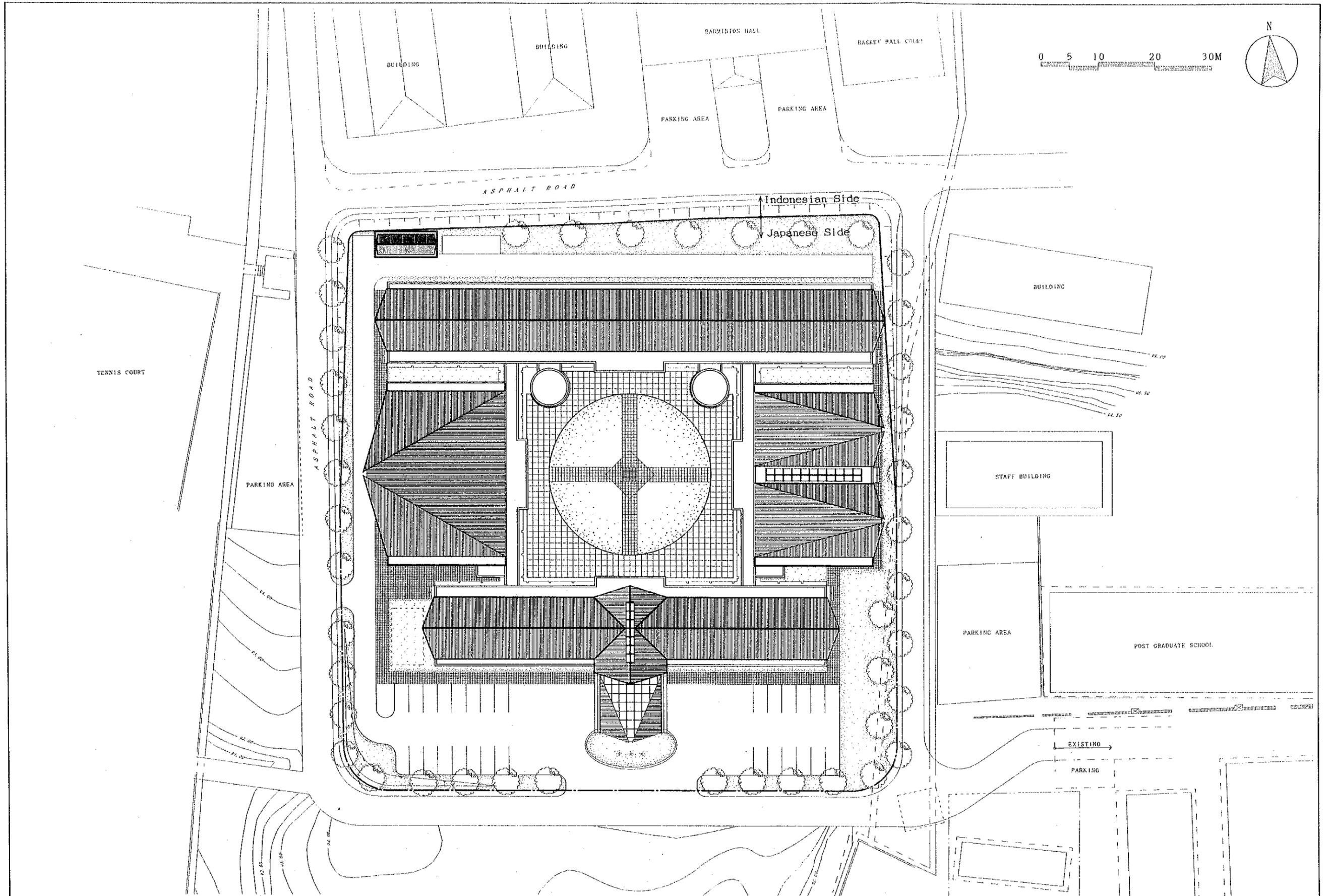
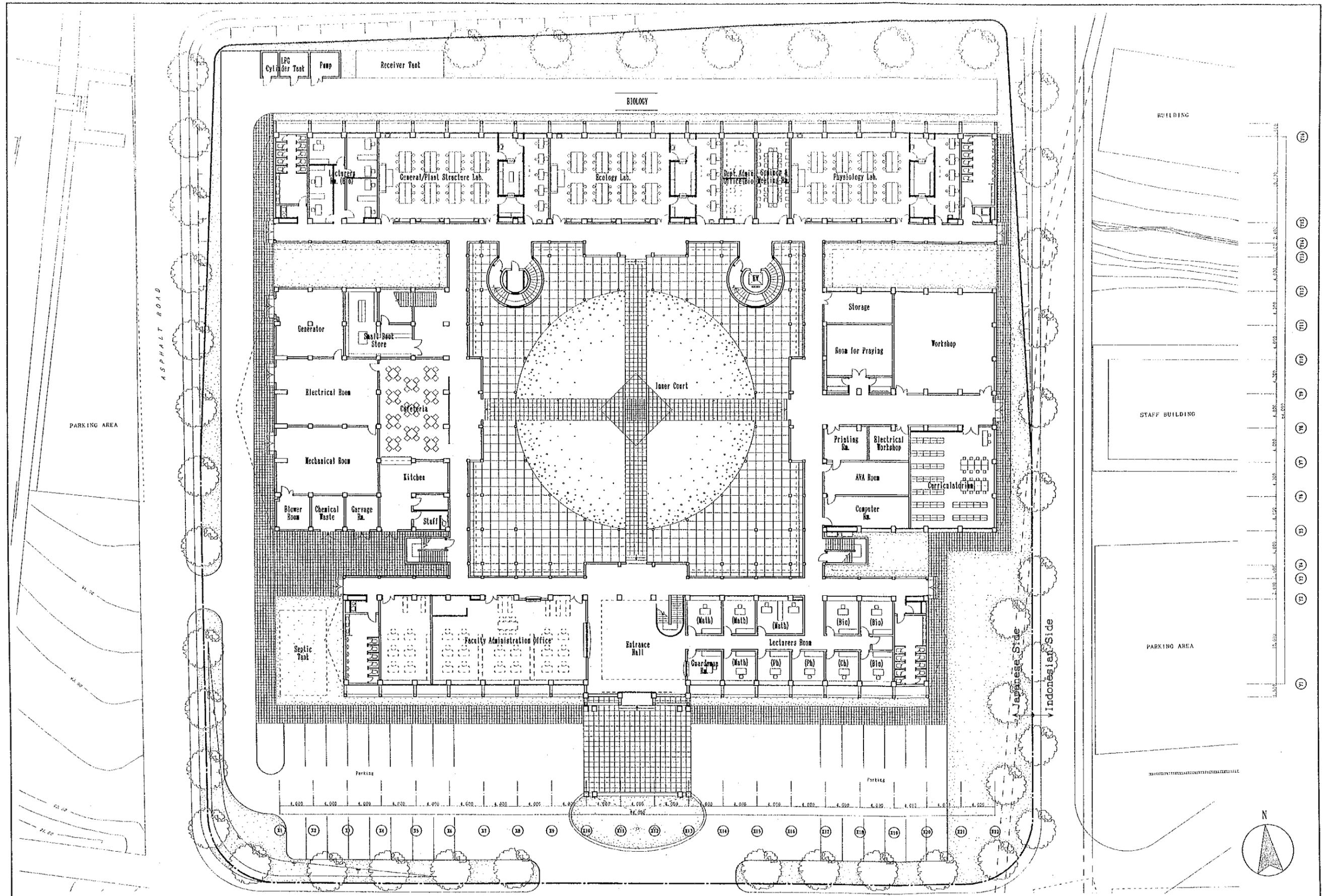


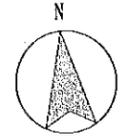
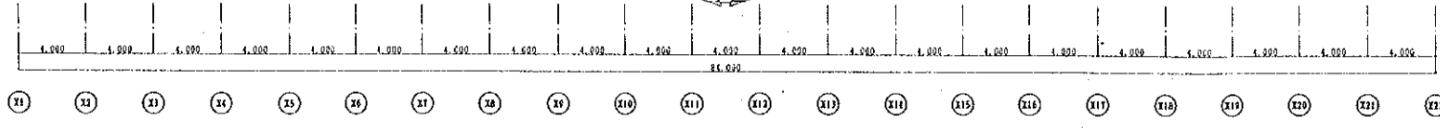
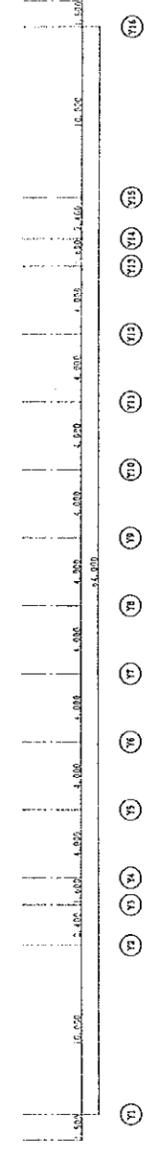
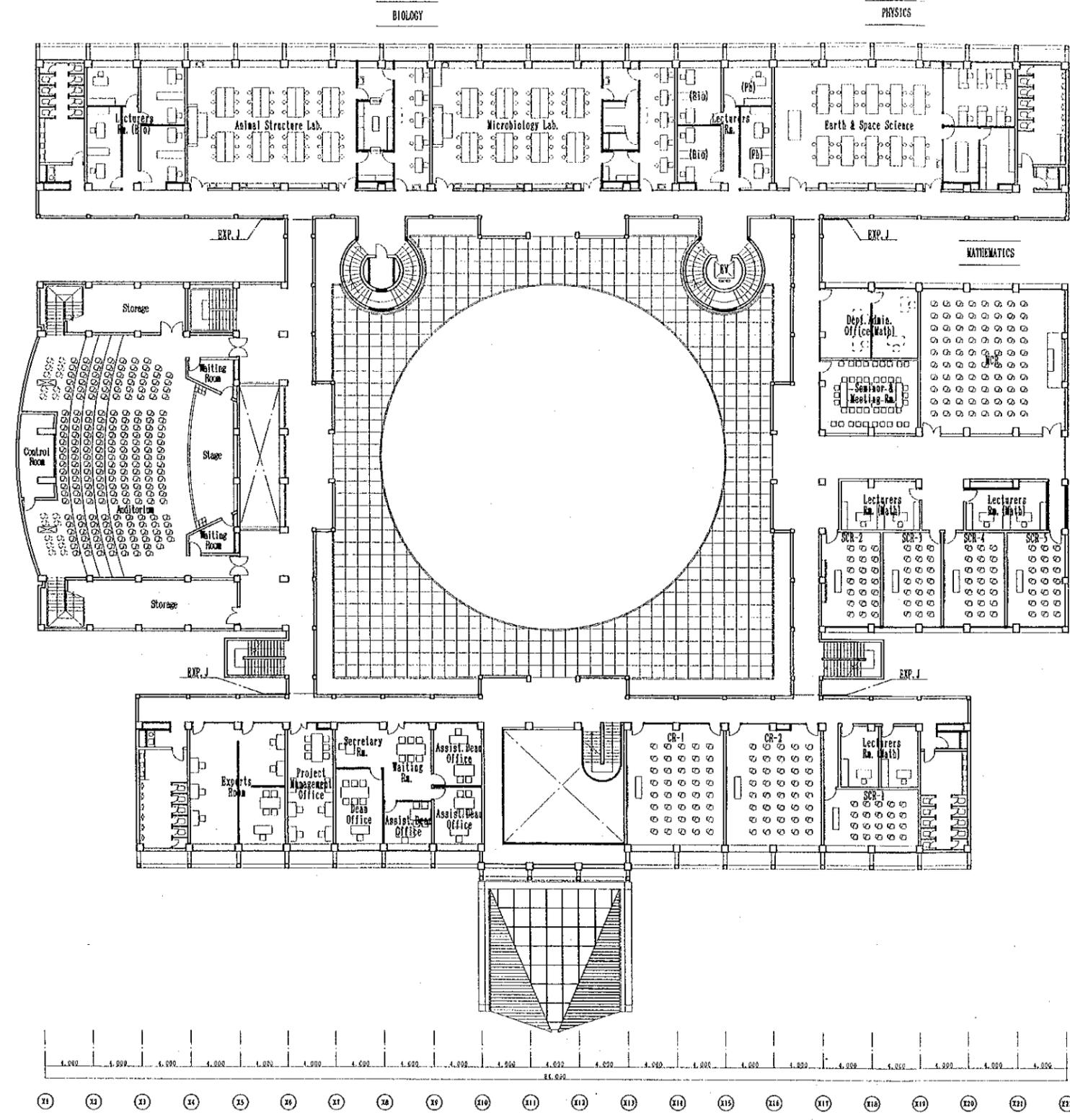
**(7) Basic Design Drawings and Equipment List**



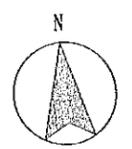
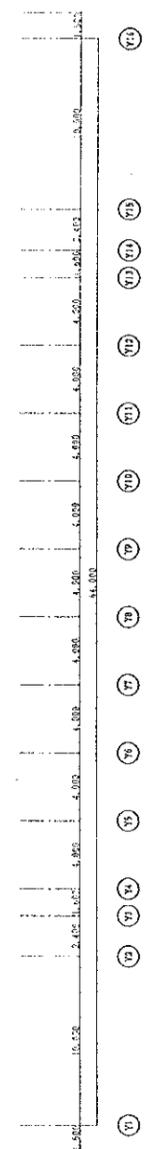
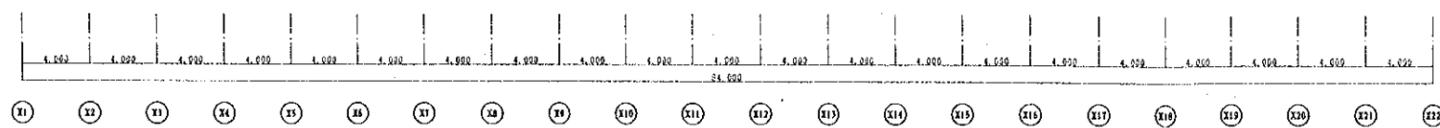
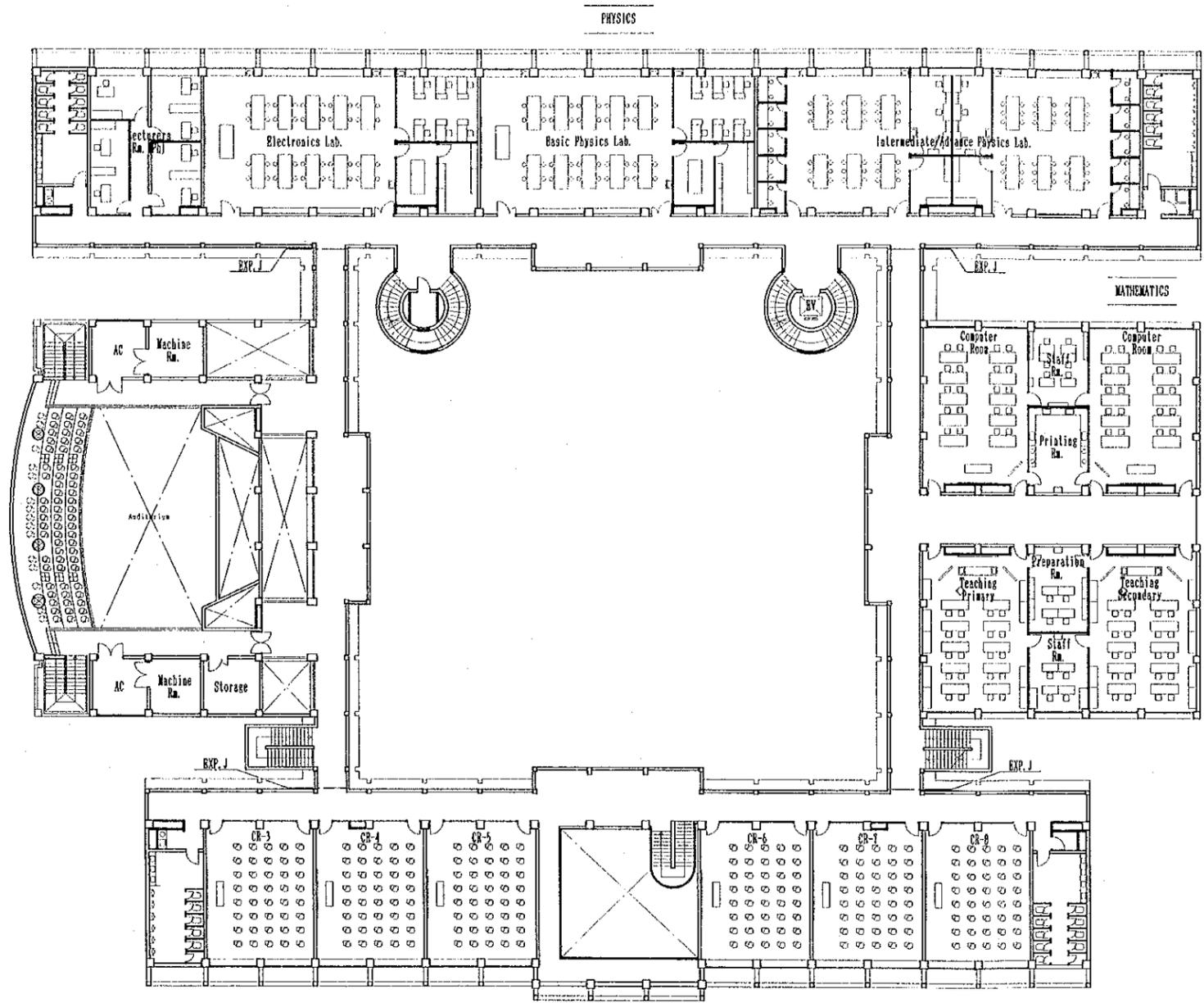
<p>PROJECT TITLE</p> <p>THE BASIC DESIGN STUDY ON THE PROJECT FOR DEVELOPMENT OF SCIENCE AND MATHEMATICS TEACHING FOR PRIMARY AND SECONDARY EDUCATION IN THE REPUBLIC OF INDONESIA</p>	<p>FACILITY DESIGN</p> <p>PACIFIC CONSULTANTS INTERNATIONAL</p>	<p>SCALE</p> <p>1:600</p>	<p>DATE</p>	<p>DWG. TITLE</p> <p>SITE LAYOUT PLAN</p>	<p>DWG. NO.</p> <p>1</p>
--	---	---------------------------	-------------	---	--------------------------



