

資料2-4) 各科のカリキュラム内容詳細 (英文)

**MANUFACTURING ENGINEERING TECHNOLOGY DEPARTMENT**

**Training Targets:**

- a. Basic knowledge in various machine tools.
- b. Utilizing of CAD/CAM/CNC with latest technology, equipment and software.
- c. Planning and designing production line.

**Training Contents:**

After completion of the training course, the trainee will be able to do the following:-

- a. Do precision machining.
- b. Utilize the principle of CNC machine tool/ programming and operation.
- c. Apply CAD/CAM to designing & machinery.
- d. Practice production management.
- e. Planning, running and design production line.

**MANUFACTURING ENGINEERING TECHNOLOGY**  
Detailed listing of curriculum

*General Education*

Curriculum	Detail
Mathematics	Trigonometrical function, complex number, differential calculus integral calculus, linear algebra
Islamic Education or Moral Education	
Technical English & Communication	Industrial technical term in English
Physics	Static, Energy, Heat, Waves, Dynamics, Newton's Law, Electricity and light

*Basic Theory*

Curriculum	Detail
Material Technology	Material structure and alloy dual system, ferrous metals, metal work, casting process and heat treatment for steel, mechanical testing, non-ferrous metal, corrosion of metal, plastic, ceramic, composite
Introduction to Electrical Engineering	Basic theory of electrical engineering, DC circuits, properties of electrical resistance, heating action of electrical current, magnetism and magnetic fields, electrical current and magnetic fields, AC circuits
Principle of Engineering Drawing	Freehand sketching, orthographic projection: isometric projection, Dimensioning, symbols for surface texture, Engineering drawing standards, Sectioning
Engineering Safety	Safety regulation, analysis/prevention of work-related injuries, safety standards, hygiene management, work environment, examples of work-related injuries, measures to prevent work-related injuries, standard operations, safety gear, danger prediction, 5S regulation
Computer Application	Basic information technology concepts, functions of major computer hardware, basic uses of application software and operating systems, DOS, WINDOWS, Microsoft offices software, data securities, computer networking

Basic Measuring Instrument.	Measuring measurement mechanics volume of length and angle, measuring the environment (vibration, temperature, humidity) other, electronic measuring methods, automated measurement, industrial measurement Sensor, measurement circuits
Computer Programming	Introduction to computer programming, Different phases of software development, software development using C language
Strength of Material	Geometrical moment of inertia, beam bending (bend moment and shearing force, bend stress and deflection)
Ergonomics Engineering	Ergonomics as link between the engineering sciences and human sciences, ergonomics applied to instrument design, ergonomics applied to machines and controls, ergonomics applied to the layout of a workplaces, noise, heating and ventilation, lighting
Thermodynamics	Heat equilibrium, first law of thermodynamics, second law of thermodynamics, changes in the state of ideal gasses
Mechanic Dynamic.	Vector calculations, force acting on rigid objects (moment of force), friction, work and energy, industrial mechanics (circular motion and moment inertia), basic stress and distortion of vibration, mechanical properties of industrial material (stretch, compression, creep, fatigue, permissible stress)
Applied Mathematics	Concepts of imaginary and real numbers, and their operation, complex variables, complex integration, Laplace Transformation, Differential Equation, Second stage semi-derived linear equations
Fluid Mechanics	Properties of fluids, fluids static, theories of the flow of pure fluids, viscous fluids and tube friction

*Specialized Theory*

Curriculum	Detail
Production Technology and Machine Tools	Processing systems, various types of machine tools, machine processing, plastic processing methods, special processing methods, plastic molding, cutting theory, cutting tools

Precision Measurement Tools	Measuring error, types, names, and structures of measuring devices, use of supplementary measuring tools, measurement (actual length, angle, gauge, torque, gears), dimension crossing, measurement of outlines, measurement of roughness, form measurement
Machine Design	ISO, JIS standard machine drafting, machine parts drafting, definition/editing/analysis of figures, product design, design calculation, element design theory, knowledge related to basic design, structural elements of machines, dimension crossing and fitting, permissible error in dimensions, surface roughness
Deformation Process	Bending theory, types of bending die, blank development, bending forces, design of bend products
Theory of Mechanics	Operation of mechanisms, link mechanisms, cam mechanisms, gear mechanisms, wrapping motors, rolling contacts, grinding wheels, motor system, spring, screw mechanisms, force equilibrium, various types of mechanisms
Precision Machining Technology	
Numerical Control Engineering	Outline of numerical control, numerical control equipment, position sensors, NC programming
Joining Engineering	Screw joining, pin connections, key joints, press joining, apply appropriate joining by combination, rivets joining, joining with bonding agents, oxyacetylene, arc welding TIG, MAG, different material joining process
Basic Electronics Engineering	Diodes, transistors, Fetes, opeamps, Boolean algebra, digital IC, flip-flops, thyristors, filters, counter circuits, A/D converters, analog circuits, digital circuits, distributed constant circuits, microwave circuits, electronic tubes, semiconductor devices and their manufacturing methods, signal analysis electrical/electronic operation methods, transient phenomena
Control Engineering	Classical control theory, basic theory of control engineering, characteristics of control system, design of control system, basic theory of feedback control, basic theory of contact sequencing, basic theory of non-contact sequencing, digital control

Sequence Control	Logic circuit, sensors and actuators, reading/writing sequence charts, basic circuits
Pneumatic and Hydraulics Engineering	Structure of hydraulic devices, hydraulic oil, hydraulic pumps and hydraulic actuators, hydraulic control, hydraulic cylinders and hydraulic motors, basic hydraulic circuits, structure of hydraulic/pneumatic control valves, compressors and pneumatic actuators, basic pneumatic circuits
Electromagnetism	Electrical loads and electrical fields, electrical potential, static electrical capacitance, electrical conductors, magnetic fields, electromagnetic inductance, inductance
Robotic Engineering	Specialized instruction of industrial robotic, knowledge of robotic, teaching method, inspection methods
CAD/CAM/CAE/CAT for Production	Introduction to CAD/CAM/CAE/CAT concepts, control system, NC programming, analysis products, reverse engineering, interfacing
Production Engineering	Production planning, process management, quality management, standard operation, cost price management, industrial law/standard, reliability management, Quality Control
Sensor Engineering	General sensor technology, behavior of inductive proximal sensor, behavior of capacitive proximity sensor, behavior optical proximity sensor, behavior of magnetic field sensor, sensor connection techniques, different sensor application
Automatic Manufacturing System Technology	Automated lines, incorporation of PLC, incorporation of computers, build up simple automated system, production integration automated lines, integrated system operation inspection, system design for FMS lines

*Basic Practice*

Curriculum	Detail
Basic Engineering Experiment	Measurement basics, stretch testing, hardness testing, static distortion measurement, dynamics distortion measurement, photoelasticity testing.

<b>Mechanical Engineering Experiment</b>	measurement, structural observation by microscope  Experiment in material mechanics, experiment in machine mechanics, experiment in thermal mechanics, experiment with industrial material, experiment in fluid mechanics
<b>Practice on Information Processing</b>	Exercises in the basic programming language, chart processing exercises, numerical calculation exercises, basic structure and operating principle of electronic computers
<b>Practice on Simulation Engineering</b>	

*Specialized Practice*

<b>Curriculum</b>	<b>Detail</b>
<b>Machining Practice I</b>	Cutting processing, use appropriate hand tools, bench tools, drilling machine, counterbore, countersink, reaming, centering and tapping, pedestal grinders machines, engraving machine, basic operation lathe machine, basic operation milling machine, basic operation grinding machine
<b>Practice on Deformation Process</b>	
<b>Practice on Precision Measurement</b>	Mechanical measuring devices, optical measuring devices, electrical measuring devices, testing and inspection of various types of machinery, cutting power/ efficiency/ tool service life, cutting temperature, measuring surface roughness
<b>Machine Design and Drafting</b>	Machine design drafting, machine parts drafting, structural elements of machines
<b>Machining Practice II</b>	Operation on Turning, Milling, Grinding, Methods on precision cutting
<b>Practice on CNC machining I</b>	Programming, CNC machine operation, numerical control processing exercises Turning and Milling
<b>Practice on Sequence Control</b>	Sequence theory control experiments, programming control experiments, rotating equipment control experiment, servo mechanism control experiment

Practice on CAD	Introduction on CAD, basic draw commands, basic edit commands, display commands, file commands, Xform commands, 2D, 2 1/2D, 3D, surfacing, dimensioning, plotting
Practice on CNC machining	Programming, CNC machine operation, DNC operation, interfacing operation, Wire-cut and EDM sinker
Practice on Robotic Engineering	Operation of industrial robot, teaching method, inspection method, status control
Practice on Pneumatic and Hydraulic Engineering	Functional characteristics of hydraulics/pneumatic machinery, disassembly and assembly of hydraulic/pneumatic machinery, building basic circuits, building electrical circuits, basic control circuits, non-contact sequence circuits, hydraulic sequence experiment, pneumatic sequence experiment
Practice on CAD/CAM/CAB/CAT	Figure processing, CAD system basic operation, 3D modeling, Solid Modeling, creating NC data for NC machine tools CAM technology, CAE and CAT technology
Project-I	
Practice on Machine Design	Operation on CAD system, machine system design, exercises in 3D modeling operation
Practice on Automatic Manufacturing System	Automated lines, incorporation of PCs, incorporation of personal computer, automated system operation
Practice on Automatic Manufacturing System Design	
Practice on Maintenance of Automatic Manufacturing System	Exercises of machine maintenance in automated manufacturing system, and diagnose machines by mean of vibration, temperature
Project - II	Student final project, automation manufacturing system project, CAD/CAM/CAE/CAT and precision machining project, including of designing, research, manufacturing and presentation
On the Job Training	Working in the Industries

## **ELECTRONIC ENGINEERING TECHNOLOGY DEPARTMENT**

### **Training Targets:**

- a. Basic electronic circuit.
- b. Computer technology, sensor technology, PCB and CAD.
- c. Maintenance and improvement in the field of electronic circuit and production line.

### **Training Contents:**

After completion of the training course, the trainee will be able to do the following:-

- a. Applying the CAD, design and make electronic circuit PCB (make PCB).
- b. Design and use Programmable Logic IC Family.
- c. Explain Principle of computer and develop hardware/software.
- d. Measure the electronic circuit and perform data analysis.
- e. Construct data communication network system.
- f. Apply PLC and several kind of sensors to control production line and perform maintenance.



## ELECTRONIC ENGINEERING TECHNOLOGY

### Detailed listing of curriculum

#### General Education

Curriculum	Detail
Mathematics	Trigonometrical function, complex number, differential calculus integral calculus, linear algebra
Islamic Education or Moral Education	
Technical English & Communication	Industrial technical term in English
Physics	Static, Energy, Heat, Waves, Dynamics, Newton's Law, Electricity and light

#### Basic Theory

Curriculum	Detail
Industrial safety	Safety concepts, mechanical safety, accidents & prevention, danger in work place, personal safety and first aid.
Electric engineering safety practice	Electrical safety, safety management, sanitation management, health management, environmental management etc.
Electrical/electronics principles & measuring	History of electric, Static electricity, Current, voltage and ohm's law, D.C and A.C, Electromagnetism, Single phase A.C. circuits, Three phase A.C. circuits, Electric mathematics, Circuit theory, Star/Delta starter circuit.
Analog electronics	A simple outline of atomic theory, conductors, insulator and semiconductors, Extrinsic (impurity) semiconductors, P-N junction, Semiconductor diode and circuits, Bipolar transistors:- Type of bipolar transistor, action of Tr. characteristic curve and transistor application (circuits). Field effect transistors.
Digital electronics	Numbering system, binary code, digital system, electronics gate( AND, OR , NOT), simplification of Boolean algebra, practical electronics gate, combinational logic gates, combinational logic circuits, Flip-flops, BCD.

Electrical/electronics measurement	MEASUREMENTS:- Accuracy and sensitivity, total measurement errors, wattmeter correction, electronic voltmeter, digital voltmeter, complex waveform, measurement of phase and frequency.
Computer engineering	History of computers, basic structure, peripheral device.
Engineering drawing(CAD/CAE)	Letters and lines, expression of figures, various type of part, diagrams, electronics circuit design diagram, outline of CAD system.

