the project site	During the Project	
2	To procure equipment with installation and commissioning		
3	To implement the detailed design, bidding support and procurement supervision (Consulting Services)		
	Total		-

* The Amount is provisional. This is subject to the approval of the Government of Japan.

(Note) Progress of the obligations of the Recipient may be confirmed and updated from time to time in a written form between JICA and the Recipient.

Project Monitoring Report
on
Project Name
Grant Agreement No. XXXXXXX

20XX, Month

Organizational Information

Signer of the G/A (Recipient)	Person in Charge (Designation) Contacts Address: Phone/FAX: Email:
Executing Agency	Person in Charge (Designation) Contacts Address: Phone/FAX: Email:
Line Ministry	Person in Charge (Designation) Contacts Address: Phone/FAX: Email:

General Information:

Project Title	
E/N	Signed date: Duration:
G/A	Signed date: Duration:
Source of Finance	Government of Japan: Not exceeding JPY _____ mil. Government of (_____): _____

1: Project Description

1-1 Project Objective

1-2 Project Rationale

- Higher-level objectives to which the project contributes (national/regional/sectoral policies and strategies)
- Situation of the target groups to which the project addresses

1-3 Indicators for measurement of "Effectiveness"

Quantitative indicators to measure the attainment of project objectives		
Indicators	Original (Yr)	Target (Yr)
Qualitative indicators to measure the attainment of project objectives		

2: Details of the Project

2-1 Location

Components	Original *(proposed in the outline design)*	Actual
1.		

2-2 Scope of the work

Components	Original* *(proposed in the outline design)*	Actual*
1.		

Reasons for modification of scope (if any).

(PMR)

2-3 Implementation Schedule

Items	Original		Actual
	(proposed in the outline design)	*(at the time of signing the Grant Agreement)*	

Reasons for any changes of the schedule, and their effects on the project (if any)

2-4 Obligations by the Recipient

2-4-1 Progress of Specific Obligations

See Attachment 2.

2-4-2 Activities

See Attachment 3.

2-4-3 Report on RD

See Attachment 11.

2-5 Project Cost

2-5-1 Cost borne by the Grant(Confidential until the Bidding)

Components			Cost (Million Yen)	
	Original *(proposed in the outline design)*	Actual *(in case of any modification)*	Original[1),2)] *(proposed in the outline design)*	Actual
	1.			
Total				

Note: 1) Date of estimation:
2) Exchange rate: 1 US Dollar = Yen

2-5-2 Cost borne by the Recipient

Components			Cost (1,000 Taka)	
	Original *(proposed in the outline design)*	Actual *(in case of any modification)*	Original[1),2)] *(proposed in the outline design)*	Actual
	1.			

Note: 1) Date of estimation:
2) Exchange rate: 1 US Dollar =

Reasons for the remarkable gaps between the original and actual cost, and the countermeasures (if any)

(PMR)

2-6 Executing Agency

- Organization's role, financial position, capacity, cost recovery etc,
- Organization Chart including the unit in charge of the implementation and number of employees.

Original *(at the time of outline design)* name: role: financial situation: institutional and organizational arrangement (organogram): human resources (number and ability of staff):
Actual *(PMR)*

2-7 Environmental and Social Impacts

- The results of environmental monitoring based on Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- The results of social monitoring based on in Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- Disclosed information related to results of environmental and social monitoring to local stakeholders (whenever applicable).

3: Operation and Maintenance (O&M)

3-1 Physical Arrangement

- Plan for O&M (number and skills of the staff in the responsible division or section, availability of manuals and guidelines, availability of spareparts, etc.)

Original *(at the time of outline design)*
Actual *(PMR)*

3-2 Budgetary Arrangement

- Required O&M cost and actual budget allocation for O&M

Original *(at the time of outline design)*

Actual *(PMR)*

4: Potential Risks and Mitigation Measures

- Potential risks which may affect the project implementation, attainment of objectives, sustainability
- Mitigation measures corresponding to the potential risks

Assessment of Potential Risks *(at the time of outline design)*

Potential Risks	Assessment
1. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
	Contingency Plan (if applicable):
2. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
	Contingency Plan (if applicable):
3. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:

	Contingency Plan (if applicable):
Actual Situation and Countermeasures	
(PMR)	

5: Evaluation and Monitoring Plan (after the work completion)

5-1 Overall evaluation

Please describe your overall evaluation on the project.

5-2 Lessons Learnt and Recommendations

Please raise any lessons learned from the project experience, which might be valuable for the future assistance or similar type of projects, as well as any recommendations, which might be beneficial for better realization of the project effect, impact and assurance of sustainability.

5-3 Monitoring Plan of the Indicators for Post-Evaluation

Please describe monitoring methods, section(s)/department(s) in charge of monitoring, frequency, the term to monitor the indicators stipulated in 1-3.