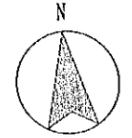
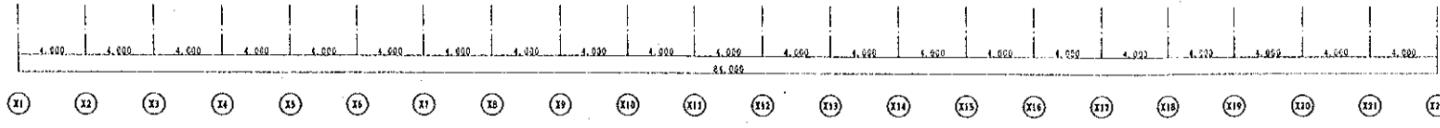
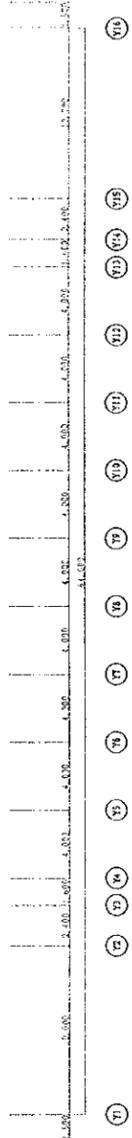
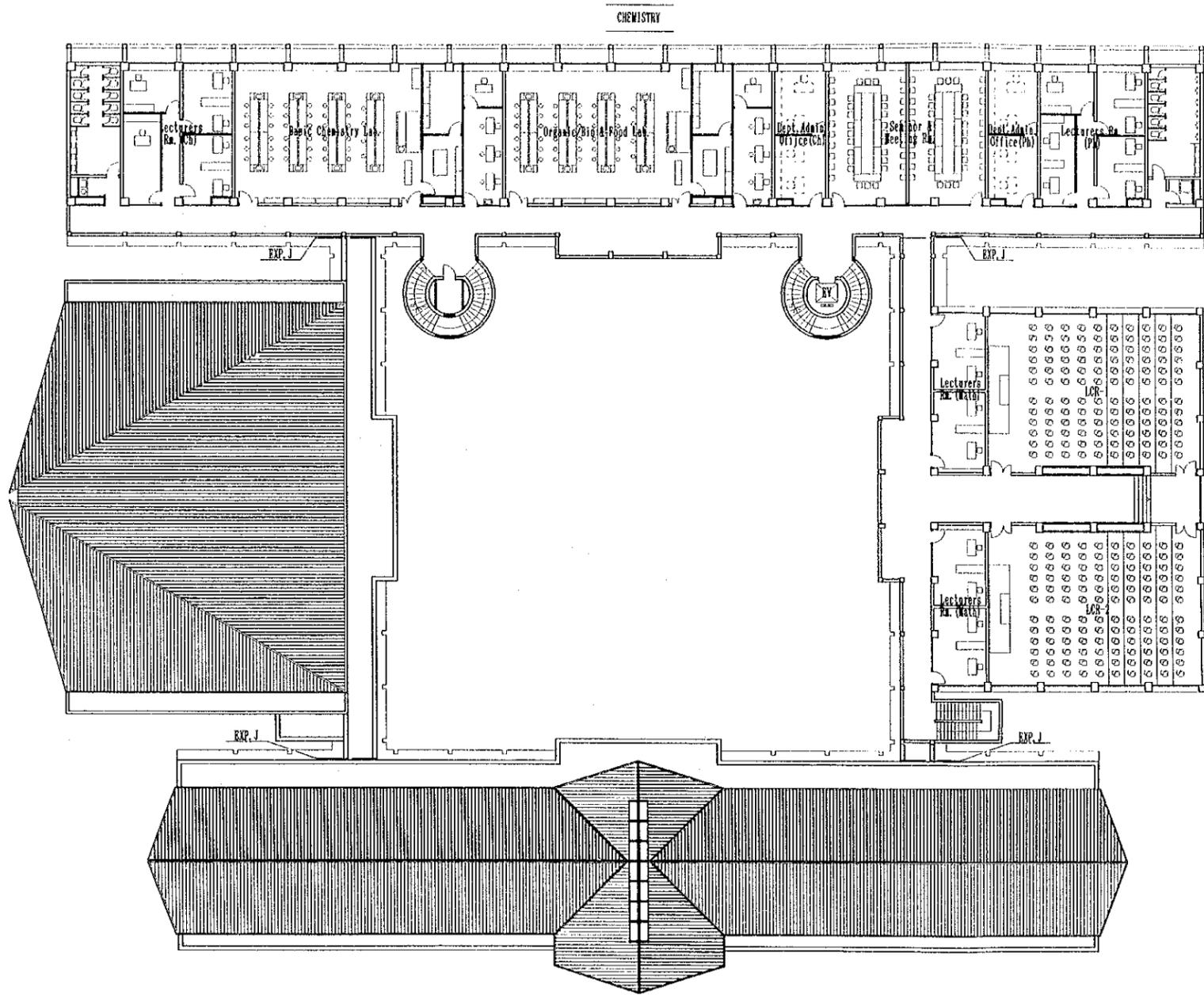
<p>PROJECT TITLE          THE BASIC DESIGN STUDY ON          THE PROJECT FOR DEVELOPMENT OF SCIENCE AND MATHEMATICS TEACHING FOR          PRIMARY AND SECONDARY EDUCATION IN THE REPUBLIC OF INDONESIA</p>	<p>FACILITY DESIGN          PACIFIC CONSULTANTS INTERNATIONAL</p>	<p>SCALE          1:400</p>	<p>DATE</p>	<p>DWG. TITLE          1st FLOOR PLAN</p>	<p>DWG. NO.          2</p>
--	---	---------------------------------	-------------	---	--------------------------------



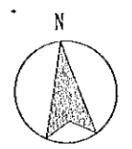
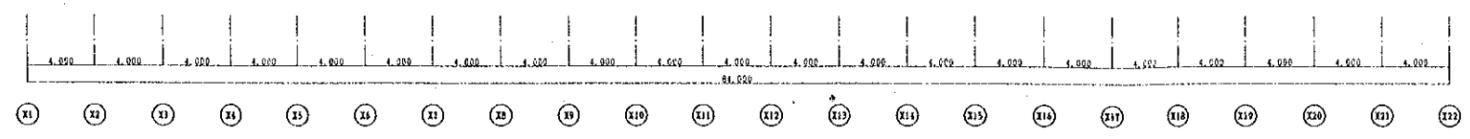
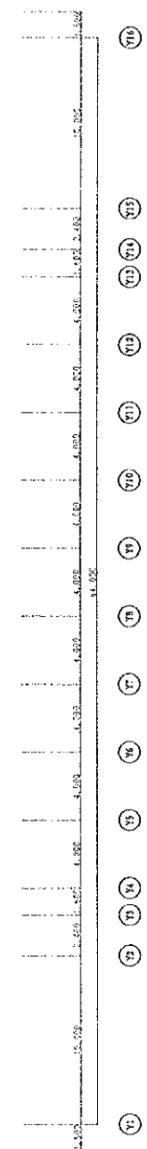
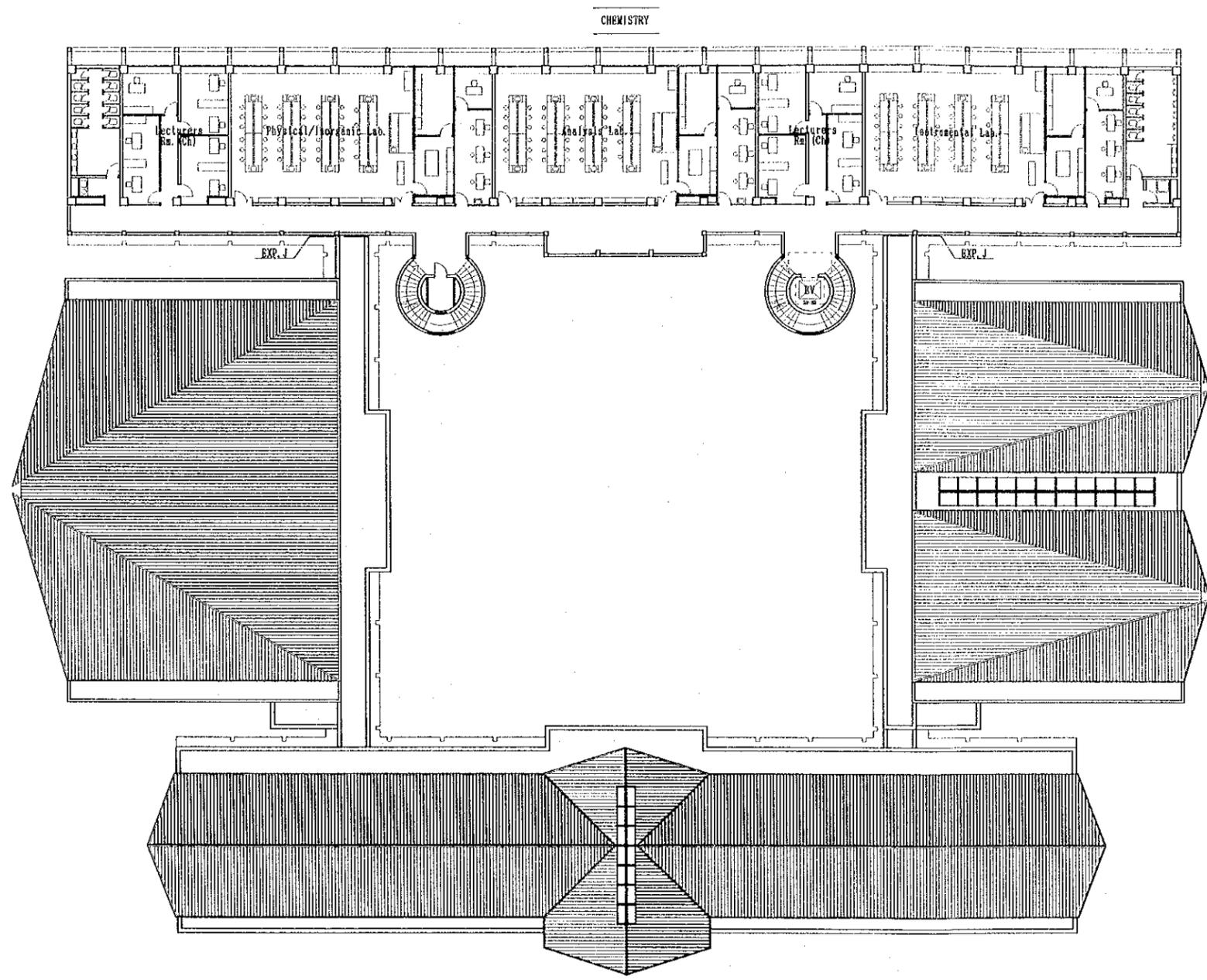
PROJECT TITLE THE BASIC DESIGN STUDY ON THE PROJECT FOR DEVELOPMENT OF SCIENCE AND MATHEMATICS TEACHING FOR PRIMARY AND SECONDARY EDUCATION IN THE REPUBLIC OF INDONESIA	FACILITY DESIGN PACIFIC CONSULTANTS INTERNATIONAL	SCALE 1:400	DATE	DWG. TITLE 2nd FLOOR PLAN	DWG. NO. 3
---	--	----------------	------	------------------------------	---------------



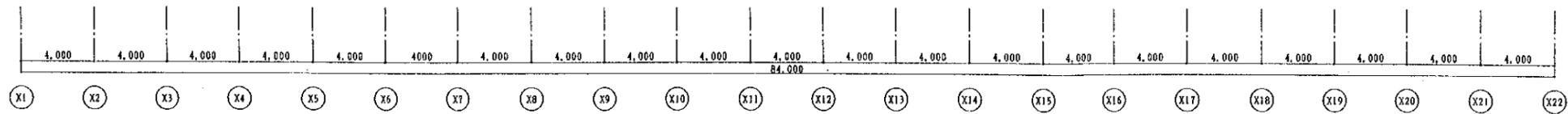
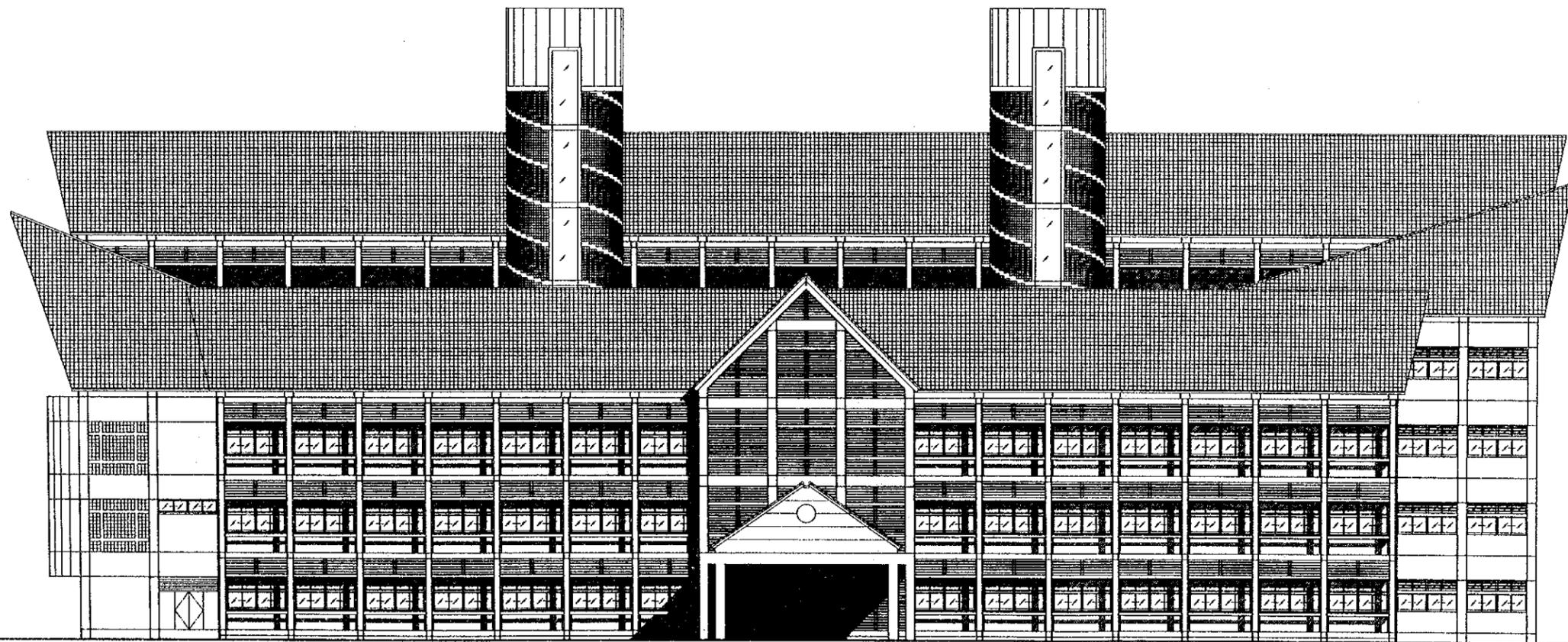
PROJECT TITLE THE BASIC DESIGN STUDY ON THE PROJECT FOR DEVELOPMENT OF SCIENCE AND MATHEMATICS TEACHING FOR PRIMARY AND SECONDARY EDUCATION IN THE REPUBLIC OF INDONESIA	FACILITY DESIGN PACIFIC CONSULTANTS INTERNATIONAL	SCALE 1:400	DATE	DWG. TITLE 3rd FLOOR PLAN	DWG. NO. 4
---	--	----------------	------	------------------------------	---------------



PROJECT TITLE THE BASIC DESIGN STUDY ON THE PROJECT FOR DEVELOPMENT OF SCIENCE AND MATHEMATICS TEACHING FOR PRIMARY AND SECONDARY EDUCATION IN THE REPUBLIC OF INDONESIA	FACILITY DESIGN PACIFIC CONSULTANTS INTERNATIONAL	SCALE 1:400	DATE	DWG. TITLE 4th FLOOR PLAN	DWG. NO. 5
---	--	----------------	------	------------------------------	---------------

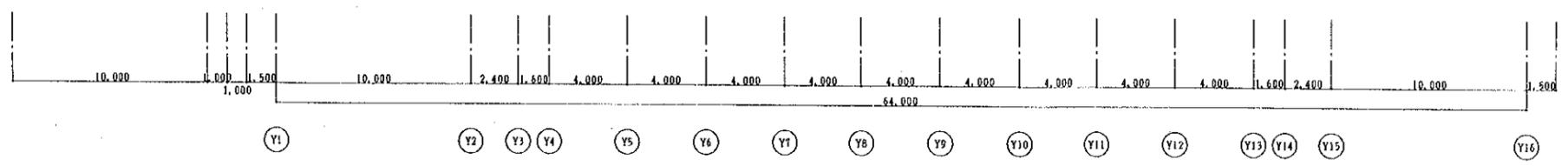
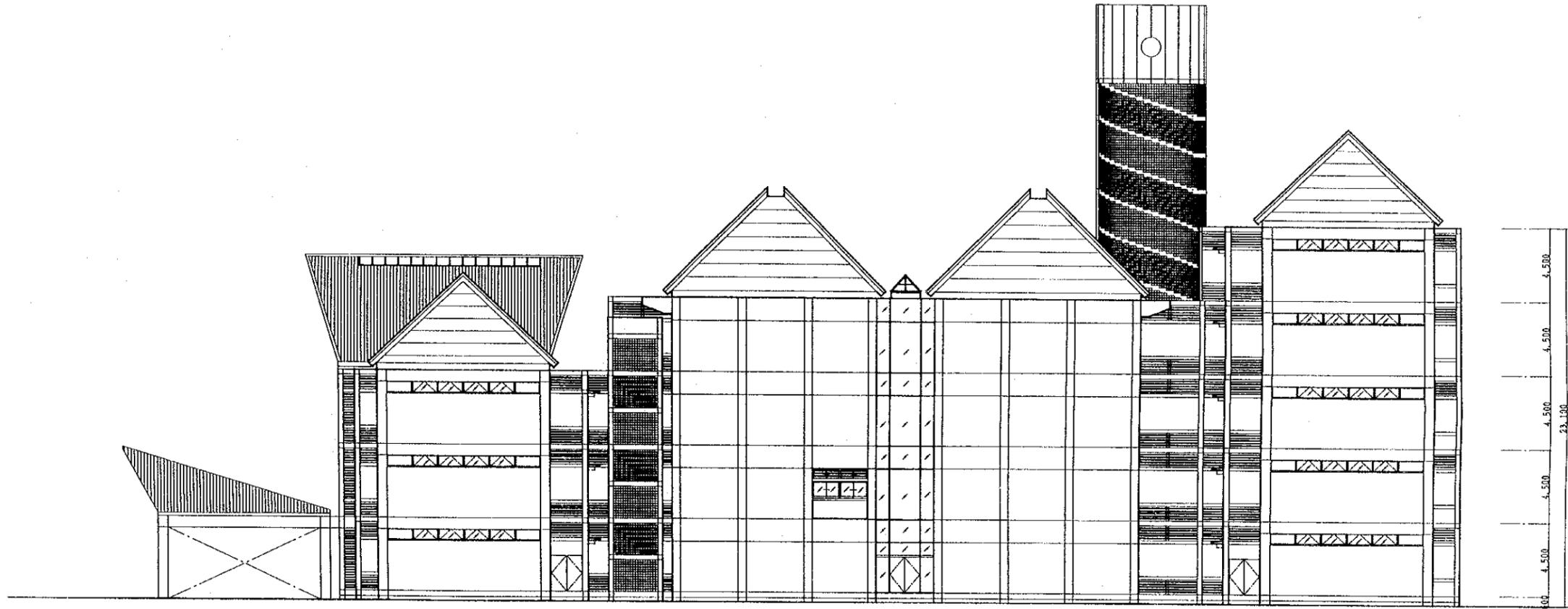