*Specialized Theory*

Curriculum	Detail
Communication engineering	Principles of data communication, Physical interface, MODEM, Communication protocol, Local Area Network, Integrated Service Digital Network (ISDN)
Analog electronics circuit	Manufacturers sheet, Amplifier, Oscillator, Operational Amplifier, 555 timer, Noise, Feedback (effect of applying), Electronics system
Power electronics	Power device (construction, operation and application)
Digital electronics	MSI combinational logic circuit(multiplexer, demultiplexer, encoder, decoder), Counter, comparator, half-adder/subtractor, full-adder/subtractor, memory, ALU, D/A A/D converter circuit.
Microprocessor	Introduction to microprocessor and Microcomputer, Internal architecture of microprocessor, Internal register of microprocessor, I/O, Memory, System clock Bus Cycle, Execute sequence, Programming Assembly language
Control engineering	PID control, Feedback control, Transfer function. Characteristic of control system, Process, measurement and calibration
Electrical drives	Theory and operation of identify, rotating machine characteristics, Describe the operation of AC, DC, stepper motor and generator, Isolate faulty motor components

Pneumatic systems	Basic Principles of pneumatic, Function and construction, Troubleshooting simple pneumatic control, maintenance of pneumatic, Overview and application of electro-pneumatic controls standard symbols Design and construct simple electro-pneumatic circuit
Hydraulic systems	Fundamental of hydraulic, Construction and function, Standard symbol.
Sensor(Transducer)	Describe basic transducer principles, Photo-electric transducer operating principles, Temperature transducer operating principles, Motion transducer operating principles, Position transducer operating principles
Opto-electronics	Refraction and reflection, the propagation of light in an optical fiber, types of optical fiber, optical source and optical detectors
PLC	Relay sequence, Identify PLC characteristics, Describe PLC operating principles, Describe hardware in a PLC, Describe PLC programming, Isolate fault in PLC.

*Basic Practice*

Curriculum	Detail
Safety work hygienic	Safety, hygienic work procedure, electrical safety work procedure, maintaining a neat, tidy and clean workplace and emergency treatment
Experiments on electronics circuit	Make circuit and measurement (DC/AC circuit)
Experiments on analog electronics	Use circuit trainer or construct, circuit for better understanding, such as, all types of rectifier, limiter, clamper, transistor and FET circuits.
Experiments on fundamental digital	Use trainer kit or construct digital circuits using logic gates
Measurement	Appropriate instrument for measurement, resistance, voltage, current, power, frequency etc.
Use of PC	Word-processing, Spread-sheet
Drawing of electronics	Letters and line, expression of figures, Various type of part, diagrams, electronics circuit design diagram, outline of CAD systems.

*Specialized Practice*

Curriculum	Detail
Power supply circuit	Rectifier circuits, Filter circuits, voltage multiplying and voltage, stabilizer (PROJECT)
Computer software	Basic Object Oriented Program ( OOP), Basic Language, C-Language,
Experiments on analog circuits	Manufacturers sheet, Use circuit trainer or construct, circuit such as Amplifier, Oscillator, Operational, Amplifier, 555 timer etc., Noise, Feedback ( effect of applying), Electronics system
Power electronics	Power device (application with load.)
Experiments on digital circuits	MSI combinational logic circuit (multiplexer, demultiplexer, encoder , decoder), Counter, comparator, half-adder/subtractor, full-adder/subtractor, memory and ALU
Computer hardware	Single board microprocessor, Programming (ROM), Assembly language
Interface circuit	I/O 8255, Microprocessor in automation
Sensor	Observe: Photo-electric transducer operating principles, Temperature transducer operating principles, Motion transducer operating principles, Position transducer operating principles
Electronic design	Design and implement & evaluate system to meet technical specification, Realize and test the design, Evaluate the test result against the design criteria, modify, retest and evaluate, Appraise and communicate the result, Report writing and presentation.
Data analysis	Automatic measuring, Data acquisition, Data analysis, Data communication
Synchro/servo electronics	Identify synchro/servo characteristic, Describe synchro operation, Describe closed loop servo operation, Isolate faulty servo/synchro components.
Pneumatic systems	Troubleshooting simple pneumatic control, maintenance of pneumatic, Overview and application of electro-pneumatic controls, standard symbols, Design and construct simple electro.

	pneumatic circuit
<b>Hydraulic systems</b>	Fundamental of hydraulic, construction and function, Standard symbol
<b>Preventive maintenance</b>	Identify manufacturers specifications, Perform preventive maintenance activities, planning write report, Quality control check
<b>Opto-electronics</b>	Identify basic fiberoptic operating principles, Measure basic fiberoptic principles
<b>PLD</b>	Programming and PLD writing.
<b>Communication engineering</b>	Experiment with wired communications, Experiment with wireless communications
<b>PLC &amp; Application</b>	Programming PLC for various type of application
<b>PCB design</b>	PCB basic, Schematic diagram, Components choice, Technique for designing PCB board artwork, Drawing PC board artwork, Make PCB and soldering, Repairing PCB boards, Project
<b>Troubleshooting techniques</b>	Describe circuit trouble shooting, Identify technique to isolate faulted components in circuits

## COMPUTER ENGINEERING TECHNOLOGY DEPARTMENT

### Training Targets:

Utilization of computers and computer softwares in industries, offices, enterprises and individuals has become a normal practice and widely used. This department is responsible in cultivating computer literacy as well as developing technologist with the ability to built design systems, to develop the fields relevant to business processing by computer, to develop the fields related to communication, image information, measurement and control, ability to design and develop software concerned to manufacturing, and with the existence of computer components and parts manufacturing industries as well as computer assembly industries, technologist should have the ability to maintain, diagnose fault and troubleshoot problems related to the hardware and software. This department consists of the both areas of Computer Engineering Technology and Information Technology and Processing. The technologies of this department are the followings.

- a. Basic technology of program development and data communication and data processing.
- b. Design and develop system in the field of computer in production line (hardware and software totally).

### Training Contents:

After completion of the training course, the trainee will be able to do the following:-

- a. Develop software application in Windows environment.
- b. Explain the structure and function of Personal Computer and simple maintenance in hardware side.
- c. Design and construct the Network and RDB system.
- d. Implement digital computer graphic and construct the graphical data system.
- e. Construct and established server client model system and construct this system.

**COMPUTER ENGINEERING TECHNOLOGY**  
Detailed listing of curriculum

*General Education*

Curriculum	Detail
Mathematics	Trigonometrical function, complex number, differential calculus integral calculus, linear algebra
Islamic Education or Moral Education	
Technical English & Communication	Industrial technical term in English
Physics	Static, Energy, Heat, Waves, Dynamics, Newton's Law, Electricity and light

*Basic Theory*

Curriculum	Detail
Basic Electronic Engineering	Analog electronics Amplifier circuits, oscillator circuits, modulator/demodulator circuits, power supply circuits, various types of electronic devices Digital electronics Pulse circuits, basic logic circuits, combined logic circuits, sequential logic circuits, A/D and D/A converter circuits, various types of digital devices
Computer Engineering	Processing devices, memory devices, input/output devices, command sets, architecture, peripheral devices
Programming Technique	Language theory, program structure, programming languages, Assembler command language, function type programs, program design theory, structural programming, modular division, programming diagrams, programming theory, program design
Operating Systems	MS-DOS, MS-Windows, UNIX, OS/2 and various command of operating system. Process management, data management, memory management, input/output management
Engineering Safety	Basic rules of safety, health and safety management, environmental management

*Specialized Theory*

Curriculum	Detail
Data Telecommunications Engineering	Data telecommunications, transmission control procedures, packet exchange systems, Various types of protocols (OSI, TCP/IP, Ethernet), LANs, WANs (Internet), Data communications protocol, ISDN, hour/minute divided processing, on-line processing, databases, Cabling method, Communication devices and software and standard
Database Systems	File structure, access methods, file operations, database systems, database models
Computer Programming	GUI programming using Visual Basic and C++
Graphic Processing Engineering	Graphic conversion, coordinate substitution, graphic displays, hidden line deletion
Data Engineering	Algorithms, Arrays, records, lists, trees, stacks, queues, heaps, tables, graphs, flat graphs, number of colors, matching, Data Flow Diagram
Microprocessor Technology 1	Various types of microprocessor and application. Various types of memory devices (EPROM, ROM, RAM), System architecture, Graphic Display, I/O mapping and communication
Control System	Transducer and sensor, Automatic process
Mathematical Statistics	Error, function approximation, numerical differentials/integrals, linear equation systems, linear planning method, optimization, network planning method, OR, recursive analysis, multivariate analysis, distributed analysis
Microprocessor Technology 2	Various types of microprocessor and application. Various types of memory devices (EPROM, ROM, RAM), System architecture, Graphic Display, I/O mapping and communication
Information Communication Engineering	Internet, Client Server model, HTML, JAVA and FIRE WALL

*Basic Practice*

Curriculum	Detail
Basic Exercises in Software Engineering 1	C language structural programming



<b>Basic Exercises in Software Engineering 2</b>	Basic computer operations using the Assembly language (8 and 16 bits), display of various types of data on the computer, computer logic circuits, calculation circuits, control circuits, memory circuits, and input/output circuits
<b>Computer Engineering Exercises</b>	Motherboard architecture, diagnose the fault, types of bus, video display unit, interface card
<b>Operating System Exercises</b>	MS-DOS, UNIX and MS-Windows, system setup and configuration, memory management
<b>Electronics Exercises</b>	Digital and analog practical exercises, using simulation software, ECAD
<b>Engineering Measurement Exercises</b>	Multimeter, Oscilloscope, function generator, logic tester, spectrum analyzer
<b>Workshop Practice</b>	Introduction to hard tool, basic fitting work, soldering technique

*Specialized Practice*

<b>Curriculum</b>	<b>Detail</b>
<b>Software Engineering Exercises</b>	Programming exercises using Visual Basic and C++
<b>Graphic Processing Exercises</b>	Movement and rotation of 2-dimensional graphics, 2-dimensional graphics affine transformation, 2-dimensional viewing conversion and clipping, movement and rotation of 3-dimensional graphics, transparent conversion and shadow conversion, 3-dimensional affine transformations, graphics processing application system
<b>Data Processing Exercise</b>	Database exercises, data analysis processing, error control exercises, file structure exercises using ORACLE, ACCESS, DBASE 5
<b>Data Telecommunication Exercises</b>	Telephone office internal technology, data communications technology, interface technology, network technology, image communications technology, data exchange technology, optical fiber communications technology, Homepage design
<b>Microprocessor Technology Exercise 1</b>	Assembly Language Exercises using 8 bit processor, Simple Interface
<b>Control System Exercises</b>	Computer software to control the process, computer interface to real world

<b>Microcomputer Interfacing Exercises</b>	Single board computer programming and application. EPROM Programming
<b>System Design Exercises</b>	System Design of various kinds of management (student register administration, library administration)
<b>Information Communication Engineering Exercises</b>	Interactive system menu design/exercise, on-line system function operation exercise, Homepage design
<b>Management Analysis Exercises</b>	Management analysis exercise based on actual examples
<b>Practical Training/ Project</b>	Practical work in the enterprise Survey of local industries, practical work in local industries

## MECHATRONIC ENGINEERING TECHNOLOGY DEPARTMENT

### Training Targets:

Mechatronics is a combination of electronics, computing technologies and mechanical engineering disciplines. As industry moves towards higher levels of technology integration, technologists equipped with knowledge and skills from the various engineering disciplines will be in great demand. This department is responsible in giving a sound board-based foundation in mechatronics and latter lay emphasis on application technologies, developing problem solving skills for integrating these technologies and ability to perform maintenance of high-technic machineries. The technologies of this department are the followings.

- a. Fundamental of Mechanical, Electronic and Engineering.
- b. Pneumatic and hydraulic control and electro-servo system and computer control.
- c. Apply latest control technology, troubleshooting, maintenance and improvement production line.

### Training contents:

After completion of the training course, the trainee will be able to do the followings:-

- a. Assemble, measure and analyze of automated equipment.
- b. Do general machine processing and control of machines.
- c. Design and apply electro-pneumatic, electro-hydraulic, electro-servo control system.
- d. Design and apply diagnosis system.
- e. Perform maintenance and improvement of production line.