Attachment

1. Project Location Map
2. Specific obligations of the Recipient which will not be funded with the Grant
3. Monthly Report submitted by the Consultant

Appendix - Photocopy of Contractor's Progress Report (if any)
- Consultant Member List
- Contractor's Main Staff List

4. Check list for the Contract (including Record of Amendment of the Contract/Agreement and Schedule of Payment)
5. Environmental Monitoring Form / Social Monitoring Form
6. Monitoring sheet on price of specified materials (Quarterly)
7. Report on Proportion of Procurement (Recipient Country, Japan and Third Countries) (PMR (final)only)
8. Pictures (by JPEG style by CD-R) (PMR (final)only)
9. Equipment List (PMR (final)only)
10. Drawing (PMR (final)only)
11. Report on RD (After project)

Attachment 6

Monitoring sheet on price of specified materials

1. Initial Conditions (Confirmed)

	Items of Specified Materials	Initial Volume A	Initial Unit Price (¥) B	Initial total Price C=A×B	1% of Contract Price D	Condition of payment	
						Price (Decreased) E=C−D	Price (Increased) F=C+D
1	Item 1	●●t	●	●	●	●	●
2	Item 2	●●t	●	●	●		
3	Item 3						
4	Item 4						
5	Item 5						

2. Monitoring of the Unit Price of Specified Materials

(1) Method of Monitoring : ●●

(2) Result of the Monitoring Survey on Unit Price for each specified materials

	Items of Specified Materials	1st ●month, 2015	2nd ●month, 2015	3rd ●month, 2015	4th	5th	6th
1	Item 1						
2	Item 2						
3	Item 3						
4	Item 4						
5	Item 5						

(3) Summary of Discussion with Contractor (if necessary)

-
-
-

Report on Proportion of Procurement (Recipient Country, Japan and Third Countries)
(Actual Expenditure by Construction and Equipment each)

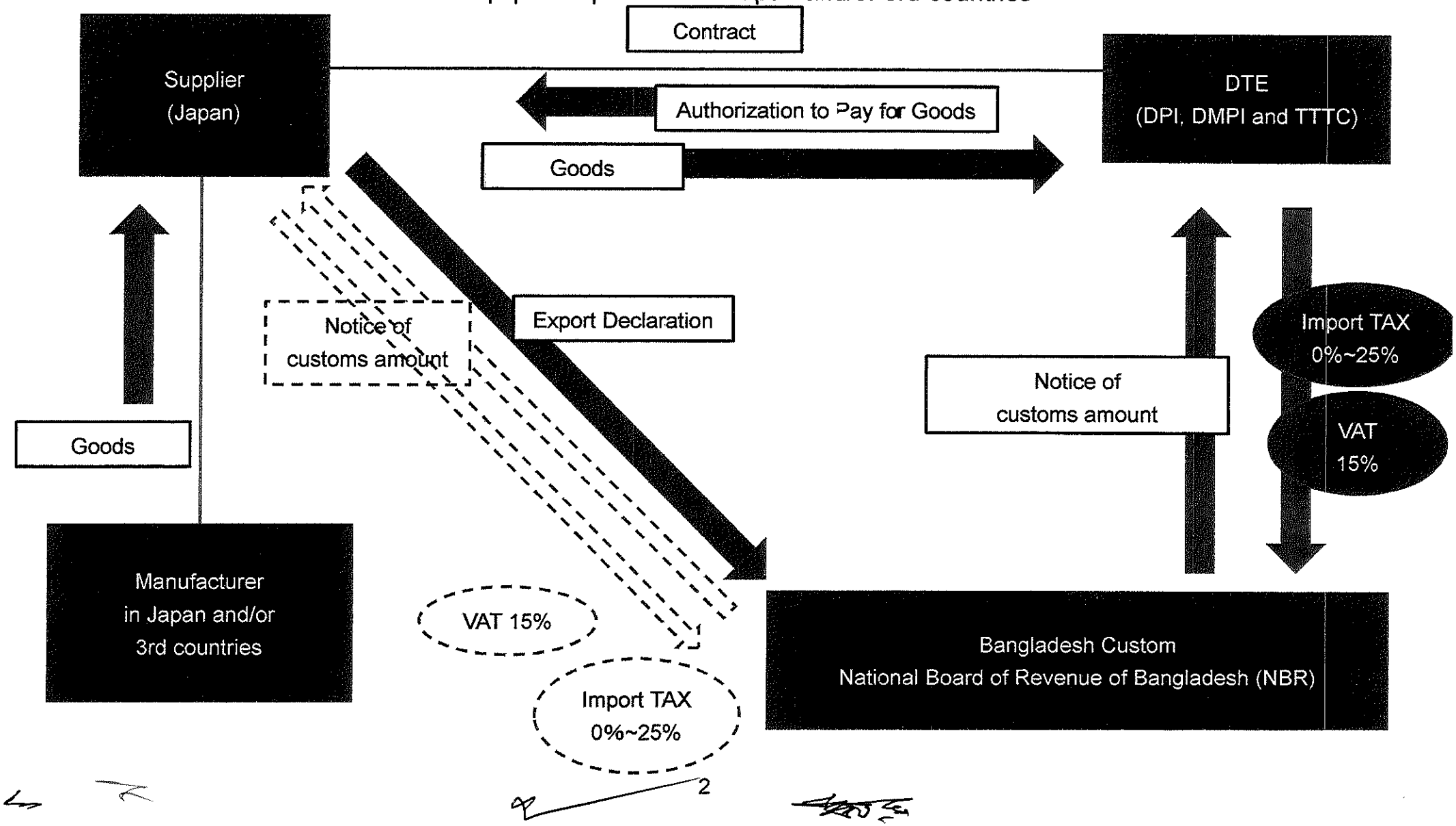
	Domestic Procurement (Recipient Country) A	Foreign Procurement (Japan) B	Foreign Procurement (Third Countries) C	Total D
Construction Cost	(A/D%)	(B/D%)	(C/D%)	
Direct Construction Cost	(A/D%)	(B/D%)	(C/D%)	
others	(A/D%)	(B/D%)	(C/D%)	
Equipment Cost	(A/D%)	(B/D%)	(C/D%)	
Design and Supervision Cost	(A/D%)	(B/D%)	(C/D%)	
Total	(A/D%)	(B/D%)	(C/D%)	