<p>PROJECT TITLE</p> <p>THE BASIC DESIGN STUDY ON THE PROJECT FOR DEVELOPMENT OF SCIENCE AND MATHEMATICS TEACHING FOR PRIMARY AND SECONDARY EDUCATION IN THE REPUBLIC OF INDONESIA</p>	<p>FACILITY DESIGN</p> <p>PACIFIC CONSULTANTS INTERNATIONAL</p>	<p>SCALE</p> <p>1:400</p>	<p>DATE</p>	<p>DWG. TITLE</p> <p>5th FLOOR PLAN</p>	<p>DWG. NO.</p> <p>6</p>
--	---	---------------------------	-------------	---	--------------------------

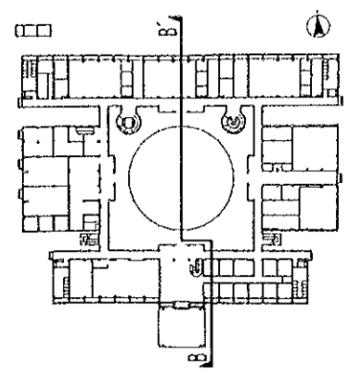


PROJECT TITLE THE BASIC DESIGN STUDY ON THE PROJECT FOR DEVELOPMENT OF SCIENCE AND MATHEMATICS TEACHING FOR PRIMARY AND SECONDARY EDUCATION IN THE REPUBLIC OF INDONESIA	FACILITY DESIGN PACIFIC CONSULTANTS INTERNATIONAL	SCALE 1:300	DATE	DWG. TITLE SOUTH ELEVATION	DWG. NO. 7
---	--	----------------	------	-------------------------------	---------------

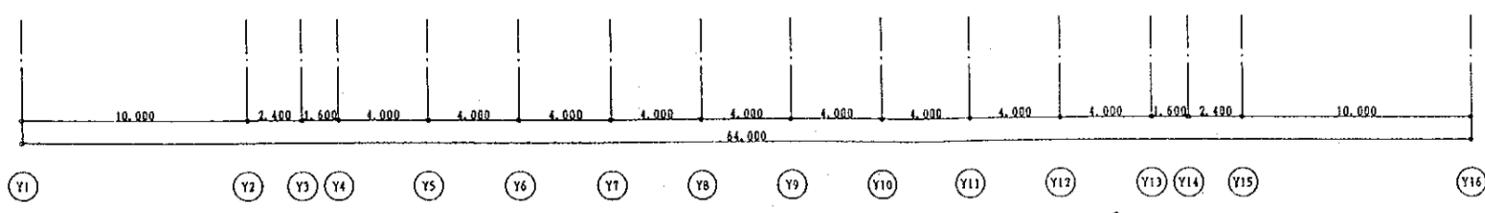
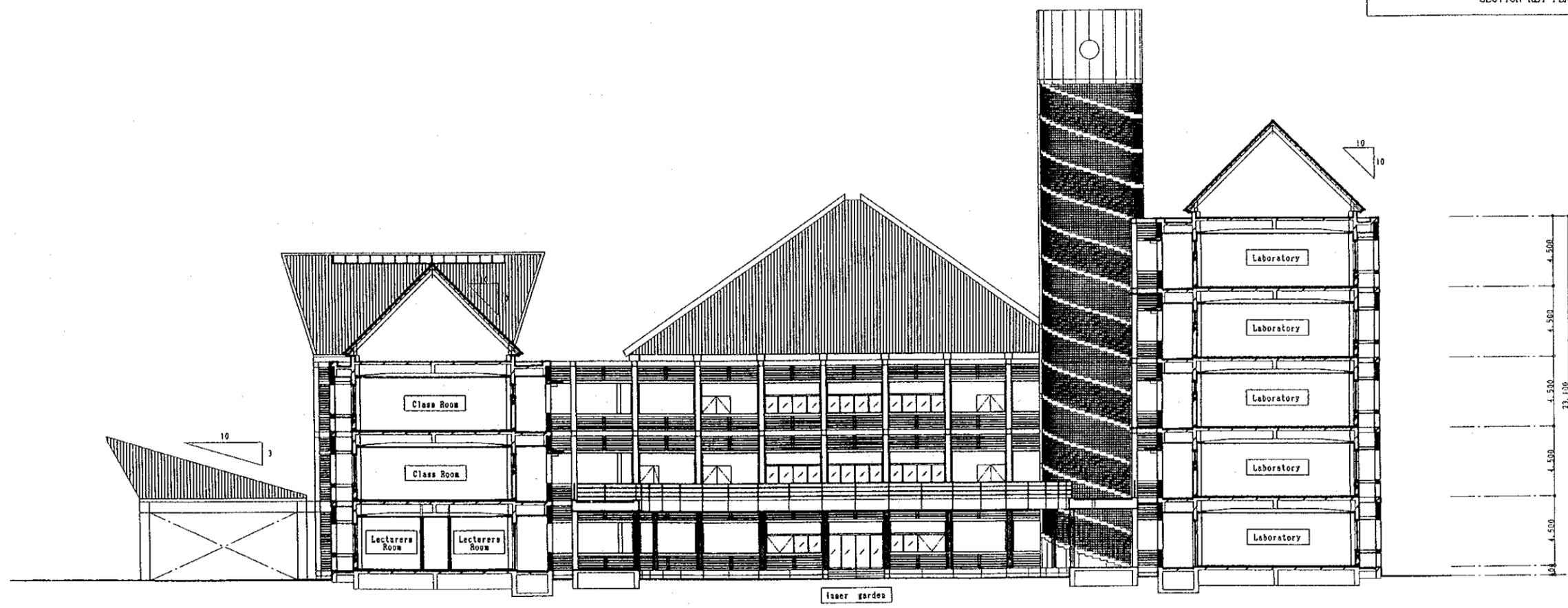




PROJECT TITLE THE BASIC DESIGN STUDY ON THE PROJECT FOR DEVELOPMENT OF SCIENCE AND MATHEMATICS TEACHING FOR PRIMARY AND SECONDARY EDUCATION IN THE REPUBLIC OF INDONESIA	FACILITY DESIGN PACIFIC CONSULTANTS INTERNATIONAL	SCALE 1:300	DATE	DWG. TITLE EAST ELEVATION	DWG. NO. 8
---	--	----------------	------	------------------------------	---------------



SECTION KEY PLAN



<p>PROJECT TITLE          THE BASIC DESIGN STUDY ON          THE PROJECT FOR DEVELOPMENT OF SCIENCE AND MATHEMATICS TEACHING FOR          PRIMARY AND SECONDARY EDUCATION IN THE REPUBLIC OF INDONESIA</p>	<p>FACILITY DESIGN          PACIFIC CONSULTANTS INTERNATIONAL</p>	<p>SCALE          1:300</p>	<p>DATE</p>	<p>DWG. TITLE          B - B' SECTION</p>	<p>DWG. NO.          9</p>
--	---	---------------------------------	-------------	---	--------------------------------



**EQUIPMENT LIST  
BIOLOGY**

Item	Equipment	Bandung			Jogyakarta			Malang			Total
		Q'ty	Exist	Req	Q'ty	Exist	Req	Q'ty	Exist	Req	
BI- 1	Dissecting Set	20	0	20	30	6	24	20	13	7	51
BI- 2	Magnifier	16	0	16	15	4	11	15	3	12	39
BI- 3	pH Meter	20	2	18	20	2	18	20	8	12	48
BI- 4	Electrode for pH Meter	50	0	50	50	0	50	50	0	50	150
BI- 5	Do Meter	8	0	8	8	0	8	8	3	5	21
BI- 6	Clinometer	8	0	8	8	0	8	8	2	6	22
BI- 7	Altimeter	8	2	8	8	0	8	8	3	5	21
BI- 8	Lux Meter	8	2	6	8	2	6	8	4	4	16
BI- 9	Barometer	4	0	4	4	0	4	4	1	3	11
BI- 10	Hygrometer	8	2	6	6	0	6	4	1	3	15
BI- 11	Soil Thermometer	10	1	9	10	0	10	10	4	6	25
BI- 12	Wind Meter	4	3	1	4	0	4	4	4	0	5
BI- 13	Rain Gauge	2	0	2	2	0	2	2	0	2	6
BI- 14	Insect Net, 2 kind	20	7	13	20	0	20	20	2	18	51
BI- 15	Plankton Net, 2 kind	5	0	5	5	1	4	5	2	3	12
BI- 16	Hydrometer	8	0	8	8	0	8	8	0	8	24
BI- 17	Max-Min Thermometer	10	0	10	10	0	10	15	5	10	30
BI- 18	Salinity Conductivity Meter	8	0	8	8	0	8	8	1	7	23
BI- 19	Turbidimeter	8	0	8	8	0	8	8	0	8	24
BI- 20	Refractometer	8	1	7	8	0	8	8	0	8	23
BI- 21	Dry Specimen Set of Insect	1	0	1	1	0	1	1	0	1	3
BI- 22	Soil Warm Extractor	8	0	8	8	0	8	8	5	3	19
BI- 23	Sampling Tubes Set with cap	10	0	10	12	2	10	15	5	10	30
BI- 24	Bottles Set for Specimen	10	0	10	10	0	10	10	0	10	30
BI- 25	Sampling Bottle	20	12	8	10	0	10	10	0	10	28
BI- 26	Binocluars	20	2	18	20	0	20	20	4	16	54
BI- 27	Hardness Meter	8	0	8	8	1	7	8	0	8	23
BI- 28	Conductivity Meter	8	0	8	8	0	8	8	0	8	24
BI- 29	Soil Analyzer Kit	8	0	8	8	0	8	8	2	6	22
BI- 30	Gas Analyser	8	0	8	8	0	8	8	0	8	24
BI- 31	Polari-saccharimeter	8	0	8	8	0	8	8	0	8	24
BI- 32	Stopwatch	20	0	20	20	0	20	20	6	14	54
BI- 33	Thermostat Water Bath	4	1	3	4	0	4	4	5	0	7
BI- 34	Centrifuge	4	1	3	4	1	3	4	5	0	6
BI- 35	Kymograph	2	0	2	2	0	2	3	3	0	4
BI- 36	Pneumograph	3	2	1	2	0	2	2	0	2	5
BI- 37	Refrigerator	3	2	1	2	0	2	9	7	2	5
BI- 38	Sphygmomanometer	4	2	2	4	3	1	4	10	0	3
BI- 39	Spirometer	2	1	1	2	0	2	3	10	0	3
BI- 40	Haemocyto Plate Counter	4	2	2	4	0	4	10	10	0	6
BI- 41	Electrocardiograph	2	0	2	2	0	2	2	0	2	6
BI- 42	Algae Slide Set	10	0	10	10	0	10	10	0	10	30
BI- 43	Plankton Slide Set	10	0	10	10	0	10	10	0	10	30
BI- 44	Mold & Fungi Slide Set	10	0	10	10	0	10	10	0	10	30
BI- 45	Bryophyta Slide Set	10	0	10	10	0	10	10	0	10	30
BI- 46	Ferm Spores Slide Set	2	0	2	2	0	2	2	0	2	6
BI- 47	Ferm Sori Slide Set	2	0	2	2	0	2	2	0	2	6
BI- 48	Ferm Prothallium Slide Set	2	0	2	2	0	2	2	0	2	6
BI- 49	Gymnosperm Root Slide Set	2	0	2	2	0	2	2	0	2	6
BI- 50	Gymnosperm Stem Slide Set	2	0	2	2	0	2	2	0	2	6
BI- 51	Gymnosperm Leaf Slide Set	2	0	2	2	0	2	2	0	2	6
BI- 52	Dicotyle Root Slide Set	2	0	2	2	0	2	2	0	2	6
BI- 53	Dicotyle Stem Slide Set	2	0	2	2	0	2	2	0	2	6
BI- 54	Dicotyle Leaf Slide Set	2	0	2	2	0	2	2	0	2	6

Item	Equipment	Bandung			Jogyakarta			Malang			Total
		Q'ty	Exist	Req	Q'ty	Exist	Req	Q'ty	Exist	Req	
BI- 55	Monocotyle Root Slide Set	2	0	2	2	0	2	2	0	2	6
BI- 56	Monocotyle Stem Slide Set	2	0	2	2	0	2	2	0	2	6
BI- 57	Monocotyle Leaf Slide Set	2	0	2	2	0	2	2	0	2	6
BI- 58	Oven Drier	6	4	2	2	0	2	2	2	0	4
BI- 59	Aspiratory Vacuum Pump	2	2	0	1	0	1	1	0	1	2
BI- 60	Garden Tool Set	2	0	2	2	0	2	2	0	2	6
BI- 61A	Desicator	4	4	0	6	0	6	10	8	2	8
BI- 61B	Vacuum pump	2	0	2	2	0	2	2	0	2	6
BI- 62	Analytical Balance	8	0	8	8	2	6	8	9	0	14
BI- 63	Magnetic Stirrer with hot plate	8	2	6	8	1	7	8	5	3	16
BI- 64	Warburg bath and manometer	1	0	1	1	0	1	1	0	1	3
BI- 65	Autoclave	3	2	1	3	1	2	2	4	0	3
BI- 66	Tripod	10	0	10	30	12	18	10	10	0	28
BI- 67	Retort Stand	10	0	10	22	10	12	20	0	20	42
BI- 68	Steel Stand	10	0	10	10	0	10	20	0	20	40
BI- 69	Student Microscope	40	25	15	40	1	39	80	62	18	72
BI- 70	Stereo Microscope	20	6	14	20	10	10	20	4	16	40
BI- 71	Binocular Microscope	40	14	26	40	4	36	40	0	40	102
BI- 72	Microscope TV Camera Set	1	1	0	1	0	1	1	0	1	2
BI- 73	Microscope Stereo Trinocular	1	1	0	1	0	1	1	0	1	2
BI- 74	Microscope Repairing Tools	2	0	2	2	0	2	2	0	2	6
BI- 75	Colony Counter	10	6	4	10	4	6	10	5	5	15
BI- 76	Incubator	4	4	0	4	1	3	9	5	4	7
BI- 77	Shaker	8	0	8	8	1	7	8	1	7	22
BI- 78	Blender	8	0	8	8	0	8	8	7	1	17
BI- 79	Chromatography	8	0	8	8	0	8	8	2	6	22
BI- 80	One Cell Animal Slide Set	2	0	2	2	0	2	2	0	2	6
BI- 81	Filaria Slide Set	2	0	2	2	0	2	2	0	2	6
BI- 82	Wet Preservative Set of Invertebrate	1	0	1	1	0	1	1	0	1	3
BI- 83	Vertebrate Organs Slide Set	10	0	10	10	0	10	10	0	10	30
BI- 84	Wet Specimen of Vertebrate(Heart, skelton & muscle)	1	0	1	1	0	1	1	0	1	3
BI- 85	Wet Specimen of Vertebrate(15 kinds)	1	0	1	1	0	1	1	0	1	3
BI- 86	Micrometer, objective	20	0	20	15	0	15	15	4	11	46
BI- 87	Micrometer, eye piece	40	0	40	40	0	40	40	3	37	117
BI- 88	Rotary Microtome	4	1	3	4	1	3	4	2	2	8
BI- 89	Parafin Specimen App.,	2	0	2	2	0	2	2	0	2	6
BI- 90	Testis Slide Set	10	0	10	10	0	10	10	0	10	30
BI- 91	Ovary Slide Set	10	0	10	10	0	10	10	0	10	30
BI- 92	Mitotic Division Slide Set	10	0	10	10	0	10	10	0	10	30
BI- 93	Frog Development Slide Set	10	0	10	10	0	10	10	0	10	30
BI- 94	Development Stage of Frog	1	0	1	1	0	1	1	0	1	3
BI- 95	Development Stage of Fish Embryo	1	0	1	1	0	1	1	0	1	3
BI- 96	Development Stage of Entomology	1	0	1	1	0	1	1	0	1	3
BI- 97	Development of Seurchin	1	0	1	1	0	1	1	0	1	3
BI- 98	RNA Protein Synthesis Kit	2	0	2	2	0	2	2	0	2	6
BI- 99	DNA Molecular KIT	2	1	1	2	0	2	3	2	1	4
BI- 100	DNA Gel Electrophoresis	2	0	2	2	0	2	2	0	2	6
BI- 101	Drying Tray for dyeing	2	4	0	1	0	1	1	0	1	2
BI- 102	Mitosis Model	1	0	1	1	0	1	1	0	1	3
BI- 103	Meiosis Model	1	0	1	1	0	1	1	0	1	3
BI- 104	Human Torso	1	6	1	1	1	1	3	2	1	3
BI- 105	Head Model	1	1	1	1	0	1	3	2	1	3
BI- 106	Eye Model	1	0	1	1	0	1	3	2	1	3
BI- 107	Heart Model	1	0	1	1	0	1	3	2	1	3
BI- 108	Skin Model	1	0	1	1	0	1	3	2	1	3
BI- 109	Kidney Model	1	1	1	1	0	1	3	2	1	3