**MECHATRONIC ENGINEERING TECHNOLOGY**  
Detailed listing of curriculum

*General Education*

Curriculum	Detail
Mathematics	Trigonometrical function, complex number, differential calculus integral calculus, linear algebra
Islamic Education or Moral Education	
Technical English & Communication	Industrial technical term in English
Physics	Static, Energy, Heat, Waves, Dynamics, Newton's Law, Electricity and light

*Basic Theory*

Curriculum	Detail
Production engineering	Production planning, process management, cost price management, industrial standard.
Mechanic engineering outline	Mechanics of basic engineering, Outline of material, Dynamics, machine element, and mechanical element.
Mechanical dynamics	Moment of force, friction, work and energy, circular motion, basis stress and distortion of vibration, geometrical moment of inertia.
Material dynamics	Mechanical properties of industrial materials, Bending moment and shearing force, bending stress and deflection.
Hydrodynamics	Properties of fluids, fluids statics, theories of the flow of pure fluids, Viscous fluids and tube friction.
Basic material technology	Physical properties, mechanical properties properties of carbon steel, metal materials, high polymer materials, electrical and electronic materials, ceramics
Engineering drawing	Basic of drafting, expression of figures, method of notating dimensions, surface roughness, geometrical crossing.
Electric/electronic engineering outline	Basic theory of electrical/electronic engineering. DC circuits, properties of electrical resistance, heating action of electrical current, and magnetic fields, AC circuits.
Metrology and quality control	Statistics for manufacturing and quality control of products.
Information engineering	History of computers, basic structure, peripheral devices.

	basic programs and languages, basics of hardware and software. Information theory, symbolic theory, networks, computer systems(hardware, soft ware), operation system.
Engineering safety	Safety regulations, safety standard, measures to prevent work-related injuries, standard operations, safety inspection.
Mechanical element design	Detail designing of mechanical elements and element's application for machine system.
Mechanisms	Mechanism, dynamics of link, cum, gear velt and another mechanics, velocity and acceleration of mechanism.
Control engineering	Basic theory of control engineering, theory of automated control, servo control, sequence control, feedback control, electric control, automation technology. Classical control theory, basic theory of control engineering, characteristics of control systems, methods for distinguishing stability of control systems.
Electrical/electronics measuring	General measuring of electrical and electronics in industrial use.
Industrial Measuring methods	Measurement theory, basic principles of measurement, types of measuring devices, measuring methods, error theory.
Electrical/Electronics measuring	General measuring of electrical and electronics in industrial use.
Thermodynamics( spare) (in mechanical dynamics)	Heat equilibrium, first law of thermodynamics, second law of thermodynamics, changes in the state of ideal gasses.

*Specialized Theory*

Curriculum	Detail
Mechatronic engineering	Mechatronics outline, mechanism element, applications of sensor, actuators, robot control, programmable control
Electronic engineering	Electronic parts, electrical properties, electronic operation methods.
System design	Machine system design, product design, calculation for design, dimension, permissible error.
Computer control	C language programming, assembler, image processing, microcomputer hardware, software for mechatronics.
Pneumatic and hydraulic engineering	Basics of fluid mechanics, properties of fluids, structure of devices, control valves, compressor, actuators, circuits.
Sequence control	Logic circuits, sensors and actuators, reading/writing se-

	quence charts, basic circuits
<b>Basic Machining technology</b>	Various types of machine tools, machine processing plastic molding, cutting theory cutting tools.
<b>Vibration engineering</b>	Vibration theory, amplitude of vibration, acceleration, velocity, displacement for diagnosis.
<b>Robot engineering</b>	Specialized Instruction of industrial robot, knowledge of robot, teaching method, inspection method.
<b>Production system engineering</b>	Basic outline of automation, trends in automation, technical element of automation, automation system layout
<b>Sensor engineering</b>	Theory and properties of sensors for engineering use,
<b>Electric motor engineering</b>	Revolution theory of electric motor and application technology of induction motor DC motor, stepping motor, servo motor.
<b>Machine maintenance</b>	Basic method of machine maintenance in automated manufacturing system.
<b>Numerical control engineering</b>	Outline of numerical control, numerical control equipment, NC programming

*Basic Practices*

Curriculum	
<b>Machine processing exercises</b>	Hand finishing, cutting using machine tools, drilling machines, lathes milling machines, grinding machines.
<b>Mechanical engineering experiments</b>	Mechanical properties of metals, tensile strength, hardness, impact experiment, distortion, measurement.
<b>Basic engineering experiments</b>	Basic measurement of mechanical fields, measuring error, measuring dimensions, roughness, geometry value.
<b>Electrical/electronic experiments</b>	Basic electrical engineering experiments for manufacturing system.
<b>Information processing exercises</b>	Exercises of BASIC programming and C language, chart processing exercises, operation principles of electronic computers.
<b>Mechanical design drafting</b>	Machine design drafting, machine parts drafting, structural elements of machines.

*Specialized Practice*

Curriculum	
<b>Sequence control exercises</b>	Exercises of Logic circuits, sensors and actuators, reading/writing sequence charts, basic circuits

Computer control exercises	programming of C and assembler language, controlling I/O, A/D, sensor, actuators, image processing.
Mechatronic exercises	Designing exercises using mechanisms, actuators, controller and sensors and manufacture the mechatronics system.
System design exercises	Basic operation of CAD system, machine system design, exercises of 3-D modeling basic operation.
Production system exercises	Automated lines, incorporation of PCs, in corporation of personal computers, automated system operation.
Pneumatic and hydraulic exercises	Exercises using hydraulic and pneumatic devices, oil, pumps, actuators, cylinders, motors, control valves, and circuits
Electric motor engineering exercises	Actual use of electric motor, induction motor, DC motor, stepping motor.
Automation control exercises	Process control study, water flow, level, Pressure, and temperature, by PID control.
Robotics engineering exercises	Operation of industrial robot, teaching method, inspection method, status control.
Numerical control machining exercises	NC programming and machine operation, numerical control processing exercises
CAD/CAM exercises	Creating NC data, exercises of CAM technology. how to proceed the design of production systems
Machine maintenance exercises	Exercises of machine maintenance in automated manufacturing system, and diagnose machines by means of vibration, temperature.
Mesuring engineering exercises	Measuring of electronic characteristics, properties of sensors, image processing.
Mechanical design exercises(spare)	Machine design by definition/editing/analysis of figures, design calculation, elemental design theory

MANUFACTURING ENGINEERING TECHNOLOGY DEPARTMENT

LIST OF EQUIPMENT AND ESTIMATE COST.

Purchase by Malaysian side.

NO.	EQUIPMENTS	QTY	ESTIMATE COST PER UNIT (RM)	TOTAL ESTIMATE COST (RM)
1.	Universal Cylindrical grinder Machine	3	150,000.00	450,000.00
2.	Universal Tool and Cutter Grinder Machine	1	150,000.00	150,000.00
3.	Precision Surface Grinding Machine	8	80,000.00	640,000.00
4.	Optical Profile Projector Grinder	1	150,000.00	150,000.00
5.	Single Lip Cutter Grinder	1	4,000.00	4,000.00
6.	Pedestal Grinder	2	1,000.00	2,000.00
7.	Universal Milling Machine (Complete with memory DRO X, Y, Z axis)	2	120,000.00	240,000.00
8.	Vertical Milling Machine (Complete with memory DRO X, Y, Z, axis)	15	40,000.00	600,000.00
9.	Precision High Speed Lathe (Complete with memory DRO)	15	30,000.00	450,000.00
10.	Upright Drilling Machine	3	12,000.00	36,000.00
11.	Pedestal Drilling Machine	2	7,000.00	14,000.00
12.	Radial Arm Drill	1	21,000.00	21,000.00
13.	Cut Off Saw	2	2,000.00	4,000.00
14.	Horizontal Band Saw	1	34,000.00	34,000.00
15.	Vertical Band Saw	1	42,000.00	42,000.00
17.	Shear Machine	1	4,000.00	4,000.00
18.	Heat Treatment Furnace	1	28,000.00	28,000.00
19.	Bending Machine	1	8,000.00	8,000.00
20.	Bending Roll Machine	1	9,000.00	9,000.00
21.	Drafting Board	30 set	3,500.00	105,000.00
22.	Universal Testing Machine	1	22,000.00	22,000.00
23.	Impact Testing Machine	1	25,000.00	25,000.00



NO.	EQUIPMENTS	Q'TY	ESTIMATE COST PER UNIT (RM)	TOTAL ESTIMATE COST (RM)
24.	Hardness Tester - Rockwell - Vickers - Micro Vickers	1 1 1	15,730.00 60,500.00 21,780.00	15,730.00 60,500.00 21,780.00
25.	CNC Coordinate Measuring Machine (CMM) - 3D	1	700,000.00	700,000.00
26.	CNC Lathe Machine	3	300,000.00	900,000.00
27.	CNC Machining Center	3	350,000.00	1,050,000.00
28.	CNC Wire Cut	1	300,000.00	300,000.00
29.	EDM Sinker	1	330,000.00	330,000.00
30.	Tool Dynamometer: - Amplifier = 3 - Lathe tool dynamometer = 1 - Graphic recorder = 1	2 set	47,000.00	94,000.00
31.	Roundness Tester	1	48,488.00	48,488.00
32.	Surface Roughness Tester	2	248,285.00	496,570.00
33.	Tool Microscope	3	40,000.00	120,000.00
34.	CAD/CAM/CAE/CAT hardware and software for PC bases (1server on Workstation, 1 DNC set, networking, 1 Plotter, 1 Printer, Operating System with WINDOW NT)	25 set		3,100,000.00
35.	Production Control Simulation (Software only, Hardware will be used on CAD/CAM Lab.)	11set	128,000.00	1,408,000.00
36.	Pneumatic and Hydraulic equipment will be sharing with Mechatronic Dept.	-	-	-
37.	Robotic Equipment will be sharing with Mechatronic Dept.	-	-	-
38.	Hand Tools and Marking Tool ( for detail refer attachment)			2,622,122.00
39.	Measuring Tools ( for detail refer attachment)			700,000.00
40.	Cutting Tools and Tool Holders ( for detail refer attachment)			385,272.00
41.	Workshop Equipments ( for detail refer attachment)			63,600.00
			TOTAL	15,454,062.00

Provided by the Japanese side.

NO.	EQUIPMENT	QTY	ESTIMATE COST PER UNIT (RM)	TOTAL ESTIMATE COST (RM)
1.	Production Automatic Line (FMS) - Turning center, Grinding center, Robot, AGV and Automatic Warehouse those each cells controlled for computer.	1 set	6,833,835.00	6,833,835.00
TOTAL			6,833,835.00	6,833,835.00

生産工学技術科機材仕様・数量・金額

マレインシア備負担

No	機材名	仕様	数量	単価 (RM)	金額 (RM)
1	円筒研削盤	テーブル振り：200mm センター間距離：500mm	3式	150,000	450,000
2	万能工具研削盤	テーブル寸法：1,060X740mm 左右移動量：500mm 前後移動量：250mm 上下移動量：250mm	1式	150,000	150,000
3	平面研削盤	テーブル寸法：600X300mm 主軸：1,500rpm 砥石：350X38X76.2mm	8式	80,000	640,000
4	投影研削盤		1式	150,000	150,000
5	1枚刃用研削盤		1式	4,000	4,000
6	両頭グラインダ	砥石：350X32X25.4mm 回転数：1,500rpm	2式	1,000	2,000
7	万能フライス盤	左右600mm 前後250mm 上下360mm 主軸12段60-1.80 rpm デジタルカウンタ付き	2式	120,000	240,000
8	立てフライス盤	左右600mm 前後250mm 上下360mm 主軸12段60-1.800rpm デジタルカウンタ付き	15式	40,000	600,000
9	普通旋盤	心筒：800mm デジタルカウンタ付き	15式	30,000	450,000
10	直立ボール盤	ストローク：550mm 主軸からテーブル最大距離：740mm	3式	12,000	36,000
11	卓上ボール盤	最大穴あけ能力：13mm 主軸：500-3,000rpm モーター：300W	2式	7,000	14,000
12	ラジアールボール盤	アーム左右：540mm 主軸上下：220mm 回転数84~1384rpm	1式	21,000	21,000
13	鋸切断機	切断能力：φ190mm 鋸刃ストローク：127mm	2式	2,000	4,000
				小計	2,761,000