Necessary Steps for Exemption of Customs Duties, Taxes, and Fiscal Levies

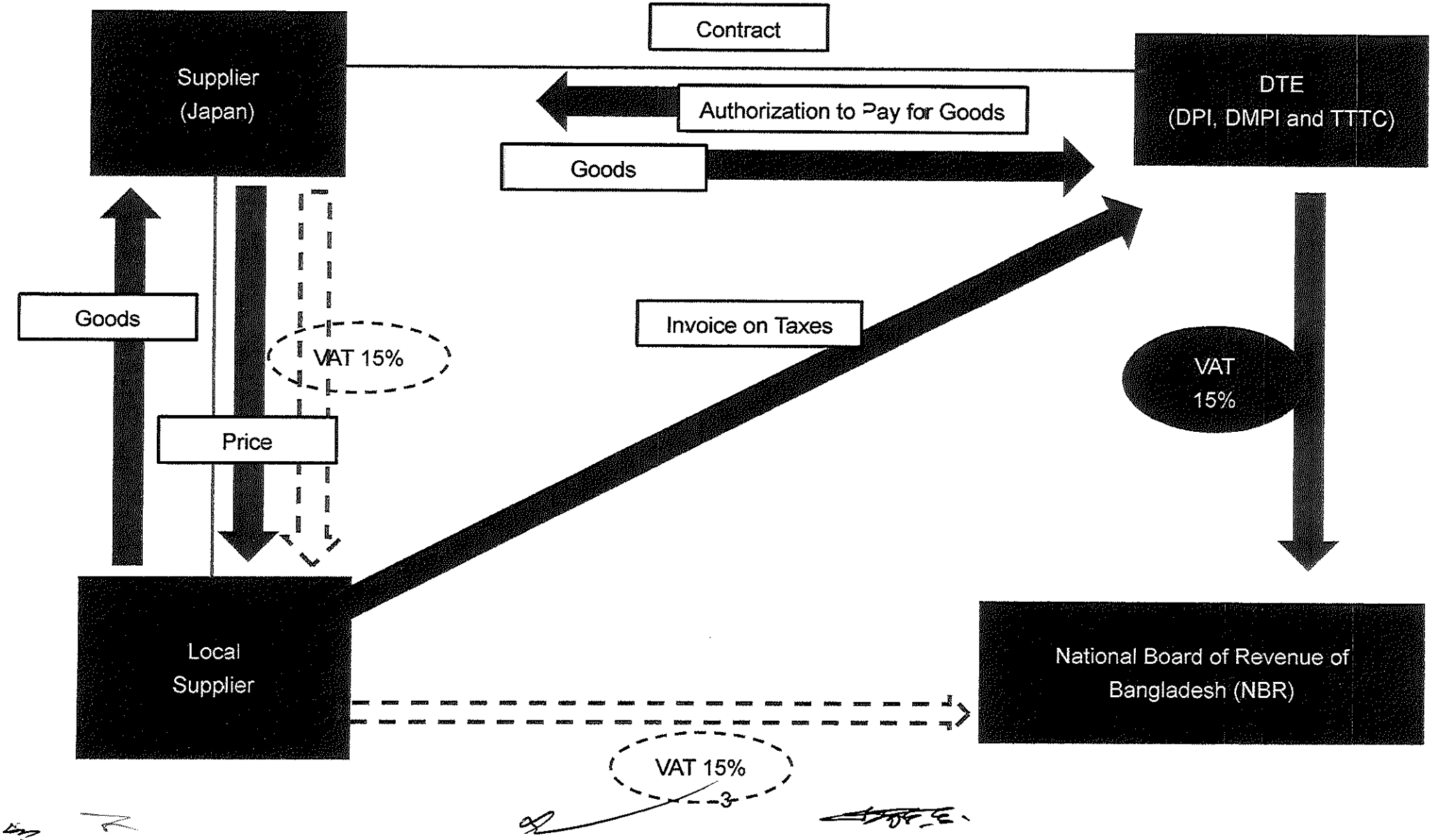
Time	Action	Note
Middle of November	Submission of PDPP from DTE to related department	
By the end of December 2021	Approval of PDPP	
December 202- February 2022	Detail calculation of Taxes and cost that is covered through the Project by DTE with the support by the survey team	
By the end of February 2021	Approval of DPP	The budget for exemption from customs duties, taxes, and fiscal levies for the Project will be secured by DPP.