Item	Equipment	Bandung			Jogyakarta			Malang			Total
		Q'ty	Exist	Req	Q'ty	Exist	Req	Q'ty	Exist	Req	
BI- 110	Pelvis Model	1	1	1	1	0	1	3	2	1	3
BI- 111	Embryo Development Model	1	0	1	1	0	1	1	0	1	3
BI- 112	Pregnancy Model	1	0	1	1	0	1	1	0	1	3
BI- 113	Ovary Model	1	0	1	1	0	1	1	0	1	3
BI- 114	Development Stage of Frog Embryo	1	0	1	1	0	1	1	0	1	3
BI- 115	Comparative Vertebrate Heart Series	1	0	1	1	0	1	1	0	1	3
BI- 116	Comparative Vertebrate Brain Series	1	0	1	1	0	1	1	0	1	3
BI- 117	Root Tip Structure	1	0	1	1	0	1	1	0	1	3
BI- 118	Dicotyle Stem Modelle	1	0	1	1	0	1	1	0	1	3
BI- 119	Monocotile Stem Model	1	0	1	1	0	1	1	0	1	3
BI- 120	Leaf Model	1	0	1	1	0	1	1	0	1	3
BI- 121	Flower Model	1	0	1	1	0	1	1	0	1	3
BI- 122	Seed Model	1	0	1	1	0	1	1	0	1	3
BI- 123	Plant Model Set	1	0	1	1	0	1	1	0	1	3
BI- 124	Clean Bench with UV Lamp	1	0	1	1	0	1	1	0	1	3
BI- 125	Homogenizer	8	0	8	8	0	8	8	0	8	24
BI- 126	Alchol Thermometer	20	0	20	20	0	20	20	0	20	60
BI- 127	Vortex Mixer(Touch mixer)	8	0	8	8	0	8	8	0	8	24
BI- 128	Adjustable Pipette	10	0	10	10	3	7	10	0	10	27
BI- 129	Reciprotating Bath Shaker	2	0	2	2	0	2	2	1	1	5
BI- 130	Spectrophotometer	2	0	2	2	2	0	2	1	1	3
BI- 131	Glassware	1		1	1		1	1		1	3
BI- 132	Chemicals	1		1	1		1	1		1	3
BI- 133	Table for experiment(student)	40		40							40
BI- 134	Table for experiment(teacher)	5		5							5
BI- 135	Side table for experiment	10		10							10
BI- 136	Side table for experiment	5		5							5
BI- 137	Side table for experiment	5		5							5
BI- 138	Side table for experiment	5		5							5
BI- 139	Side table for experiment	5		5							5
BI- 140	Chair for student	240		240							240
BI- 141	Chair for teacher	5		5							5
BI- 142	Chemical cabinet	10		10	5		5	5		5	20
BI- 143	Glassware cabinet	10		10	5		5	5		5	20
BI- 144	Shelf	10		10	5		5	5		5	20
BI- 145	Water Treatment System	1	0	1	1	0	1	1	0	1	3
BI- 146	Exhaust Fan				7	0	7	10	0	10	17
BI- 147	Airconditioner							1	0	1	1
BI- 148	Water Distillation	2	0	2	4	2	2	2	0	2	6
Total				1107			842			722	2671

**EQUIPMENT LIST  
CHEMISTRY**

Item	Equipment	Bandung			Jogyakarta			Malang			Total
		Q'ty	Exist	Req	Q'ty	Exist	Req	Q'ty	Exist	Req	
CH- 1	Analytical Balance	10	5	5	10	7	3	10	7	3	11
CH- 2	Barometer	5	0	5	5	0	5	5	1	4	14
CH- 3	Bunsen Burner	40	16	24	40	0	40	40	70	0	64
CH- 4	Cork Borer	5	1	4	5	0	5	5	0	5	14
CH- 5	Drying Oven	4	3	1	4	1	3	4	1	3	7
CH- 6	Eudiometer	8	0	8	8	0	8	8	0	8	24
CH- 7	Forceps	8	0	8	10	0	10	8	0	8	26
CH- 8	Funnel Support	8	2	6	15	3	12	40	18	22	40
CH- 9	Mantle Heater	16	0	16	10	8	2	19	13	6	24
CH- 10	Hoffman Appratus	4	0	4	2	0	2	8	9	0	6
CH- 11	Tube Holder	12	0	12	20	0	20	10	0	10	42
CH- 12	Hygrometer	4	0	4	4	0	4	4	0	4	12
CH- 13	Manometer	8	0	8	8	0	8	8	0	8	24
CH- 14	Periodic Chart	3	0	3	4	0	4	1	0	1	8
CH- 15	Rubber Stopper	30	0	30	30	0	30	30	0	30	90
CH- 16	Standard Support	50	0	50	50	0	50	50	0	50	150
CH- 17	Mercury Thermometer	40	5	35	40	0	40	40	0	40	115
CH- 18	Alcohol Thermometer	40	0	40	40	0	40	40	0	40	120
CH- 19	Tripod	100	143	0	100	17	83	100	75	25	108
CH- 20	Burette Support	45	4	41	45	5	40	45	18	27	108
CH- 21	DC Milli-ammeter	8	0	8	8	0	8	8	0	8	24
CH- 22	pH Meter	15	7	8	10	1	9	15	8	7	24
CH- 23	Electrode for pH Meter	20	0	20	20	0	20	20	0	20	60
CH- 24	Power Source	16	6	10	10	0	10	12	5	7	27
CH- 25	Soldering Iron	3	0	3	5	0	5	2	0	2	10
CH- 26	Stop Watch	20	0	20	20	2	18	20	10	10	48
CH- 27	Electronic Precision Balance	6	1	5	6	0	6	6	0	6	17
CH- 28	Calorimeter	10	7	3	5	1	4	5	28	0	7
CH- 29	Thermostatic Circular Bath	5	0	5	5	0	5	5	0	5	15
CH- 30	Utility Clamp	15	3	12	15	0	15	15	0	15	42
CH- 31	Furnace	4	0	4	4	2	2	4	3	1	7
CH- 32	Picnometer	10	0	10	10	0	10	10	4	6	26
CH- 33	Magnetic Stirrer	16	6	10	10	0	10	16	8	8	28
CH- 34	Du Noy Surface Tensiometer	4	0	4	4	0	4	4	0	4	12
CH- 35	Colorimeter	16	14	2	6	0	6	6	0	6	14
CH- 36	Conductivity meter	8	2	6	8	0	8	8	0	8	22
CH- 37	Multitester	10	1	9	10	0	10	10	0	10	29
CH- 38	Polarimeter	8	1	7	8	0	8	8	2	6	21
CH- 39	Potentiometer	4	0	4	4	0	4	4	0	4	12
CH- 40	Blender	2	0	2	2	0	2	2	0	2	6
CH- 41	Centrifuge	4	2	2	4	2	2	2	0	2	6
CH- 42	Electrophoresis Apparatus	2	0	2	2	0	2	2	1	1	5
CH- 43	Hot Plate	2	0	2	2	0	2	7	4	3	7
CH- 44	Paper Chromatography	2	0	2	2	1	1	4	0	4	7
CH- 45	Kjeldhal Set	2	0	2	2	0	2	2	0	2	6
CH- 46	Melting Point Apparatus	8	1	7	8	0	8	8	2	6	21
CH- 47	Mechanical Stirrer	4	0	4	4	0	4	4	0	4	12
CH- 48	BOD Meter	2	0	2	2	0	2	2	0	2	6
CH- 49	COD Apparatus	2	0	2	2	0	2	4	1	3	7
CH- 50	Fraction Collector	2	0	2	2	0	2	2	0	2	6
CH- 51	Autoclave/Sterilizer	2	1	1	2	0	2	2	2	0	3
CH- 52	DNA Model	1	0	1	1	0	1	1	0	1	3
CH- 53A	Desicator	20	16	4	10	1	9	10	1	9	22
CH- 53B	Vacuum pump	2	0	2	2	0	2	2	0	2	6

Item	Equipment	Bandung			Jogyakarta			Malang			Total
		Q'ty	Exist	Req	Q'ty	Exist	Req	Q'ty	Exist	Req	
CH- 54	Top Loading Balance	5	0	5	5	0	5	5	1	4	14
CH- 55	Magnetic Stirrer with hot plate	8	1	7	8	0	8	8	2	6	21
CH- 56	Microscope	8	2	6	8	1	7	8	1	7	20
CH- 57	Molecular Model	2	1	1	3	2	1	1	0	1	3
CH- 58	Stick pH Meter	8	0	8	8	0	8	8	3	5	21
CH- 59	Electrode for pH Meter	20	0	20	20	0	20	20	0	20	60
CH- 60	Refrigerator	3	0	3	5	1	4	2	0	2	9
CH- 61	Rotary Vacuum Evaporator	3	1	2	3	2	1	3	2	1	4
CH- 62	Soxhlet Extraction Apparatus	8	6	2	2	14	0	5	3	2	4
CH- 63	Automatic Regulated Transformer	6	0	6	6	0	6	6	0	6	18
CH- 64	Multi-shaker	2	0	2	2	0	2	2	0	2	6
CH- 65	Refractometer	2	0	2	2	0	2	4	2	2	6
CH- 66	Crystal Model	1	0	1	2	0	2	1	0	1	4
CH- 67	Water Bath with shaker	2	0	2	2	1	1	2	0	2	5
CH- 68	Automatic Titrator	8	0	8	8	0	8	8	0	8	24
CH- 69A	Electronic Balance	1	0	1	1	0	1	1	0	1	3
CH- 69B	Computer for CH-69A	1	0	1	1	0	1	1	0	1	3
CH- 69C	Printer for CH-69A	1	0	1	1	0	1	1	0	1	3
CH- 70	Draft Chamber	5	(4)	5	4	6	0	4	4	0	5
CH- 71	Freeze Dryer	1	0	1	1	0	1	1	0	1	3
CH- 72	FT/IR Spectrophotometer	1	0	1	1	1	0	1	1	0	1
CH- 73	UV/VS Spectrophotometer	1	0	1	1	1	0	1	1	0	1
CH- 74	NMR for Education	1	0	1	1	0	1	1	0	1	3
CH- 75	Ultrasonic Cleaner	2	0	2	2	0	2	2	1	1	5
CH- 76	Water Demineralizator	2	0	2	1	0	1	2	0	2	5
CH- 77	Osmotic Pressure Experiment App.,	2	0	2	2	0	2	2	0	2	6
CH- 78	Beckman's Molecular Weight App.,	2	0	2	2	0	2	2	0	2	6
CH- 79	Spectrophotometer	1	4	1	1	0	1	1	7	0	2
CH- 80	Glassware	1		1	1		1	1		1	3
CH- 81	Chemicals	1		1	1		1	1		1	3
CH- 82	Table for experiment(student)	20		20							20
CH- 83	Table for experiment(teacher)	5		5							5
CH- 84	Side Table for experiment	15		15							15
CH- 85	Side Table for experiment	10		10							10
CH- 86	Side Table for experiment	25		25							25
CH- 87	Chair for student	200		200							200
CH- 88	Chair for teacher	5		5							5
CH- 89	Chemical Cabinet	10		10	5		5	5		5	20
CH- 90	Glassware Cabinet	10		10	5		5	5		5	20
CH- 91	Shelf	10		10	5		5	5		5	20
CH- 92	Water Treatment System	1	0	1	1	0	1	1	0	1	3
CH- 93	Exhaust Fan				10	0	10	10		10	20
CH- 94	Aircon				1	0	1	2	0	2	3
CH- 95	Water Distillation	2	0	2	2	1	1	2	0	2	5
CH- 96	Experimental Table for student with reagent shelf							16	0	16	16
Total				902			732			599	2233



# EQUIPMENT LIST

## MATHEMATICS, COMPUTER, AV EQUIP., T/M PRODUCTION, WORKSHOP

Item	Equipment	Bandung			Jogyakarta			Malang			Total
		Q'ty	Exist	Req	Q'ty	Exist	Req	Q'ty	Exist	Req	
<b>Mathematics(Practical Room)</b>											
MA- 1	Programmable Calculator	41	0	41	41	0	41	41	0	41	123
MA- 2	Color Graph Calculator	41	7	34	41	0	41	41	0	41	116
MA- 3	OHP Calculator Set	2	0	2	2	0	2	2	0	2	6
MA- 4	Fraction Demonstration Kit	10	0	10	10	0	10	16	6	10	30
MA- 5	Volume Blocks	10	0	10	10	0	10	10	0	10	30
MA- 6	Plane Figure Kit	10	0	10	10	0	10	10	0	10	30
MA- 7	Tangram	10	0	10	10	0	10	10	0	10	30
MA- 8	Blackboard Ruler Set	2	0	2	2	0	2	2	0	2	6
<b>Computer(Computer Room)</b>											
CM- 1	Personal Computer Set	46	38	20	0	65	0	40	92	0	20
CM- 2	Desk & Chair for Student Computer	40	0	40	0	65	0	40	92	0	40
CM- 3	Desk & Chair for Teacher Computer	2	0	2	0	0	0	0	0	0	2
CM- 4	Printer, dotmatrix	2	3	0	5	3	2	17	13	4	6
CM- 5	Printer, laser	2	1	1	1	0	1	4	3	1	3
CM- 6	Printer, color jet	1	1	0	1	0	1	4	3	1	2
CM- 7	Scanner	2	1	1	2	0	2	2	2	0	3
CM- 8	Electric & Cable wiring	2	0	2	2	0	2	2	0	2	6
CM- 11	Computer Projector	2	1	1	2	1	1	2	0	2	4
CM- 12	Software	1	0	1	1	0	1	1	0	1	3
CM- 13	Modem	0	0	0	3	2	1	1	0	1	2
CM- 14	UPS/VR for room	2	0	2			4				6
CM- 15	UPS/VR						10			10	20
CM- 16	Black Curtain				2	0	2	2	0	2	4
CM- 17	Airconditioner				4	2	2	2	0	2	4
CM- 18	Computer	1	0	1	1	0	1	1	0	1	3
<b>Audio Visual</b>											
AV- 1	OHP	5	4	1	4	1	3	4	3	1	5
AV- 2	Slide Projector	4	0	4	4	1	3	4	0	4	11
AV- 3	Screen	4	0	4	4	1	3	4	2	2	9
AV- 4	Video Tape Deck	4	0	4	4	0	4	4	0	4	12
AV- 5	Color Monitor	4	0	4	4	1	3	4	1	3	10
AV- 6	Whiteboard with pen and magnet				1	0	1				1
AV- 7	Black Curtain				5	0	5	5	0	5	10
AV- 8	Black Curtain							1	0	1	1
AV- 9	Portable Sound System	4	0	4	4	0	4	5	0	5	13
AV- 10	Airconditioner							4	0	4	4
AV- 11	Fire Extinguisher				28	0	28	30	0	30	58
<b>Teaching Materials Production</b>											
TP- 1	Video Camera Set	1	0	1	1	0	1	1	0	1	3
TP- 2	Camera Set for Computer	2	0	2	2	0	2	2	0	2	6
TP- 3	VHS Recorder	1	0	1	1	0	1	1	0	1	3
TP- 4	VHS Editing System	1	0	1	1	0	1	1	0	1	3
TP- 5	Video Dubbing System	1	0	1	1	0	1	1	0	1	3
TP- 6	Personal Computer Set with monitor	2	0	2	1	0	1	1	0	1	4
TP- 7	Scanner	1	0	1	1	0	1	1	0	1	3
TP- 8	Color Printer	1	0	1	1	0	1	1	0	1	3
TP- 9	Magnetic Optical Disk Driver	1	0	1	1	0	1	1	0	1	3
TP- 10	CDR	2	0	2	1	0	1	1	0	1	4
TP- 11	Airconditoner	1	0	1	1	0	1	1	0	1	3
<b>Printing Equipment</b>											
PR- 1	Phocopy Machine	1	0	1	1	0	1	1	0	1	3
PR- 2	Printing Machine	1	0	1	1	0	1	1	0	1	3
PR- 3	Printing Base Production	1	0	1	1	0	1	1	0	1	3

Item	Equipment	Bandung			Jogyakarta			Malang			Total
		Q'ty	Exist	Req	Q'ty	Exist	Req	Q'ty	Exist	Req	
PR- 4	Paper Cutter	1	0	1	1	0	1	1	0	1	3
PR- 5	Book Binding Machine	1	0	1	1	0	1	1	0	1	3
PR- 6	Typewriter	1	0	1	1	0	1	1	0	1	3
<b>Work shop Equipment</b>											
<b>Equipment for Wood and Plastic process</b>											
WS- 1	Electric saw	1		1	1		1	1		1	3
WS- 2	Electric saw (round saw)	1		1	1		1	1		1	3
WS- 3	Electric sander for wood	1		1	1		1	1		1	3
WS- 4	Electric Drill	1		1	1		1	1		1	3
WS- 5	Electric Lathe for wood	1		1	1		1	1		1	3
WS- 6	Electric planer	1		1	1		1	1		1	3
WS- 7	Foamed Plastic Cutter	1		1	1		1	1		1	3
WS- 8	Vice for wood	5		5	5		5	5		5	15
WS- 9	Tool Kit for Plastic Work	5		5	5		5	5		5	15
WS- 10	Tool Kit for Wooden Work	5		5	5		5	5		5	15
<b>Equipment for Metal process</b>											
WS- 11	Metal Turning Lathe	1		1	1		1	1		1	3
WS- 12	Electric drill for Metal	1		1	1		1	1		1	3
WS- 13	Drill set	1		1	1		1	1		1	3
WS- 14	Band Saw	1		1	1		1	1		1	3
WS- 15	Electric Grinder	1		1	1		1	1		1	3
WS- 16	Welder	1		1	1		1	1		1	3
WS- 17	Universal cutter	1		1	1		1	1		1	3
WS- 18	Metal Bender	1		1	1		1	1		1	3
WS- 19	Tap and Dice	5		5	5		5	5		5	15
WS- 20	Vice	5		5	5		5	5		5	15
WS- 21	Tool Kit for Metal Working	5		5	5		5	5		5	15
WS- 22	Measurement set	5		5	5		5	5		5	15
WS- 23	Anvils	5		5	5		5	5		5	15
WS- 24	Work Board	5		5	5		5	5		5	15
<b>Equipment for Glass process</b>											
WS- 25	Burner set for glass process	5		5	5		5	5		5	15
WS- 26	Glass tube cutter	5		5	5		5	5		5	15
WS- 27	File Set	5		5	5		5	5		5	15
<b>Equipment for Electrical work</b>											
WS- 28	Tool Kit for Electric Work	5		5	5		5	5		5	15
WS- 29	Electric Drill	1		1	1		1	1		1	3
WS- 30	Multi tester	5		5	5		5	5		5	15
WS- 31	Multi meter	5		5	5		5	5		5	15
WS- 32	Oscilloscope	2		2	2		2	2		2	6
<b>Common</b>											
WS- 33	Work Bench	5		5	5		5	5		5	15
WS- 34	Vacuum Cleaner	1		1	1		1	1		1	3
<b>Total</b>				330			327			329	986

