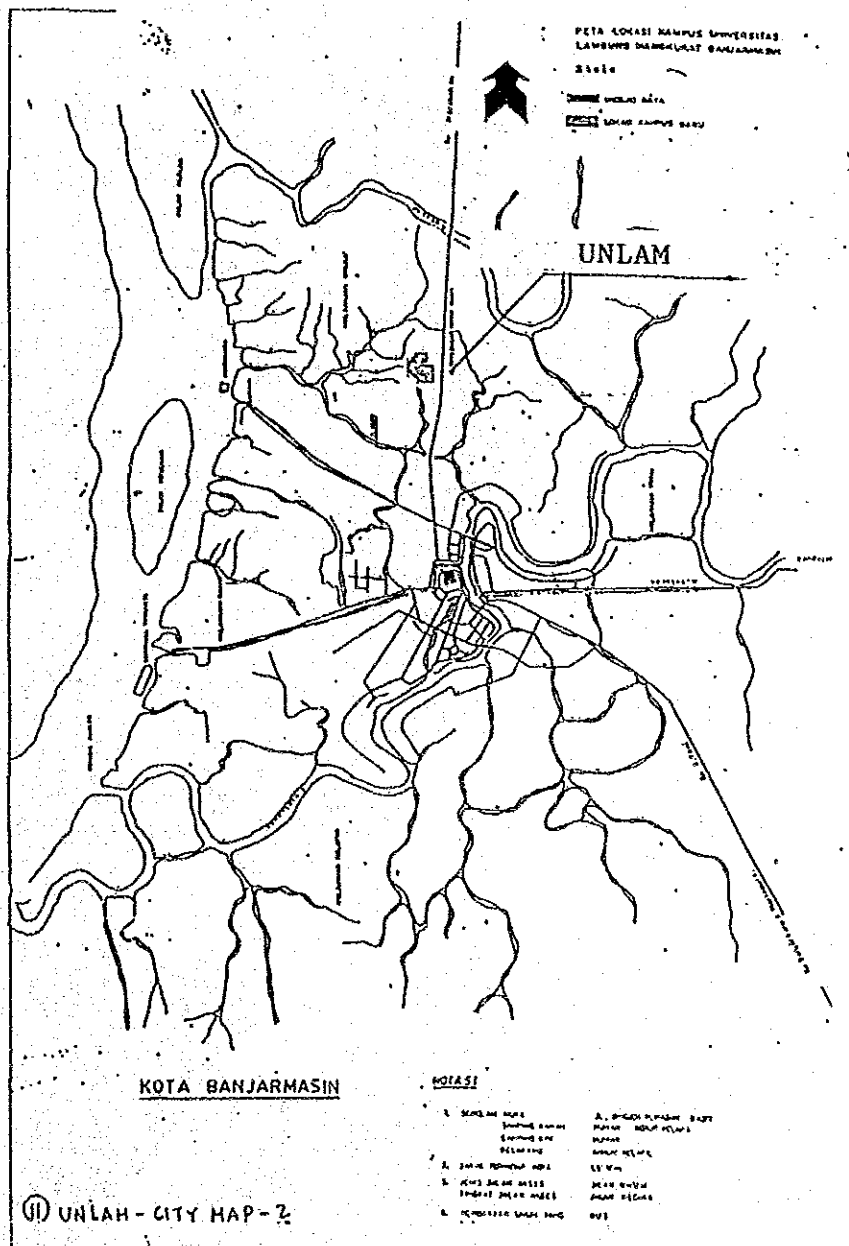
APPENDIX 5. LOCATION OF THE PROJECT SITE

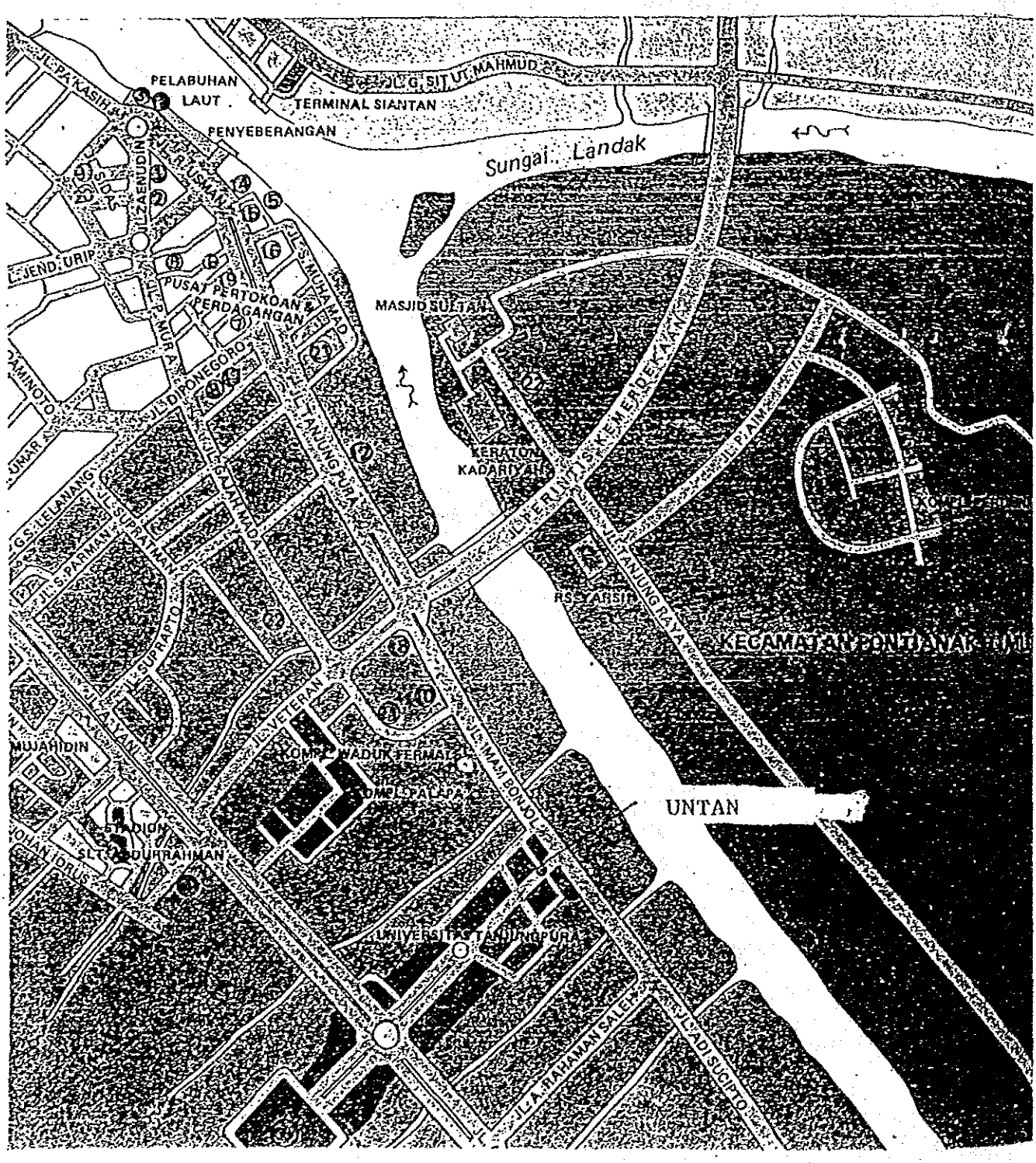
LOCATION OF THE PROJECT SITE

University of Lambung Mangkurat (Banjarmasin)



LOCATION OF THE PROJECT SITE

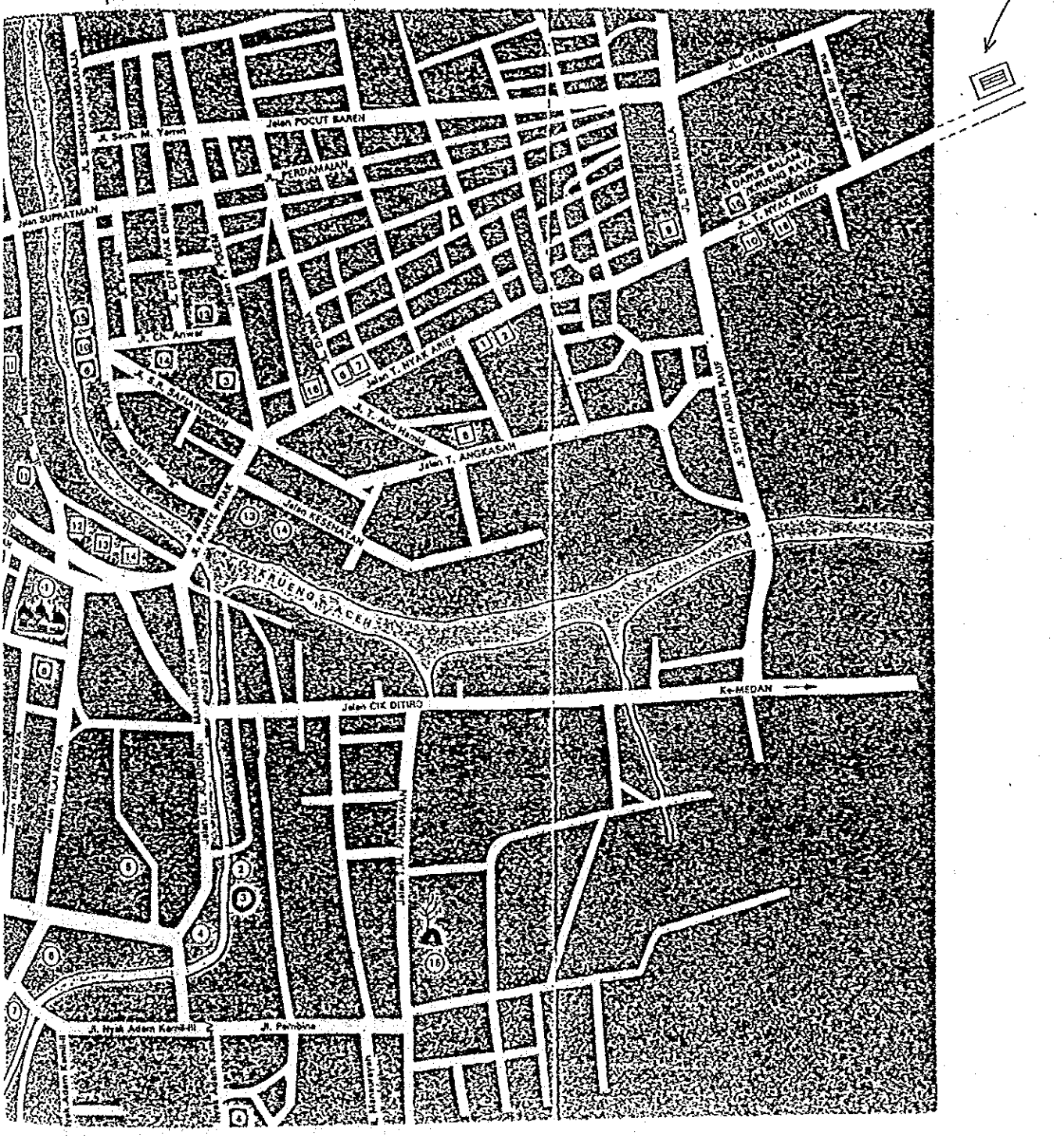
University of Tanjungpura (Pontianak)



LOCATION OF THE PROJECT SITE

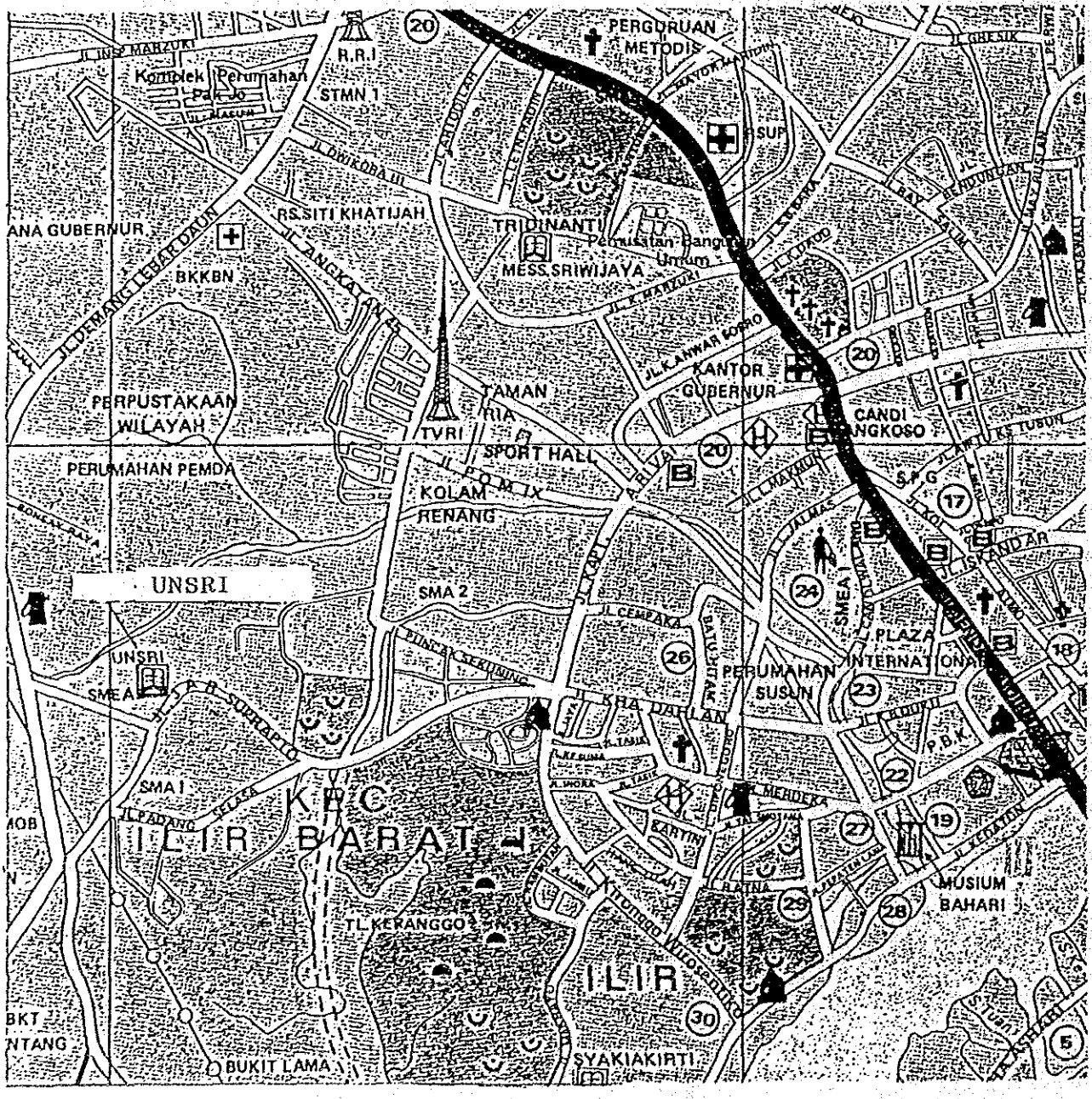
University of Syiah Kuala (Banda Aceh)