交換レート1RM=44円

# 生産工学技術科機材仕様・数量・金額

マシンシア側負担

No.	機材名	仕様	数量	単価 (RM)	金額 (RM)
14	バンドソー	切断径: φ250mm 鋸刃: 25x0.95x3,505mm	1式	34,000	34,000
15	コンクリングマシン	バンドソー長さ: 3000mm モータ1.5kw	1式	42,000	42,000
16	シャーリングマシン	10X1,280mm	1式	4,000	4,000
17	電気炉		1式	28,000	28,000
18	手動万能折り曲げ機	1.6X1,250mm	1式	8,000	8,000
19	3本ロール	ロール径φ80mm	1式	9,000	9,000
20	ドラフター	A0版 ライト、椅子付き	30式	3,500	105,000
21	万能試験機	Max 300kN	1式	22,000	22,000
22	シャルピー衝撃試験機	ひょう量: 300J 衝撃点までの距離: 750mm	1式	25,000	25,000
23	硬さ試験機	ロックウェル硬度計 ビッカース硬度計 マイクロビッカース硬度計	1式 1式 1式	15,730 60,500 21,780	15,730 60,500 21,780
24	CNC三次元測定機	X400 Y350 Z300 CNC,CAT対応	1式	700,000	700,000
25	NC旋盤	最大加工長さ: 380mm 最大加工径: 310mm 主軸: 11kW	3式	300,000	900,000
26	マシンングセンタ	X540 Y350 Z450 主軸: 60-8000rpm 5.5kW テーパ: No40 ATC: 20本	3式	350,000	1,050,000
			小計		3,025,010

交換レート 1 RM = 4.4 円

# 生産工学技術科機材仕様・数量・金額

マレイシア側負担

No	機材名	仕様	数量	単価 (RM)	金額 (RM)
27	CNCワイヤカッター	ワーク最大寸法: 450X600X250mm X300mm, Y450mm, Z265mm	1式	300,000	300,000
28	CNC放電加工機	ワーク最大寸法: 750X500X210mm X350, Y250, Z350 総液量: 120kg	1式	330,000	330,000
29	工具動力計	動力計: Range DC to 2.5kHz 工具動力計: 至300kg 送り200kg 背150kg 旋盤用 グラブフィックレコーダー	2式	47,000	94,000
30	真円測定器	防震台付き	1式	48,488	48,488
31	表面粗さ測定機	オートレベルリング装置付き	2式	248,285	496,570
32	工具顕微鏡	回転テーブル付き	3式	40,000	120,000
33	CAD/CAM/CAE/CAF	3次元ソリッドモデリング 3D, CAM/77 DNCsystem NASTRAN IBM750PC動作 OS-Windows-NT NETWORK-2SSET	25式		3,100,000
34	生産管理シミュレーション	生産管理シミュレーション OS-Windows-NT	11式	128,000	1,408,000
35	油空圧システム	油空圧システム機器に関してはメカトロニクス技術科のものを 使用する。	-	-	-
36	産業用ロボットシステム	産業用ロボットシステム機器に関してはメカトロニクス技術科 のものを使用する。	-	-	-
37	作業用工具	作業用工具、ケガキ用工具、やすり等	1式	2,622,122	2,622,122
38	汎用測定器	パス、マイクロメータ、千分尺、スリット、シリンダゲージ、7'ロケージ等	1式	700,000	700,000
		小計			9,219,180

交換レート 1 RM = 4.4 円

生産工学技術科機材仕様・数量・金額

マレシア側負担

No	機 材 名	仕 様	数 量	単 価 (RM)	金 額 (RM)
39	切削工具・工具ホルダー	旋削用バイト、エンドミル、ドリル、正面フライス、7-ボ-等	1式	385,272	385,272
40	突習場付帯設備	コンプレッサ等	1式	63,600	63,600
小 計					448,872
合 計					15,454,062

交換レート 1 RM = 4.4 円

生産工学技術科機材仕様・数量・金額

日本側負担

No	機 材 名	仕 様	数 量	単 価 (円)	金 額 (円)
1	生産ライン (FMS)	クーニングセンター、グラインディングセンター、ロボット、AGV、自動倉庫から構成されるセルを、自動化ラインとしてコンピュータにより制御する。	1 式	301,050,000	301,050,000
合 計					301,050,000

# System for Electronics Engineering Technology Course

Malaysian side

NO	SYSTEM	DESCRIPTION		
1	Basic Electronic Circuit Training System	Basic Measuring Instruments (Tester Oscillator, Electronic Voltmeter, Voltmeter, Ammeter), etc. Breadboard, TTL set, Logic Circuit Training Kit, Electronic Training Kit, tools	1	1,101,000
2	Sequence Training System	PLC, Sensor Training Unit Belt Conveyor Loading Unit (Air Robot*4, Index Table, Multi-axis Robot)*6	1	1,200,000
3	Micro Computer Control Training System	Server for Management, PC, PC for Writing, Sensor Training Unit Training Support Display System	1	2,780,000
5	EDA Training System	Server for Management, PC, PC for Writing PC CAD, PLD/FPGA Design System, PCD CAD, PCB Product System	1	2,320,000
6	Communication Training System	Communication Training Unit Infrared Ray Remote Control Training System	1	620,000
Whole Total				8,021,000

1 RM = 4 4 YEN



# System for Electronics Engineering Technology Course

Japanese side

NO	SYSTEM	DESCRIPTION		
4	Automatic Measuring System	Server for Management, PC, LabVIEW, A/D Board, GP-18 Board, F/C, DMN, Digital Oscillo Scope, Training Support Display System	1	1,850,000
Whole Total				1,850,000

1 RM = 44 YEN

電子工学技術科機材仕様・数量・金額

マシニング課負担

NO	機 材 名	仕 様	数 量	単 価 (RM)	金 額 (RM)
1	基本電子回路実習装置	基本測定装置(テスタ、オシロスコープ、電子電圧計、電圧計、電流計) ブレッドボード、TTL-ICセット、論理回路実習装置、電子回路実習装置、工具	1		1,101,000
2	シーケンサ実習装置	PLC、センサ実習装置、ベルトコンベア式シーケンサ実習装置(空気圧ロボット×4、インテックステアブル、多軸ロボット×6)	1		1,200,000
3	マイコン実習装置	サーバースystem、パソコン、マイコン実習装置、センサトレーニング装置、実習支援装置	1		2,780,000
5	EDA実習装置	サーバースystem、パソコン、PCB CAD、PLDE/FPGA Design System、PCB CAD、PCB製造装置	1		2,320,000
6	通信実習装置	通信実習装置、赤外線リモコン実習装置	1		620,000
				合 計	8,021,000

為替レート 1 RM = 44円

電子工学技術科機材仕様・数量・金額

日本郵貨出

NO	機材名	仕 様	数量	単価 (RM)	金額 (RM)
4	自動計測装置	サーバシステム、パソコン、LabVIEW、A/Dボード GB-13ボード、ファンクションセネレータ、DMM、ディ ジタルオシロスコープ、実習支援装置	1		1,850,000
				合 計	1,850,000

合計 1 RM = 4.4円

## JMFI Machine Specification (Computer Technology Department)

No.	Name of System	No.	Specification	Qty.	Unit/Total	Sub Total	System Total
1	Programming Training System	1	Server for Administration	1set	1	RM 540,900.00	
		2	Client PC	31set	31	RM 3,459,134.10	
		3	Training Support Display System	1set	1	RM 261,890.45	RM 4,261,954.55
2	Client Server Model Training System	4	Server for Administration	1set	1	RM 161,961.38	
		5	EWS Server	1set	1	RM 638,634.10	
		6	PC Server	1set	1	RM 170,870.45	
		7	Client PC	31set	31	RM 1,758,970.45	
		8	Training Support Display System	1set	1	RM 261,890.45	RM 3,012,316.83
3	Visual Data Processing System	9	Server for Administration	1set	1	RM 208,868.18	
		10	Server for Multi Media	1set	1	RM 212,145.45	
		11	Client PC	31set	31	RM 1,602,018.18	
		12	Training Support Display System	1set	1	RM 261,890.45	RM 2,284,912.25
4	Networking Training System	13	Server for Administration	1set	1	RM 140,938.63	
		14	Server for Internet	1set	1	RM 1,937,801.60	
		15	Client PC	31set	31	RM 959,947.73	
		16	Fire Wall	1set	1	RM 733,811.38	
		17	Training Support Display System	1set	1	RM 261,890.45	RM 4,034,379.78
5	PC Hardware Training System	18	Complete PC Component Training Set	31set	31	RM 5,000.00	
		19	Singleboard Computer Trainer	31set	31	RM 5,000.00	
		20	Micro Computer Trouble Shooting System	31set	31	RM 7,000.00	
		21	Color Monitor Trouble Shooting System	31set	31	RM 7,000.00	RM 24,000.00
6	Electronic Training Lab	22	Electronic Training Kit	31set	1	RM 4,500.00	
		23	Digital and Analog Training Equipment	31set	1	RM 91,000.00	RM 55,500.00
						Whole Total:	RM 13,703,073.40

Except SES  
1RM=44YEN

情報工学技術科機材仕様・数量・金額

No.	機材名	仕様	数量	単価	金額
1	マレーシア側負担 プログラミング実習システム	管理用サーバ (本体) CPU Pentium133MHz x2以上、メモリ 208MB以上、HDD、CD-ROM、FDD、DAT、 I/F LANカード、マウス、キーボード 管理用サーバ (付属品) ディスプレイ、LBP、CRT74cm、マウス、無停電電源装置、キーボード、キーパッド、 サーバOS (WindowsNT Server)、サーバ管理ツール、バックアップツール クライアントPC (本体) CPU Pentium133MHz以上、メモリ 48MB以上、HDD、CD-ROM、FDD、I/F LANカード クライアントPC (付属品) CD-ROM、キーボード、マウス、キーボード、マウス、キーボード、ディスプレイ ディスプレイ、LBP、CRT74cm、マウス、無停電電源装置、キーボード、キーパッド、 サーバOS (WindowsNT Server)、サーバ管理ツール、バックアップツール クライアントPC (本体) CPU Pentium133MHz以上、メモリ 48MB以上、HDD、CD-ROM、FDD、I/F LANカード クライアントPC (付属品) CD-ROM、キーボード、マウス、キーボード、マウス、キーボード、ディスプレイ	1set	RM 540,900.00	
			31set	RM 3,459,184.10	
			1set	RM 261,880.45	RM 4,261,964.55
2	クライアントサーバモデル実習システム	管理用サーバ (本体) CPU Pentium133MHz x2以上、メモリ 208MB以上、HDD、CD-ROM、FDD、DAT、 I/F LANカード、マウス、キーボード 管理用サーバ (付属品) ディスプレイ、LBP、CRT74cm、マウス、無停電電源装置、キーボード、キーパッド、 サーバOS (WindowsNT Server)、サーバ管理ツール、バックアップツール EWS サーバ (本体) CPU、メモリ 256MB以上、HDD、20GB以上、I/F LANカード、マウス、キーボード EWS サーバ (付属品) FDD、CD-ROM、DAT、CRT、LANカード、LBP、OS Solaris PC サーバ (本体) CPU Pentium133MHz以上、メモリ 48MB以上、HDD、CD-ROM、FDD、I/F LANカード PCサーバ (付属品) ディスプレイ、LBP、CRT74cm、マウス、無停電電源装置、キーボード、キーパッド、 サーバOS (WindowsNT Server)、サーバ管理ツール、バックアップツール クライアントPC (本体) CPU Pentium133MHz以上、メモリ 48MB以上、HDD、CD-ROM、FDD、I/F LANカード クライアントPC (付属品)	1set	RM 161,961.38	
			1set	RM 658,634.10	
			1set	RM 170,870.45	
			31set	RM 1,758,970.45	