**EQUIPMENT LIST  
PHYSICS**

Item	Equipment	Bandung			Jogyakarta			Malang			Total
		Q'ty	Exist	Req	Q'ty	Exist	Req	Q'ty	Exist	Req	
PH- 1	Air Table for Dynamics	6	0	6	6	0	6	6	0	6	18
PH- 2	Bunsen Burner	6	3	3	6	3	3	6	1	5	11
PH- 3	Dynamic Cart with Track	6	0	6	6	2	4	6	3	3	13
PH- 4	Electric Turntable Set	6	1	5	6	0	6	6	0	6	17
PH- 5	Electronic Precision Balance	6	0	6	6	1	5	6	5	1	12
PH- 6	Experimentatl App., of Second Law of Motion	6	1	5	6	0	6	6	0	6	17
PH- 7	Experimental App., for First Law of Motion	6	1	5	6	0	6	6	1	5	16
PH- 8	Experimental App., for Hook's Law	6	1	5	6	0	6	6	0	6	17
PH- 9	Experimental Spring Set	6	1	5	6	0	6	6	0	6	17
PH- 10	Free Fall Experimental Apparatus	6	0	6	6	1	5	6	0	6	17
PH- 11	Gyroscope with stand base	2	0	2	2	0	2	2	0	2	6
PH- 12	Helical Spring Pendulum Set	6	0	6	6	0	6	6	0	6	18
PH- 13	Hydrometer	6	0	6	6	3	3	6	3	3	12
PH- 14	Jolly Balance	6	0	6	6	0	6	6	0	6	18
PH- 15	Kater's Reversible Pendulum Set	2	0	2	2	0	2	2	0	2	6
PH- 16	Pendulum for Resonance	6	0	6	6	2	4	6	0	6	16
PH- 17	Pulley Set	6	0	6	6	0	6	6	0	6	18
PH- 18	Screw Gauge Micrometer	10	4	6	10	0	10	10	0	10	26
PH- 19	Spring Balance Set	6	1	5	6	11	0	6	0	6	11
PH- 20	Spring Pendulum Set	6	0	6	6	0	6	6	0	6	18
PH- 21	Stop Clock, LED	6	1	5	6	0	6	6	0	6	17
PH- 22	Stroboscope	6	1	5	6	1	5	6	0	6	16
PH- 23	Vernir Caliper	10	7	3	10	2	8	7	7	0	11
PH- 24	Weight Set for Spring	6	0	6	6	0	6	20	20	0	12
PH- 25	Optical Bench Set	6	1	5	6	0	6	6	3	3	14
PH- 26	Coil for Magnetizing	6	1	5	6	3	3	6	0	6	14
PH- 27	Lead Wire Set, more than 10 pcs.,	6	2	4	6	0	6	6	0	6	16
PH- 28	Diffraction Grating Prism	6	0	6	6	5	1				7
PH- 29	Du Noy Surface Tension Meter	6	0	6	6	0	6	6	0	6	18
PH- 30	c/m Experimental Apparatus	6	1	5	6	0	6	6	2	4	15
PH- 31	Elasticity of Flexure Apparatus	6	0	6	6	0	6	6	0	6	18
PH- 32	Electric Current -Magnetic Field Measuring Apparatus	6	0	6	6	0	6	6	0	6	18
PH- 33	Electromagnetic Force Demonstrator	6	0	6	6	0	6	6	0	6	18
PH- 34	Electronic Digital Counter	6	3	3	6	0	6	6	0	6	15
PH- 35	Eudiometer	6	0	6	6	0	6	6	0	6	18
PH- 36	Experimental App. 'of Critical Angle of Liquid	4	0	4	4	0	4	6	0	6	14
PH- 37	Experimental App., of Boyle-Charles' Law	6	0	6	6	1	5	6	0	6	17
PH- 38	Faraday's Effect App.,	6	0	6	6	0	6	6	0	6	18
PH- 39	Galvanometer	6	3	3	6	7	0	6	5	1	4
PH- 40	Light Velocity Measuring Apparatus	6	0	6	6	0	6	6	3	3	15
PH- 41	Linear Expansion Apparatus	6	0	6	6	0	6	6	0	6	18
PH- 42	Magnetic Circuit Training App.,	2	0	2	2	0	2	2	0	2	6
PH- 43	Mercury Tongs	6	0	6	6	0	6	6	1	5	17
PH- 44	Michelson Interferometer	6	1	5	6	0	6	6	1	5	16
PH- 45	Polari-Sacchari Meter Set	6	0	6	6	0	6	6	0	6	18
PH- 46	Polarizing Plate	6	0	6	6	0	6	6	0	6	18
PH- 47	Power Source	20	0	20	20	0	20	20	0	20	60
PH- 48	Revolving Magnetic Field Apparatus	6	0	6	6	0	6	6	0	6	18
PH- 49	Semiconductor Laser Oscillator	6	0	6	6	0	6	6	0	6	18
PH- 50	Sonometer	6	0	6	6	0	6	6	0	6	18
PH- 51	Stepdown Transformer	9	4	5	7	2	5	7	7	0	10
PH- 52	Thermometer	6	2	4	6	0	6	6	0	6	16
PH- 53	Thermometer	6	2	4	6	5	1	6	0	6	11
PH- 54	Vacuum Pump	2	0	2	2	1	1	2	0	2	5

Item	Equipment	Bandung			Jogyakarta			Malang			Total
		Q'ty	Exist	Req	Q'ty	Exist	Req	Q'ty	Exist	Req	
PH- 55	Variety of Lens	6	1	5	6	0	7	6	0	6	18
PH- 56	Viscosity Measruing Equipment	6	0	6	6	0	6	6	1	5	17
PH- 57	Water Calorimeter	6	1	5	6	0	6	6	4	2	13
PH- 58	XY Recorder	2	0	2	2	0	2	2	0	2	6
PH- 59	Amplifier	6	1	5	6	0	6	6	0	6	17
PH- 60	Analog Auto Measuring Apparatus(with 2 circuits)	1	0	1	1	0	1	1	0	1	3
PH- 61	Basic Logic Circuit Trainer Panel	2	0	2	2	0	2	2	0	2	6
PH- 62	Circuit Trainer	2	0	2	2	0	2	2	0	2	6
PH- 63	Condenser Circuit Experimental Apparatus	2	0	2	2	0	2	2	0	2	6
PH- 64	Coulomb Meter	6	1	5	6	0	6	6	0	6	17
PH- 65	Counter Circuit	6	0	6	6	0	6	6	0	6	18
PH- 66	Digital Circuit Tester	6	0	6	6	0	6	6	0	6	18
PH- 67	Diode Set	6	1	5	6	0	6	6	0	6	17
PH- 68	Electronic Circuit Experimental Apparatus	2	0	2	2	0	2	2	0	2	6
PH- 69	Electrostatic Fields Apparatus Set	6	1	5	6	0	6	6	0	6	17
PH- 70	Equipotential Experimental Set	6	0	6	6	0	6	6	0	6	18
PH- 71	Experimental App., for Coulomb's Law	6	1	5	6	0	6	6	1	5	16
PH- 72	Experimental App., for Parallel Plate Capacitor	6	0	6	6	0	6	6	0	6	18
PH- 73	Experimental App., of Ohm's Law	6	0	6	6	0	6	6	0	6	18
PH- 74	Frank-Hertz Apparatus	6	2	4	6	1	5	6	0	6	15
PH- 75	Function Generator	6	0	6	6	4	2	6	0	6	14
PH- 76	Gauss Meter	6	0	6	6	0	6	6	1	5	17
PH- 77	Hall Effect Experimental Set	4	1	3	4	0	4	4	2	2	9
PH- 78	High Frequency Circuit Trainer	2	0	2	2	0	2	2	0	2	6
PH- 79	LCR Bridge	2	0	2	2	0	2	2	0	2	6
PH- 80	Logic Circuit Experimental Apparatus	2	0	2	2	0	2	2	0	2	6
PH- 81	Low Frequency Oscillator	6	2	4	6	6	0	6	0	6	10
PH- 82	Lux Meter	6	0	6	6	1	5	6	1	5	16
PH- 83	Main Voltage Wave Observing Apparatus	2	0	2	2	0	2	2	0	2	6
PH- 84	Milikan's Elementary Charge App.,	2	1	1	2	0	2	2	0	2	5
PH- 85	Oscillation Circuit Experimental Apparatus	2	0	2	2	0	2	2	0	2	6
PH- 86	Oscilloscope	13	7	6	8	17	0	6	8	0	6
PH- 87	Photoelectric Effect Demonstrator	6	0	6	6	0	6	6	0	6	18
PH- 88	Potentiometer	6	0	6	6	0	6	6	1	5	17
PH- 89	Regulated Power Supply	9	3	6	5	1	4	7	4	3	13
PH- 90	Resistance Box	6	0	6	6	0	6	6	10	0	12
PH- 91	Semiconductors Element Experimental App.,	6	0	6	6	0	6	6	0	6	18
PH- 92	Thermo Electromotive Force Measuring App.,	6	0	6	6	0	6	6	0	6	18
PH- 93	Transistor Set	6	0	6	6	0	6	6	0	6	18
PH- 94A	Personal computer for PH-60	1	0	1	1	0	1	1	0	1	3
PH- 94B	Printer for CH-69A	1	0	1	1	0	1	1	0	1	3
PH- 95	Wheastone Bridge	6	1	5	6	0	6	6	2	4	15
PH- 96	Archimedes' Principle Demonstration Device	2	0	2	2	0	2	2	0	2	6
PH- 97	Astronomical Telescope	1	0	1	1	0	1	1	0	1	3
PH- 98	CCD camera & monitor	0	0	0	0	0	0	1	0	1	1
PH- 99	Spectrometer	2	0	2	2	0	2	2	0	2	6
PH- 100	Spectroscope	2	0	2	2	0	2	2	0	2	6
PH- 101	Reading Microscope	6	0	6	6	0	6	6	0	6	18
PH- 102	Reading Telescope	6	0	6	6	0	6	6	0	6	18
PH- 103	DC Voltmeter	6	0	6	6	0	6	6	0	6	18
PH- 104	DC Ammeter	6	0	6	6	0	6	6	0	6	18
PH- 105	Micro Ammeter	6	0	6	6	0	6	6	0	6	18
PH- 106	Induction Coil	6	0	6	6	0	6	6	0	6	18
PH- 107	Regulated DC Power Supply	6	0	6	6	0	6	6	0	6	18
PH- 108	Integrating Wattmeter	2	0	2	2	0	2	2	0	2	6
PH- 109	Table for Experiment(student)	42		42							42

Item	Equipment	Bandung			Jogyakarta			Malang			Total
		Q'ty	Exist	Req	Q'ty	Exist	Req	Q'ty	Exist	Req	
PH- 110	Table for Experiment(teacher)	3		3							3
PH- 111	SideTable for experimet	3		3							3
PH- 112	SideTable for experimet	8		8							8
PH- 113	SideTable for experimet	56		56							56
PH- 114	SideTable for experimet	2		2							2
PH- 115	SideTable for experimet	2		2							2
PH- 116	SideTable for experimet	10		10							10
PH- 117	Chair for student	200		200							200
PH- 118	Chair for teacher	3		3							3
PH- 119	Shelf	24	8	16	6		6	6		6	28
PH- 120	Airconditioner				3	0	3	1	0	1	4
PH- 121	Black Curtain				1	0	1	1	0	1	2
Total				862			518			497	1877

## 2-4 Project Implementation Mechanism

### 2-4-1 Organization for Implementation and Management

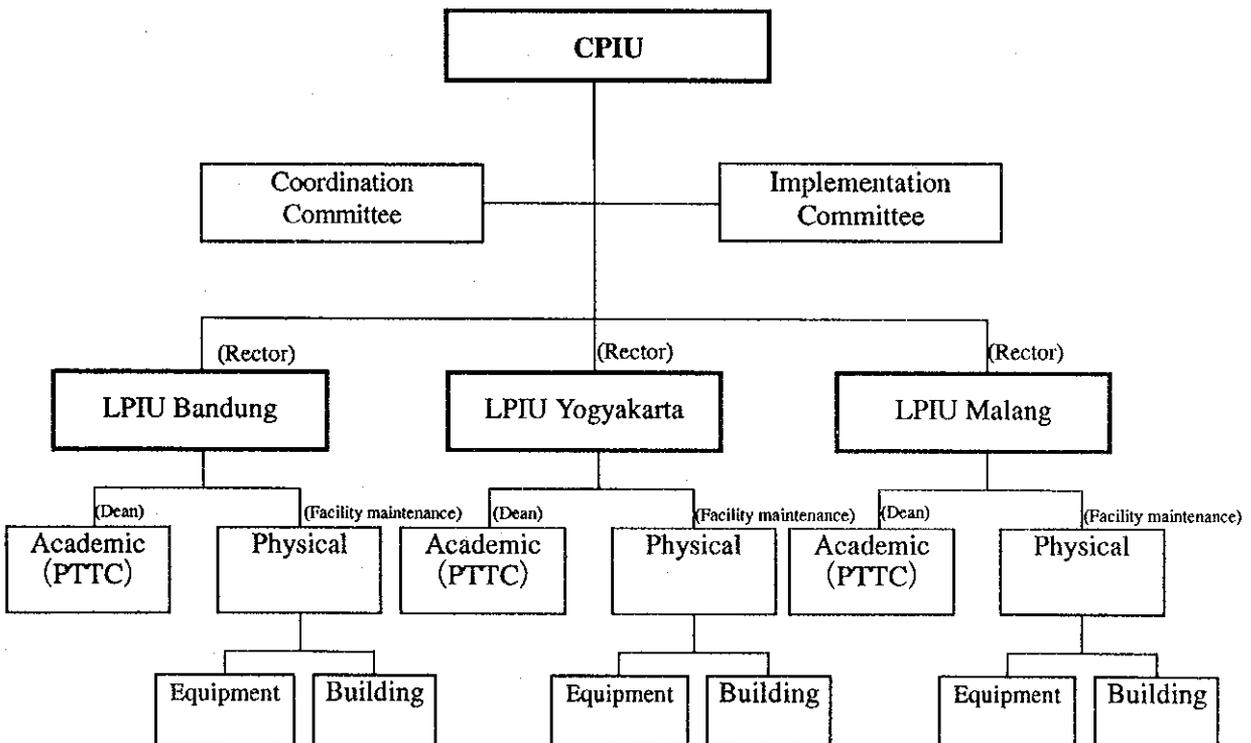
#### (1) Project Implementation

As to the Indonesian organization for project implementation, the Ministry of

Education and Culture is the counterpart organization, the Directorate General of Higher Education is the Central Project Implementation Unit (CPIU), and each IKIP is the Local Project Implementation Unit (LPIU).

At the same time of this project implementation, organizations for the Project Type Technical Cooperation (PTTC), (for instance, working group and task team), are planned to be formed. Accordingly, in order to achieve a smooth implementation, it is imperative for IKIP to have good coordination among these organizations.

Figure 2-4-1 Project Implementation Organization



## (2) Project Management

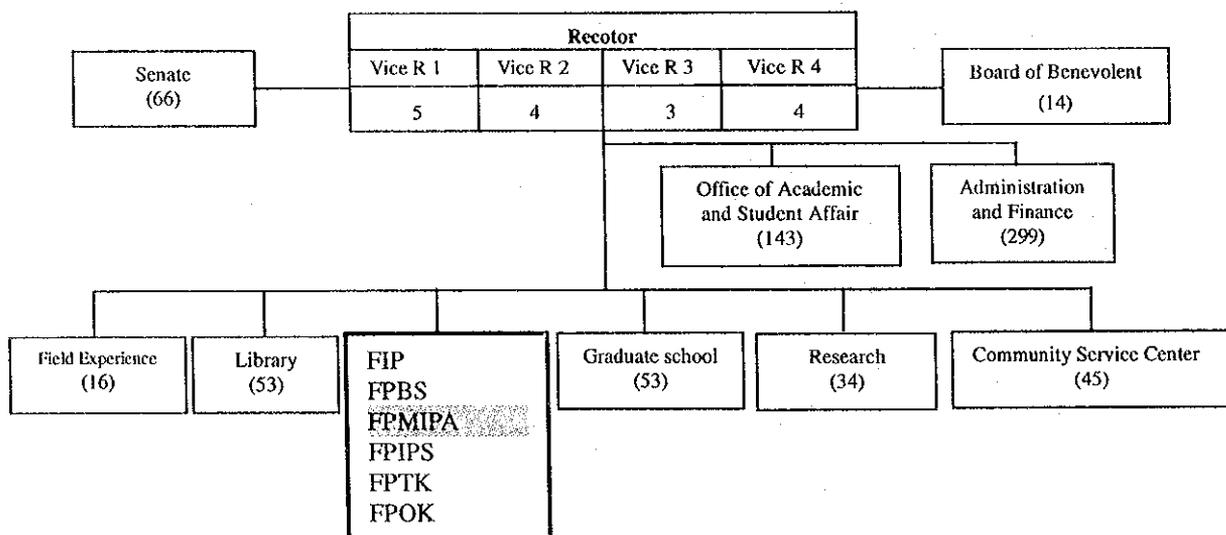
After the implementation of the project, each IKIP will be in charge of the management aspects. The management system and education plan for each IKIP are shown in the following explained and shown with organization chart below.

### IKIP-Bandung

#### 1) Management System

The organization chart for IKIP-Bandung is shown in the Figure 2-4-1-1. In IKIP-Bandung, there are one Rector and four Vice-Rectors. These Vice-Rectors are in charge of the following matters respectively such as, academic, administration and finance, student affairs, and outside cooperation. In the central administration office, about 450 staff members are working in the Bureau of Academic and Student Affairs or in the Bureau of Administration and Finance. In addition to the central administration office, there are an education practice office, a library, a graduate school, a research center, and a community service center. As to the Faculty for the undergraduate study, IKIP-Bandung has six Faculties, namely, Education, Science and Mathematics Education, Social Studies Education, Technical and Vocational Education, Humanities and Art education, Physical Science Education. Among them, the Faculty of Science and Mathematics Education (FPMIPA) provides a program for science and mathematics teacher education of secondary school, and the Faculty of Education (FIP) provides a program for teacher education of primary school.