: UNSYIAH



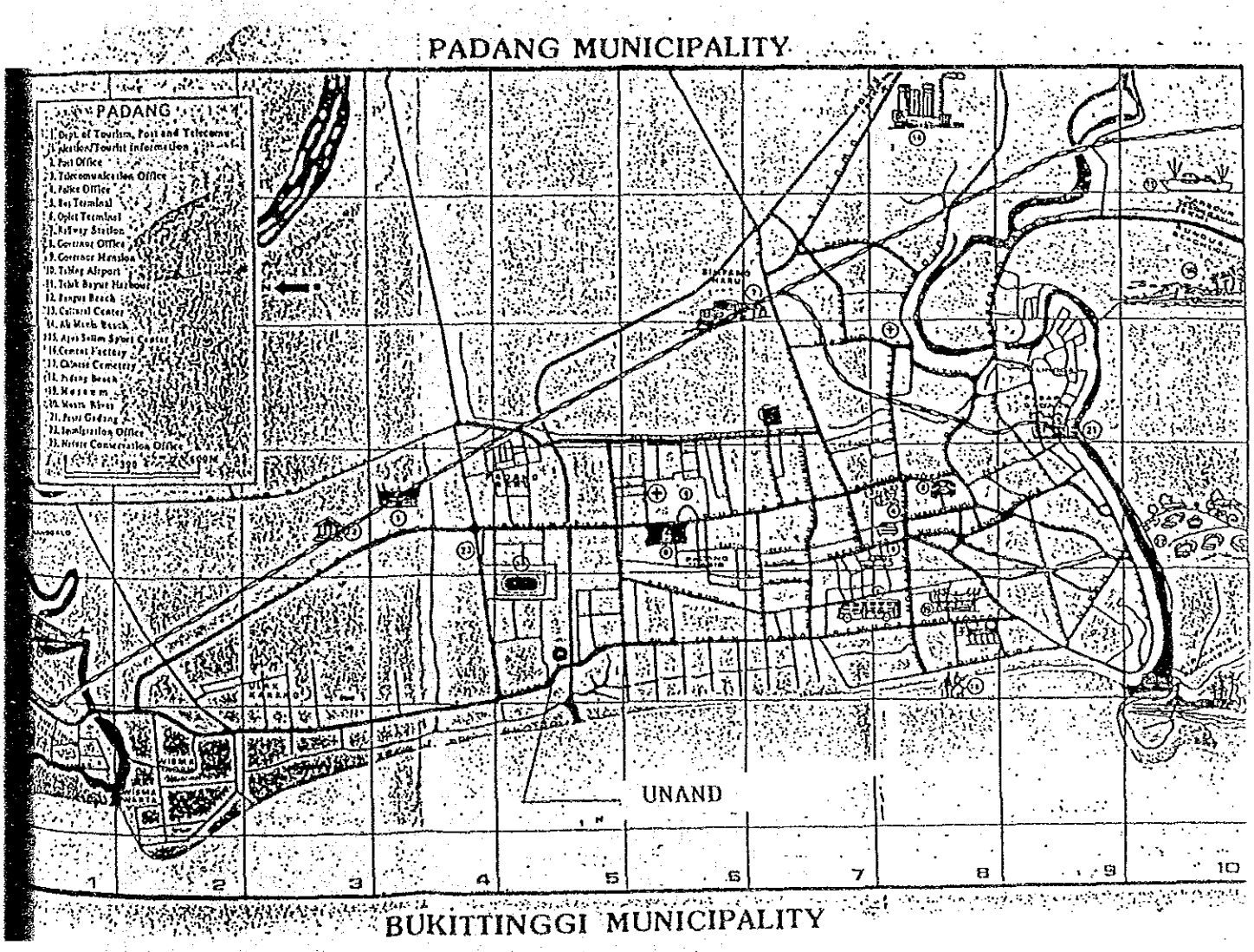
LOCATION OF THE PROJECT SITE

University of Sriwijaya (Palembang)

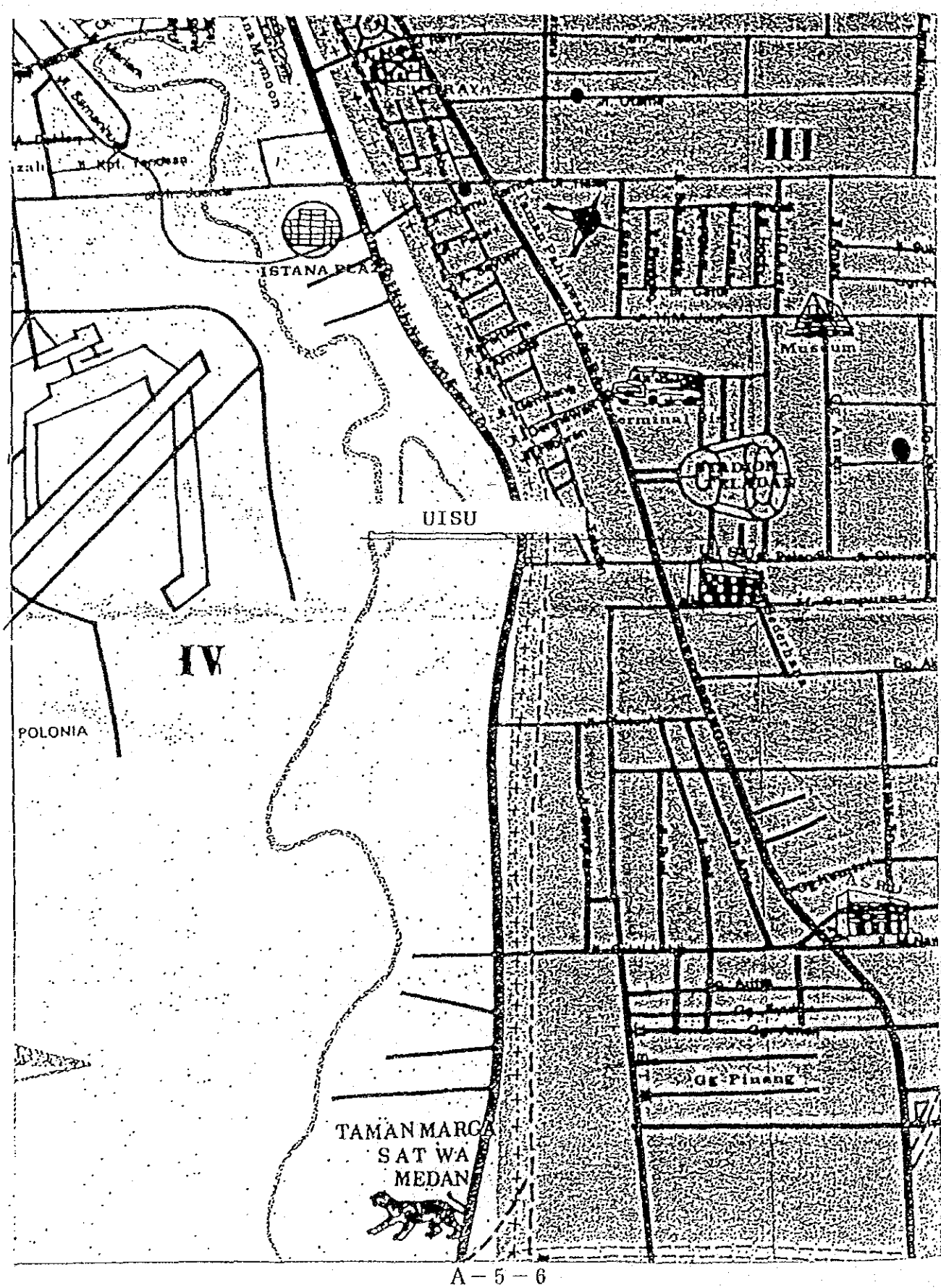


LOCATION OF THE PROJECT SITE

Andalas University (Padang)



The Islamic University of North Sumatera (Medan)



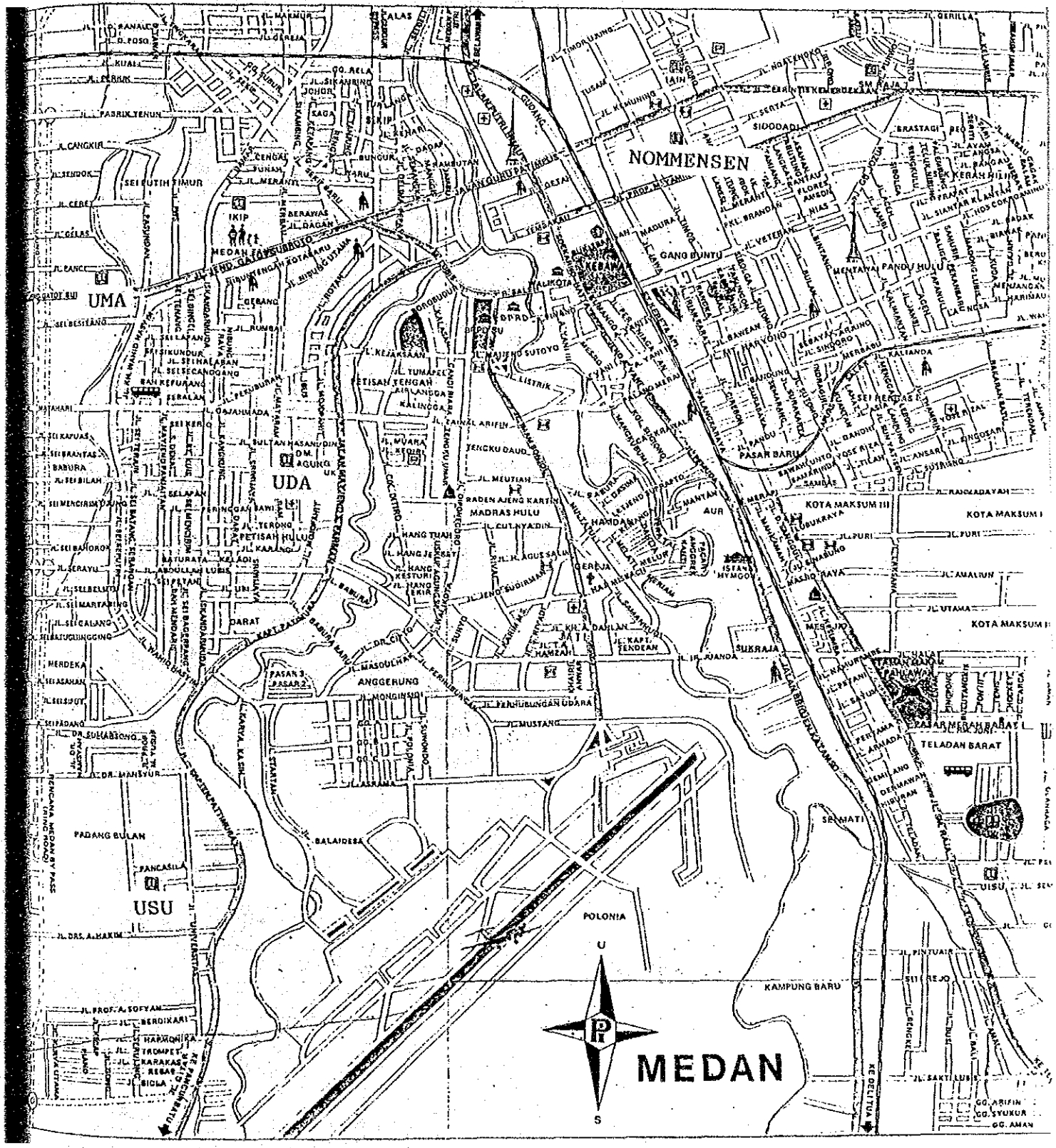
LOCATION OF THE PROJECT SITE

University of Medan Area (Medan)

Nommensen University (Medan)

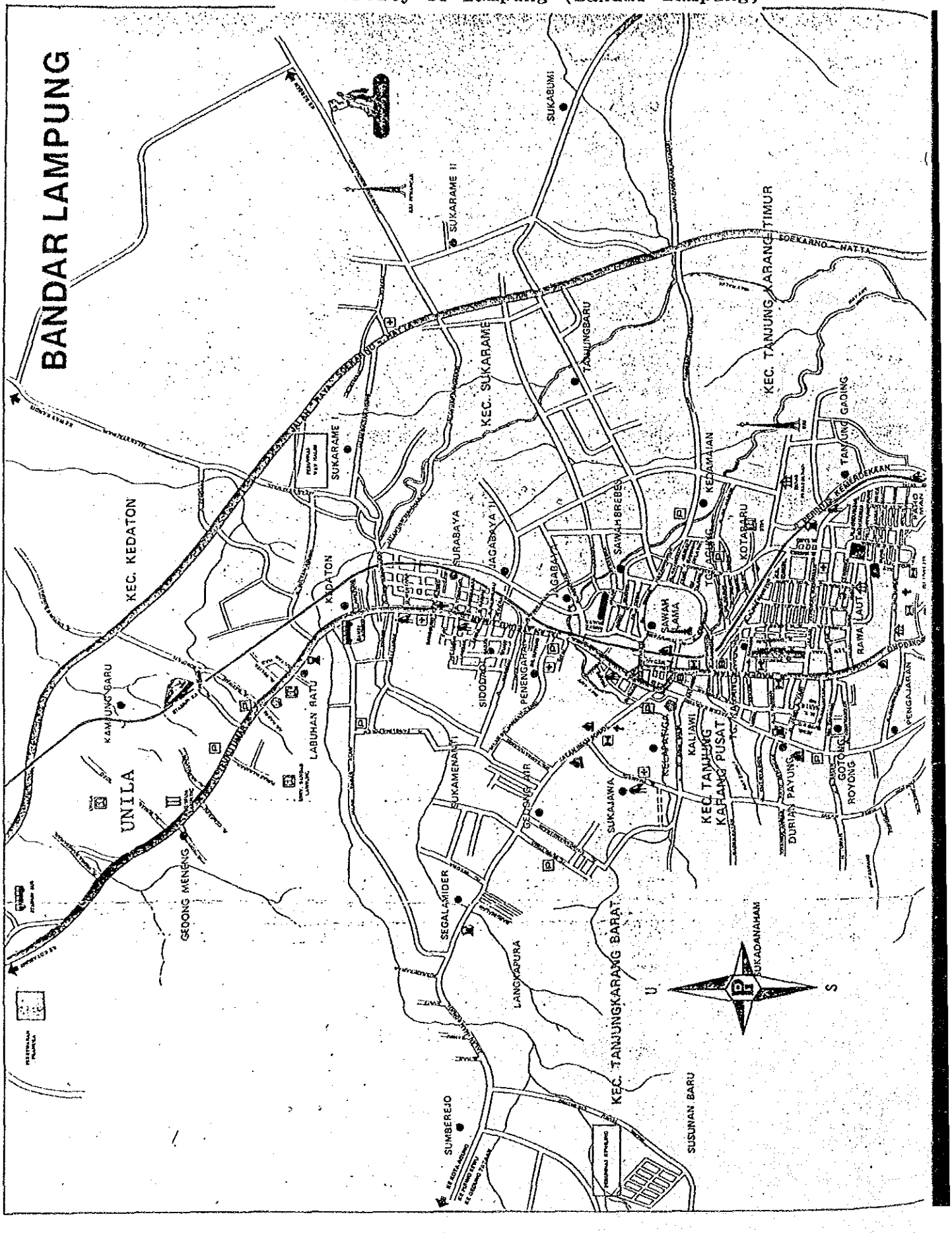
Dharma Agung University (Medan)

University of Sumatera Utara (Medan)



LOCATION OF THE PROJECT SITE

University of Lampung (Bandar Lampung)



APPENDIX 6. LIST OF EQUIPMENT PROPOSED IN TARGET 11 UNIVERSITIES

Appendix 6 EQUIPMENT LIST FOR 11 TARGET UNIVERSITIES

I. UNIVERSITY OF SYIAH KUALA

I-1 CIVIL ENGINERING

A. Laboratory: Land Survey

1.	Theodolite	5
2.	Level	5
3.	Plane Table Set	5

B. Laboratory: Soil Mechanics

1.	Dutch Cone Penetrometer	1

C. Laboratory: Highway

1.	Universal Asphalt Penetration Tester	1
2.	Softening Point Tester	1
3.	Cleveland Flash Point Tester	1
4.	Marshall Test Apparatus	1
5.	Los-Angeles Abrasion Testing Machine	1
6.	Benkelman Beam Tester	1
7.	Electronic Balance (20kg/10g)	1
8.	Electronic Balance (100g/0.01g)	1
9.	Stop Watch	3
10.	Convection Oven	1
11.	Ductivity Tester	1
12.	Core Drilling Machine	1
13.	Asphalt Oven	1

D. Laboratory: Concrete Testing

1.	Briquette Mold	2
2.	Concrete Cylindrical Mold (15 dia x 30 H cm)	5
3.	Concrete Beam Mold (15 x 15 x 53 cm)	5
4.	Concrete Cube Mold (15 x 15 x 15 cm)	5