No.	機 種 名	仕 様	数 量	単 価	金 額
		SE-9、CRT74cm、マウス、キーボード、モニター、 OS Windows95以上、開発言語: Borland C/C++、 開発言語: Visual C++、GUI開発ツール: Visual Basic Pro、 静止画面編集ツール、動画編集ツール、77、リソース管理ツール Office Pro トレーニング支援システム 42インチワイドモニターシステム 管理サーバ (本体) CPU Pentium133MHz×2以上、1GB 208MB以上、HDD、CD-ROM、FDD、DAT、 I/F、LANカード、マウス、キーボード 管理用サーバ (付属品) CRT74cm、LBP、CRT74cm、マウス、キーボード、無停電電源装置、モニター、 OS WindowsNT Server)、サーバ管理ツール、77、リソース管理ツール Office Pro マルチメディアサーバ (本体) CPU Pentium133MHz以上、1GB 48MB以上、HDD、CD-ROM、FDD、I/F、LANカード マルチメディアサーバ (付属品) CRT74cm、LBP、CRT74cm、マウス、キーボード、無停電電源装置、 77、モニター、サーバ、ハードウェア クライアントPC (本体) CPU Pentium133MHz以上、1GB 14MB以上、HDD、CD-ROM、FDD、I/F、LANカード クライアントPC (付属品) CD-ROM、77、マウス、キーボード、モニター、静止画面編集ツール、77、 SE-9、CRT74cm、マウス、キーボード、モニター、77、 OS Windows95以上、開発言語: Borland C/C++、 開発言語: Visual C++、GUI開発ツール: Visual Basic Pro、 静止画面編集ツール、動画編集ツール、77、リソース管理ツール Office Pro トレーニング支援システム 42インチワイドモニターシステム 管理サーバ (本体) CPU Pentium133MHz×2以上、1GB 208MB以上、HDD、CD-ROM、FDD、DAT、 I/F、LANカード、マウス、キーボード 管理用サーバ (付属品) CRT74cm、LBP、CRT74cm、マウス、キーボード、無停電電源装置、モニター、 OS WindowsNT Server)、サーバ管理ツール、77、リソース管理ツール Office Pro インターネットサーバ (本体) CPU、1GB、28MB以上、HDD、20GB以上、I/F、マウス、キーボード インターネットサーバ (付属品) FDD、CD-ROM、DAT、CRT、LANボード、OS Solaris、無停電電源装置 インターネットツール クライアントPC (本体)	1set	RM 261,380.45	RM 3,012,316.83
	3) ビジュアルワークstationsシステム		1set	RM 208,868.18	
			1set	RM 212,145.45	
			31set	RM 1,602,018.18	
			1set	RM 261,380.45	RM 2,284,912.25
	4) ネットワークstationsシステム		1set	RM 140,938.63	
			3set	RM 1,927,801.60	
			31set	RM 959,947.73	

No.	機材名	仕様	数量	単価	金額
5	PC ハードウェア実習システム	CPU Pentium 333MHz以上、メモリ 80MB以上、HDD、CD-ROM、FDD、I/F、LANカード			
		クライアントPC (付属品)			
		CD-ROM: 1/27 資料集、1/28 資料集、1/29 資料集、1/30 資料集、1/31 資料集			
		1/32、1/33、1/34、1/35、1/36、1/37、1/38、1/39、1/40、1/41、1/42、1/43、1/44、1/45、1/46、1/47、1/48、1/49、1/50、1/51、1/52、1/53、1/54、1/55、1/56、1/57、1/58、1/59、1/60、1/61、1/62、1/63、1/64、1/65、1/66、1/67、1/68、1/69、1/70、1/71、1/72、1/73、1/74、1/75、1/76、1/77、1/78、1/79、1/80、1/81、1/82、1/83、1/84、1/85、1/86、1/87、1/88、1/89、1/90、1/91、1/92、1/93、1/94、1/95、1/96、1/97、1/98、1/99、1/100			
		OS Windows95以上、開発言語: Borland C/C++、WWW Runuizer			
		開発言語2: Visual C++、GUI開発ツール: VisualBasic Pro			
		グラフィック編集ツール: 動画編集ツール、77' リンク、77' リンク Office Pro			
		ソフトウェアマニュアル (本体)	1set	RM 733, 811.38	
		CPU、メモリ 128MB以上、HDD、20GB以上、I/F、キーボード			
		ソフトウェアマニュアル (付属品)			
FDD、CD-ROM、DAT、CMT、LANボード、LBP、OS Solaris、ネットワーク					
トレーニング支援システム	1set	RM 261, 880.45			
6	電子実験実習システム	12' 牌プラクティスネットワークシステム			
		PC コンポーネントレイアウトセット	31set	RM 5, 000.00	
		シングルボードコンピュータレイアウトセット	31set	RM 5, 000.00	
		マイクロナンピュータ故障診断システム	31set	RM 7, 000.00	
		カラーモニター故障診断システム	31set	RM 7, 000.00	
		電子実験トレーニングキット	31set	RM 4, 500.00	
		デジタル・アナログ回路トレーニングキット	31set	RM 81, 000.00	
	総合計			RM 4, 034, 379.78	

SESを除く  
!RM=4円内

EQUIPMENTS SPECIFICATION OF MECHATRONICS ENGINEERING DEPARTMENT

Malaysia supply

No	EQUIPMENTS	SPECIFICATION	n	UNIT PRICE RM (yen)	AMOUNTS RM (yen)
1	Electro-pneumatic system	Press decreasing valve, Solenoid valve, Quick exhaust valve, Jamming protect valve Speed controller, Air cylinder, Rodless cylinder Filter regulator, Air filter, Mist separator Pressure switch, Rotary actuator	20	102,000 (4,600,000)	2,040,000 (92,000,000)
2	Electro-hydraulic system	Valve stand Control table Load device Cutting sample Valve base Parts for assemble and take to pieces Tools Storage table	1 5 5 5 1 5 5 5 5		3,800,000 (171,000,000)
3	Process control system	Flow control experiments Flow system Computer Printer Water level control experiments Water level system Computer Printer	1 1	122,000 (5,500,000)	488,000 (22,000,000)



No	EQUIPMENTS	SPECIFICATION	n	UNIT PRICE RM (yca)	AMOUNTS RM (yca)
		Pressure control experiments Pressure control system Computer Printer	1	118,500 (5,300,000)	
		Temperature control experiments Temperature control system Computer Printer	1	132,500 (6,000,000)	
4	Computer system	Computer Display RAM Printer Software(O.S, C language, MS-OFFICE)	30	11,100 (500,000)	333,000 (15,000,000)
6	Mechatronics exercises equipments	Mechanic parts Sensor Actuator, Controller Tools	1		200,000 (9,000,000)
7	Electric motor system	Main system Computer A/D, D/A board Software	3	90,000 (4,000,000)	270,000 (12,000,000)
8	PLC practice system	PLC, Computer Sensor Automatic mechanism machine Air-cylinder, Motor	1		1,780,000 (80,000,000)

Total supply by Malaysia 8,911,000  
(400,995,000)

Japanese supply

No	EQUIPMENTS	SPECIFICATION	n	UNIT PRICE RM (yen)	AMOUNTS RM (yen)
1	Industrial robot system	Vertical-articulated robot Horizontal axis base Image processor Working cell AHC Aria sensor Security fence	1 2 1 1 1 1 1 1		2,700,000 (121,500,000)
2	Diagnosis system	Vibration pick up Temperature sensor Junction box Vibration local station Temperature local station Central station Revolution model machine Portable diagnosis machine analyzer Software	1 8 8 4 2 2 2 2 2 2 2		870,000 (39,150,000)

Total supply by Japan 3,570,000  
(160,650,000)

# メカトロニクス工学技術科機材仕様・数量・金額

マレインシア側負担

No	機材名	仕 様	数量	単価 R M (円)	金額 R M (円)
1	空気圧制御実験装置	減圧弁, 電磁弁, 急速排気弁, 飛び出し防止弁 スピードコントローラ エアシリンダ, ロッドレスシリンダ, フィードレギュータ, エアフィリター ミストセパレータ, 圧力スイッチ ロータリアクチュエータ	20	102,000 (4,600,000)	2,040,000 (92,000,000)
2	油圧制御実験装置	バルブ プロポーションバルブ コントローラ 負荷装置 カッター バルブベース 分解, 組立実験機器 工具 取組棚	1 式 5 5 5 1 5 5 5 5		3,800,000 (171,000,000)
3	プロセス制御実験装置	流量制御実験装置 本体 コンピュータ プリンタ 液面制御実験装置 本体 コンピュータ プリンタ	1 式 1 1	122,000 (5,500,000) 115,000 (5,200,000)	498,000 (22,000,000)

No	機材名	仕 様	数 量	単 価 R.M. (円)	金額 R.M. (円)
		圧力制御実験装置 本体 コンピュータ プリンタ	1	118,500 (5,300,000)	
		温度制御実験装置 本体 コンピュータ プリンタ	1	132,500 (6,000,000)	
4	コンピュータシステム	本体、メモリ ディスプレイ プリンタ ソフト (OS, C言語, MS-OFFICE)	30	11,100 (500,000)	333,000 (15,000,000)
5	メカトロニクス実習用機材	機械・機帯機材 センサ アクチュエータ、コントローラ 工具	1式		200,000 (9,000,000)
6	モータ制御実習装置	本体 コンピュータ A/D, D/Aポート ソフトウェア	3	90,000 (4,000,000)	270,000 (12,000,000)
7	PLC実習装置	PLC, コンピュータ センサ 自動化機帯機器 エアシリンダ, モータ	14	127,140 (5,714,000)	1,780,000 (80,000,000)

マレーシア側総計 8,911,000  
(400,995,000)

日本興業銀行

No	機材名	仕 様	数量	単価 R.M. (円)	金額 R.M. (円)
1	産菜用ロボットシステム	垂直多関節型ロボット 水平軸ベース 画像処理装置 ワーキングセル AHC エリアセンサ 安全機	1式  2 1 1 1 1 1 1		2,700,000 (121,500,000)
2	診断システム	振動ピックアップ 温度センサ 中継ボックス 振動測定ローカルスチーション 温度測定ローカルスチーション セントラルスチーション 回転モータ駆動器 ボータブル診断器 ソフトウェア	1式  8 8 4 2 2 2 2 2 2		870,000 (39,150,000)

日本興業銀行 3,570,000  
(160,650,000)

JMTI Machine Specification (Back Bone System and Instructors Room)

Name of System		Specification			Sub Total	System Total
No.	No.	Qty.	Unit	Total		
1	Instructors Room	1 set	5	5	RM 890,727.50	
		20 set	5	100	RM 3,680,875.00	RM 4,571,602.50
2	Back-Born System	1 set	1	1	RM 338,750.00	
		Computer Technical Section	1 set	1	RM 373,806.83	
		Other LAN	5 set	1	RM 124,886.38	
					Whole Total	RM 837,443.20
						RM 5,409,045.70

Except SES  
1RM=44YEN

全学共通機材仕様・数量・金額

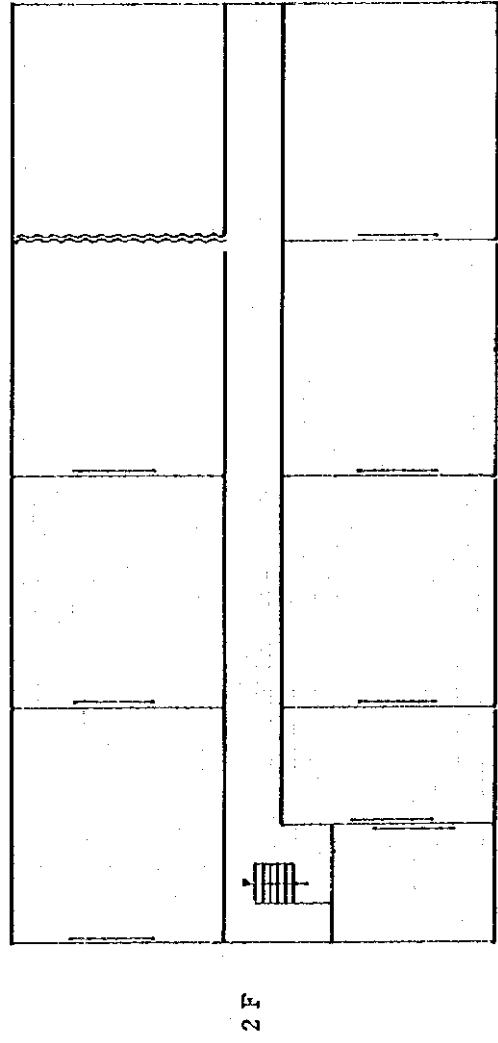
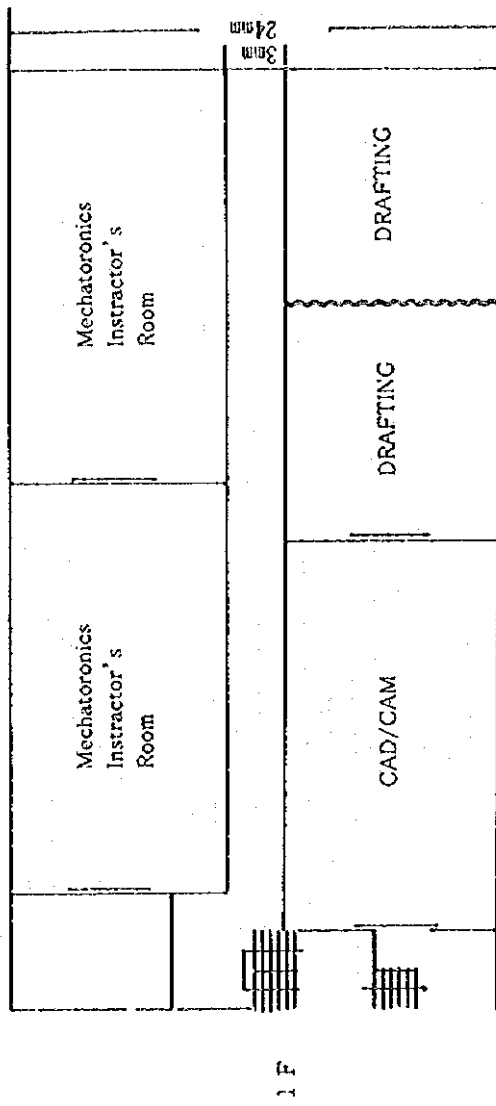
マレーシア側仕様