Figure 2-4-1-1 Organization chart of IKIP Bandung



The current organization for IKIP-FPMIPA Bandung, shown in the Figure 2-4-1-2, consists of the sections of academics, personnel and finance, student affairs, and

general works. Since the current FPMIPA organization does not have any section in charge of maintenance of facility and equipment, FPMIPA will reorganize current general works section to a technical section that has specialists of various technical fields such as electricity, and machinery.

In addition, FPMIPA plans to have a section of common facilities in charge of maintenance of computer room and common workshop. As to the personnel for maintenance, FPMIPA will have at least one technical personnel for each laboratory. As to the personnel for administration, FPMIPA does not have a plan to employ a large number of new personnel because a new facility for administration will increase the efficiency of management.

Figure 2-4-1-2 Organization Chart of IKIP-FPMIPA Bandung (before Project)

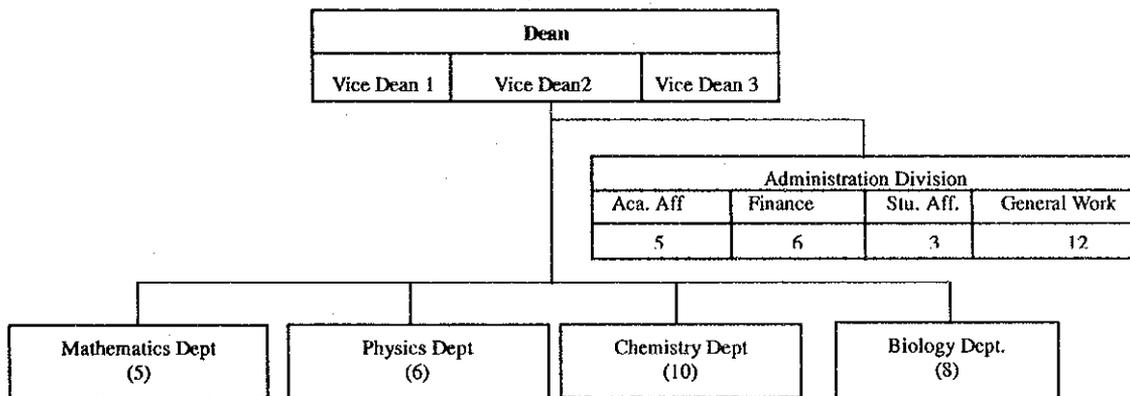
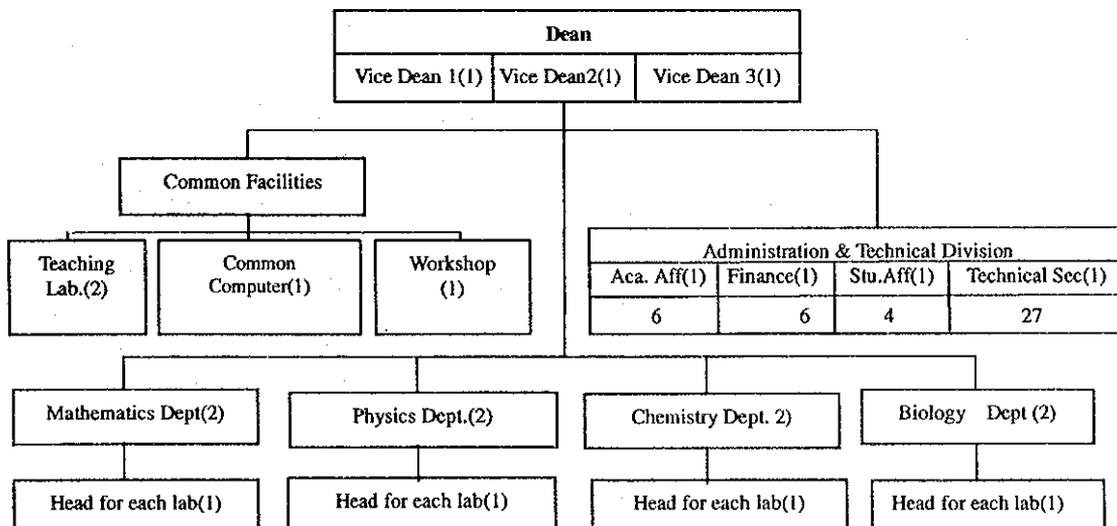


Figure 2-4-1-3 Organization Chart of IKIP-FPMIPA Bandung (after Project)





## 2) Education Program

The programs IKIP-FPMIPA Bandung is now offering are the pre-service and in-service teacher education programs, pure-science program, and short-term training program for FPMIPA teachers and staffs of all IKIPs. The last program has been mandated by the MOEC, and has been one of the main financial sources of FPMIPA.

In 1998, the in-service teacher training program has two classes in each department, one class has been financed by World Bank's PGSM project, and the other class has been financed by DGPSE. The fact that DGPSE has provided financial assistance for in-service teacher education program only to IKIP-Bandung seems to reflect the maturity of the programs here. As to the pure-science program, FPMIPA plans to have only one class in each department, which reflects the idea of IKIP-Bandung that it wants to flourish as a teacher's college.

One of the challenging issues facing IKIP-Bandung is that the most of the students need five or six years for the completion of the whole study. In order to improve its internal efficiency, FPMIPA is now thinking to take necessary actions such as,

- ① To reduce required credits for graduation.
- ② To provide counseling to the needed students.
- ③ To have supplemental courses between semesters.

Among the above actions, the last one will be made possible by the development of facilities and equipment in this grant aid project.

In addition to the undergraduate education, there are graduate programs which mainly aim to provide teachers for IKIP and other higher education institutions. Because of the shortage of facilities and equipment, graduate school of IKIP-Bandung has been offering only lecture classes, and graduate students have to go to ITB to do the necessary experiments. After the implementation of the Grant Aid which includes the provision of equipment, however, some of the necessary experiment will be done in a graduate school. Since the quality of IKIP teachers, most of them coming from a graduate school, is one of the important factors for the strengthening of education in IKIP, an expected improvement of the graduate school will be able to contribute the improvement of the quality of IKIP graduates indirectly.

IKIP-Yogyakarta

1) Management System

IKIP-Yogyakarta has a Rector and three Vice-Rectors in charge of academic affairs, general administration, and student affairs respectively (shown in the Figure 2-4-1-4). In the central management office, there are 212 staff members working in the Bureau of General Administration, and that of Academic and Student Affairs. In terms of the number of staff members working, IKIP-Yogyakarta is not so large as the other two organizations. In addition to the central management office, IKIP-Yogyakarta has a library, a project staff office, a technical section, a research center, and a community service center. Also, same as the case of IKIP-Bandung, there are six faculties including the Faculty of Science and Mathematics Education (FPMIPA) and the Faculty of Education (FIP).

Figure 2-4-1-4 Organization chart of IKIP Yogyakarta

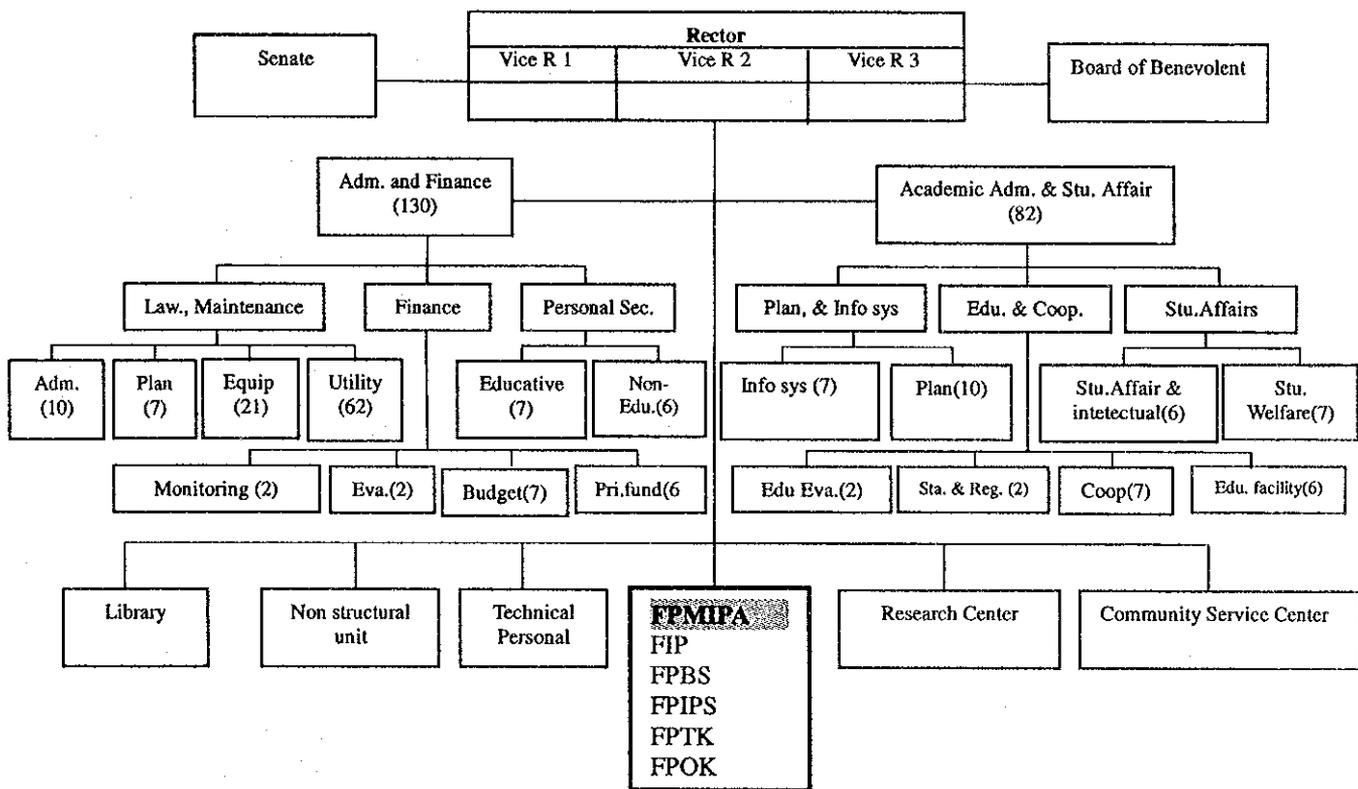


Figure 2-4-1-5 and Figure 2-4-1-6 is the current and projected organization structure for IKIP-FPMIPA Yogyakarta respectively. Although the structure of organization is very much similar to that of IKIP-Bandung, there are particular features like, that each department has clearly separated pure-science program and teacher-education program, and that a relatively large number of personnel are working in the

academic section. These features seem to reflect the fact that IKIP-Yogyakarta eagerly pursues to acquire the “university” status.

The management structure, however, is not well established compared to the other two FPMIPA. Thus IKIP-FPMIPA Yogyakarta needs to make every effort to establish the complete management structure with the help of JICA specialists.

Figure 2-4-1-5 Organization Chart of IKIP-FPMIPA Yogyakarta (before Project)

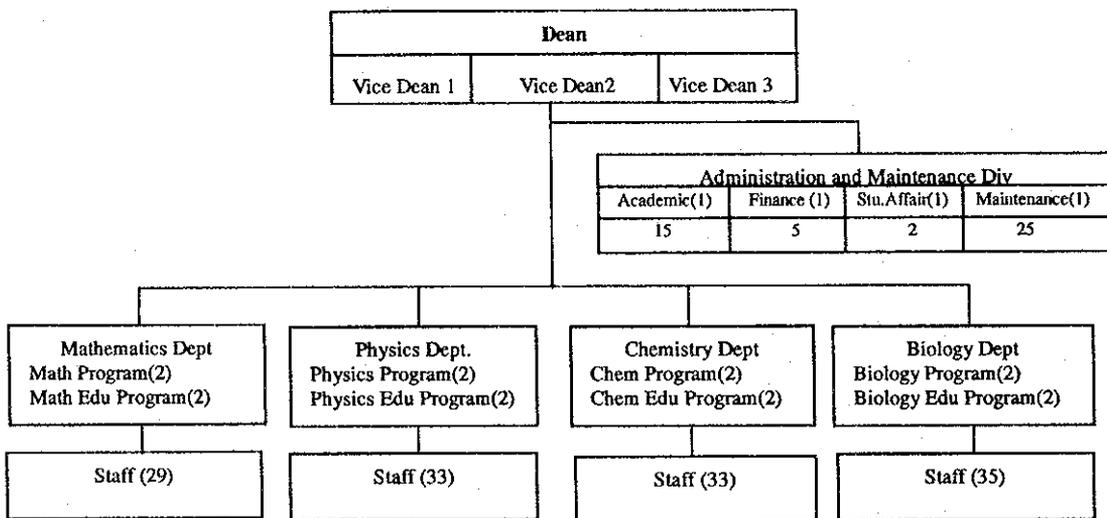
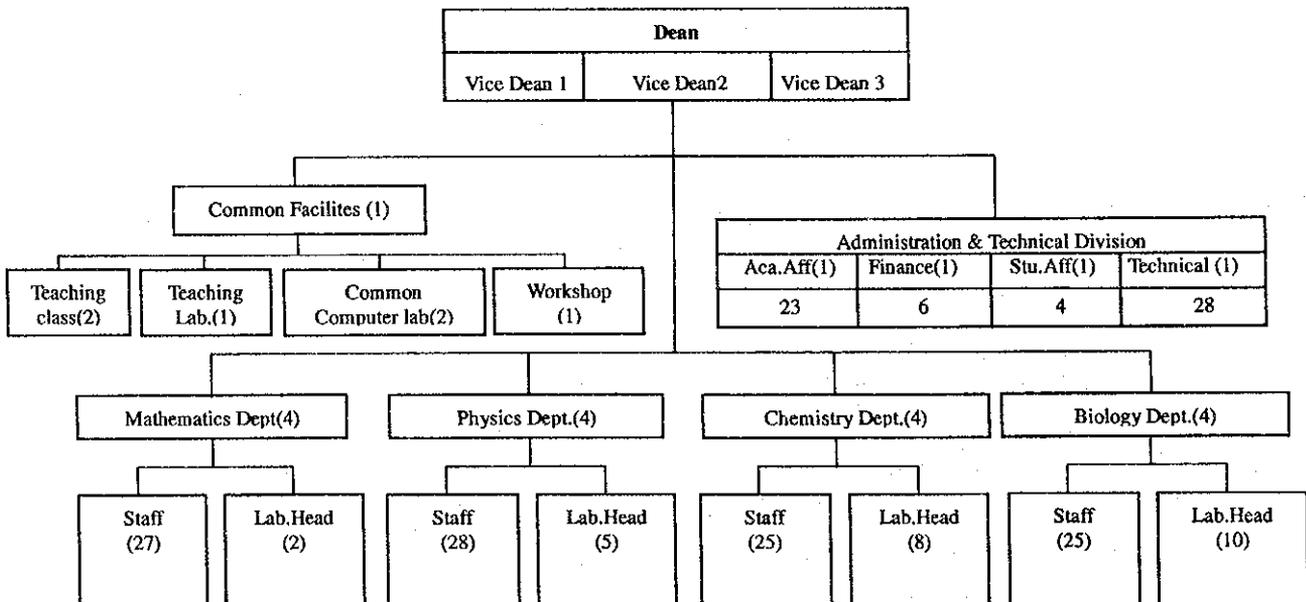


Figure 2-4-1-6 Organization Chart of IKIP-FPMIPA Yogyakarta (after Project)



## 2) Education Program

The programs that IKIP-FPMIPA Yogyakarta is now offering are pre-service and in-service teacher education programs, and pure-science program. Regarding the in-service teacher education program, there are regular programs ordered by MOEC and irregular programs asked by the Ministry of Health, and the Ministry of Agriculture. Since most of the in-service training programs here have been financed through the PGSM project which has been decided to reduce the scheduled loan amount, FPMIPA will be possibly required to look for another sources to finance the in-service training program.

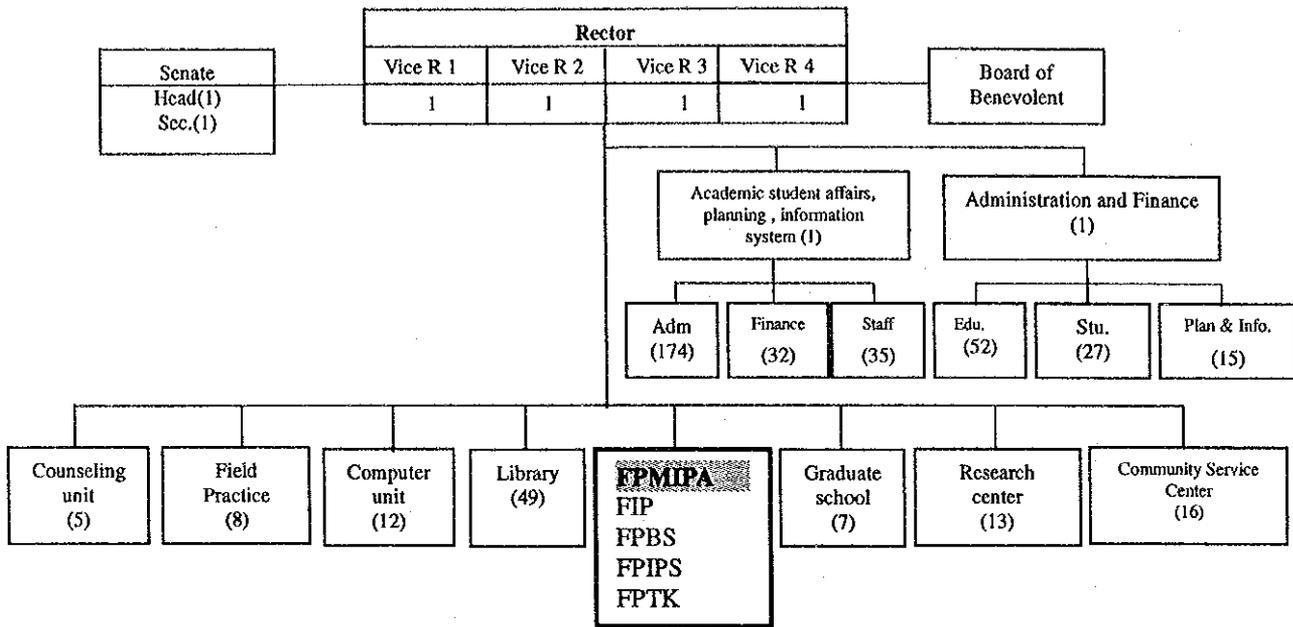
Although the graduates from the pure-science program cannot acquire teacher certificate, it is possible for them to get teacher certificate by studying one more year in the teacher education program after graduation from the pure-science program. In this case, however, students have to pay tuition by themselves. Accordingly, there is not much possibility of large demand for this kind of program due to the current low status of teachers. It is worried that even though students graduate from IKIP, they are not qualified as secondary teachers.