E. Laboratory: Hydraulics

1.	Floating Body Experimental Apparatus	1
2.	Synthetic Hydro Experimental Apparatus	1
3.	(Synthetic Hydro Experimental Apparatus)	1
4.	Reynolds Experimental Apparatus	1
5.	Universal Hydraulics Experimental Apparatus	1
6.	Resistant Loss Measuring Apparatus	1
7.	Sediment Transport Channel	1
8.	Orifice Experimental Apparatus	1
9.	Water Gate Hydraulics Exp. App.	1
10.	Velocity Distribution Test App.	1
11.	Energy Loss Test App. in Pipe	1
12.	Open Channel Velocity Test App.	1
13.	Open Channel Flow Uniformity Test	1
14.	Wave Generator (Plunger-Float Type)	1

15.	Propeller Type Current Meter	1
16.	Young's Modulus Rigidity Meter	1
17.	R-meter	1

I-2 MECHANICAL ENGINEERING

A. Laboratory: Work Shop

1.	Shaping Machine	1
2.	Band Sawing Machine	1
3.	Hack Sawing Machine	1
4.	Pedestal Grinder	1

B. Laboratory: Material Testing

1.	Brinell Hardness Tester	1
2.	Rockwell Hardness Tester	1
3.	Vickers Hardness Tester	1
4.	Erichsen Cupping Tester	1
5.	Metal Specimen Polishing Machine 1	1
6.	XY Recorder	1

C. Laboratory: Heat Treatment & Forging

1.	Hydraulics Bench	1
2.	Pipe Network Apparatus	1
3.	Centrifugal Pump	2
4.	Water Weel	1
5.	V-Notched Weir	1
6.	Orifice	1
7.	Venturimeter	1

D. Laboratory: Internal Combustion Engine Testing 1
Orsat-Lung Gas Analyzer

H. Laboratory: Measurement and Mechanical Dynamics Testing

1.	Tachometer	1

I. Laboratory: Electric Testing

1.	Variable Transformer	1
2.	Multi-Tester	1
3.	Wattmeter	1
4.	Personal Computer	5
5.	Volt/Ammeter	1

J. Laboratory: Tools

1.	Six Set Wrench	5
2.	Pipe Wrench Set	3
3.	Hammer Set	5
4.	Wooden Mallet Set	5
5.	Micrometer Set	5
6.	Dial Gauge Set	5
7.	Vernier Caliper Set	5
8.	Steel Scale Set	5
9.	Caliper Set	5
10.	Electric Soldering Iron Set	3
11.	Stop Watch	5
12.	Screw Driver Set	5
13.	Six Set File	5
14.	Desiccator	10
15.	Breaker Set	20
16.	Watch Galss Set	20
17.	Graduated Cylinder Set	10
18.	Funnel Set	20
19.	Hygrometer	3
20.	Mercury Thermometer	10
21.	Thermocouple Pyrometer	20
22.	Pitot Tube Set	1
23.	Electronic Tachometer	1

I-3 CHMICAL ENGINEERING

A. Chemical Analysis

1.	Special Type Glass Ware	1 set
2.	Dish, Crystalizing	10
3.	Dish, Evaporating	10
4.	Condenser, Liebig	5
5.	Condenser, Dimroth	5
6.	Dryring Tower, Calcium Chloride	2
7.	Gas Washing Bottle	2
8.	Desiccater	2
9.	Funnel, Separator	5
10.	Funnel	5
11.	Flask, Filtering	5
12.	Jet Aspirator	5
13.	Pipet, Volumetric	10
14.	Pipet, Measuring	10
15.	Buret	5
16.	Volumetric Flask (1 l.)	5
17.	Graduater Cylinder (100 cc, 1 l.)	10

B. General Experiment

1.	Support, Lab-Frame Set	1
2.	Rod	25
3.	Clamp Holder	25
4.	Labo-Jack	5
5.	Asbestos Wire	25

6.	Tripod	10
7.	Rubber Stopper (Each Size)	1
8.	Rubber Tube (200 m)	100
9.	Vacuum Hose	50
10.	Gas Burner, Bunsen	5
11.	Blower	1
12.	Crucible Platinum	2
13.	Sterilizer	1
14.	Magnetic Stirrer	5
15.	Muffle Furnace	1
16.	Pump, Labo Type	2
17.	Vacuum Pump	2
18.	Air Compressor	1
19.	Water Bath, Table-top Type	1
20.	Shaker, Ro-tap Type	1
21.	Thermo Recorder	1
22.	Thermocouple	5
23.	Thermometer	25
24.	electronic Balance	2
25.	Slide Regulator	5
26.	Microscope	1
27.	Photoelectric Colorimeter	1
28.	Gas Analyzer, Orsat Lunge	1
29.	Pressure Reducing Valve	5
30.	Refrigerator	1
31.	Stop Watch	5
32.	Motor, Small Size	2
33.	Tester	1
34.	Voltmeter	1
35.	Amperemeter	1
36.	Gas Cylinder	2
37.	Ball Mill	1
38.	Transformer	2
39.	Flow Meter (Liquid)	2
40.	Flow Metre(gas)	2
41.	Manometer	5
42.	Autoclave	1
43.	Viscosimeter, Ubbelohde	1
44.	Centrifuge	1

C. Chemical Engineering Experiment

1.	Fluid Friction Apparatus	1
2.	Heat Convection Apparatus	1
3.	Adjustable Bed Flow Channel	1
4.	Liquid Mixing Appararus	1
5.	Liquid Phase Chemical Reactor	1
6.	Tubular Flow Reactor	1
7.	Wetted Wall Gas Absorption Column	1
8.	Batch Drying	1
9.	Leaf Tester	1
10.	Personal Computer	5

D.	Glass Blowing Kit	1
	1. Wood Working Machine	1
	2. Tool Set	1
	3. Grinder	1
F.	Additional Items	
	1. Digital pH/mV Meter	2
	2. Rotary Evaporators	1
	3. Melting Point Apparatus	1
	4. Digital Conductivity Meter	2
	5. Water Distilling Apparatus	1

II. UNIVERSITY OF SUMATERA UTARA

II-1 CIVIL ENGINERING

A. Laboratory: Land Survey

1.	Theodolite w/tripod	15
2.	Level/tripod	15
3.	Plane Table Set	15
4.	Staff (3m)	5
6.	Measure Pole	30
7.	Planimeter	5
8.	Range Finder	1

B. Laboratory: Soil Mechanics

1.	Standard Penetrometer	1
2.	Plate Bearing Test Set	1

C. Laboratory: Highway

1.	Los-Angeles Abrasion Testing Machine	1
2.	Laboratory C.B.R. Tester	1
3.	Field C.B.R. Test Set	1
4.	Benkelman Beam Tester	1
5.	Universal Asphalt Penetration Tester	1

D. Concrete Testing Lab.

1.	Schmidt Hammer	3

E. Laboratory: Hydraulics

1.	Rainfall Hydrographs	1
2.	Personal Computer	5
3.	Floating Body Experimental Bench	1
4.	Reyolds Experimental Bench	1
5.	Orifice Experimental Bench	1
6.	Propeller Type Current Meter	1

II-2 MECHANICAL ENGINEERING

A. Laboratory: Work Shop

1.	Lathe	1
2.	Universal Milling Machine	1
3.	Shaping Machine	1
4.	Hack Sawing Machine	1
5.	Pedestral Grinder	1

B. Laboratory: Material Testing

1.	Brinell Hardness Tester	1
2.	Rockwell Hardness Tester	1
3.	Erichsen Cupping Tester	1

C. Laboratory: Heat Treatment and Forging

1.	Electric Muffle Furnace	1

D. Laboratory: Welding

1.	Pickling Bath	1
2.	Welding Rod	200
3.	Welding Rod Dryer	1
4.	Eye Shield	10

G. Laboratory: Refrigeration and Heat Transfer

1.	Compact Electronic Recorder	1

H. Laboratory: Measurement. Mechanical Engineering

1.	Vibration Tester	1
2.	Surface Plate	1
3.	Tachometer	4

I. Laboratory: Electric Testing

1.	Multi-Tester	2
2.	Personal Computer	5

J. Laboratory: Tools

1.	Six Set Wrench	5
2.	Pipe Wrench Set	3
3.	Hammer Set	5
4.	Wooden Mallet Set	5
5.	Micrometer Set	5
6.	Dial Gauge Set	5
7.	Vernier Caliper Set	5
8.	Steel Scale Set	5
9.	Caliper	5
10.	Electric Soldering Iron Set	3
11.	Stop Watch	5
12.	Screw Driver Set	5
13.	Six Set File	5
14.	Desiccator	10
15.	Beaker Set	20
16.	Petri Dish	20
17.	Graduated Cylinder Set	10
18.	Funnel Set	20
19.	Thermocouple Pyrometer	20
20.	Hydrometer	3
21.	Mercury Thermometer	10

K. Internal Combustion Engine Testing

1.	Orsat-Lung Gas Analyzer	1

L. Additional Items

1.	Universal Tool and Cutter Grinder	1
2.	Specimen Dryer	1
3.	AC/DC Tig Welder	1
4.	Electronic Tachometer	1
5.	Freon Gas Charging Kit	1
6.	Roundness Tester	1

II-3 ELECTRICAL ENGINEERING

A. Basic Electric Testing

1.	Wheaston Bridge	2
2.	Double Bridge	2
3.	Universal Bridge	2
4.	DC Potensiometer	2
5.	AC Voltage Current Standard	1
6.	Anlog Muli-Tester	5
7.	Insulation Tester	2
8.	DC Ammeter	3
9.	AC Ammeter	3
10.	Milli Ammeter	2
11.	DC Voltmeter	2
12.	AC Voltmeter	2
13.	Milli Voltmeter	2
14.	Shunt Resistor	2
15.	Trace Amplifier	1
16.	Synchroscope	1
17.	Watt Meter	3
18.	Electronic Wattmeter	1
19.	Epistein Iron Loss Test Set	1
20.	Volt Slider	1
21.	Elimimator	1
22.	Automatic AC Voltage Regulator	2
23.	Standard DC Power Supply Unit	2
24.	Frequency Meter	2
25.	Digital Power Meter	2
26.	Digital Multimeter	2
27.	Dual Trace Oscilloscaope	2
28.	Personal Computer	5
29.	Tools and Consumable Materials	5

B. Laboratory: High Voltage Testing

1.	Silicon Rectifier	2
2.	Insulation Polytester	2
3.	Plug Type Wheatstone Bridge	1
4.	Liquid Resistance Measuring Vessel	1
5.	Electrolytic Plotter	1
6.	Digital Peak Voltmeter	1

7.	Storage Oscilloscope	2
8.	Analogue Peak Voltmeter	1
9.	Impulse Voltmeter	1
10.	Picoammeter	1
11.	Vacuum Pump	1
12.	Digital Ammeter	1
13.	Digital Multimeter	1
14.	X-Y Recorder	1
15.	Digital Galvanometer	1
16.	AC High Voltage Test Set	1
17.	DC High Voltage Test Set	1
18.	Impulse Voltage Generator	1
19.	High Voltage Power System	1
20.	Transformer	1
21.	Variable Transformer	1
22.	Resistive Load	1
23.	Load Reactor	1
24.	Load Capacitor	1
25.	Load Switch	1
26.	AC Dielectric Withstand Test Set	1
27.	DC Dielectric Withstand Test Set	1
28.	Transmission Lines Demonstrator	1
29.	Protective Relays Installation Kit	1
30.	Fault Locator	1
31.	Insulation Tester	1

C. Additional Items

1.	Clip-on Power Meter	1

II-4 CHEMICAL ENGINEERING

A. Chemical Analysis

1.	Special Type Glass Ware	1 set
2.	Dish, Crystalizing	10
3.	Dish, Evaporating	10
4.	Condenser, Liebig	5
5.	Condenser, Dimroth	5
6.	Dryring Tower, Calcium Chloride	2
7.	Gas Washing Bottle	2
8.	Desiccater	2
9.	Funnel, Separator	5
10.	Funnel	5
11.	Flask, Filtering	5
12.	Jet Aspirator	5
13.	Pipet, Volumetric	10
14.	Pipet, Measuring	10
15.	Buret	5
16.	Volume Metric Flask (1 l.)	5
17.	Graduated Cylinder (100 cc, 1 l.)	10
18.	Glass Blowing Kit	1

B. General Experiment

1.	Support, Lab-Frame Set	1
2.	Rod	25
3.	Clamp Holder	25
4.	Labo-Jack	5
5.	Asbestos Wire	25
6.	Tripod	10
7.	Rubber Stopper (Each Size)	1
8.	Rubber Tube (200 m)	100
9.	Vacuum Hose	50
10.	Gas Burner, Bunsen	5
11.	Blower	1
12.	Crucible Platinum	2
13.	Sterilizer	1
14.	Magnetic Stirrer	5
15.	Muffle Furnace	1
16.	Pump, Labo Type	2
17.	Vacuum Pump	2
18.	Air Compressor	1
19.	Water Bath, Tabl-top Type	1
20.	Shaker, Ro-tap Type	1
21.	Thermo Recorder	1
22.	Thermocouple (ca, pt)	5
23.	Thermometer	25
24.	electronic Balance	2
25.	Slide Regulator	5
26.	Microscope	1
27.	Photoelectric Colorimeter	1
28.	Gas Analyzer, Orsat Lunge	1
29.	Pressure Reducing Valve	5
30.	Refrigerator	1
31.	Stop Watch	5
32.	Motor, Small Size	2
33.	Tester	1
34.	Voltmeter	1
35.	Amperemeter	1
36.	Gas Cylinder	2
37.	Ball Mill	1
38.	Tramsfomer	2
39.	Flow Meter (Liquid)	3
40.	Flow Meter(gas)	2
41.	Manometer	5
42.	Autclave	1
43.	Viscosimeter, Ubbelohde	1
44.	Centrifuge	1

C. Chemical Engineering Experiment

1.	Fluid Friction Apparatus	1
2.	Heat Convection Apparatus	1
3.	Adjustable Bed Flow Channel	1
4.	Liquid Mixing Appararus	1
5.	Liquid Phase Chemical Reactor	1
6.	Personal Computer	5

D. Glass Blowing Kit

1.	Wood Working Machine	1
2.	Tool Set	1
3.	Grinder	1

E. Additional Items

1.	Digital pH/mV Meter	2
2.	Rotary Evaporators	1
3.	Melting Point Apparatus	1
4.	Digital Conductivity Meter	2
5.	Water Distilling Apparatus	1

II-5 INDUSTRIAL ENGINEERING

1.	Video Projector	2
2.	Video Camera	2
3.	35 MM Slide Projector	2
4.	Tape Recorder	4
5.	Educational Video Film	2
6.	Light Table	5
7.	Copying Machine	1
8.	Overhead Projector	2
9.	Micro Chronometer	10
10.	Cycle Graph	5
11.	Strobo Camera	2
12.	Video Tape Recorder	2
13.	Design and Technology Models	3
14.	Projection Screen	2
15.	Sampling Equipment	10
16.	Distribution Model	10
17.	Random Number Dice	10
18.	Random Number Sampler	10
19.	Drawing Instrument	10
20.	Teacher's Drawing Tools	5
21.	Scale Storage Stand	10
22.	Drawing Sheet Stand	10
23.	Layout Board	5
24.	Model Plate for Equipments and Facilities	2
25.	Stop Watch	15
26.	Vibration Tester	2
27.	Luxmeter	2
28.	Personal Computer	5
29.	Electronic Typewriter	1
30.	Binding Machine	1
31.	Paper Cutter	1
32.	Drilling Machine	1
33.	Sound Level Meter	1
34.	Digital Multimeter	1
35.	Digital Thermometer	1
36.	Digital Scale	1
37.	Parallelogram Demonstrator	1