No.	機材名	仕様	数量	単価	金額
1	インストラクター室	管理サーバ (空筐)	1set	RM 890,727.50	
		CPU Pentium133MHz×2以上、メモリ 208MB以上、HDD、CD-ROM、FDD、DAT、I/F LANカード、マウス、キーボード			
		管理用サーバ (付属品)			
		ディスプレイ、LBP、CRT714MHz、ワカバット、無停電電源装置、テープ、プリンター			
		サーバ OS (Windows NT Server)、サーバ管理ソフトウェア、プリンター、ワーク			
		クライアント PC (本体)			
		CPU Pentium133MHz以上、メモリ 48MB以上、HDD、CD-ROM、FDD、I/F LANカード			
		クライアント PC (付属品)			
		CD-ROMドライブ、サットポート、ビデオボード、マウス、キーボード、ディスプレイ、スピーカー、CRT714MHz、ワカバット、プリンター、テープ、プリンター			
		OS Windows95以上、開発言語1 Borland C/C++、開発言語2 VisualC++、GUI開発ワーク VisualBasic Pro、静止画編集ワーク、動画編集ワーク、J7 リリケワーク Office Pro			
バックボーンインテンテリジェントサーバ	20set	RM 3,680,875.00			
情報工学 LANセット					
他学科及び本部棟 LANセット					
2	バックボーンシステム		1set	RM 338,750.00	
			1set	RM 373,806.83	
			5set	RM 124,886.38	RM 837,443.20
			総合計		RM 5,409,045.70

SESを除く  
1RM=44円

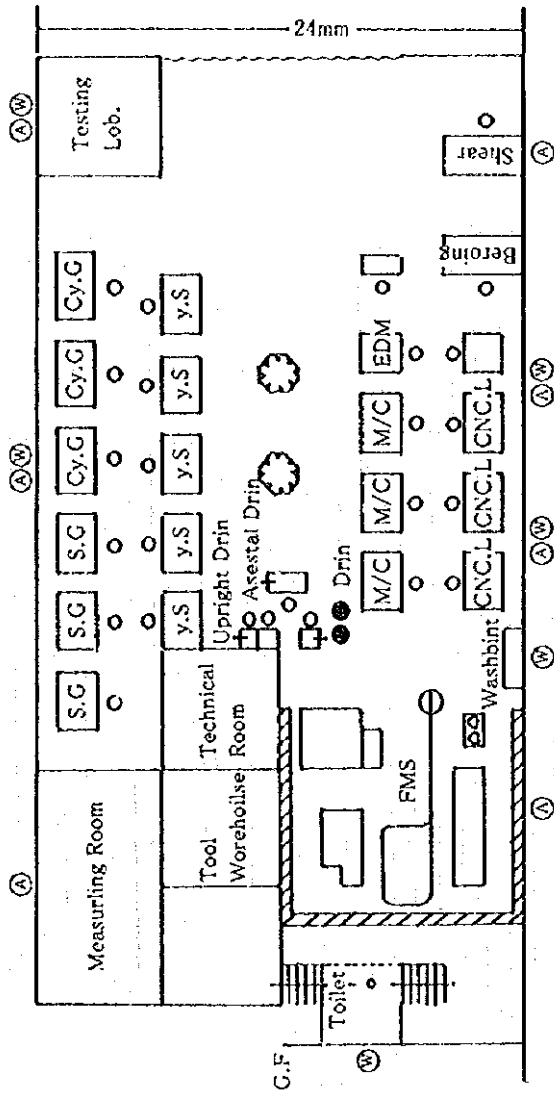
資料2-(6) 各科施設レイアウト図

Mechatronic Engineering Technology Department





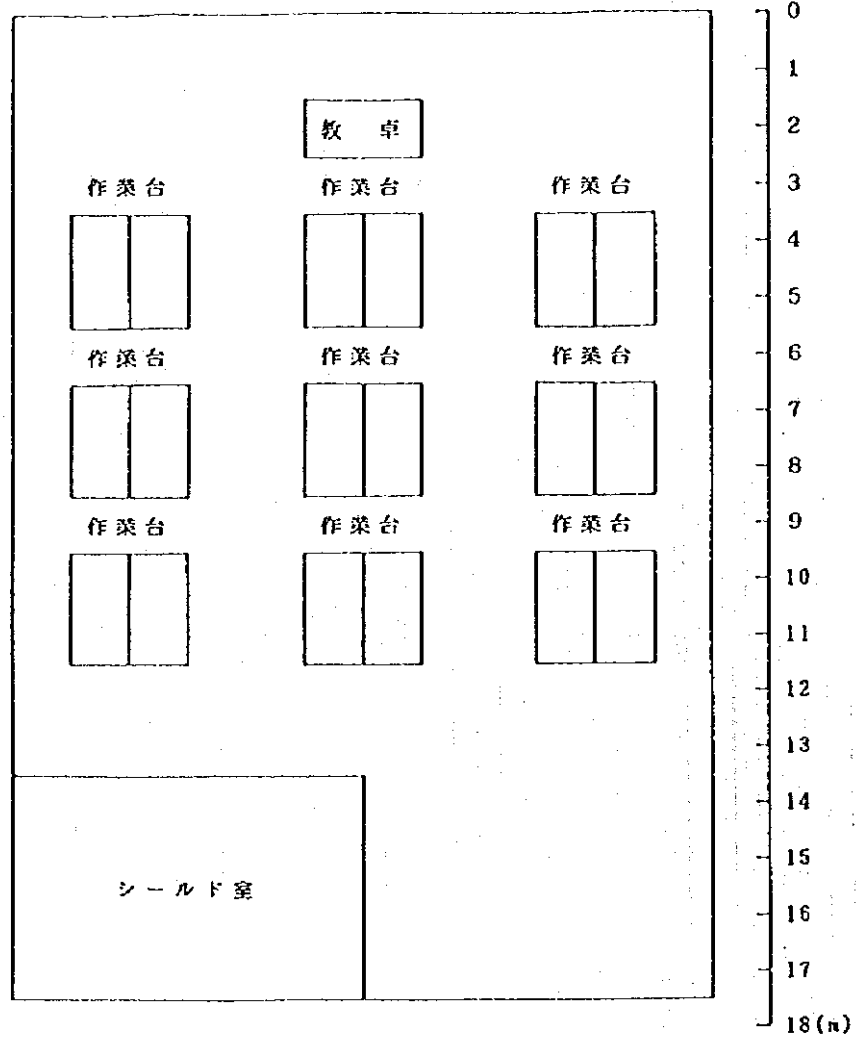
# Mechatronic Engineering Technology Department



- (A) Air
- (W) Water
- ww Shutter
- ▨ Pit

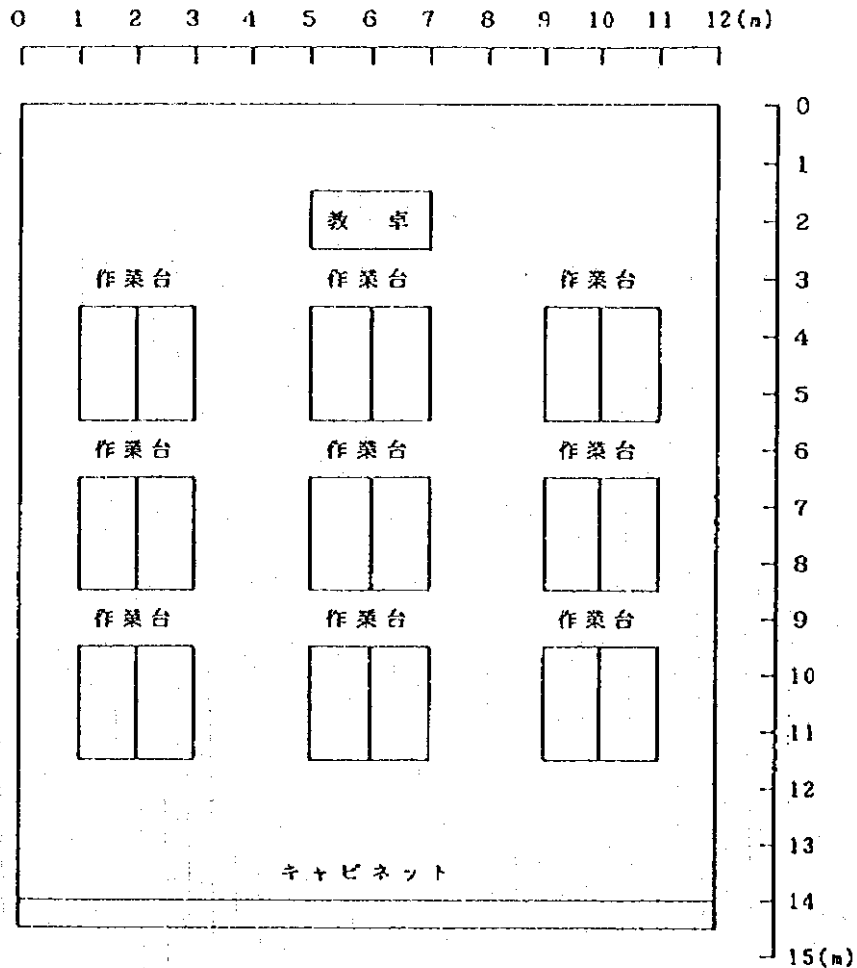
# Electronic Engineering Technology Department