Detail process for exemption from customs duties, taxes, and fiscal levies after DPP approval is shown as Page 2 and Page 3.

1. Detail process for exemption of customs duties, taxes, and fiscal levies after DPP approval for the equipment procured in Japan and/or 3rd countries



2. Detail process for exemption of customs duties, taxes, and fiscal levies after DPP approval for the equipment procured in Bangladesh



Appendix 5 Major Equipment List

No.	Equipment	Q'ty	Purpose of use
1	Advanced Maintenance Electrician Training Equipment	2	Practical training of electrical maintenance
10	Transformer Trainer	1	Learning the characterization of tansformer
11	Complete Renewable Energy Lab Trainer	1	Practical training of renewable energy
13	Speed Control of AC Motor Trainer (DPI)	1	Practical training of speed control of motor
16	3 Point / 04 Point Starter with DC Motor	1	Practical training of speed control of motor
20	Motor-Generator Set (DPI)	1	Practical training of motor and generator
21	Low-Transmission Pannel Equipment	1	Practical training of transmission pannel
22	High-Transmission Pannel Equipment	1	Practical training of transmission pannel
31	Power Electronics Trainer (A)	2	Practical training of power electronics
32	Power Electronics Trainer (B)	1	Practical training of power electronics
42	Satellite Communication Trainer (DPI)	1	Practical training of satellite communication
50	Microwave Trainer (DPI)	1	Practical training of microwave
63	Biomedical Measurement System	1	Practical training of electromedical apparatus
64	ECG Machine (DPI)	1	Practical training of electromedical apparatus
65	Portable X-Ray Machine (DPI)	1	Practical training of electromedical apparatus
66	Digital Color Doppler 3D/4D	1	Practical training of electromedical apparatus
99	Basic Communication Trainer (DPI)	8	Practical training of basic communication
100	CNC Lathe Machine (DPI)	1	Practical training of mechanical working
101	Desktop Milling Machine (DPI)	10	Practical training of mechanical working
102	3D Printer (DPI)	2	Practical training of mechanical working
106	Centrifugal & Positive Displacement Pump Module with Universal Dynamometer (DPI)	2	Learning the characterization of centrifugal pump
107	Fluid Friction Trainer (DPI)	2	Learning the characterization of fluid friction
109	Two Stage Series and Parallel Pumps with Analogue Pressure Gauge (DPI)	2	Learning the characterization of parallel pump
117	Universal Testing Machine (DPI)	2	Learning testing methods and different types of test pieces
141	Wireless Controller / Access Point	2	Practical training of networking
157	Basic Communication Trainer (DMPI)	2	Practical training of basic communication
170	Robot Station with Artificial Vision (DMPI-EnT)	1	Practical training of programming and automatic control