III. NOMMENSEN UNIVERSITY

III-1 CIVIL ENGINEERING

E. Laboratory: Computer Training

1.	Personal Computer	5

III-2 MECHANICAL ENGINEERING

I. Laboratory: Electric Testing

1.	Personal Computer	5

III-3 ELECTRICAL ENGINEERING

A. Laboratory: Basic Electric Testing

1.	Wheaston Bridge	5
2.	Double Bridge	5
3.	Universal Bridge	3
4.	DC Potensiometer	2
5.	AC Voltage Current Standard	1
6.	Analog Multi-tester	5
7.	Insulation Tester	1
8.	DC Ammeter	4
9.	AC Ammeter	4
10.	Milli Ammeter	2
11.	DC Voltmeter	5
12.	AC Voltmeter	4
13.	Milli Voltmeter	2
14.	Shunt Resistor	1
15.	Trace Amplifier	1
16.	Synchroscope	2
17.	Capacitive Load	2
18.	Inductive Load	1
19.	Portable Luxmeter	1
20.	Variable Transformer	1
21.	Watt Meter	4
22.	Electronic Wattmeter	4
23.	Standard Cell	5
24.	Electrronic Wattmeter	1
25.	Volt Slider	2
26.	Elimimator	2
27.	Automatic AC Voltage Regulator	2
28.	Standard DC Power Supply Unit	1
29.	Frequency Meter	1
30.	Digital Power Meter	2
31.	Digital Multi Meter	6
32.	Dual Trace Oscilloscope	2
33.	Personal Computer	5
34.	Tools and Consumable Materials	5
35.	Digital Tachometer	2
36.	Watt Meter, 1 phase	1

37.	Power Factor Meter	1
38.	LCR Bridge	2
39.	Standard Resistances	1
40.	Standard Self Inductors	1
41.	Standard Capacitors	1
42.	Electro-Hydraulic Servo	1
43.	Pnewmatic Servo	1

C. Laboratory: High Voltage Testing

1.	Storage Oscilloscope	1
2.	Picoammeter	1
3.	Digital Ammeter	1
4.	Digital Multimeter	2
5.	X-Y Recorder	2
6.	Transformer	1
7.	Variable Transformer	1
8.	Fault Locator	1

D. Laboratory: Tele-Communication and Electronics

1.	Signal Generator	2
2.	Pulse Generator	2
3.	Automatic Ac Voltage Regulator	3
4.	Standard DC Power Supply Unit	2
5.	X-Y Recorder	2
6.	Function Generator	1
7.	Microprocessor Training System	2
8.	Color TV Training Kit	2
9.	Frequency Spectrum Analyzer	1
10.	Microwave Experimental Apparatus	1
11.	Radiowave Demonstration Apparatus	1
12.	Electronics Systems Teaching Programme	1
13.	Servo Demonstrator	1
14.	Anntena Systems Demonstrator	1

Additional Items

1.	IC Checker	1
2.	Transistor Checker	1
3.	Clip-on Power Meter	1

IV. DHARMA AGUNG UNIVERSITY

IV-1 CIVIL ENGINERING

1.	Personal Computer	5

IV-2 MECHANICAL ENGINEERING

I. Laboratory: Electric Testing

1.	Personal Computer	5

IV-3 ELECTRICAL ENGINEERING

A. Laboratory: Basic Electric Testing

1.	Personal Computer	5

IV-4 INDUSTRIAL ENGINEERING

1.	Video Projector	1
2.	Video Camera	1
3.	35 MM Slide Projector	1
4.	Tape Recorder	1
5.	Educational Video Film	1
6.	Light Table	2
7.	Copying Machine	1
8.	Overhead Projector	1
9.	Micro Chronometer	2
10.	Cycle Graph	5
11.	Strobo Camera	1
12.	Video Tape Recorder	1
13.	Design and Technology Models	1
14.	Projection Screen	1
15.	Sampling Equipment	5
16.	Distribution Model	5
17.	Random Number Dice	5
18.	Random Number Sampler	5
19.	Drawig Instrument	5
20.	Teacher's Drawing Tools	5
21.	Scale Storage Stand	5
22.	Drawing Sheet Stand	5
23.	Layout Board	5
24.	Stop Watch	5
25.	Vibration Tester	2
26.	Luxmeter	1
27.	Personal Computer	5
28.	Electronic Typewriter	1
29.	Binding Machine	1
30.	Paper Cutter	1
31.	Drilling Machine	1
32.	Sound Level Meter	1
33.	Digital Multimeter	1

34.	Digital Thermometer	1
35.	Digital Scale	1
36.	Parallelogram Demonstrator	1

IV-5 MINING ENGINEERING

C. Personal Computer

1.	Personal Computer	5

V. UNIVERSITY OF MEDAN AREA

V-1 CIVIL ENGINERING

E. Laboratory: Computer

1.	Personal Computer	5

V-2 MECHANICAL ENGINEERING

A. Laboratory: Work Shop

1.	Shaping Machine	1
2.	Pedestal Grinder	1
3.	Hack Sawing Machine	1

B. Laboratory: Material Testing

1.	Charpy Impact Testing Machine	1
2.	Rockwell Hardness Tester	1
3.	Brinell Hardness Tester	1
4.	Metallurgical Microscope	1
5.	Camera System for Microscope	1
6.	Vickers Hardness Tester	1

C. Laboratory: Heat Treatment and Casting

1.	Electric Muffle Furnace	1
2.	Platform Scale	1
3.	X-Y Recorder	1

D. Laboratory: Welding

1.	Electric Spot Welding Machine	1

E. Laboratory: Hydraulic Testing

1.	Hydraulics Bench	1
2.	Pipe Network Apparatus	1
3.	Centrifugal Pump	1
4.	Water Weel	1
5.	V-Notched Weir	1
6.	Orifice	1
7.	Platform Balance	1
8.	Flow Meter	1

F. Laboratory: Internal Combustion Engine Testing
Dynamometer 1

G. Laboratory: Feezing and Heat Transfer

1.	Compact Electronic Tester	1

I. Laboratory: Electric Testing

1.	Multi-Tester	3
2.	Wattmeter	2
3.	Volt/Ammeter	3
4.	Personal Computer	5

J. Laboratory: Tools

1.	Six Set Wrench	5
2.	Pipe Wrench Set	3
3.	Hammer Set	5
4.	Wooden Mallet Set	5
5.	Micrometer Set	5
6.	Dial Gauge Set	5
7.	Vernier Caliper Set	5
8.	Steel Scale Set	5
9.	Caliper Set	5
10.	Electric Soldering Iron Set	3
11.	Stop Watch	5
12.	Screw Driver Set	5
13.	Six Set File	5
14.	Desiccator	10
15.	Beaker Set	20
16.	Watch Galss Set	20
17.	Graduated Cylinder Set	10
18.	Funnel Set	20
19.	Hygrometer	3
20.	Mercury Thermometer	10
21.	Thermocouple Pyrometer	20
22.	Drawing Machine	15

Additional Items

Universal Too and Cutter Grinder	
Drill Grinder	1
Sand Blasting Machine	1
Pitot Tube Set	1
Freon Gas Charging Kit	1

V-3 ELECTRICAL ENGINEERING

A. Laboratory: Basic Electric Testing

1.	Personal Computer	5

V-4 INDUSTRIAL ENGINEERING

1.	Personal Computer	5

VI. THE ISLAMIC UNIVERSITY OF SUMATERA UTARA

VI-1 CIVIL ENGINERING

A. Laboratory: Land Survey

1.	Theodolite w/tripod	5
2.	Level/tripod	5
3.	Steel Rule (20m)	2
4.	Staff (3m)	10
5.	Measure Pole	20
6.	Planimeter	2
7.	Plane Table Set	5
8.	Stilon Reel (20M)	2
9.	Staff Rule (5M)	2

B. Laboratory: Soil Mechanics

1.	Direct Shear Apparatus	1
2.	Electric Unconfined Compression Apparatus	1
3.	Compaction Test Set	1
4.	Laboratory C.B.R. Test Set	1
5.	Liquid Limit Device	2
6.	Plastic Limit Test Set	2
7.	Pycnometer	2
8.	Drying Oven	2
9.	Desiccator	2
10.	Trimmer	2
11.	Wire Saw	3
12.	Miter Box	2
13.	Straight Edge	5
14.	Vernier Caliper	2
15.	Thermometer	5
16.	Triple Beam Balance (200g/0.1g)	1
17.	Triple Beam Balance (10kg/1g)	1
18.	Enamelled Tray (L)	3
19.	Enamelled Tray (M)	3
20.	Enamelled Tray (S)	5
21.	Sprayer	3
22.	Measuring Cylinder (500ml)	3
23.	Measuring Cylinder (200ml)	3
24.	Measuring Cylinder (1000ml)	3
25.	Stop watch	3
26.	Watch Dish	30
27.	Test Sieve Set	2

D. Laboratory: Concrete Testing

1.	Pycnometer	1
2.	Thermostatic Circulation System for Water Bath	1
3.	Blaine Finess Tester	2
4.	Cement Coagulation Test	1
5.	Vicat Apparatus	1
6.	Measuring Cylinder (200cc)	2
7.	Mortar and Pestle	2
8.	Glass Plate	2
9.	Knife	2

Concrete Stability Test

9.	Ebullition Container	1
10.	Thermostatic Constant Humidity Chamber for Mortor	1
11.	Measuring Cylinder (200cc)	2
12.	Glass Plate	2

Strength of Cement

13.	Mixing Plate and Scoop	1
14.	Motorized Mortar Flow Table	1
15.	Machaelis Mortar Flexure	1
16.	Briquette Mold	3

Sieve Testing

17.	Sample Splitter	1
18.	Sieve Set	1

Absorption Test

19.	Sand Absorption Cone with Rod	1
20.	Sample Splitter	1
21.	Flask (500cc)	3

Specific Gravity Test

22.	Gravel Specific Gravity Testing Set (Wire Basket)	1
23.	Gravel Specific Gravity Testing Set	1

Unit Measure Test

24.	Unit Weight Measure	1
25.	Tamping Rod	1

Material Water Level Test

26.	Chapman Flask	2
27.	Pipett	2

Concrete Slump Testing

28.	Slump Test Set (Slump Cone)	1
29.	Slump Test Set (Tamping Rod)	1
30.	Slump Test Set (Slump Scale)	1
31.	Slump Test Set (Plate)	1

Air Content Test in Fresh Concrete

32.	Washington Air Meter	1
33.	(Tamping Rod)	1
34.	(Mallet)	1
35.	(Container 7 l. & 15 l.)	2

Concrete Strength Test

36.	Mold	10
37.	Glass Plate	10
38.	Tamping Rod	3
39.	Concrete Mixer	1
40.	Trowel	3
41.	Caliper	3
42.	Scoop	2

Concrete Mixing Test

43.	Concrete Mixer	1
44.	Mixing Pan	1
45.	Convection Oven (100*60*75cm)	1
46.	Beam Balance (1kg/0.1g)	1
47.	Balance (10kg/0.5g)	1
48.	Compression Testing Machine (100t)	1
49.	Three Points Bending Attachment	1
50.	Platform Balance (50kg/50g)	1
51.	Balance (1kg/0.01g)	1
52.	Concrete Cylindrical Mold (15 dia. x 30 H cm)	2
53.	Concrete Beam Mold (15cmx15cmx53cm)	2
54.	Concrete Cube Mold (15cmx15cmx15c)	2
55.	Schmidt Hammer	1
56.	Los Angeles Abrasion Testing Machine	1
57.	Universal Testing Machine (200t)	
58.	Universal Testing Machine (100t)	1
59.	Personal Computer	5

Additional Items

1.	Land Slide Test Set	1
2.	Field Test Kit	1

VI-2 MECHANICAL ENGINEERING

Personal Computer	5

VI-3 ELECTRICAL ENGINEERING

Personal Computer	5

VI-4 INDUSTRIAL ENGINEERING

Personal Computer	5

VII. ANDALAS UNIVERSITY

VII-1 CIVIL ENGINERING

A. Laboratory: Land Survey

1.	Theodolite	10
2.	Level	5
3.	Plane Table Set	5
4.	Stereo Scope Set	1
5.	Steel Rule (50m)	2
6.	Steel Rule (20m)	3
7.	Stilon Reel (50m)	3
8.	Stilon Reel (20m)	10
9.	Staff Rule (5m)	3
10.	Staff (3m)	3
11.	Measure Pole	20

B. Laboratory: Soil Mechanics

1.	Multi Triaxial Apparatus	1
2.	Laboratory C.B.R. Test Set	1
3.	Test Sieve Set	2

C. Laboratory: Highway

1.	Marshall Test Apparatus	1
2.	Laboratory C.B.R. Tester	1
3.	Field C.B.R. Test Set	1
4.	Core Drilling Machine	1
5.	Asphalt Oven	1
6.	Membraneous-Stripping Apparatus	1
7.	Apparatus for Estimating Moisture in Oil	1
8.	Distillation Apparatus for Cut Back Asphalt	1

D. Laboratory: Concrete Testing

1.	Pycnometer	2
2.	Thermostatic Circulation System for Water Bath	1
3.	Blaine Finess Tester	1
4.	Vicat Apparatus	2
5.	Measuring Cylinder (200cc)	5
6.	Mortar and Pestle	5
7.	Glass Plate	5
8.	Knife	5
9.	Ebullition Container	2
10.	Thermostatic Constant Humidity Chamber for Mortor	1
11.	Measuring Cylinder (200cc)	5
12.	Mortar and Pestle	5
13.	Glass Plate	5
14.	Motorized Mortar Flow Table	1
15.	Machaelis Mortar Flexure	1
16.	Briquette Mold	3
17.	Concrete Beam Mold (15*15*53cm)	5
18.	Concrete Cube Mold (15*15*15cm)	5
19.	Core Drilling Machine	1

E. Laboratory: Hydraulics

1.	Floating Body Experimental Bench	1
2.	Universal Hydraulics Experimental Bench	1
3.	Resistant Loss Measuring Bench	1
4.	Sediment Transport Channel	1
5.	Orifice Experimental Bench	1
6.	Wave Generator (Plunger-Float Type)	1
7.	Propeller Type Current Meter	1
8.	Personal Computer	5

VII-2 MECHANICAL ENGINEERING

A. Laboratory: Work Shop

1.	Lathe	1
2.	Hack Sawing Machine	1
3.	Pedestal Grinder	1
4.	Universal Milling Machine	1
5.	Radial Drilling Machine	1
6.	Shaping Machine	1
7.	Band Sawing Machine	1

B. Laboratory: Material Testing

1.	Universal Testing Machine	1
2.	X-Y Recorder	1
3.	Charpy Impact Testing Machine	1
4.	Metal Specimen Polishing Machine	1
5.	Brinell Hardness Tester	1
6.	Rockwell Hardness Tester	1

C. Laboratory: Heat Treatment and Casting

1.	Platform Scale	1
2.	Electric Furnace	1

D. Laboratory: Welding

1.	Oxy-Acetylene Gas Welding & Cutting Kit	1
2.	Pickling Bath	1
3.	Welding Rod	200
4.	Welding Rod Dryer	1
5.	Eye Shield	10

E. Laboratory: Hydraulic Testing

1.	Hydraulics Bench	1
2.	Pipe Network Apparatus	1
3.	Turbine Pump	1
4.	Centrifugal Pump	1
5.	Water Weel	1
6.	V-Notched Weir	1
7.	Orifice	1
8.	Platform Balance	1

9.	Flow Meter	1
10.	Dynamometer	1

G. Laboratory: Feezing and Heat Transfer

1.	Improved Nenken-Type Adiabatic Calorimeter	1

H. Laboratory: Measurement and Mechanical Dynamics Testing

1.	Vibration Tester	1
2.	Torque Meter	1
3.	Oscilloscope	1
4.	Toolmaker's Microscope	1
5.	Surface Roughness Tester	2
6.	Block Gauge Set	1
7.	Strain Meter	1

I. Laboratory: Electric Testing

1.	Wheaston Bridge	3
2.	Decode Resistance Meter	5
3.	Multi-Tester	3
4.	Volt/Ammeter	2
5.	Personal Computer	5
6.	Variable Transformer	3
7.	Personal Computer	5