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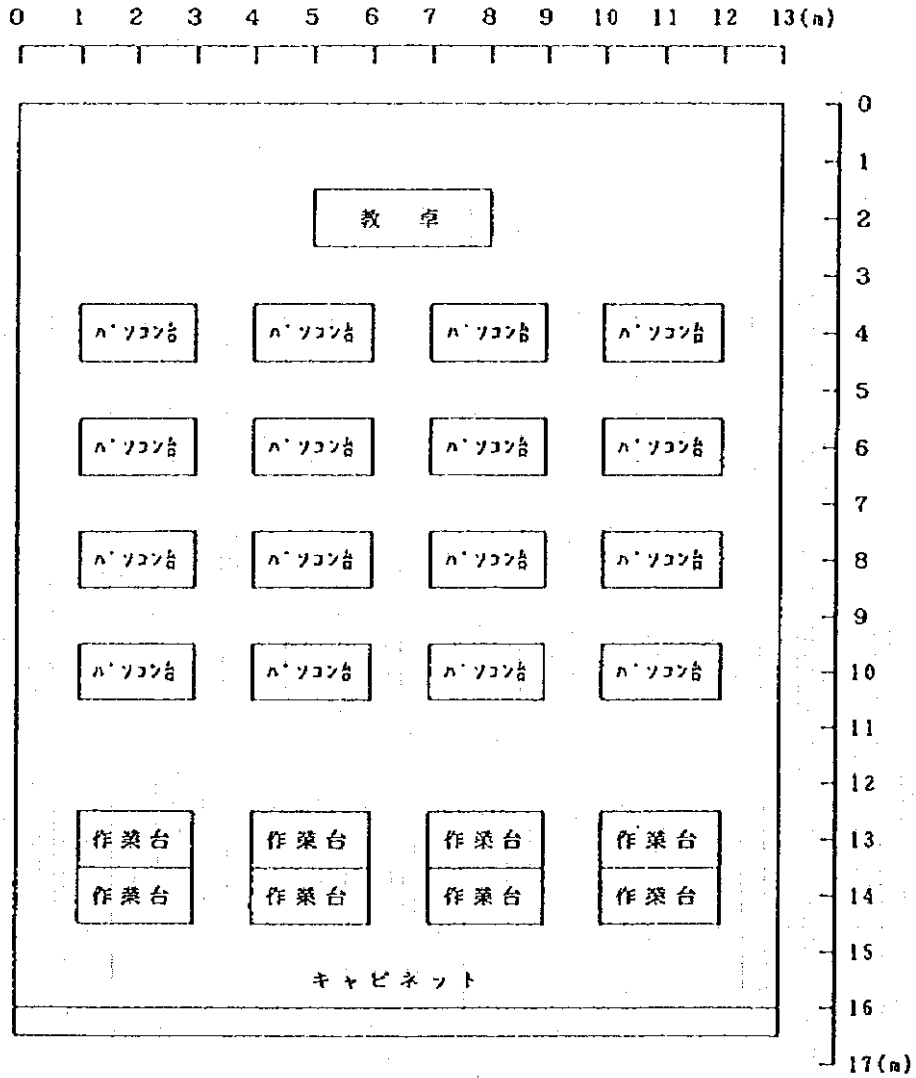
通信実習室

# Electronic Engineering Technology Department



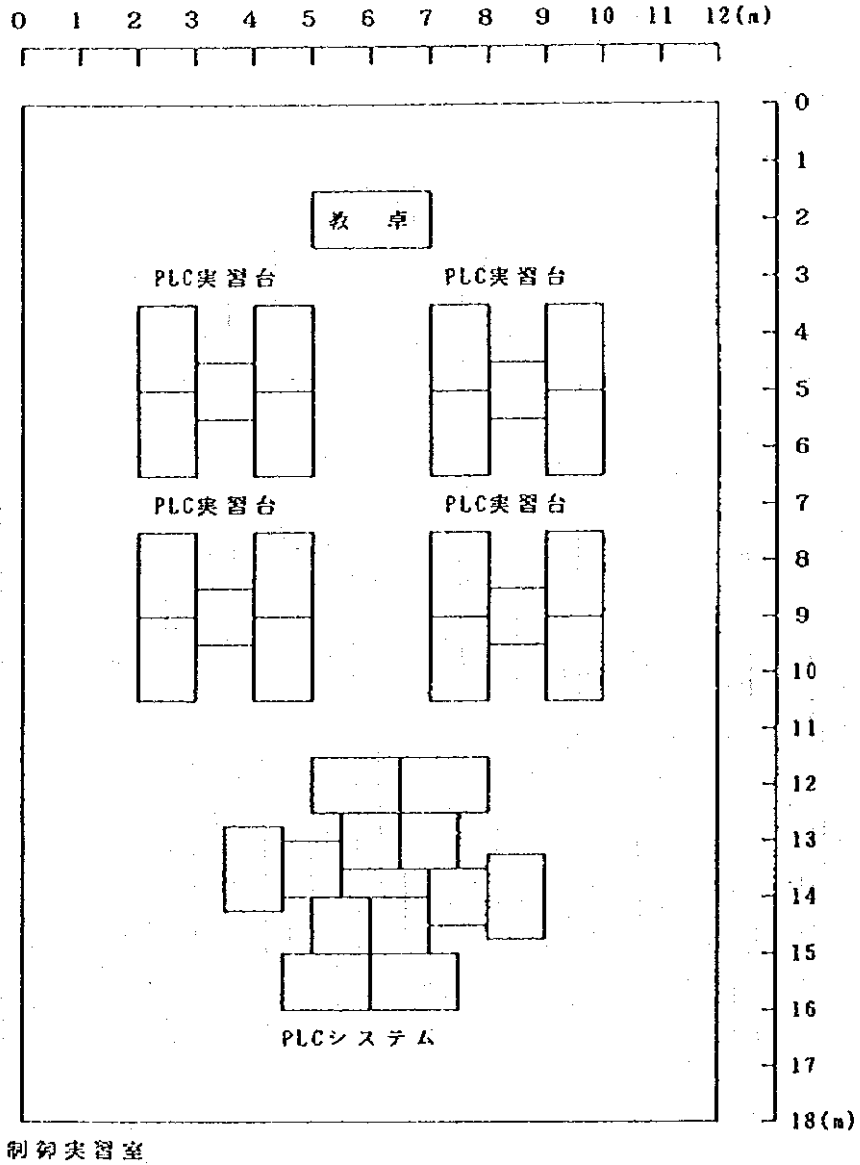
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- アナログ回路実習室 1
- アナログ回路実習室 2
- デジタル回路実習室 1
- デジタル回路実習室 2