No.	Equipment	Q'ty	Purpose of use
172	Portable X-Ray Machine (DMPI)	1	Practical training of electromedical apparatus
176	ECG Machine (DMPI)	1	Practical training of electromedical apparatus
196	Robot Station with Artificial Vision (DMPI-CmT)	1	Practical training of programming and automatic control
209	Motor-Generator Set (TTTC)	1	Practical training of motor and generator
213	Electrical Power System Simulator	1	Learning the characterization of powe system
217	Single Phase Transformer Trainer	2	Practical training of transformer
218	VFD/PLC Wiring Learning System	2	Practical training of VFD, PLC programming
220	Speed Control of AC Motor Trainer (TTTC)	2	Practical training of speed control
223	3-Phase Transformer Trainer	3	Practical training of 3-phase transformer
226	Industrial Power Electronics Trainer with Modules	4	Practical training of industrial power electronics
245	Satellite Communication Trainer (TTTC)	1	Practical training of satellite communication
250	Sensor Trainer with Modules	2	Practical training of sensor
251	Microwave Trainer (TTTC)	1	Learning the characterization of microwave
254	Power Electronics Trainer with Modules	2	Practical training of sensor power electronics
255	Basic Communication Trainer with Modules (TTTC)	4	Practical training of basic communication
257	Robot Trainer	4	Practical training of programming
258	DC Servo System Trainer	2	Practical training of servo system
259	CNC Lathe Machine (TTTC)	1	Practical training of mechanical working
260	Desktop Milling Machine (TTTC)	7	Practical training of mechanical working
261	3D Printer (TTTC-MT)	1	Practical training of mechanical working
265	Centrifugal & Positive Displacement Pump Module with Universal Dynamometer (TTTC)	1	Learning the characterization of centrifugal pump
266	Fluid Friction Trainer (TTTC)	1	Learning the characterization of fluid friction
268	Two Stage Series and Parallel Pumps with Analogue Pressure Gauge (TTTC)	1	Learning the characterization of parallel pump
276	Universal Hardness Tester	1	Learning hardness testing methods and different types of test pieces
277	Universal Testing Machine (TTTC)	1	Learning testing methods and different types of test pieces
278	Energy Absorbed at Fracture	1	Learning energy absorbed at fracture
279	Torsion Testing Machine	1	Learning torsion testing methods and different types of test pieces

No.	Equipment	Q'ty	Purpose of use
290	Geared System Trainer	1	Practical training of gear system
293	Refrigeration Cycle Trainer	1	Practical training of refrigeration cycle
294	Air Conditioning System Trainer	1	Practical training of air conditioning system
295	Cooling Tower Trainer	1	Learning the characterization of cooling tower
296	Small Engine Test Set with Manual Volumetric Fuel Gauge & Exhaust Gas Calorimeter	2	Learning the characterization of engine
299	Engine Cycle Analyzer with Detectors	2	Learning the characterization of engine
300	3D Printer (TTTC-CmT)	2	Learning the characterization of 3D printer

Appendix 6 Project Monitoring Report (PMR)

Project Monitoring Report
on
the Project for the Improvement of Equipment for Technical Education
Grant Agreement No. XXXXXXX

2022, February

Organizational Information

Signer of the G/A (Recipient)	**Economic Relations Division (ERD), Ministry of Finance** Person in Charge Mohammad Ashraf Ali Faruk (Joint Secretary) Contacts Address: Block # 6, 7, 8, 10, 15 & 16 Shere Bangla Nagar (Planning Commission Campus), Dhaka-1207 Phone/FAX: (+88) 02-48117636/(+88) 02-9180788 Email: info@erd.gov.bd
Executing Agency	**Directorate of Technical Education (DTE), Technical & Madrasah Education Division (TMED), Ministry of Education (MoE)** Person in Charge Md. Omar Faruque (Director General) Mohammad Aktaruzzaman (Director of Planning and Development) Contacts Address: F-4/B, Agargaon, Dhaka-1207 Phone/FAX: (+88) 02-9110664 /(+88) 02-9110671 Email: mofaruque_ru@yahoo.com
Line Ministry	**Technical & Madrasah Education Division (TMED), Ministry of Education (MoE)** Person in Charge M. M. Tarikul islam (Additional Secretary Development) Contacts Address: Building No.6, Floor 13, Bangladesh secretariat, Dhaka-1000 Phone: (+88) 02-9586583 Email: addsdev@tmed.gov.bd

General Information:

Project Title	The Project for the Improvement of Equipment for Technical Education
E/N	Signed date: Duration:
G/A	Signed date: Duration:
Source of Finance	Government of Japan: Not exceeding JPY _____ mil. Government of Bangladesh: _____

1: Project Description

1-1 Project Objective

To contribute to the economic growth of Bangladesh by developing human resources to meet the needs of industry through the procurement of teaching and practical equipment and associated educational facilities at Dhaka Polytechnic Institutes (DPI), Dhaka Mohila Polytechnic Institute (DMPI), and Technical Teacher Training College (TTTC).

1-2 Project Rationale

- Higher-level objectives to which the project contributes (national/regional/sectoral policies and strategies)
- Situation of the target groups to which the project addresses

(1) Beneficiaries of the Project
The direct beneficiaries of the Project are the students, teachers, and instructors of the three target institutes. Indirectly, the project will benefit the people of Bangladesh in the target area, since it is expected that the production of the large number of human resources required by the relevant industries in Bangladesh will lead to Bangladeshi industrial development and the generation of further employment.

(2) Contribution to the achievement of medium-long-term development goals
The human resource development strategy of the Perspective Plan 2021-2041 (PP2041) includes "To mainstream the technical education and vocational training (TVET) for the fourth industrial revolution" and "To provide the flexible training institutions for all people seeking to acquire vocational skills". To achieve these objectives, there are specific strategies such as "Strengthening National Skills Development Policy (NSDP 2011)", "To promote the women's participation in the technical education and training" and "Strengthen the partnership between public-private in the technical education and training". The contribution of this project is significant as it aims to bridge the gap between the needs of industry and the needs of the government through strengthening the functioning of industrial human resource development in the three target institutes.