J. Laboratory: Tools

1.	Six Set Wrench	5
2.	Pipe Wrench Set	3
3.	Hammer Set	5
4.	Wooden Mallet Set	5
5.	Micrometer Set	5
6.	Dial Gauge Set	5
7.	Vernier Caliper Set	5
8.	Steel Scale Set	5
9.	Caliper Set	5
10.	Electric Soldering Iron Set	3
11.	Stop Watch	5
12.	Screw Driver Set	5
13.	Six Set File	5
14.	Desiccator	10
15.	Beaker Set	20
16.	Watch Glass Set	20
17.	Graduated Cylinder Set	10
18.	Funnel Set	20
19.	Hygrometer	3
20.	Mercury Thermometer	10
21.	Thermocouple Pyrometer	20

Additional Items

Universal Too and Cutter Grinder	1
Drill Grinder	1
Specimen Dryer	1

Specimen hand Press	1
Pitot Tube Set	1

VIII. UNIVERSITY OF SRIWIJAYA

VIII-1 CIVIL ENGINERING

A. Laboratory: Land Survey

1.	Theodolite	3
2.	Level	3
3.	Plane Table Set	3
4.	Range Finder	1
5.	Staff (3m)	3

B. Laboratory: Soil Mechanics

1.	Constant Head Permeameter	1
2.	Particle Size Analysis Set	1
3.	Test Sieve Set	1
4.	Field C.B.R. Test Set	1
5.	Tripple Beam Balance (200mg/.1g)	1
6.	Tripple Beam Balance (10kg/1g)	1

C. Laboratory: Highway

1.	Sieve (19.1mm, 4760u)	2

E. Laboratory: Hydraulics

1.	Floating Body Experimental Bench	1
2.	Universal Hydraulics Experimental Bench	1
3.	Resistant Loss Measuring Bench	1
4.	Sediment Transport Channel	1
5.	Orifice Experimental Bench	1
6.	Wave Generator (Plunger-Float Type)	1
7.	Propeller Type Current Meter	1
8.	Personal Computer	5
9.	Reynolds Experimental Bench	1

VIII-2 MECHANICAL ENGINEERING

A. Laboratory: Work Shop

1.	Hack Sawing Machine	1

B. Laboratory: Material Testing

1.	Universal Testing Machine	1
2.	Torsion Testing Machine	1
3.	Charpy Impact Testing Machine	1
4.	Torsion & Bending Fatigue Test Machine	1
5.	Brinell Hardness Tester	1
6.	X-Y Recorder	1
7.	Vickers Hardness Tester	1
8.	Rockwell Hardness Tester	1
9.	Erichsen Cupping Testing	1
10.	Metallurgical Microscope	1

11.	Camera System for Microscope	1
12.	Metal Specimen Polishing M/C	1

I. Laboratory: Electric Testing

1.	Personal Computer	5
2.	Torque Meter	1
3.	Strain Meter	1
4.	Photographic System	1
5.	Oscilloscope	1

J. Laboratory: Tools

1.	Six Set Wrench	5
2.	Pipe Wrench Set	3
3.	Hammer Set	5
4.	Wooden Mallet Set	5
5.	Micrometer Set	5
6.	Dial Gauge Set	5
7.	Vernier Caliper Set	5
8.	Steel Scale Set	5
9.	Caliper Set	5
10.	Electric Soldering Iron Set	3
11.	Stop Watch	5
12.	Screw Driver Set	5
13.	Six Set File	5
14.	Desiccator	10
15.	Beaker Set	20
16.	Watch Glass Set	10
17.	Graduated Cylinder Set	10
18.	Funnel Set	10
19.	Hygrometer	3
20.	Mercury Thermometer	10
21.	Thermocouple Pyrometer	10
22.	Overhead Projector	1

Additional Items

Specimen Dryer	1
Specimen Hand Press	1

VIII-3 ELECTRICAL ENGINEERING

A. Laboratory: Basic Electric Testing

1.	Wheaston Bridge	4
2.	Analog Multi Tester	40
3.	Photoelectric Luxmeter	1
4.	Variable Transformer	10
5.	Wattmeter	2
6.	Electronic Wattmeter	3
7.	Frequency Meter	24
8.	Digital Multimeter	15
9.	Dual Trace Oscilloscope	3
10.	Tools and Consumable Materials	5

11.	Personal Computer	5
12.	Wattmeter (Single Phase)	1
13.	Double Bridge	2
14.	Universal Bridge	2
15.	DC Potensiometer	2
16.	AC Voltage Current Standard	1

C. Laboratory: High Voltage Testing

1.	Digital Galvanometer	5
2.	High Voltage Power System	1
3.	AC Dielectric Withstand Test Set	1
4.	DC Dielectric Withstand Test Set	1
5.	Transmission Line Demonstrator	1
6.	Insulation Tester	2

D. Additional Items

1.	Printed Circuit Board Fabrication Unit	1
2.	Ultra Sonic Washer	1
3.	IC Checker	1
4.	Transistor Checker	1
5.	Sequence Trainer	1
6.	Elevator System Experimental Unit	1

VIII-4 CHMICAL ENGINEERING

A. Chemical Analysis

1.	Special Type Glass Ware	1 set
2.	Dish, Crystalizing	10
3.	Dish, Evaporating	10
4.	Condenser, Liebig	5
5.	Condenser, Dimroth	5
6.	Dryring Tower, Calcium Chloride	2
7.	Gas Washing Bottle	2
8.	Desiccater	2
9.	Funnel, Separator	5
10.	Funnel	5
11.	Flask, Filtering	5
12.	Jet Aspirator	5
13.	Pipet, Volumetric	10
14.	Pipet, Measuring	10
15.	Buret	5
16.	Volumetric Flask (1 l.)	5
17.	Graduated Cylinder (100 cc, 1 l.)	10

B. General Experiment

1.	Support, Lab-Frame Set	1
2.	Rod	25
3.	Clamp Holder	25
4.	Labo-Jack	5
5.	Asbestos Wire	25
6.	Tripod	10

7.	Rubber Stopper (Each Size)	1
8.	Rubber Tube (200 m)	100
9.	Vacuum Hose	50
10.	Gas Burner, Bunsen	5
11.	Blower	1
12.	Crucible Platium	2
13.	Sterilizer	1
14.	Magnetic Stirrer	5
15.	Muffle Furnace	1
16.	Pump, Labo Type	3
17.	Vacuum Pump	3
18.	Air Compressor	1
19.	Water Bath, Table-top Type	1
20.	Shaker, Ro-tap Type	1
21.	Thermo Recorder	1
22.	Thermocouple	5
23.	Thermometer	25
24.	electronic Balance	3
25.	Slide Regulator	5
26.	Microscope	1
27.	Photoelectric Colorimeter	1
28.	Gas Analyzer, Orsat Lunge	1
29.	Pressure Reducing Valve	5
30.	Refrigerator	1
31.	Stop Watch	5
32.	Motor, Small Size	3
33.	Tester	1
34.	Voltmeter	1
35.	Amperemeter	1
36.	Gas Cylinder	3
37.	Ball Mill	1
38.	Tramsformer	3
39.	Flow Meter (Liquid)	3
40.	Flow Metre(gas)	3
41.	Manometer	1
42.	Autclave	1
43.	Viscosimeter, Ubbelohde	1
44.	Centrifuge	1

C. Chemical Engineering Experiment

1.	Fluid Friction Apparatus	1
2.	Heat Conduction Apparatus	1
3.	Adjustable Bed Flow Channel	1
4.	Liquid Mixing Appararus	1
5.	Liquid Phase Chemical Reactor	1
6.	Tubular Flow Reactor	1
7.	Wetted Wall Gas Absorption Column	1
8.	Batch Drying	1
9.	Leaf Tester	1
10.	Personal Computer	5

D.	Glass Blowing Kit	1
	1. Wood Working Machine	1
	2. Tool Set	1
	3. Grinder	1
E.	Additional Items	
	1. Digital pH/mV Meter	2
	2. Rotary Evaporators	1
	3. Melting Point Apparatus	1
	4. Digital Conductivity Meter	2
	5. Water Distilling Apparatus	1

VIII-5 MINING ENGINEERING

A.	Rock Mineral Observation and Analysis	
	1. Polarizing Microscope	5
B.	Oil Analysis	
	1. Canon-Fenske Viscosimeter	2
	2. Aniline Point Tester	2
	3. Universal Asphalt Penetration Tester	2
	4. Standard Thermometer	2
	5. Reference Thermometer	2
	6. Cleveland Flash Point Tester	2
	7. API Hydrometer Test Set	2
	8. Glass Miscellaneous	2
	9. Other Tools	2
	10. Saybolt Viscometer	1
	11. Mohr's Specific Gravity Balance	1
	12. Drying Oven	1
	13. Electric Thermostat Water Tester	1
	14. Spectrophotometer	1
C.	Searching	
	1. Resistivity Survey Equipment	1
D.	Personal Computer	
	1. Personal Computer	5
E.	Additional Items	
	1. Hand Auger Set	2
	2. Moh's Hardness Collection	3
	3. Economic Mineral Collection	3
	4. Metallic Ore Mineral Collection	1
	5. Collection of 10 Imitated Gems	3
	6. Clear Plastic Crystal Models	1
	7. 14 Bravais Lattices Set	1
	8. Diamond Lattices	1

9.	Hexagonal Closest Lattice	1
10.	Body-Centered Lattice	1
11.	Halite Lattice	1

IX. UNIVERSITY OF LAMPUNG

IX-1 CIVIL ENGINERING

A. Laboratory: Land Survey

1.	Theodolite w/tripod	5
2.	Level/tripod	5
3.	Plane Table Set	5
4.	Stereo Scope Set	2
5.	Planimeter	5
6.	Drafter Set	5
7.	Range Finder	1

B. Laboratory: Soil Mechanics

1.	Direct Shear Apparatus	1
2.	Electric Unconfined Compression App.	1
3.	Multi Triaxial Apparatus	1
4.	Consolidation Test Apparatus	1
5.	Compaction Test Set	1
6.	Constant Head Permeameter	1
7.	Liquid Limit Device	2
8.	Plastic Limit Test Set	2
9.	Standard Penetrometer	1
10.	Dutch Cone Penetrometer	1
11.	Field C.B.R. Test Set	1

C. Laboratory: Highway

1.	Universal Asphalt Penetration Tester	1
2.	Softening Point Tester	1
3.	Cleveland Flash Point Tester	1
4.	Engler's Viscosimeter	1
5.	Marshall Test Apparatus	1
6.	Bitumen Auto Extractor	1
7.	Los-Angeles Abrasion Testing Machine	1
8.	Compression Testing Machine	1
9.	Electronic Balance (5kg/.5g)	2
10.	Electronic Balance (20kg/10kg)	2
11.	Electronic Balance (100g/01g)	2
12.	Sieve (19.1mm, 4760u)	2
13.	Stop Watch	5
14.	Convection Oven	2
15.	Ductility Tester	2
16.	Core Drilling Machine	1
17.	Asphalt Oven	1
18.	App. for Estimating Moisture in Oil	1
19.	Distillation App. for Cut Back Asphalt	1
20.	Membraneous Stripping App.	1

D. Laboratory: Concrete Testing

1.	Pycnometer	2
2.	Thermostatic Dirculation System for Water Bath	1
3.	Blaine Finess Tester	2

4.	Vicat Apparatus	2
5.	Measuring Cylinder (200cc)	5
6.	Mortar and Pestle	5
7.	Glass Plate	5
8.	Knife	5
9.	Ebullition Container	2
10.	Thermostatic Constant Humidity Chamber for Mortor	1
11.	Measuring Cylinder (200cc)	5
12.	Mortar and Pestle	5
13.	Glass Plate	5
14.	Mixing Plate and Scoop	2
15.	Motorized Mortar Flow Table	1
16.	Machaelis Mortar Flexure	1
17.	Briquette Mold	3
18.	Concrete Cylindrical Mold (15 dia*30 H cm)	5
19.	Concrete Beam Mold (15*15*53cm)	5
20.	Concrete Cube Mold (15cmx15cmx15cm)	5
21.	Floating Body Experimental Bench	1
22.	Synthetic Hydro Experimental Bench	1
23.	Venturimeter Testing App. (incld 5.2)	1
24.	Reynolds Experimental Bench	1
25.	Universal Hydraulics Exp. Bench	1
26.	Water Gate Hydraulics Exp. App. (included in 5.5)	1
27.	Resistant Loss Measuring Bench	1
28.	Sediment Transport Channel	1
29.	Wave Generator (Plunger Float Type)	1

F. Laboratory: Computer Training

1.	Personal Computer	5

Additional Items

Cubic Permeability Apparatus	1
Personal Computer for Administration Use	1 set

X. UNIVERSITY OF TANJUNGPURA

X-1 CIVIL ENGINERING

A. Laboratory: Land Survey

1.	Theodolite w/tripod	5
2.	Level /tripod	3
3.	Steel Rule (20m)	3
4.	Stilon Reel (50m)	2
5.	Stilon Reel (20M)	3
6.	Staff Rule (5m)	3
7.	Staff (3m)	5
8.	Measure Pole	10
9.	Planimeter	5

B. Laboratory: Soil Mechanics

1.	Direct Shear Apparatus	1
2.	Multi Triaxial Apparatus	1

C. Laboratory: Highway

1.	Softening Point Tester	1
2.	Cleaveland Flash Point Tester	1
3.	Engler's Viscometer	1
4.	Marshall Test Apparatus	1
5.	Los Angeles Abrasion Testing machine	1

E. Laboratory: Hydraulics

1.	Floating Body Experimental Bench	1
2.	Universal Hydraulics Experimental Bench	1
3.	Water Gate Hydraulics Exp. App. (included in 5.5)	1
4.	Resistant Loss Measuring Bench	1
5.	Sediment Transport Channel	1
6.	Orifice Experimental Bench	1
7.	Velocity Distribution Test App. (5.7)	1
8.	Energy Loss Test App. in Pipe (5.7)	1
9.	Open Channel Velocity Test App. (5.5)	1
10.	Open Channel Flow Uniformity Test (5.5)	1
11.	Wave Generator (Plunger-Float Type)	1
12.	Propeller Type Current Meter	1
13.	Personal Computer	5

X-3 ELECTRICAL ENGINEERING

A. Laboratory: Basic Electric Testing

1.	Wheatston Bridge	3
2.	Dougle Bridge	2
3.	Universal Bridge	1
4.	DC Potensiometer	2
5.	AC Voltage Current Standard	1
6.	Capacitive Load	2

7.	Inductive Load	1
8.	Variable Transformer	3
9.	Wattmeter	1
10.	Electronic Wattmeter	1
11.	Standard Cell	2
12.	Volt Slider	2
13.	Eliminator	2
14.	Automatic AC Voltage Regulator	4
15.	Standard DC Power Supply Unit	1
16.	Frequency Meter	2
17.	Digital Power Meter	2
18.	Digital Multimeter	3
19.	Dual Trace Oscilloscope	2
20.	Personal Computer	5
21.	Tools and Consumable Materials	4
22.	Digital Tachometer	1
23.	Standard Resistances	1
24.	Standard Self Inductors	1
25.	Standard Capacitors	1

C. Laboratory: High Voltage Testing

1.	Digital Galvanometer	4
2.	AC High Voltage Test Set	1
3.	DC High Voltage Test Set	1
4.	High Voltage Power System	1
5.	AC Dielectric Withstand Test Set	1
6.	DC Dielectric Withstand Test Set	1
7.	Transmission Line Demonstrator	1
8.	Protective Relays Installation Kit	1
9.	Fault Locator	1
10.	Insulation Tester	1

D. Laboratory: Tele-Communication and Electronics

1.	Automatic AC Voltage Regulator	1
2.	Standard DC Power Supply Unit	1
3.	X-Y Recorder	1
4.	Function Generator	1
5.	Microprocessor Training System	1
6.	Computer Numerically Controlled Machine	1
7.	Color TV Training Kit	1
8.	Electronics Systems Teaching Programme	1

Additional Items

1.	Printed Circuit Board Fabrication Unit	1
2.	Ultra Sonic Washer	1
3.	IC Checker	1
4.	Transistor Checker	1
5.	Sequence Trainer	1
6.	Clip-on Power Meter	1