## IKIP-Malang

### 1) Management System

IKIP-Malang has a Rector, and four Vice-Rectors who are in charge of academic affairs, administration and finance, student affairs, and cooperation with other institution respectively. In the central administration office, there are 242 staff members working in the Bureau of Academic, Student Affair, Planning, Information System, and 95 staff members working in the Bureau of Administration and Finance (shown in the Figure 2-4-1-7). In addition to the central management office, there are a library, a graduate school, a research center, a community service center. Although IKIP-Malang has a graduate school, there is no particular staff for graduate school except seven administration staff. Thus teachers of each faculty come to the graduate school and teach each subject. As to the faculties, IKIP-Malang has five Faculties, namely, Education, science and Mathematics Teacher Education, Social Studies Teacher Education, Humanity and Art Teacher Education, and Vocational and Technical Teacher Education. Among them, Faculty of Education is in charge of providing basic education courses such as education psychology. Therefore students of FPMIPA go to FIP and take basic education classes.

Figure 2-4-1-7 Organization Chart of IKIP Malang



IKIP-FPMIPA Yogyakarta has a dean, and three vice dean in charge of academic affairs, administration and finance, and student affairs respectively. In FPMIPA management office, there are 18 staff members working in the four sections, Academic Affair, Finance, Facility, and Student Affairs. In addition, there is a workshop in charge of doing small maintenance and making education materials. So far, the head of workshop has direct responsibility to the Dean of FPMIPA. Similar to the other institutions, FPMIPA here also is offering pre-service and in-service teacher education programs, and pure-science programs.

Figure 2-4-1-8 Organization Chart of IKIP-FPMIPA Malang (before Project)

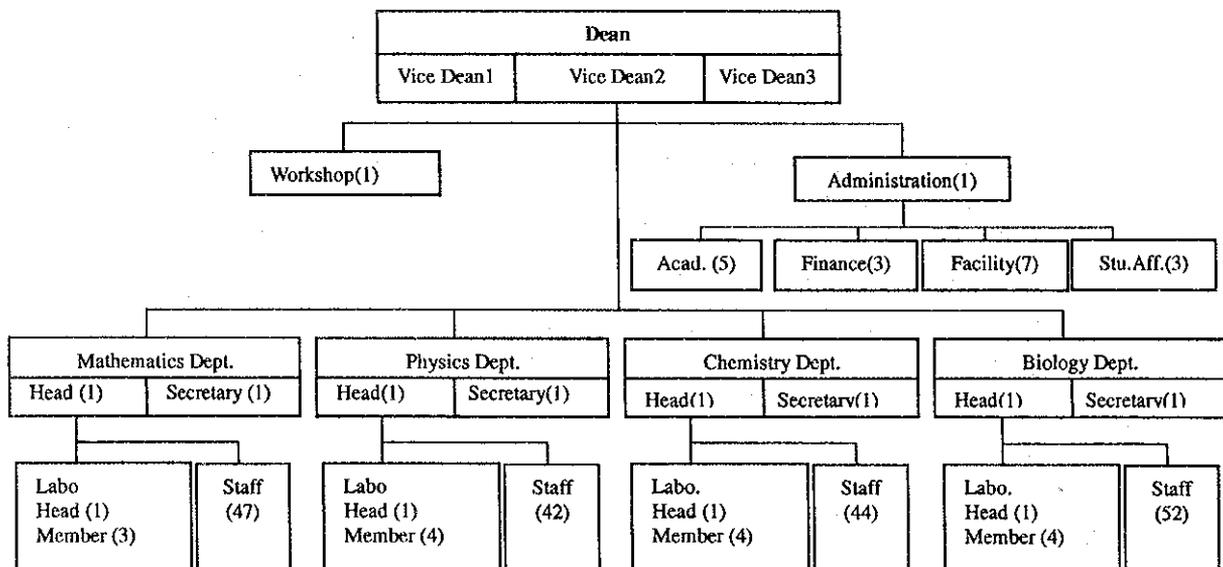
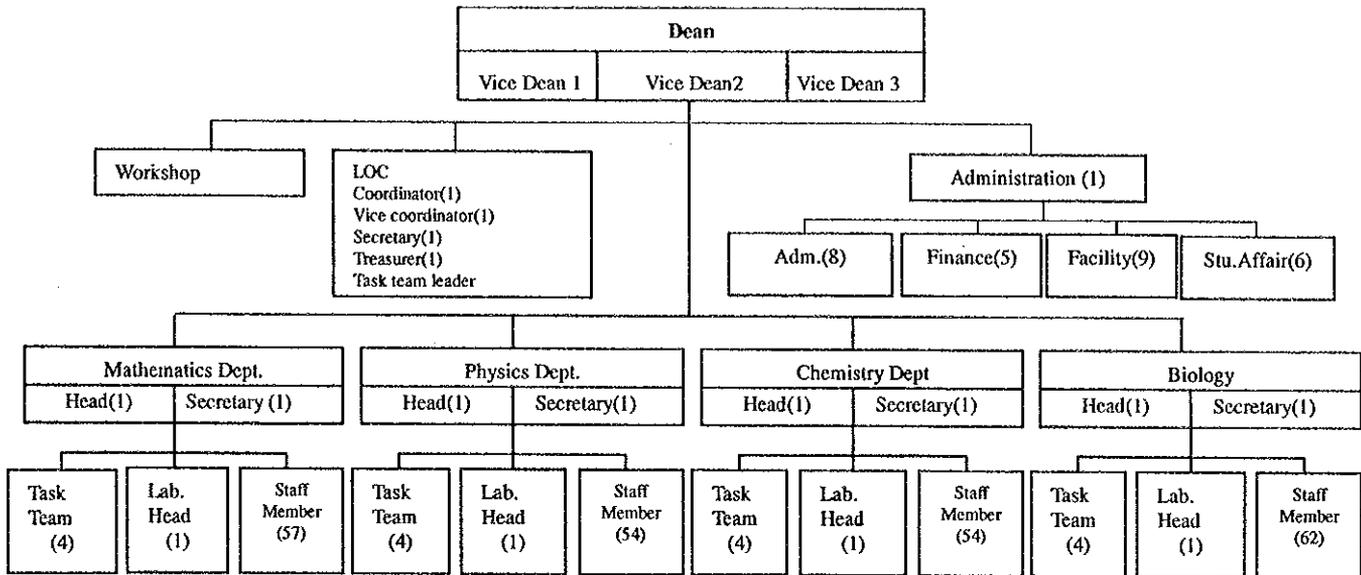


Figure 2-3-1-9 Organization Chart of IKIP-FPMIPA Malang (after Project)



## 2) Education Program

IKIP-FPMIPA Malang has been accepting students majoring pure-science program in every department since 1997, as intended by the national policy of increasing science-major graduates. So far, the ratio of the number of students between teacher education program and pure-science program has been 1:1. FPMIPA, however, plans to increase the number of student majoring pure-science up to the point that the above ratio reaches to 1:3. According to such plan, characteristics of FPMIPA will be alternated significantly.

Regarding the curriculum, the national curriculum has been used in both programs. Among the required number of credits, about 20 credits are so-called local content credits, i.e., learning contents of these credits can be decided locally. Since almost the same subjects have been offered to first-year and second-year students of both programs, the classrooms and laboratories have been shared by the students of both of the teacher education program and the pure-science program. Currently the curriculum of FPMIPA has been reviewed and will be revised by the committee of specialists appointed by the PGSM project.

Similar to the cases of other FPMIPA, IKIP-FPMIPA Malang has a problem that many students need to study five or six years until graduation. The FPMIPA staff finds several reasons for that, such as: ① quality of admitted students are relatively low; ② course schedules are usually very tight; ③ shortage of teaching staff because of temporary absence due to studying elsewhere in order to upgrade their academic qualification. Based on these problem analysis, FPMIPA tries to improve its internal efficiency through taking the following steps, such as: ① admitting capable students directly from high school without taking national examination; ② offering courses in a summer vacation time so that students can take the failed courses again rather easily; ③ improving the teaching practice methods.

## 2-4-2 Finance

The budget for each IKIP is decided as follows. First of all, each faculty makes its own budget plan and submits it to the headquarters of IKIP for overall review. Then, each IKIP submits budget plan to MOEC for further review, after that MOEC submits budget plan to BAPPENAS for final approval. The actual fund is sent to each IKIP directly through BAPPENAS. Accordingly, each IKIP can decide the use of the available fund within the broad categories. DGHE, however, has the authority to ask each IKIP to submit financial documents and the result of auditing. In this way, DGHE supervise the financial management of each IKIP.

National budget for each IKIP has two broad categories, development budget and routine budget. Other than these national budget, tuition fees occupies significant portion of the total revenue. Since the amount of the each higher education institution's tuition fee should be sanctioned by MOEC, it is very difficult for each IKIP to raise the amount of tuition fees frequently. Therefore, each IKIP has to cope with financial shortage through its own efforts such as increasing the classes for in-service training, and/or collecting extra fees from students.

### IKIP-Bandung

The total amount of budget for the fiscal year 1998 is about 40,600 million rupiah, 79 % from national budget and the rest from other sources such as tuition fees (see Figure 2-4-2-1). As to the expenditure, 48 % will be spent as a salary for teachers and staff, 24 % will be spent as an operation cost, and 20 % will be spent as a project cost. In contrast to the above categories of expenditure, the planned budget for maintenance and repair is only 1.72 % of total budget.

For the projected cost for operation and maintenance incurred by the implementation of the Grant Aid, IKIP-FPMIPA Bandung plans to collect the necessary revenue through the following ways.

- 1) Increment of the allocation from government fund
- 2) Introducing extra fees (250,000 rupiah) to each student besides tuition fees
- 3) Increase of the in-service training class for IKIP teachers and technical staff
- 4) Introducing commission fees through the extra activities by the teachers

Figure 2-4-2-IKIP Bandung Revenue and Expenditure

(1,000 Rp.)

		Past record				Future plan		
		1995/1996	1996/1997	1997/1998	1998/1999	1999/2000	2000/2001	2001/2002
<b>Revenue</b>								
1. Government fund	Rp	22,510,117	24,729,599	28,359,318	32,064,707	36,874,413	42,405,576	48,766,412
	%	82.24	79.39	74.36	79.04	79.04	79.04	79.04
2. Student fee	Rp	4,861,753	6,421,092	9,779,062	8,503,186	9,778,186	11,245,463	12,932,283
	%	17.76	20.61	25.64	20.96	20.96	20.96	20.96
3. Consulting service & Other Income	Rp	—	—	—	—	—	—	—
	%	—	—	—	—	—	—	—
Total	Rp	27,371,870	31,150,691	38,138,380	40,567,893	46,653,893	53,651,039	61,698,695
	%	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Increase rate	%		14.00	22.00	6.00	15.00	15.00	15.00
<b>Expenditure</b>								
1. Salaries & Welfare	Rp	14,391,621	15,682,411	17,521,943	19,417,706	22,330,361	25,679,916	29,531,903
	%	52.58	50.24	45.94	47.86	47.86	47.86	47.86
2. Staff development	Rp	1,457,000	1,620,000	1,822,420	2,271,538	2,612,268	3,004,109	2,454,725
	%	5.32	5.20	4.78	5.60	5.60	5.60	5.60
3. Cost for projects	Rp	4,549,975	5,994,996	1,562,168	8,329,062	9,578,421	11,015,184	12,667,462
	%	16.62	19.25	11.96	20.53	20.53	20.53	20.53
4. Maintenance	Rp	1,640,043	1,175,000	525,000	698,100	802,815	923,237	1,061,722
	%	5.99	3.77	1.38	1.72	1.72	1.72	1.72
5. Operation	Rp	5,015,027	6,547,712	13,500,141	9,851,487	11,329,210	13,028,592	14,982,881
	%	18.32	21.02	35.40	24.28	24.28	24.28	24.28
6. Residual Funds	Rp	318,202	130,571	206,706	—	—	—	—
	%	1.16	0.42	0.54	—	—	—	—
Total	Rp	27,371,870	31,150,691	38,138,380	40,567,893	46,653,077	53,651,039	61,698,695
	%	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Data provided by IKIP Bandung, 1998

Figure 2-4-2-2 IKIP-FPMIPA Bandung Revenue and Expenditure

(1,000Rp.)

		実績ベース				将来計画				
		1995/1996	1996/1997	1997/1998	1998/1999	1999/2000	2000/2001	2001/2002	2001/2003	2001/2004
1. Government fund	Rp	1,784,421	2,027,809	2,235,427	2,792,517	3,748,628	4,311,178	5,092,017	5,633,446	6,307,977
	%	82.2	79.4	74.4	79.0	79.0	79.0	79.0	76.0	74.0
2. Student fee	Rp	386,408	526,107	769,179	742,315	996,471	1,146,009	1,353,574	1,556,610	1,790,102
	%	17.8	20.6	25.6	21.0	21.0	21.0	21.0	21.0	21.0
3. Consulting service & Other Income	Rp	0	0	0	0	0	0	0	222,373	426,215
	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	5.0
Total	Rp	2,170,829	2,553,916	3,004,606	3,534,832	4,745,099	5,457,187	6,445,591	7,412,429	8,524,294
	%	100	100	100	100	100	100	100	100	100
Increase rate	%		18.00	18.00	18.00	34.00	15.00	18.00	15.00	15.00
1. Salaries & Welfare	Rp	1,306,839	1,537,457	1,808,773	2,126,894	3,126,251	3,595,166	4,132,830	4,754,636	5,467,832
	%	60.2	60.2	60.6	59.0	65.9	65.9	64.1	64.1	64.1
2. Staff development	Rp	212,741	250,284	279,428	60,092	66,431	76,401	90,238	103,774	119,340
	%	9.8	9.8	9.4	1.7	1.4	1.4	1.4	1.4	1.4
3. Maintenance	Rp	130,250	153,235	160,276	283,158	325,632	374,477	430,649	495,246	569,532
	%	6.0	6.0	5.4	7.9	6.9	6.9	6.7	6.7	6.7
4. Operation	Rp	520,999	612,940	736,128	1,134,681	1,243,216	1,407,954	1,791,874	2,060,655	2,369,754
	%	24.0	24.0	24.7	31.5	26.2	25.8	27.8	27.8	27.8
Total	Rp	2,170,829	2,553,916	2,984,606	3,604,826	4,745,099	5,457,187	6,445,591	7,412,429	8,524,294
	%	100	100	100	100	100	100	100	100	100

Data provided by IKIP Bandung, 1998



Among above strategies, DGHE has mentioned that the increment of the allocation for national budget may be very difficult because of the expected financial squeeze though, IKIP shows the high expectation from the central government. Since assuring the sufficient budget is one of the imperative conditions for the success of the Grant Aid, more frequent exchange of information and thought between DGHE and IKIP should be done as soon as possible.

Other than the problem mentioned above, however, IKIP-Bandung plans to take special financial arrangement within the IKIP budgeting plan, which will be sufficient for the implementation of the Grant Aid.

The budget of IKIP-FPMIPA Bandung is shown in Figure 2-4-2-2. FPMIPA plans to annually expand its budget with 15%. The cost for staff development is partly cut, and Maintenance and Operation costs are to be increased and kept 7% and 28% respectably. Since annual budgetary increase rate of IKIP Bandung is set at 15% after 1998, the same increase rate seems reasonable for FPMIPA budgetary expansion.

#### IKIP-Yogyakarta

The total amount of budget for the fiscal year 1998 is about 35,700 million rupiah, 79 % from national budget and the rest from other sources such as tuition fees (see Figure 2-4-2-3). As to the expenditure, 40 % will be spent as a salary for teachers and staff, 32 % will be spent as an operation cost and facility construction cost. In contrast to the above categories of expenditure, the planned budget for maintenance and repair is only 5 % of total budget. According to the budget plan submitted by IKIP-Yogyakarta, the amount of the allocation from the national budget is projected to increase about 2.6 times until 2001. Taking account of the current economic situations of Indonesia, however, this projection seems to be very optimistic, and will be required to revise sooner or later.

Regarding the budget for FPMIPA, project funds which may be used for the purpose of facility construction has been allocated from the IKIP budget since 1997, the amount of the budget has been increased significantly. The planned budget of IKIP-FPMIPA Yogyakarta(Figure 2-4-2-4) is shown in the next page. The budget is planned to annually increase at 25%. Although until 1998 IKIP-FPMIPA Yogyakarta has spent less than 1 % for the maintenance purpose, which seems utterly insufficient amount, it plans to allocate close to 3 % of the budget for the maintenance purpose since 1999. In addition, 5.7% is allocated into the operation cost.

Figure 2-4-2-3 IKIP Yogyakarta Revenue and Expenditure

(1,000 Rp.)