(3) Consistency with Japanese Government Country Development Cooperation Policy
It is consistent with the Japanese "Country Development Cooperation Policy for the People's Republic of Bangladesh (February 2008)" for which the assistance policy is "GDP Growth acceleration, employment generation, and rapid poverty reduction", "A broad-based strategy of inclusiveness to empower every citizen to participate fully and benefit from the development process" and "Overcoming social vulnerabilities (improving the quality of primary education, improving technical education and promoting research and development in the field of science and technology).

1-3 Indicators for measurement of "Effectiveness"

Quantitative indicators to measure the attainment of project objectives		
Indicators	Baseline (Actual figure in 2021)	Target (2026) 【3 years after the project completion】
Dhaka Polytechnic Institute (no. of the student)	-	1100
Dhaka Mohila Polytechnic Institute (no. of the student)	-	200

Technical Teachers Training College (no. of the student)	-	40

Electrical and Electronics Technology (Subject)	-	20
Mechanical Technology (Subject)	-	10
Computer Technology (Subject)	-	40
Qualitative indicators to measure the attainment of project objectives		
● To improve the skills and know-how for practical education by using the equipment. ● To improve the students' proficiency. ● To produce qualified human resources to meet the needs of industry. ● To develop the Bangladeshi industry in the areas covered by the Project.		

2: Details of the Project

2-1 Location

Components	Original *(proposed in the outline design)*	Actual
Procurement and Installation of the equipment	Dhaka Polytechnic Institute (DPI), Dhaka Mohila Polytechnic Institute (DMPI) and Technical Teachers Training College (TTTC) in Dhaka	

2-2 Scope of the work

Components	Original* *(proposed in the outline design)*	Actual*
1.Electric technology equipment	items	
2.Electronics technology equipment	items	
3.Mechanical technology equipment	items	
4.Computer technology equipment	items	

Reasons for modification of scope (if any).

(PMR)

2-3 Implementation Schedule

Items	Original		Actual
	(proposed in the outline design)	*(at the time of signing the Grant Agreement)*	
Cabinet Approval	2/2022(Feb.8 done)		
E/N	4/2022		
G/A	4/2022		
Detailed Design	5 - 8/2020		
Bid Notice	8/2020		

Bidding	10/2020		
Procurement and Installation period of the equipment	10/2022 – 11/2023		
Project Completion	12/2022		

Reasons for any changes of the schedule, and their effects on the project (if any)

2-4 Obligations by the Recipient

2-4-1 Progress of Specific Obligations

See Attachment 2.

2-5 Project Cost

2-5-1 Cost borne by the Grant (Confidential until the Bidding)

Components			Cost (Million Yen)	
	Original *(proposed in the outline design)*	Actual *(in case of any modification)*	Original[1),2)] *(proposed in the outline design)*	Actual
Equipment	Equipment described in 2-2		940.0	
Consulting Services	Detailed design, and Supervision for Procurement and Installation		58.0	
Total			998.0	

Note: 1) Date of estimation: September, 2021
2) Exchange rate: 1 US Dollar = 110.51 Yen, 1 EUR = 133.43Yen

2-5-2 Cost borne by the Recipient

Components			Cost (Million Yen)	
	Original *(proposed in the outline design)*	Actual *(in case of any modification)*	Original[1),2)] *(proposed in the outline design)*	Actual
Refurbish expenses	Rehabilitation of buildings Discarding unnecessary equipment		Approx. 3.5 Approx. 1.0	
Bank expenses	Commissions to a bank of Japan for the banking services under the Banking Arrangement.		Approx. 1.5	
			Approx. 6.0	

Note: 1) Date of estimation: September, 2021
2) Exchange rate: 1 BDT = 1. 2910 Yen

Reasons for the remarkable gaps between the original and actual cost, and the countermeasures (if any)

(PMR)

2-6 Executing Agency

- Organization's role, financial position, capacity, cost recovery etc,
- Organization Chart including the unit in charge of the implementation and number of employees.