XI. UNIVERSITY OF LAMBUNG MANGKURAT

XI-1 CIVIL ENGINERING

A Laboratory: Land Surveying

1.	Slide Projector	1
2.	Overhead Projector	1

B. Laboratory: Soil Mechanics

1.	Multi Triaxial Apparatus	1
2.	Compaction Test Set	1
3.	Laboratory C.B.R. Test Set	1
4.	Test Sieve Set	2
5.	Standard Penetrometer	1
6.	Field C.B.R. Test Set	1
7.	Highway Lab.	
8.	Field C.B.R. Test Set	1
9.	Benkelman Beam Tester	1
10.	App. for Estimating Moisture in Oil	1
11.	Distillation App. for Cut Back Asphalt	1

D. Laboratory: Concrete Testing

1.	Pychnometer	2
2.	Thermostatic Circulation System for Water Bath	1
	Water Bath	
3.	Blaine Finess Tester	2
4.	Cement Coagulation Test	
	Vicat App.	2
	Measuring Cylinder (200cc)	5
	Mortar and Pestle	5
	Glass Plate	5
	Knife	5
5.	Concrete Stability Test	
	Ebullition Container	2
	Thermostatic Constant Humidity Chamber for Mortar	1
	Measuring Cylinder (200cc)	5
	Mortar and Pestle	5
	Glass Plate	5
6.	Strength of Cement	
	Mixing Plate and Scoop	2
	Motorized Mortar Flow Table	1
	Machaelis Mortar Flexure	1
	Briquette Mold	3
7.	Sieve Testing	
	Sample Splitter	1
	Sieve Set	1
8.	Absorption Test	
	Sand Absorption Cone with Rod	1
	Sample Splitter	1
	Flask (500cc)	1
9.	Convection Oven (100x60x75cm)	1
10.	Beam Balance (1kg/0.1g)	1
11.	Platform Balance (50kg/50g)	1

12.	Balance (10kg/0.5g)	1
13.	Balance (1kg/0.01g)	
14.	Concerete Cylindrical Mold (15 dia*30 H cm)	5
15.	Concrete Beam Mold (15cmx15cmx53cm)	5
16.	Concrete Cube Mold (15*15*15cm)	5
17.	Schmidt Hammer	1
18.	Compression Testing Machine (100t)	1
19.	Three Points Bending Attachment	1
20.	Los Angeles Abrasion Testing Machine	
21.	Universal Testing Machine (200t)	1

E. Laboratory: Hydraulics

1.	Floating Body Experimental Bench	1
2.	Universal Hydraulics Experimental Bench	1
3.	Water Gate Hydraulics Exp. App. (included in 5.5)	1
4.	Resistant Loss Measuring Bench	1
5.	Sediment Transport Channel	1
6.	Orifice Experimental Bench	1
7.	Velocity Distribution Test App. (5.7)	1
8.	Energy Loss Test App. in Pipe (5.7)	1
9.	Open Channel Velocity Test App. (5.5)	1
10.	Open Channel Flow Uniformity Test (5.5)	1
11.	Wave Generator (Plunger-Float Type)	1
12.	Propeller Type Current Meter	1

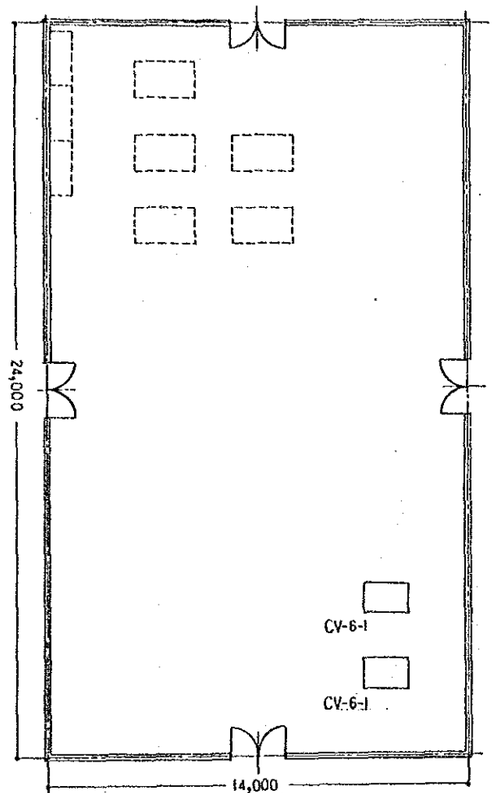
F. Laboratory: Computer Training

1.	Personal Computer	5

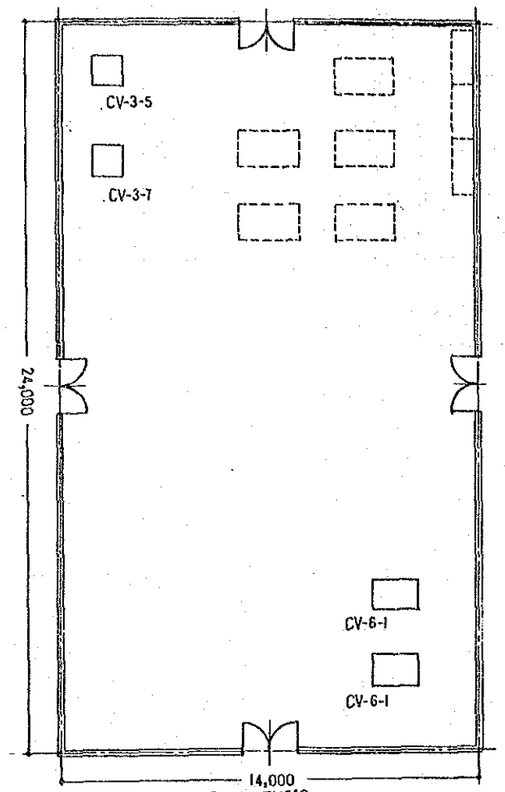
Additional Items

Cubic Permeability Apparatus	1
Specimen Finishing Machine	1
Specimen Finishing Machine	1
R-meter	1

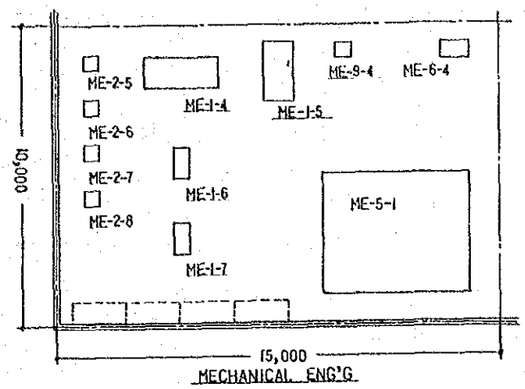
APPENDIX 7. LAYOUT PLAN OF EQUIPMENT IN TARGET 11 UNIVERSITIES



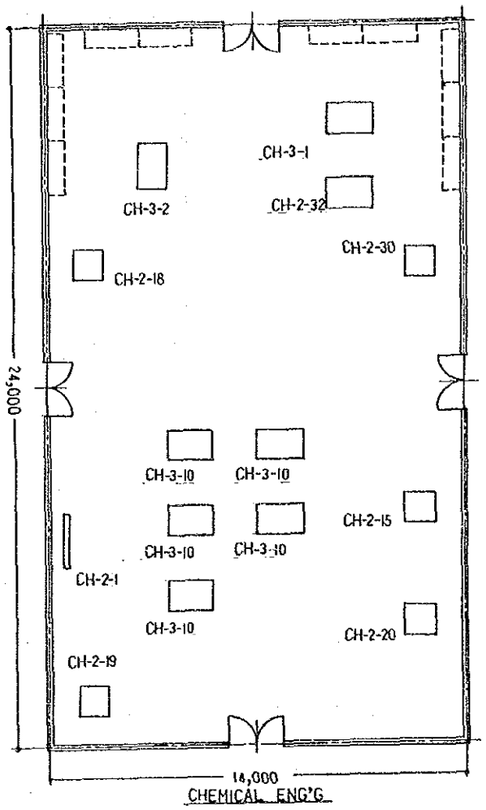
CIVIL ENG'G
SOIL MECHANICAL LAB.



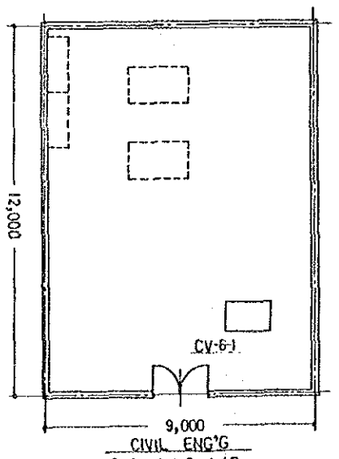
CIVIL ENG'G
MATERIAL TESTING LAB.



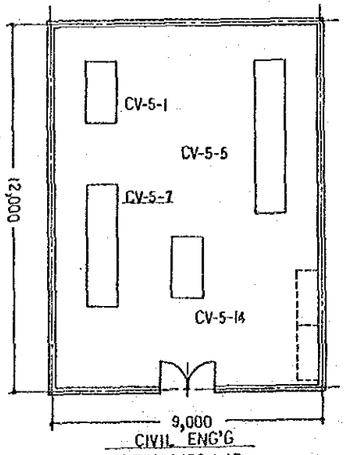
MECHANICAL ENG'G



CHEMICAL ENG'G



CIVIL ENG'G
SURVEYING LAB.



CIVIL ENG'G
HYDRAULICS LAB.

CODE NO.	EQUIPMENT NAME	Q'TY
CV-1-5	MARSHALL TEST APPARATUS	1
CV-1-7	LOS-ANGELS ABRATION TESTING MACHINE	1
CV-5-1	FLOATING BODY EXPERIMENTAL APPARATUS	1
CV-5-5	UNIVERSAL HYDRAULICS EXPERIMENTAL APP.	1
CV-5-7	RESISTANT LOSS MEASURING APPARATUS	1
CV-5-16	WAVE GENERATOR	1
ME-2-5	BRINEL HARDNESS TESTER	1
ME-2-6	ROCKWELL HARDNESS TESTER	1
ME-2-7	VICKERS HARDNESS TESTER	1
ME-2-8	ERICHSEN CUPPING TESTER	1

CODE NO.	EQUIPMENT NAME	Q'TY
ME-5-1	SYNTHETIC STORO-EXPERIMENTAL MACHINE	1
ME-6-4	ORSAT-LUNGE GAS ANALYZER	1
ME-1-4	SHAPING MACHINE	1
ME-1-5	BAND SAWING MACHINE	1
ME-1-6	HACK SAWING MACHINE	1
ME-9-4	VARIABLE TRANSFORMER	1
CH-2-1	SUPPORT LAB-FRAME SET	1
CH-2-15	MUFFLE FURNACE	1
CH-2-18	AIR COMPRESSOR	1
CH-2-19	WATER BATH, TABLE TOP TYPE	1

CODE NO.	EQUIPMENT NAME	Q'TY
CH-2-20	SHAKER, ROTARY TYPE	1
CH-2-30	REFRIGERATOR	1
CH-3-2	HEAT CONDUCTIVITY MEASURING APPARATUS	1
ME-1-7	PEDESTAL GRINDER	1
CV-6-1	PERSONAL COMPUTER	5
CH-2-32	WATER DISTILLING APPARATUS	1
CH-3-1	FLUID FRICTION APPARATUS	1
CH-3-10	PERSONAL COMPUTER	5

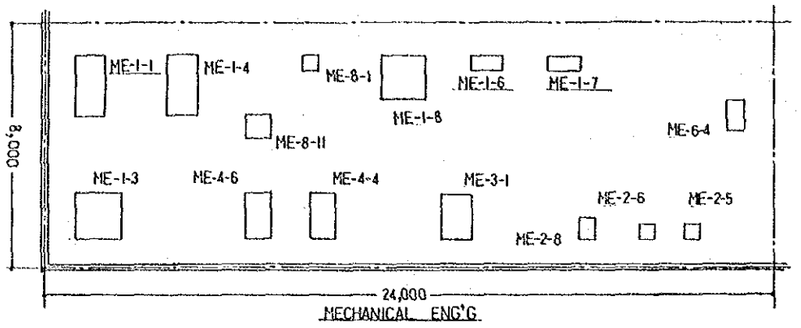
HIGHER EDUCATION DEVELOPMENT SUPPORT PROJECT

LABORATORY EQUIPMENT LAYOUT PLAN

UNIVERSITY SYIAH KUALA | ENG'G FACULTY

DATE : OCT. 1990 | DWG. NO. SY-900

J I C A A-7-1



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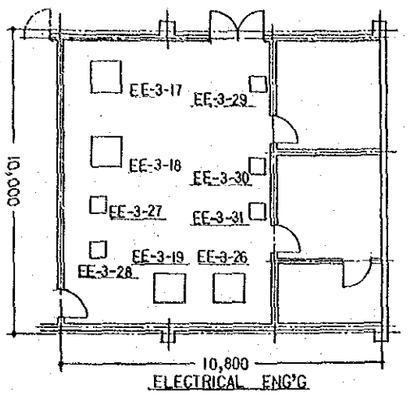
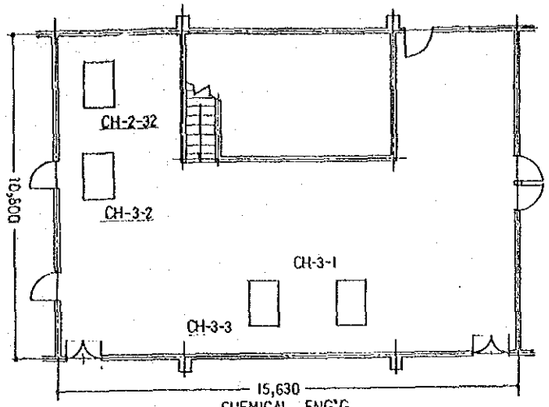
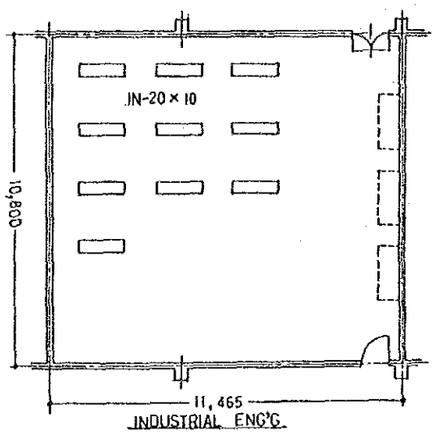


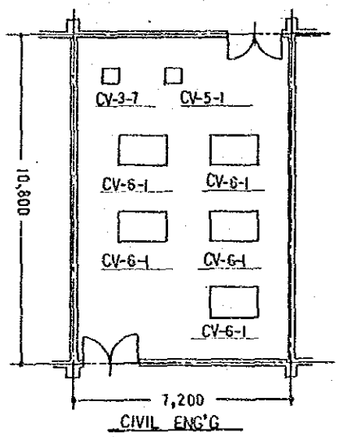
ELECTRICAL ENG'G



CHEMICAL ENG'G
CHEMICAL TECHNOLOGY OPERATION LAB.



INDUSTRIAL ENG'G



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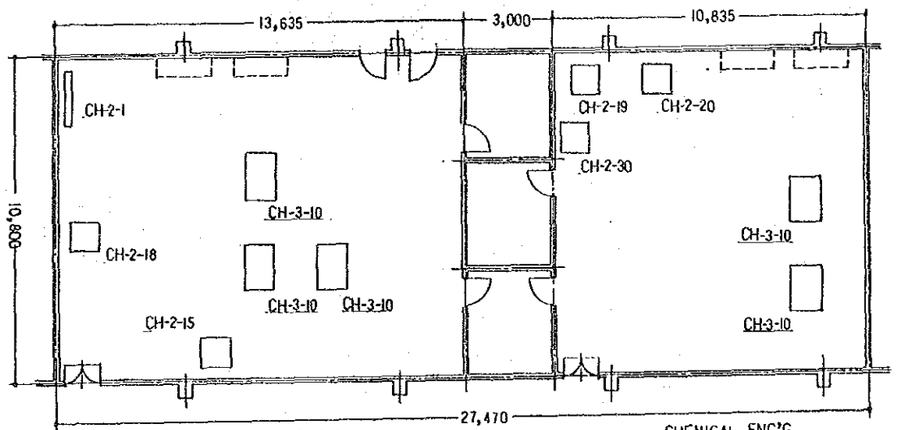
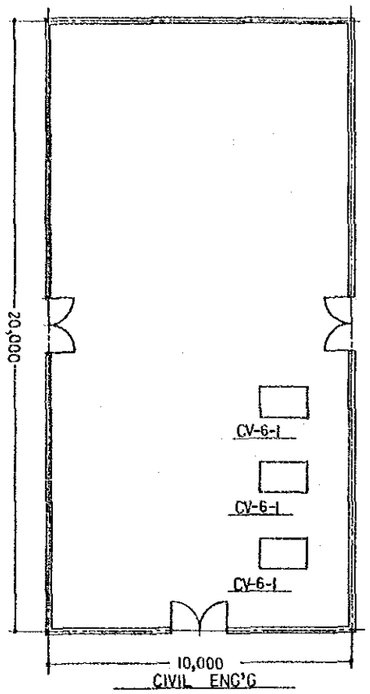


CHEMICAL ENG'G
RESEARCH LAB.