		Past Record				Future Plan		
		1995/1996	1996/1997	1997/1998	1998/1999	1999/2000	2000/2001	2001/2002
<b>Revenue</b>								
1. Government fund	Rp	15,965,932	17,906,307	21,868,326	28,044,749	44,298,646	58,816,422	72,528,113
	%	72.11	72.86	76.97	78.55	84.50	86.43	89.88
2. Student fee	Rp	3,746,811	3,967,218	3,395,622	4,115,598	4,498,910	5,001,451	5,531,592
	%	16.92	16.14	11.95	11.52	8.58	7.35	6.70
3. Consulting service & Other Income	Rp	2,427,273	2,699,854	3,143,856	3,542,435	3,625,742	4,225,271	4,464,756
	%	10.96	10.98	11.06	9.92	6.91	6.20	5.41
Total	Rp	22,140,016	24,573,379	28,407,804	35,702,782	52,423,298	68,043,144	82,524,461
	%	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Increase rate	%		11.00	16.00	26.00	47.00	30.00	21.00
<b>Expenditure</b>								
1. Salaries & Welfare	Rp	10,911,546	11,247,000	12,329,831	14,308,557	15,539,002	19,848,888	24,992,314
	%	49.28	45.76	42.40	40.07	29.64	29.17	30.28
2. Staff development	Rp	572,946	949,601	1,330,852	2,135,651	4,874,503	10,848,888	11,963,238
	%	2.58	3.86	4.68	5.98	9.29	15.95	14.49
3. Maintenance	Rp	430,061	1,702,106	1,845,578	1,849,382	2,733,864	5,175,592	6,537,692
	%	1.94	6.92	6.49	5.17	5.21	7.60	7.32
4. Operation	Rp	913,285	901,368	1,019,353	1,172,566	2,400,679	2,749,090	3,274,523
	%	41.25	36.68	35.88	32.83	45.99	40.40	39.67
5. Residual Funds	Rp	1,092,606	1,660,989	2,708,007	5,686,626	5,269,137	4,671,198	6,285,694
	%	4.93	6.75	9.53	15.92	10.05	6.86	7.61
Total	Rp	22,140,016	24,573,379	28,407,804	35,702,782	52,423,298	68,043,198	82,524,461
	%	100.00	100.00	100.00	100.00	100.00	100.00	100.00

\*Ordinary goods, equipment, Cost for practice material

Data provided by IKIP Yogyakarta, 1998

Figure 2-4-2-4 IKIP-FPMIPA Yogyakarta Revenue and Expenditure

(1,000Rp)

		Past Record			Future Plan			
		1995/1996	1996/1997	1997/1998	1998/1999	1999/2000	2000/2001	2001/2002
<b>Revenue</b>								
1. Government fund	Rp	1,365,821	1,586,655	1,510,233	1,600,000	1,700,000	2,550,000	2,550,000
	%	90	91.3	55.8	56	48.6	48.6	48.6
2. Student fee	Rp	93,537	102,509	152,597	160,000	300,000	450,000	450,000
	%	6.2	5.9	5.6	5.6	8.5	8.5	8.5
3. Consulting service & Other Income	Rp	57,806	49,583	1,045,508	1,100,000	1,500,000	2,250,000	2,250,000
	%	3.8	2.8	38.6	38.4	42.9	42.9	42.9
Total	Rp	1,517,166	1,738,747	2,708,338	2,860,000	3,500,000	5,250,000	5,250,000
	%	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Increase rate	%		15.00	56.00	6.00	22.00	50.00	0.00
<b>Expenditure</b>								
1. Salaries & Welfare	Rp	1,334,032	1,540,435	1,496,953	1,500,000	1,900,000	2,850,000	2,850,000
	%	87.9	88.6	55.3	52.5	54.3	54.3	54.3
2. Staff development	Rp	31114	43809	46279	50000	100000	150000	150000
	%	2.1	2.5	1.70	1.7	2.85	2.85	2.85
3. Maintenance	Rp	10,000	15,000	15,000	20,000	100,000	150,000	150,000
	%	0.6	0.9	0.60	0.7	2.85		
4. Operation	Rp	142,017	139,503	151,856	160,000	200,000	300,000	300,000
	%	9.4	8	5.6	5.6	5.7	5.7	5.7
5. Others	Rp	—	—	998,250	1,130,000	1,200,000	1,800,000	1,800,000
	%	—	—	36.8	39.5	34.3	34.3	34.3
Total	Rp	1,517,162	1,738,747	2,708,338	2,860,000	2,500,000	5,250,000	5,250,000
	%	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Data provided by IKIP Yogyakarta, 1998

For the projected cost for operation and maintenance incurred by the implementation of the Grant Aid, IKIP-FPMIPA Yogyakarta plans to collect the necessary revenue through the following ways.

- 1) Increment of the allocation from national budget.
- 2) Introducing extra fees (170,000 rupiah) to each student besides tuition fees.
- 3) Introducing an in-service training class for the teachers of the religious school.
- 4) Introducing commission fees through the extra activities by the teachers.

Among these strategies, first one has the same problem as the case of IKIP-Bandung. Besides this, there are other financial problems. One is that most of the in-service training classes conducted by IKIP-Yogyakarta have been financed through PGSM project. PGSM project, however, is decided to scale down significantly, IKIP-Yogyakarta may be forced to scale down its in-service training program. Another one is that IKIP-Yogyakarta has to contribute all of the necessary cost for the construction of the chemistry department building. Accordingly, financial condition of IKIP-Yogyakarta should be closely checked.

#### IKIP-Malang

As seen in the Figure 2-4-2-5, most of its revenue have come from the national budget and, in contrast, revenue from tuition fees has occupied only about 2%. On the other hand, 95 % of the expenditure has been spent in the categories of salary and operation. Since IKIP is the higher education institution particularly aiming for teacher training, it is very difficult for IKIP to find a way to raise own fund through the operation of so called "production unit" as many polytechnics doing. Even though taking into accounts of this difficulty, current economic difficulty has forced IKIP to desperately look for innovative way to raise fund.

About half of the revenue of the budget of FPMIPA for the fiscal year 1998 comes from national budget, and other half comes from various sources such as contributions and allocation from the IKIP budget. The reason why the amount of budgetary allocation to FPMIPA (See Figure 2-4-2-5) has increased rather significantly since the fiscal year 1997 is that IKIP-Malang has begun to collect extra fees of 250,000 rupiah from newly admitted student since 1997. In fact, after this project, the budget is set to annually increase with 11%.

As to the expenditure, and 33 % of the budget is spent as a personnel cost and 65 % is spent as an operation cost. In contrast to these items, expenditure for maintenance purpose for facilities and equipment has been less than 1.0% until 1997 and will be raised up to 3%. Since maintenance for facility and equipment has been shared between FPMIPA and IKIP headquarters, it is very difficult to compare the sufficiency of the

Figure 2-4-2-3 IKIP Malang Revenue and Expenditure

(1,000Rp.)

		Past Record				Future Plan		
		1995/1996	1996/1997	1997/1998	1998/1999	1999/2000	2000/2001	2001/2002
<b>Revenue</b>								
1. Government fund	Rp	19,998,694	20,814,391	25,011,846	26,243,761	28,868,137	31,754,951	34,930,446
	%	94.72	88.05	79.03	84.57	83.91	83.38	82.84
2. Student fee	Rp	75,625	75,210	337,490	617,390	740,868	814,955,000	896,450
	%	0.36	0.31	1.07	1.99	2.15	2.14	2.12
3. Consulting service & Other Income	Rp	1,039,513	3,299,721	6,298,885	4,169,550	4,794,825	5,514,229	6,341,364
	%	4.92	13.64	19.90	12.44	13.94	14.48	15.04
Total	Rp	21,113,832	24,188,322	31,648,023	31,030,701	34,403,830	38,084,136	42,166,261
	%	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Increase rate	%		15.00	31.00	-2.00	11.00	11.00	11.00
<b>Expenditure</b>								
1. Salaries & Welfare	Rp	11,527,055	12,527,578	14,246,757	14,675,207	16,142,728	17,757,001	19,532,701
	%	54.60	51.79	45.02	47.29	46.92	46.63	46.32
2. Staff development	Rp	774,040	291,261	1,191,021	582,300	1,100,000	1,320,000	1,548,000
	%	3.66	1.21	3.76	1.88	3.20	2.47	3.76
3. Maintenance	Rp	226,595	354,058	326,562	328,791	382,149	470,579	564,695
	%	1.07	1.46	1.03	1.05	1.14	1.23	12.4
4. Operation	Rp	8,586,140	11,015,426	15,883,682	15,446,402	16,768,952	18,536,555	20,498,864
	%	40.67	45.54	50.19	49.78	48.74	49.67	49.58
5. Residual Funds	Rp	--	--	--	--	--	--	--
	%	--	--	--	--	--	--	--
Total	Rp	21,113,832	24,188,322	31,648,023	31,030,701	34,403,830	38,084,136	42,168,261
	%	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Data provided by IKIP Malang, 1998

Figure FPMIPA IKIP Malang Revenue and Expenditure

(1,000Rp.)

		Past Record				Future Plan		
		1995/1996	1996/1997	1997/1998	1998/1999	1999/2000	2000/2001	2001/2002
<b>Revenue</b>								
1. Government fund	Rp	4,359,099	3,013,941	2,349,671	3,556,203	4,036,290	4,581,190	5,199,650
	%	96.99	92.61	40.76	48.32	49.05	49.79	50.53
2. Student fee	Rp	89,539	94,000	181,500	187,527	213,781	243,710	277,830
	%	1.992	2.888	3.149	2.548	2.598	2.649	2.700
3. Consulting service & Other Income	Rp	45,836	146,620	3,233,010	3,616,421	3,978,063	4,375,889	4,813,456
	%	1.02	4.51	56.09	49.14	48.35	47.56	46.77
Total	Rp	4,494,474	3,254,561	5,764,181	7,360,151	8,228,134	9,200,789	10,290,936
	%	100	100	100	100	100	100	100
Increase rate	%		-27.59	77.11	27.69	11.79	11.82	11.85
<b>Expenditure</b>								
1. Salaries & Welfare	Rp	1,629,082	1,829,395	2,009,028	2,345,964	2,580,560	3,096,672	4,025,674
	%	36.25	56.21	34.85	31.87	31.36	33.66	39.12
2. Staff development	Rp	24,530	20,000	779,171	12,750	698,018	837,621	980,907
	%	0.55	0.61	13.52	0.17	8.48	9.10	9.53
3. Maintenance	Rp	6,700	6,000	6,530	64,292	264,500	290,950	320,045
	%	0.15	0.18	0.11	0.87	3.21	3.16	3.11
4. Operation	Rp	2,834,161	1,399,166	2,969,452	4,937,146	4,685,058	4,975,526	4,964,310
	%	63.06	42.99	51.52	67.08	56.94	54.08	48.24
5. Others	Rp							
	%							
Total	Rp	4,494,473	3,254,561	5,764,181	7,360,151	8,228,136	9,200,769	10,290,936
	%	100	100	100	100	100	100	100

Data provided by IKIP Malang, 1998

amount of budget with those of other IKIP. Nonetheless, implementation of the Grant Aid will require IKIP to allocate more resources for the maintenance purpose.

In order to cope with the projected cost for operation and maintenance incurred by the implementation of the Grant Aid, IKIP-FPMIPA Malang plans to collect the necessary revenue through the following ways.

- 1) Increment of the allocation from government fund.
- 2) Introducing extra fees (250,000 rupiah) to each student besides tuition fees.
- 3) Increment of revenue from user fees by other institutions due to the increase of joint research activities.

Among these strategies, first one has the same problem as the case of IKIP-Bandung and Yogyakarta. Besides, introduction of the extra fees of 250,000 rupiah may become an issue in the future, for all student including FPMIPA students has to pay this fees, though most of the students other than FPMIPA students does not take advantage of the project. FPMIPA staff answered this concern that IKIP headquarters and other faculties have agreed that most of the revenue from extra fees will be used for the implementation and operation of the FPMIPA related projects.

As shown, all three IKIP are contemplating the necessary strategies to raise fund within a limitation of the characteristics of the teacher training institution. In addition, it is expected that the implementation of this project may improve the education activities, and, as a result, may incur the revenue and improve the financial position of each IKIP. Particularly, considering the current financial position of Indonesia, this kind of positive financial effect will be helpful to each IKIP.

### 2-4-3 Personnel and Technical level

#### IKIP-Bandung

##### 1) Teaching Staff

In 1997, IKIP-FPMIPA Bandung has 197 teaching staff and the number of student per teacher is from 13 to 14. As to the male/female ratio, male teachers are 142 and female teachers are 55, thus female teachers occupies 28% of all teaching staff. This male/female disparity is particularly apparent when we see this in each department. For instance, in the physics department almost all of the teaching staff are male teachers, in contrast, however, 43 % of the teaching staff are female teachers in the biology department. So far this is not clear whether male domination within the physics department has close relationship with the shortage of physics teachers in the secondary schools. Still, it is necessary to pay continuous attention to this issue.

Regarding the academic qualification among teaching staff, there are 81 S1 holders, 99 S2 holders, and 17 S3 holders, thus 59 % of all teaching staff have S2 or above degree. Compared to the situation of other IKIP, however, the ratio of teaching staff having more than S2 degree among all staff is relatively small, which should be rectified because IKIP-Bandung is expected to take a leadership role among all higher education institutions with teacher education program. Teaching experience is concerned, however, 89 % of staff have teaching experience of more than 6 years, which should be one of the advantage of this institution such as a maturity of teaching practice.

FPMIPA now plans to increase the number of its teaching staff from current 197 to 220 until 2001 partly because of the implementation of the Grant Aid. Possible main sources for recruitment are Bandung Institute of Technology, and its own graduates. In addition to these new teachers, some of the incumbent teachers who are presently pursuing higher degree such as S2 or S3 in abroad or another domestic institutions would be returned to join the member of the full-time teaching staff. Therefore, the number of the teaching staff is considered to be sufficient to deal with even after the implementation of the project.

Figure 2-4-3-1 IKIP-FPMIPA Bandung Teaching staff and Experience

Sub.	Total	Sex		Qualification			Status			Experience (year)		
		M	F	S1	S2	S3	Ass.	Lec.	Pro.	0~5	6~10	11~15
Phy	43	37	6	23	18	2	18	24	1	6	12	9
Chem	51	34	17	16	29	6	19	31	1	5	13	12
Bio.	49	22	21	18	24	7	14	35	0	3	16	8
Math	54	43	11	24	28	2	18	34	2	7	15	13
Total	197	142	55	81	99	17	69	124	4	21	56	42

## 2) Administration Staff

IKIP-FPMIPA Bandung currently has 59 administration staff (including dean, vice dean, etc.). Among them, 44 are doing secretarial work, 12 (3 in each department) are in charge of maintenance and repair, 4 are guards and drivers. Although there are some staff with S1 degree, most of the staff have only high school certificate or below. In contrast, however, many staff has work experience of more than 11 years.

After implementation of the Grant Aid, FPMIPA plans to employ 22 new administration staff. Since the central government has taken a policy of not increasing public officer, however, FPMIPA would be forced to employ new staff at its own expense. Accordingly, new employees would have a status of contracted employee with FPMIPA, instead of a status of public servant. So far, new employees get training through the means of on-the-job training. This is because it is very difficult for FPMIPA to provide long-term training to its contracted workers.

## IKIP-Yogyakarta

### 1) Teaching Staff

In 1997, IKIP-FPMIPA Yogyakarta has 139 teaching staff and the number of student per teacher is 11.3. As to the male/female ratio, female teachers occupy about one-third of all teaching staff. Similar to the case of IKIP-FPMIPA Bandung, this male/female disparity is particularly apparent when we see the situation of physics department that almost all of the teaching staff are male teachers.

As to the academic qualification among teaching staff, about two third of all teaching staff have S2 or above degree which is sufficient as a academic qualification as a college teacher. Compared to the situation of other IKIP, the ratio of teaching staff having S2 or above degree among all teaching staff is higher. As long as teaching experience is concerned, however, a considerable number of teachers do not have teaching experience of many years. Therefore, they should be closely supervised by the senior teaching staff for the time being.

FPMIPA now plans to increase the number of its teaching staff from current 139 to 146 until 2001. Similar to the case of IKIP-Bandung, some of the incumbent teachers who are presently pursuing higher degree such as S2 or S3 in abroad or another domestic institutions would be returned to join the member of the full-time teaching staff along with the prospective new teachers. Therefore, the number of the teaching staff is considered to be sufficient to cope with even after the implementation of the project.

Figure 2-4-3-1 IKIP-FPMIPA Yogyakarta Teaching staff and Experience

Sub.	Total	Sex		Qualification			Status			Experience (year)		
		M	F	S1	S2	S3	Ass.	Lec.	Pro.	0~5	6~10	11~15
Phy	35	-	-	18	17		15	20		-	-	-
Chem	36	-	-	10	22	4	16	19	1	-	-	-
Bio.	36	-	-	7	27	2	10	25	1	-	-	-
Math	32	-	-	10	20	2	13	19		-	-	-
Total	139			45	86	8	54	83	2	-	-	-

## 2) Administration Staff

IKIP-FPMIPA Yogyakarta currently has 71 administration staff, such as clerical workers, accountants, maintenance and repair workers, guards, and drivers. Although all clerical workers have S1 degree, most of the other administration staff have only high school certificate or below, which requires FPMIPA to provide appropriate kinds of training to these staff.

After implementation of the Grant Aid, FPMIPA plans to employ 46 new administration staff. Because of the same reason mentioned in IKIP-FPMIPA Bandung, FPMIPA would be forced to employ new staff at its own expense. As a result, new employees would have a status of contracted employee with FPMIPA, instead of a status of public servant.

## IKIP-Malang

### 1) Teaching Staff

In 1997, IKIP-FPMIPA Malang has 199 teaching staff and the number of student per teacher is 10.5. As to the male/female ratio, female teachers are 57, which means that female teachers occupies about 29% of all teaching staff (see the Figure 2-4-3-3). Similar to the cases of previous two IKIP, almost all of the teaching staff are male teachers in the physics department. In contrast, however, almost half of the teaching staff is female teachers in the biology department.

As to the academic qualification, there are 72 S1 holders, 115 S2 holders, and 12 S3 holders, thus 62 % of all teaching staff have S2 or above degree. Therefore, similar



to the case of IKIP-Yogyakarta, academic qualification among teaching staff can be considered relatively high. Besides, about 44 % of the teaching staff have more than 16 years of teaching experience, which should be reflected in a maturity of the teaching practices.

FPMIPA now plans to increase the number of its teaching staff from current 199 to 227 until 2001. Since current teaching staff come from a variety of higher education institutions including overseas institutions, possible sources for recruitment are not limited to the particular schools. Also, like other IKIP, in addition to these new teachers, some of the incumbent teachers who are presently pursuing higher degree such as S2 or S3 in abroad or another domestic institutions would be returned to join the member of the full-time teaching staff. Therefore the number of the teaching staff is considered to be sufficient to cope with even after the implementation of the project.

Figure 2-4-3-1 IKIP-FPMIPA Malang Teaching staff and Experience

Sub.	Total	Sex		Qualification			Status			Experience (year)			
		M	F	S1	S2	S3	Ass.	Lec.	Pro.	0~5	6~10	11~15	15~
Phy	47	42	6	17	30	-	21	25	1	7	15	9	16
Chem	47	31	16	18	28	1	16	26	5	8	12	4	23
Bio.	55	30	25	16	36	3	19	32	4	6	1	7	31
Math	50	39	11	20	27	3	16	32	2	6	17	10	17
Total	199	142	57	71	121	7	72	115	12	27	55	30	87

## 2) Administration Staff

IKIP-FPMIPA Malang currently has 51 administration staff. Among them, 16 are doing secretarial work, 3 are accountants, 15 are in charge of maintenance and general work, 3 are guards and drivers, and so on. Although all of the secretarial workers have S1 degree, most of the other staff have only high school certificate or below. As to the working experience is concerned, although some staff has more than 16 years of working experience, some staff has little experience, which shows a trend of polarization among administration staff in terms of working experience.

After implementation of the Grant Aid, FPMIPA plans to employ 15 new administration staff. 8 will be doing a secretarial work and 2 will be in charge of financial matters. Similar to the cases of other IKIPs, new employees would have a status of contracted employee with FPMIPA, instead of a status of public servant.