Original *(at the time of outline design)* name: Directorate of Technical Education (DTE) role: DTE is a Bangladesh government Directorate under the Ministry of Education responsible for the development, expansion and research in the field of technical education in Bangladesh. DTE was established in 1960 under the Ministry of Education, when Bangladesh was part of Pakistan. The Directorate is responsible for 64 Technical School and College, 49 Polytechnic Institutes, one Degree Level Technical Teachers Training College and four Engineering College. financial situation: Annual budget of DTE in 2021-2022: 312,394 lakh BDT (Revenue: 190,897 lakh BDT, Development: 121,497 lakh BDT) institutional and organizational arrangement (organogram): Head of DTE: Director General Project Director: Director (Planning and Development) Department-in-charge of the Project: Planning and Developmnet Department human resources (number and ability of staff): DTE has a workforce of about 130, including 1 Director General, 5 Department Directors, and 10 Assistant Directors based on the latest organogram in 2021.
Actual *(PMR)*

2-7 Environmental and Social Impacts

- The implementation of this project will not have any significant or undesirable effects on the environment or society, nor will it have any adverse effects on the lives of residents in the project area. Based on JICA's Guidelines for Environmental and Social Considerations, this Project is classified as Category C that is considered to have minimal or no undesirable effects on the environment and society.

3: Operation and Maintenance (O&M)

3-1 Physical Arrangement

- Plan for O&M (number and skills of the staff in the responsible division or section, availability of manuals and guidelines, availability of spareparts, etc.)

Original *(at the time of outline design)* The following manpower will be assigned for the project under DTE - 1 Project Director, 1 Assistant Project Director, 1 Accountant, 1 Equipment officer, 1 Computer Operator, and 1 Office Assistant

Actual *(PMR)*

3-2 Budgetary Arrangement

- Required O&M cost and actual budget allocation for O&M

Original *(at the time of outline design)*

Technologies	Spare parts, consumables	DPI (BDT) *(JPY)*	DMPI (BDT) *(JPY)*	TTTC (BDT) *(JPY)*
【Electric】 Drilling MC	Cutting tools	78,000 *100,000*	-	78,000 *100,000*
【Electronics】 Electrocardiograph, Color doppler	Electrocardiograph probe, color doppler probe, gel	233,000 *300,000*	233,000 *300,000*	-
【Machinery】 CNC lathe, other machining tools	Cutting tool, cutting oil, fuse, lamp	310,000 *400,000*	-	310,000 *400,000*
【Computer】 3D printer	Resin powder and other consumables for 3D printer	-	-	233,000 *300,000*
Total		BDT 621,000 *¥800,000*	BDT 233,000 *¥300,000*	BDT 621,000 *¥800,000*

Such cost shall be covered by DTE.

Actual *(PMR)*

4: Potential Risks and Mitigation Measures

- Potential risks which may affect the project implementation, attainment of objectives, sustainability
- Mitigation measures corresponding to the potential risks

Assessment of Potential Risks (*at the time of outline design)*

Potential Risks	Assessment
1. General risks associated with the project implementation procedure under Japan's Grant Aid, e.g. consultant agreement, bidding, supplier's contract, opening of Authorization to Pay (A/P), budgeting taxes, duties, etc.	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Timely follow-ups are indispensable, otherwise, significant delay of the project will take place.
	Mitigation Measures:
	The Executing Agency and the Consultant shall communicate well in advance, and sort out the measures to avoid foreseeable risks.
	Action required during the implementation stage:
	-Regular monitoring by the Consultant and reporting to the Executing Agency -Periodical meeting of the Consultant and the Supplier
	Contingency Plan (if applicable):

	N/A
2. Risks of delay in undertakings of the Bangladesh side, e.g. -Rehabilitation works of the rooms. -Local budget allocation of DTE to 3 target institutes for the above works.	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Timely follow-ups are indispensable, otherwise, significant delay of the project will take place.
	Mitigation Measures:
	The Executing Agency and the Consultant shall confirm the firm delivery schedule of the equipment immediately after the Supplier is selected.
	Action required during the implementation stage:
	The Executing Agency shall secure the budget and undertake the required works before delivery of the Project equipment on site.
	Contingency Plan (if applicable):
	N/A
Actual Situation and Countermeasures	
(PMR)	

5: Evaluation and Monitoring Plan (after the work completion)

5-1 Overall evaluation

Please describe your overall evaluation on the project.