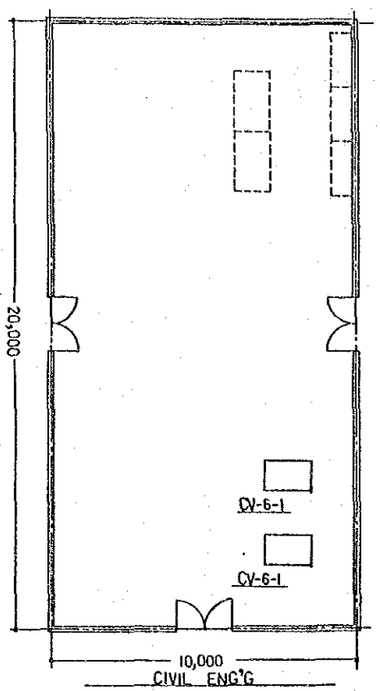
CHEMICAL ENG'G
MICRO BIOLOGY LAB.

CODE NO.	EQUIPMENT NAME	Q'TY	CODE NO.	EQUIPMENT NAME	Q'TY	CODE NO.	EQUIPMENT NAME	Q'TY	CODE NO.	EQUIPMENT NAME	Q'TY
ME-1-1	LATHE	1	ME-8-11	SURFACE PLATE	1	CH-2-30	REFRIGERATOR	1	EE-3-27	AC HIGH VOLTAGE TEST SET	1
ME-1-3	UNIVERSAL MILLING MACHINE	1	EE-3-17	AC HIGH VOLTAGE TEST SET	1	CH-3-1	FLUID FRICTION APPARATUS	1	EE-3-28	DC HIGH VOLTAGE TEST SET	1
ME-1-4	SHAPING MACHINE	1	EE-3-18	DC HIGH VOLTAGE TEST SET	1	CH-3-3	FLOW BED APPARATUS	1	EE-3-29	TRANSMISSION DEMONSTRATOR UNIT	1
ME-2-5	BRINEL HARDNESS TESTER	1	EE-3-19	IMPULSE VOLTAGE GENERATOR	1	ME-1-6	HACK SAWING MACHINE	1	EE-3-30	RELAY TESTING SET	1
ME-2-6	ROCKWELL HARDNESS TESTER	1	EE-3-26	HIGH VOLTAGE EXPERIMENTAL UNIT	1	ME-1-7	PEDESTAL GRINDER	1	EE-3-31	CABLE FOLT ROCATOR	1
ME-2-8	ERICHSEN CUPPING TESTER	1	CH-2-1	SUPPORT LAB-FRAME SET	1	IN-20	DRAWING INSTRUMENT	10	CH-2-32	WATER DISTILLING APPARATUS	1
ME-6-4	PICKLING BATH	1	CH-2-15	MUFFLE FURNACE	1	ME-1-8	UNIVERSAL TOOL & CUTTER GRINDER	1	CH-3-2	HEAT CONVECTION APPARATUS	1
ME-8-1	WELDING ROD DRYER	1	CH-2-18	AIR COMPRESSOR	1	CV-3-7	LOS ANGELES ABRATION TESTING M/C	1	CH-3-10	PERSONAL COMPUTER	5
VC-1-4	ORSAT-LUNGE GAS ANALYZER	1	CH-2-19	WATER BATH, TABLE TOP TYPE	1	CV-5-1	FLOATING BODY EXPERIMENTAL APP.	1			
VC-1-1	VIBRATION TESTER	1	CH-2-20	SHAKER, ROTARY TYPE	1	CV-6-1	PERSONAL COMPUTER	5			

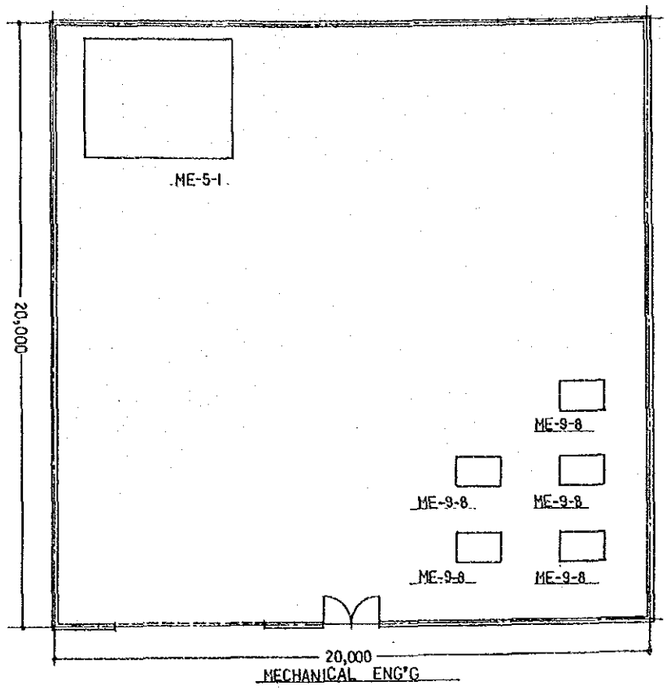
HIGHER EDUCATION DEVELOPMENT SUPPORT PROJECT			
LABORATORY EQUIPMENT LAYOUT PLAN			
UNIVERSITY SUMATRA UTARA			ENG' G FACULTY
DATE	OCT. 1990	DWG. NO.	SU-900
J I C A			A-7-2



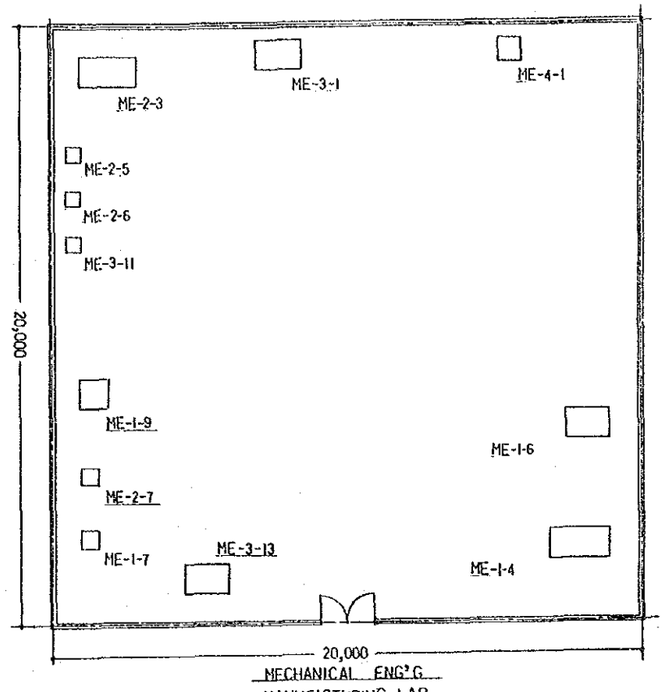
CIVIL ENG'G
SOIL MECHANICS LAB.



CIVIL ENG'G
HIGHWAY AND SURVEYING LAB.



MECHANICAL ENG'G
FLUID MECHANICS LAB.



MECHANICAL ENG'G
MANUFACTURING LAB.

CODE NO.	EQUIPMENT NAME	Q'TY	CODE NO.	EQUIPMENT NAME	Q'TY
CV-6-1	PERSONAL COMPUTER	5	ME-9-1	ELECTRIC MUFFLE FURNACE	1
ME-1-9	DRILL GRINDER	1	ME-9-11	PLATFORM SCALE	1
ME-2-7	VICKERS HARDNESS TESTER	1	ME-4-1	ELECTRIC SPOT WELDING MACHINE	1
ME-3-13	SAND BLASTING MACHINE	1	ME-5-1	SYNTHETIC HYDRO-EXPERIMENTAL MACHINE	1
ME-1-4	SHAPING MACHINE	1	ME-9-8	PERSONAL COMPUTER	5
ME-1-6	BACK SAWING MACHINE	1			
ME-1-7	PEDESTAL GRINDER	1			
ME-2-3	CHARPY IMPACT TESTING MACHINE	1			
ME-2-5	BRINEL HARDNESS TESTER	1			
ME-2-6	ROCKWELL HARDNESS TESTER	1			

HIGHER EDUCATION DEVELOPMENT SUPPORT PROJECT			
LABORATORY EQUIPMENT LAYOUT PLAN			
UNIVERSITY MEDAN AREA			ENG' G FACULTY
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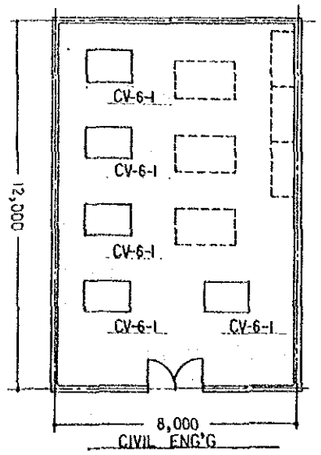
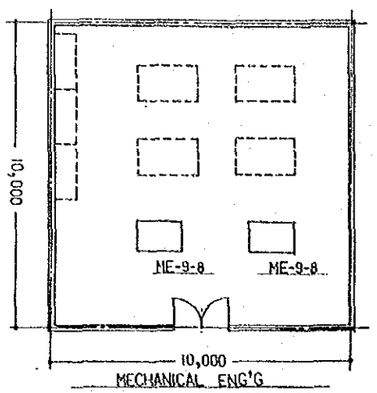
J I C A			A-7-3



CIVIL ENG'G
SOIL & CONCRETE LAB.



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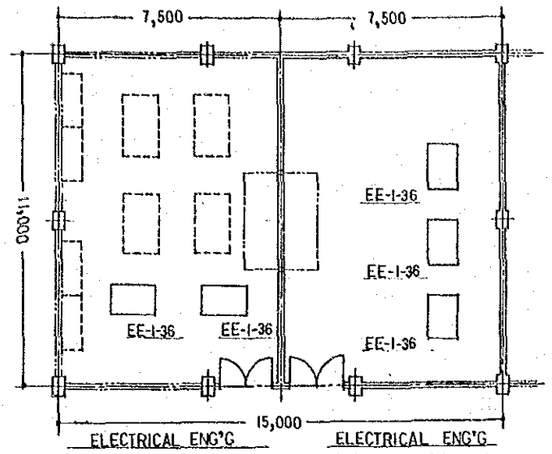
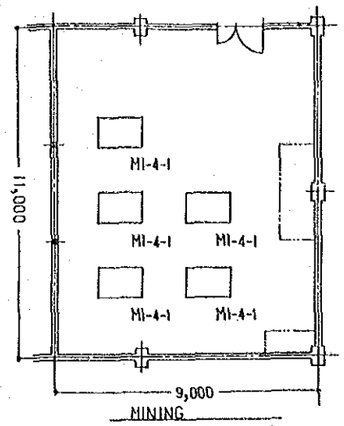
MECHANICAL TECHNOLOGY LAB.

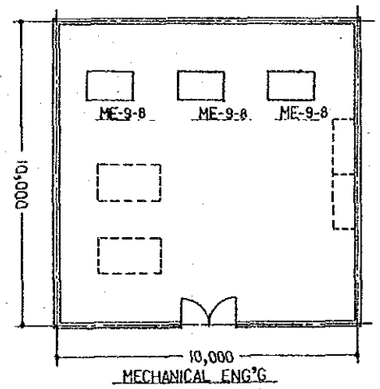


ELECTRICAL ENG'G
ELECTRICAL CONTROL LAB.

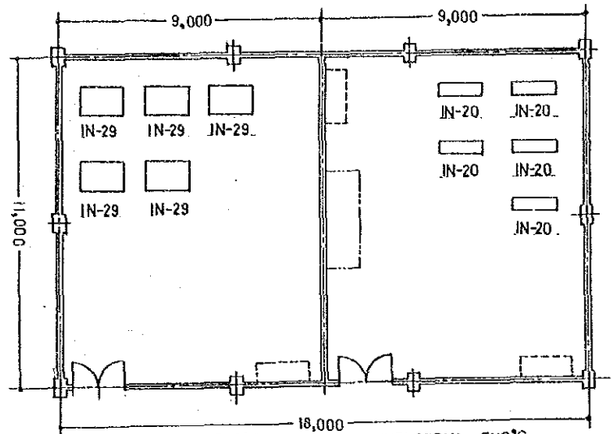
ELECTRICAL ENG'G
HIGH VOLTAGE LAB.



MINING
BASIC GEOLOGY LAB.



MECHANICAL ENG'G
METALLURGY LAB.



INDUSTRIAL ENG'G
STATISTIC LAB.

INDUSTRIAL ENG'G
PLANT LAYOUT LAB.

CODE NO.	EQUIPMENT NAME	Q'TY
CV-6-1	PERSONAL COMPUTER	5
ME-9-8	PERSONAL COMPUTER	5
MI-4-1	PERSONAL COMPUTER	5
EE-1-36	PERSONAL COMPUTER	5
IN-20	DRAWING INSTRUMENT	5
IN-29	PERSONAL COMPUTER	5

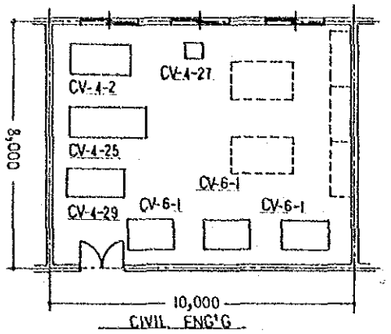
HIGHER EDUCATION DEVELOPMENT SUPPORT PROJECT

LABORATORY EQUIPMENT LAYOUT PLAN

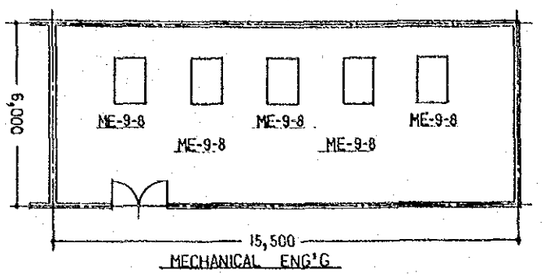
UNIVERSITY DARMA AGUN | ENG' G FACULTY

DATE: OCT. 1990 | DWG. NO.: DA-900

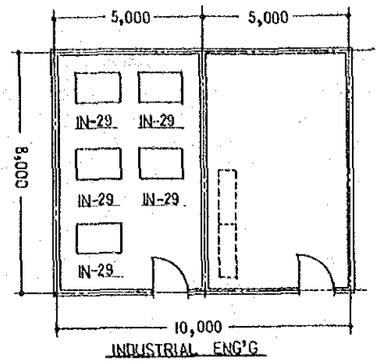
J I C A A-7-4



CIVIL ENG'G
CONCRETE LAB.



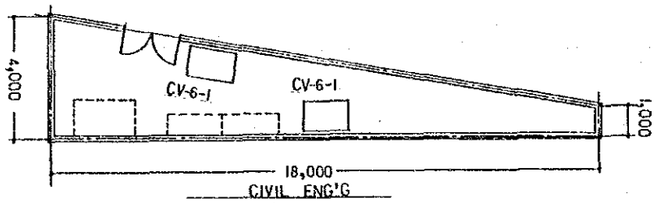
MECHANICAL ENG'G



INDUSTRIAL ENG'G

INDUSTRIAL STASTICS LAB.