# Electronic Engineering Technology Department



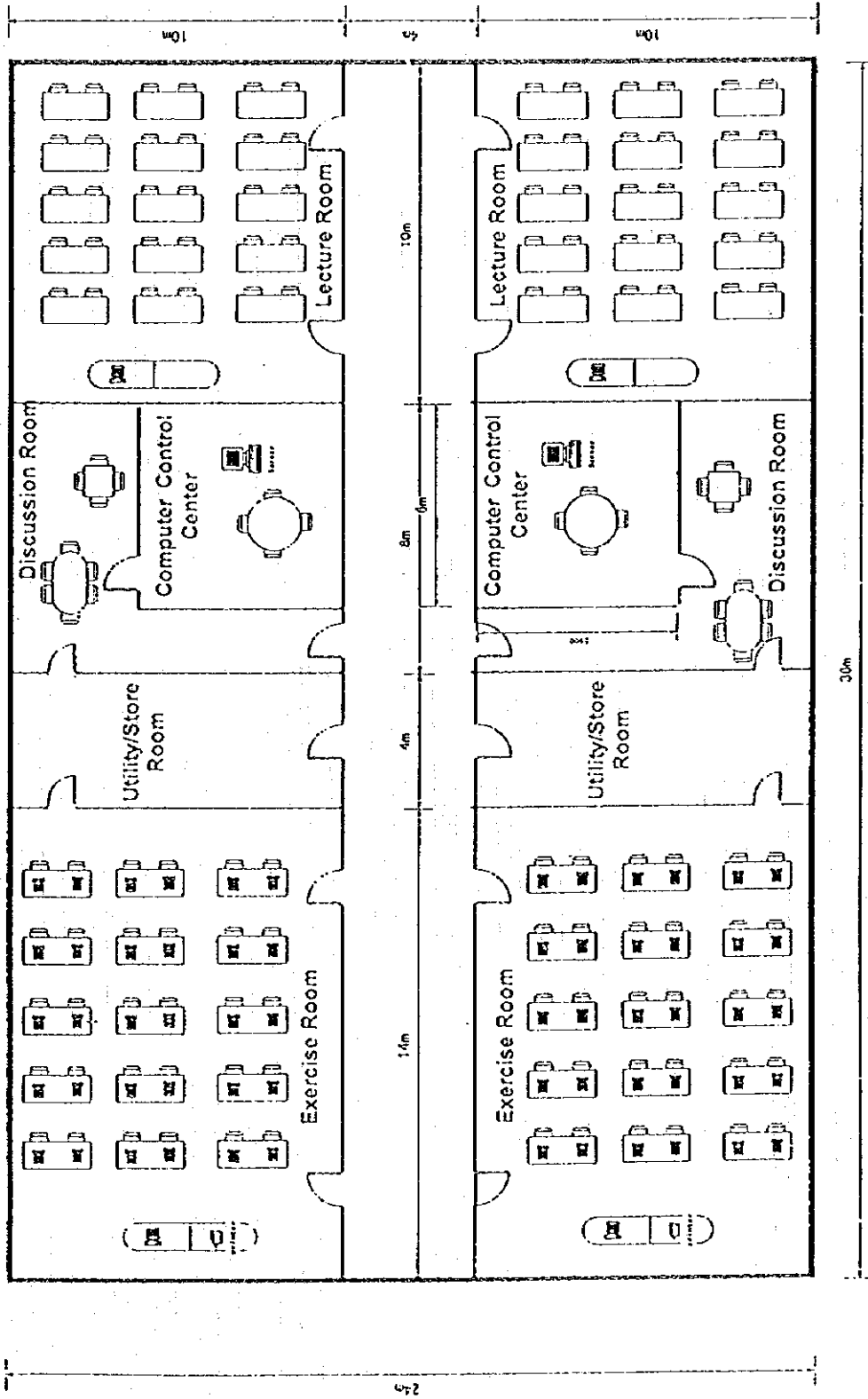
CAD室  
自動計測室

# Electronic Engineering Technology Department

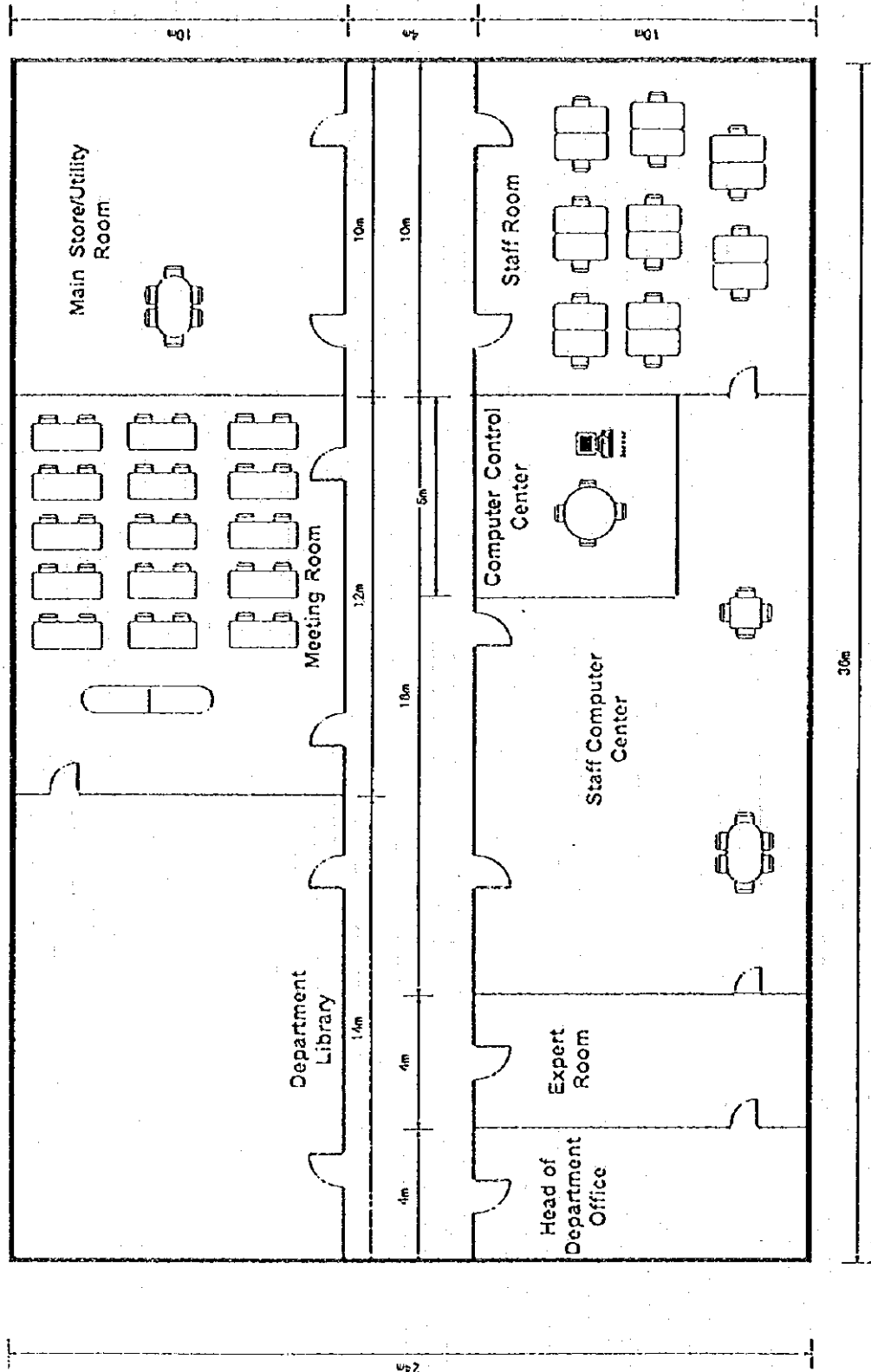


Computer Engineering Technology Department

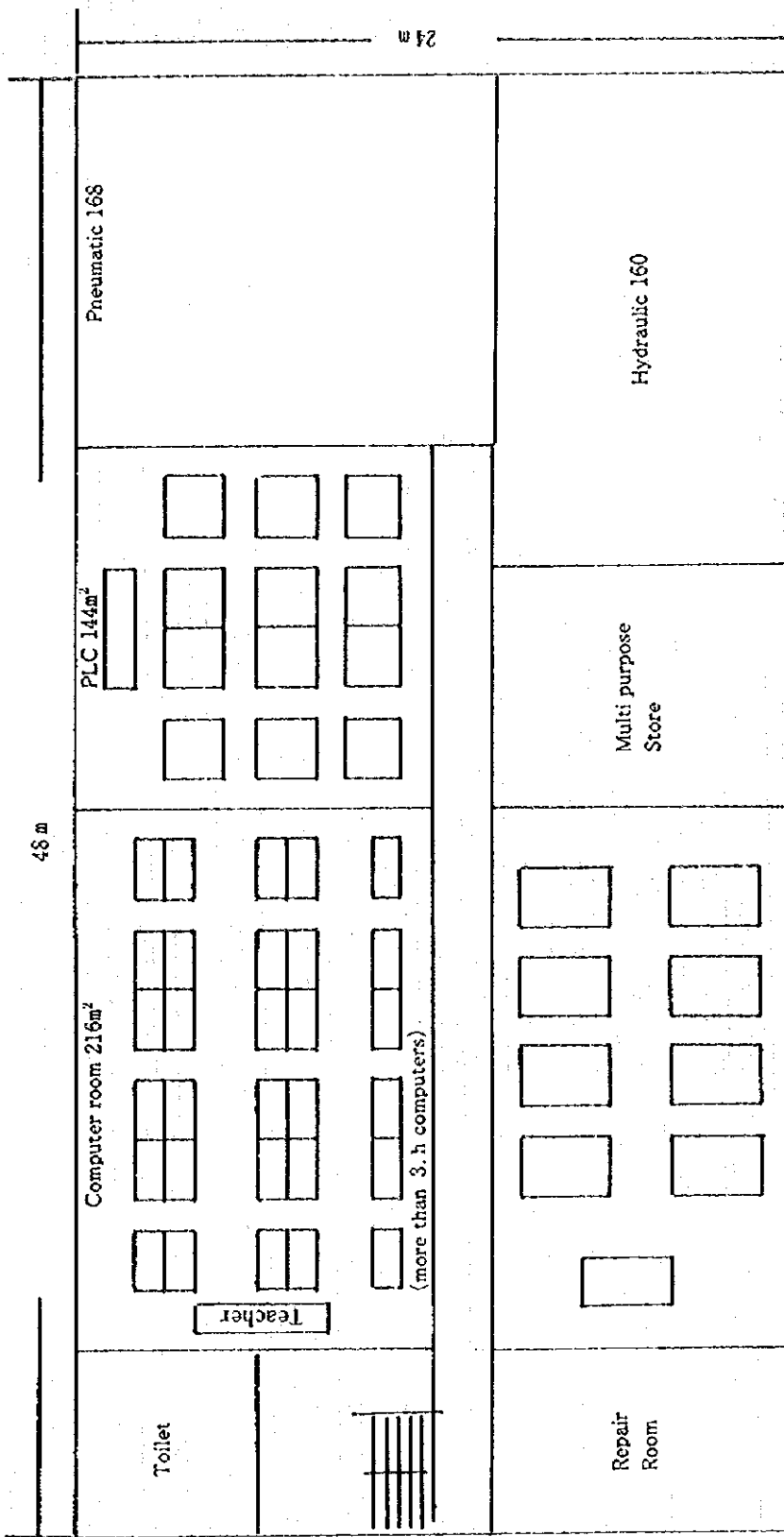
1st Floor, 2nd Floor, 3rd Floor



Computer Engineering Technology Department  
Gnd Floor



# Mechatronic Engineering Technology Department

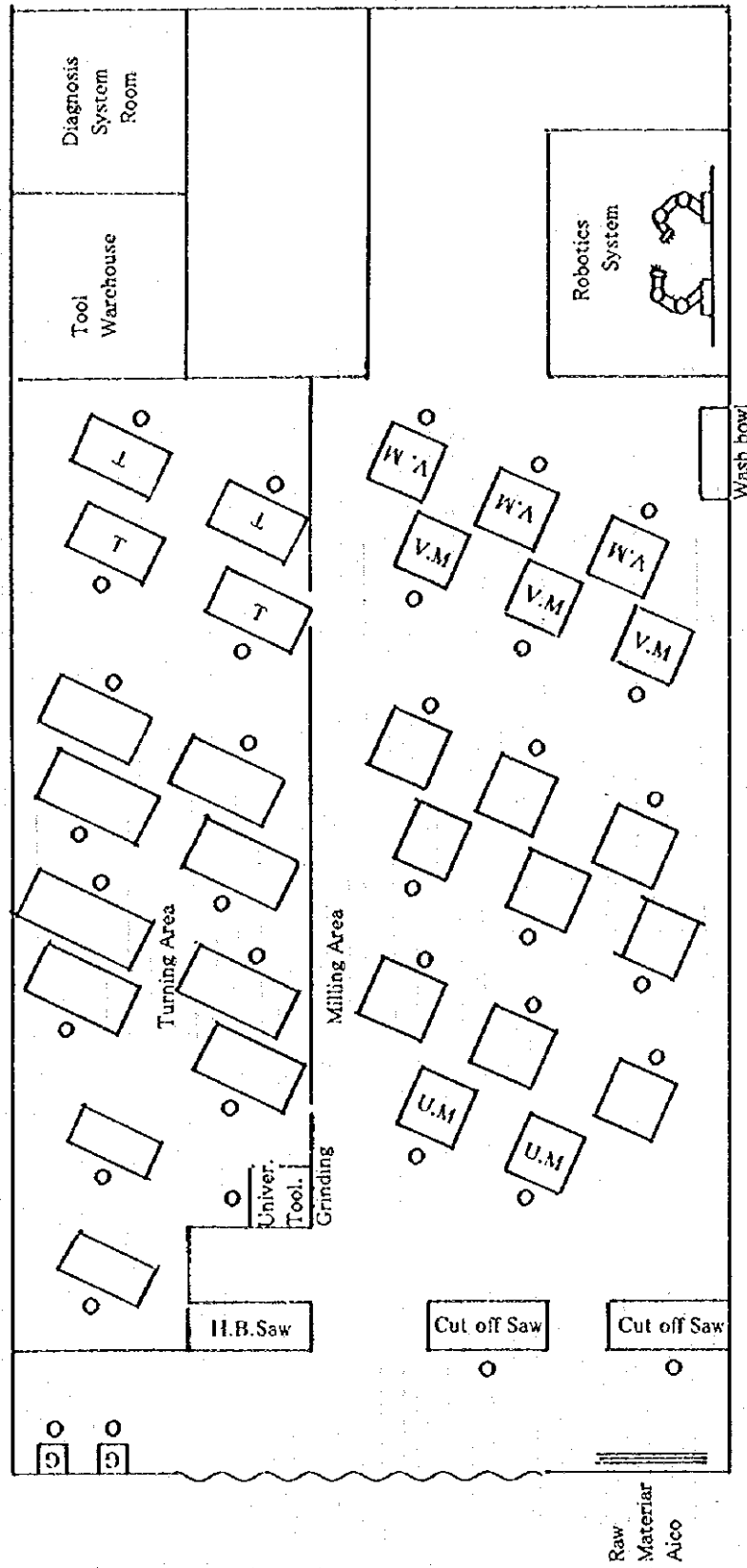


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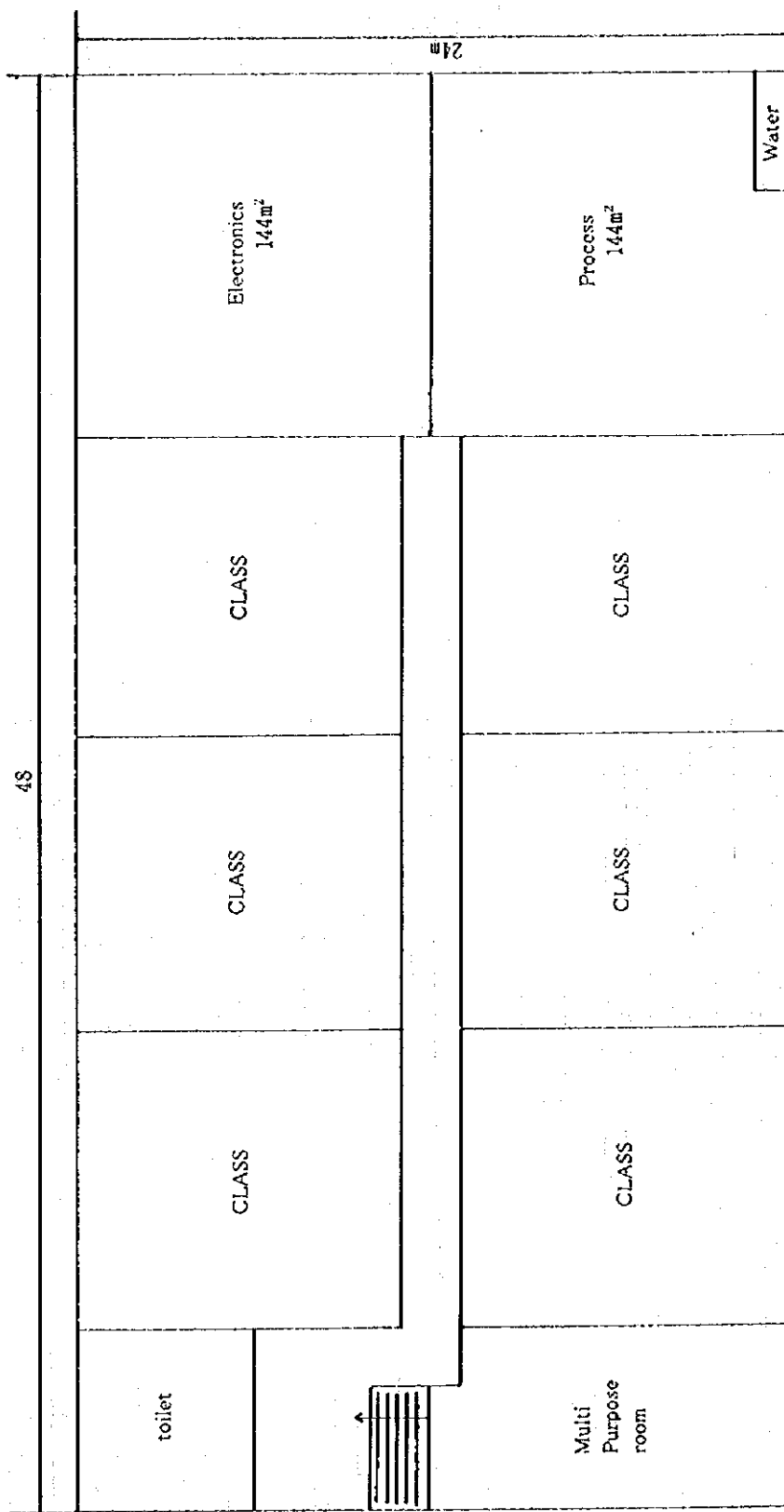
Mechatronics 1F



# Mechatronic Engineering Technology Department



# Mechatronic Engineering Technology Department



Mechtronics 2F









JICA