5-2 Lessons Learnt and Recommendations

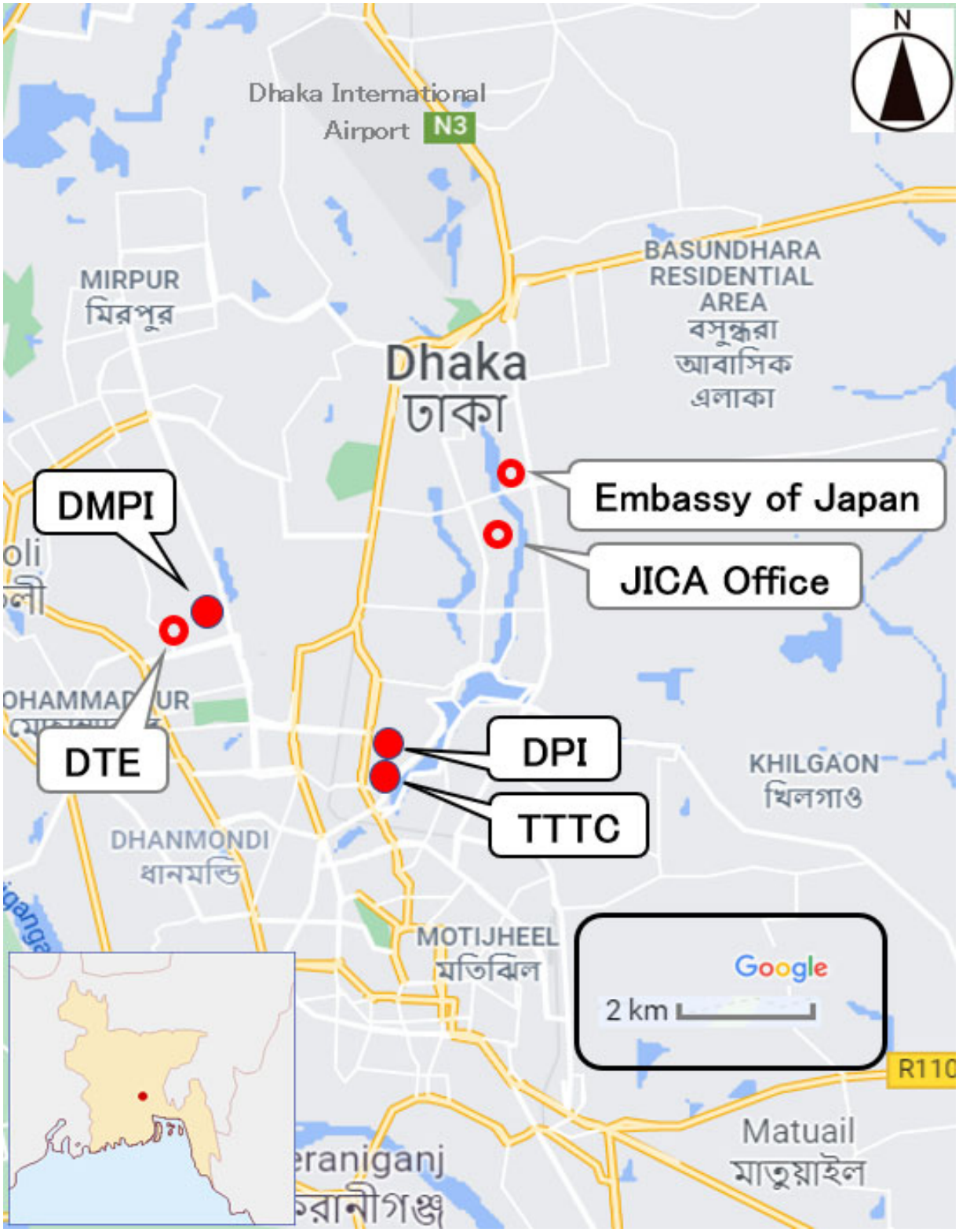
Please raise any lessons learned from the project experience, which might be valuable for the future assistance or similar type of projects, as well as any recommendations, which might be beneficial for better realization of the project effect, impact and assurance of sustainability.

5-3 Monitoring Plan of the Indicators for Post-Evaluation

Please describe monitoring methods, section(s)/department(s) in charge of monitoring, frequency, the term to monitor the indicators stipulated in 1-3.

Attachment

1. Project Location Map



2. Specific obligations of the Recipient which will not be funded with the Grant

Specific obligations of the Bangladesh side which are confirmed during the site survey are described below.

Before Bidding	-To open a bank account (B/A) -To issue A/P to a bank in Japan (the Agent Bank) for the payment to the consultant. -To bear the following commissions paid to a bank in Japan for the banking services based upon the B/A. -Advising commission of A/P -Payment commission for A/P
During the Project Implementation until handing-over	-To issue A/P to a bank in Japan (the Agent Bank) for the payment to the Supplier(s). -To bear the following commissions paid to a bank in Japan for the banking services based upon the B/A. ▪ Advising commission of A/P ▪ Payment commission for A/P -To ensure prompt unloading and customs clearance at ports of disembarkation and to assist the Supplier(s) with internal transportation therein. -To accord Japanese nationals and/or physical persons of third countries whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the country of the Recipient and stay therein for the performance of their work. -To ensure that customs duty, internal taxes, and other fiscal levies which may be imposed in the country of the Recipient for the purchase of the products and/or the services are exempted. -To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project, such as tables and chairs for general use, etc. -To remove existing equipment and to rehabilitate facilities and utilities (electricity, water supply, drainage system, and LAN network). -To prepare and submit Project Monitoring Report (PMR). -To prepare and submit the final PMR upon completion of the works. -To allocate necessary staff.
After the Project	-To secure maintenance costs for proper use and management of procured equipment. -To organize operation and maintenance structure. -To implement a daily check and regular inspection of procured equipment.