PLANT LAYOUT LAB.



CIVIL ENG'G
SURVEYING AND OTHERS

CODE NO.	EQUIPMENT NAME	Q'TY	CODE NO.	EQUIPMENT NAME	Q'TY
CV-4-2	THERMOSTATIC CIRCULATION SYSTEM	1			
CV-4-25	COMPRESSION TESTING MACHINE (100t)	1	IN-29	PERSONAL COMPUTER	5
CV-4-27	LOS ANGELES ABRATION TESTING M/C	1			
CV-4-29	UNIVERSAL TESTING MACHINE (100t)	1			
CV-6-1	PERSONAL COMPUTER	5			
ME-9-8	PERSONAL COMPUTER	5			

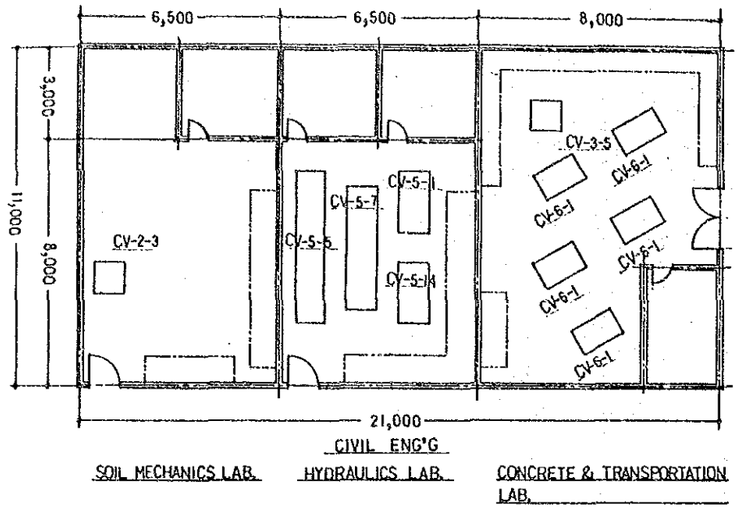
HIGHER EDUCATION DEVELOPMENT SUPPORT PROJECT

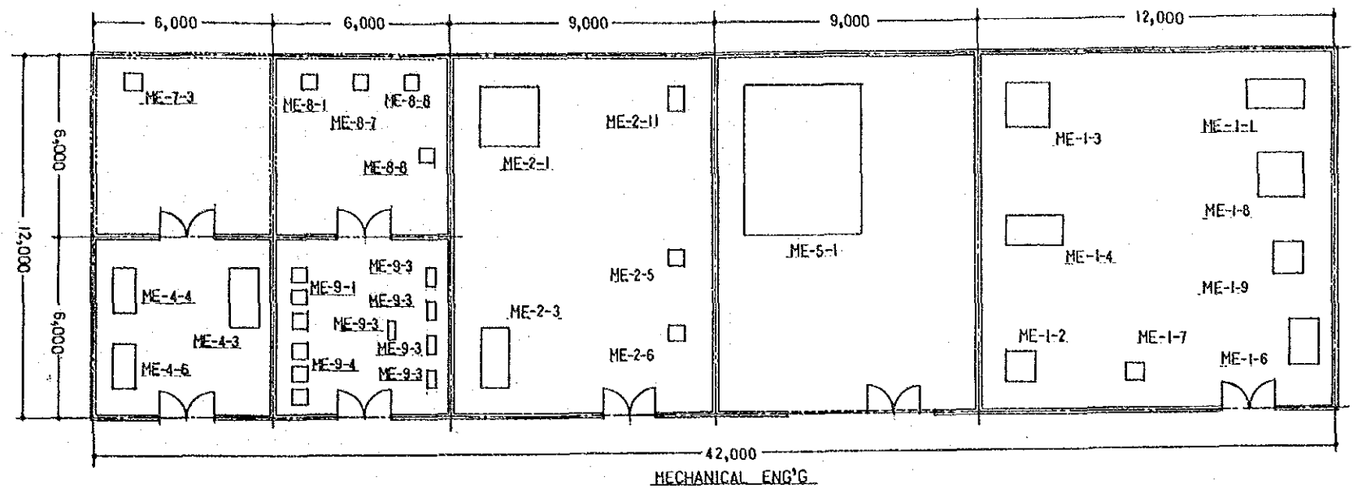
LABORATORY EQUIPMENT LAYOUT PLAN

UNIVERSITY ISLAM SUMATRA UTARA | ENG' G FACULTY

DATE: OCT. 1990 | DWG. NO. IS-900

J I C A A-7-5





CODE NO.	EQUIPMENT NAME	Q'TY	CODE NO.	EQUIPMENT NAME	Q'TY	CODE NO.	EQUIPMENT NAME	Q'TY	CODE NO.	EQUIPMENT NAME	Q'TY
CV-2-3	MULTI TRIAXIAL APPARATUS	1	ME-1-6	HACK SAWING MACHINE	1				ME-1-8	UNIVERSAL TOOL & CUTTER GRINDER	1
CV-3-5	MARSHALL TEST APPARATUS	1	ME-1-7	PEDESTAL GRINDER	1	ME-7-3	CALORIMETER	1	ME-1-9	DRILL GRINDER	1
CV-5-1	FLOATING BODY EXPERIMENTAL APPARATUS	1	ME-2-1	UNIVERSAL TESTING MACHINE	1	ME-8-1	VIBRATION TESTER	1	ME-2-5	BRINELL HARDNESS TESTER	1
CV-5-5	UNIVERSAL HYDRAULICS EXPERIMENTAL APP.	1	ME-2-3	CHARPY IMPACT TESTING MACHINE	1	ME-8-7	TOOL MAKER'S MICROSCOPE	1	ME-2-6	ROCKWELL HARDNESS TESTER	1
CV-5-7	RESISTANT LOSS MEASURING APPARATUS	1	ME-2-11	METAL SPECIMEN POLISHING MACHINE	1	ME-8-8	SURFACE ROUGHNESS TESTER	2	CV-6-1	PERSONAL COMPUTER	5
CV-5-14	WAVE GENERATOR	1				ME-9-1	WHEATSTONE BRIDGE				
ME-1-1	LATHE	1	ME-4-3	OXY-ACE. GAS WELDING & CUTTING KIT	1						
ME-1-2	RADIAL DRILLING MACHINE	1	ME-4-4	PICKLING BATH	1	ME-9-3	DECADE RESISTANCE METER				
ME-1-3	UNIVERSAL MILLING MACHINE	1	ME-4-6	WELDING ROD DRYER	1	ME-9-4	VARIABLE TRANSFORMER				
ME-1-4	SHAPING MACHINE	1	ME-5-1	SYNTHETIC HYDRO-EXPERIMENTAL MACHINE	1						

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LABORATORY EQUIPMENT LAYOUT PLAN

UNIVERSITY ANDALAS | ENG' G FACULTY

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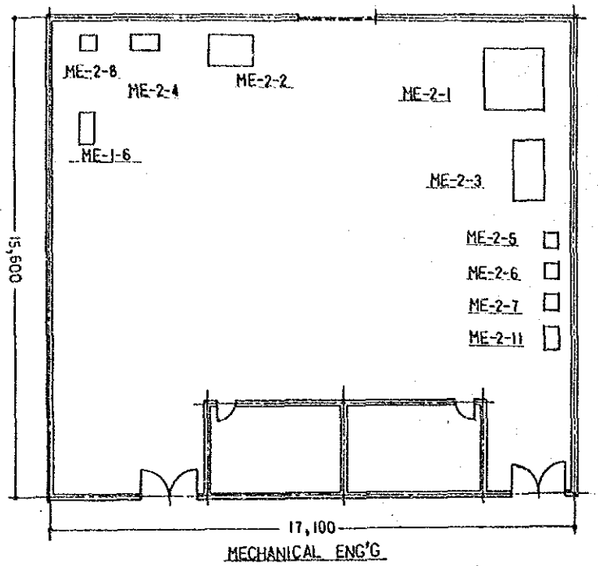
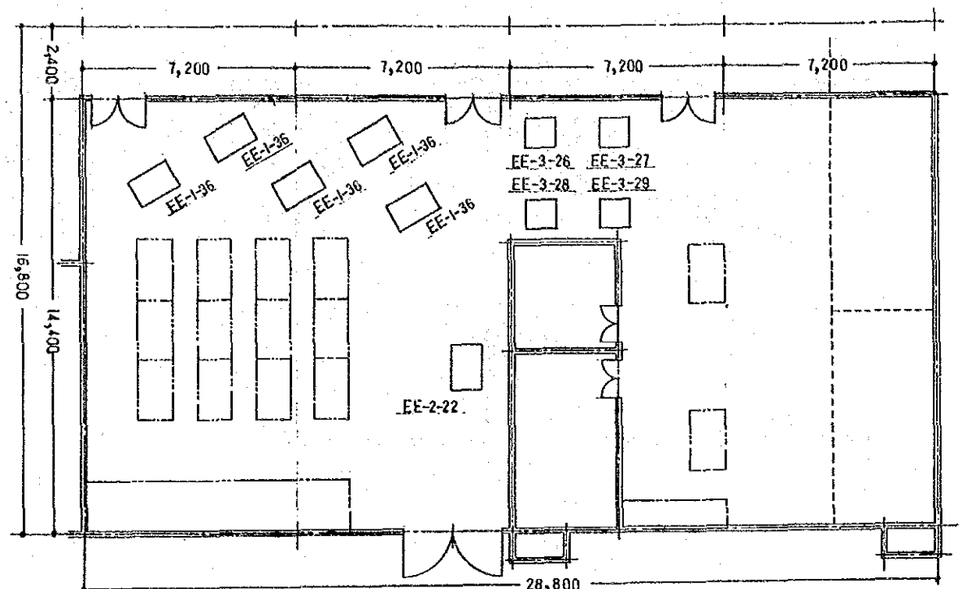
J I C A A-7-6

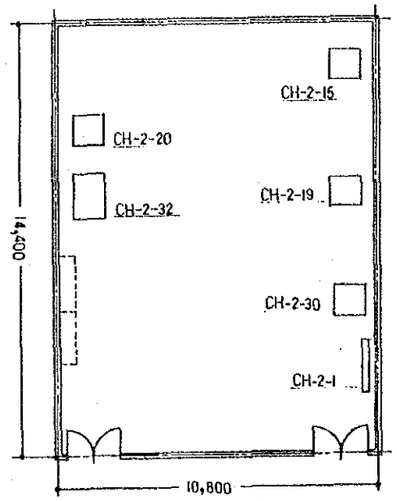


MECHANICAL ENG'G



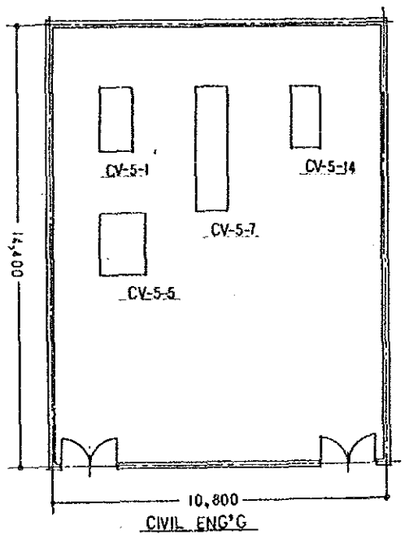
ELECTRICAL ENG'G

ELECTRICAL MEASUREMENT LAB.

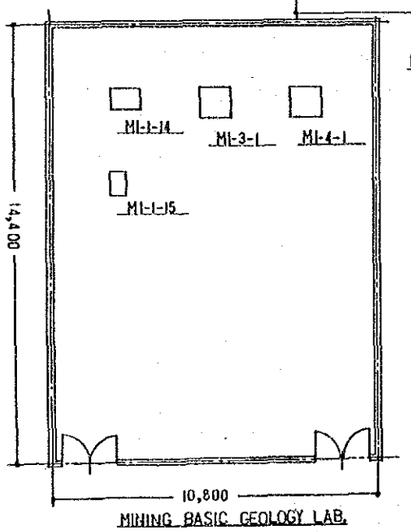


CHEMICAL ENG'G
RESEARCH LAB.

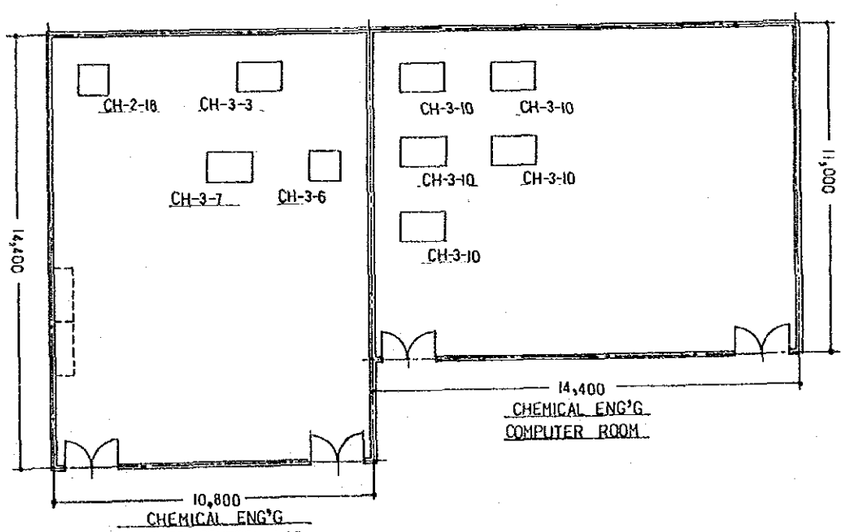
HIGH VOLTAGE LAB.



CIVIL ENG'G



MINING BASIC GEOLOGY LAB.



CHEMICAL ENG'G
PROCESS CONTROL LAB.

CHEMICAL ENG'G
COMPUTER ROOM

CODE NO.	EQUIPMENT NAME	Q'TY	CODE NO.	EQUIPMENT NAME	Q'TY	CODE NO.	EQUIPMENT NAME	Q'TY	CODE NO.	EQUIPMENT NAME	Q'TY
ME-1-1	UNIVERSAL TESTING MACHINE	1	EE-3-26	HIGH VOLTAGE EXPERIMENTAL UNIT	1	CH-3-3	FLOW BED APPARATUS	1	MI-1-14	DRYING OVEN	1
ME-2-1	CHARPY IMPACT TESTING MACHINE	1	EE-3-27	AC DIELECTRIC WITHSTAND TEST SET	1	CH-3-6		1	MI-1-15	WATER BATH	1
ME-2-5	BRINELL HARDNESS TESTER	1	EE-3-28	DC DIELECTRIC WITHSTAND TEST SET	1	CH-3-7	GAS ABSORPTION TESTING APPARATUS	1	MI-3-1	ELECTRIC SCANNING TEST SET	1
ME-2-6	ROCKWELL HARDNESS TESTER	1	EE-3-29	TRANSMISSION LINE DEMONSTRATOR	1	CH-2-32	PERSONAL COMPUTER	5	MI-4-1	PERSONAL COMPUTER	5
ME-2-7	VICKERS HARDNESS TESTER	1	CH-2-1	SUPPORT LAB-FRAME SET	1	CH-1-10	PERSONAL COMPUTER	5	EE-2-22	ELEVATOR SYSTEM EXPERIMENTAL APP.	1
ME-2-11	METAL SPECIMEN POLISHING MACHINE	1	CH-2-15	MUFFLE FURNACE		CV-5-1	FLOATING BODY EXPERIMENTAL APP.	1	EE-1-36	PERSONAL COMPUTER	5
ME-1-6	HACK SAWING MACHINE	1	CH-2-28	AIR COMPRESSOR		CV-5-5	UNIVERSAL HYDRAULICS EXP. APP.	1			
ME-2-2	TORSION TESTING MACHINE	1	CH-2-19	WATER BATH, TABLE TOP TYPE		CV-5-7	RESISTANT LOSS MEASURING APPARATUS	1			
ME-2-4	TORSION & BENDING FATIQUE T. M/C	1	CH-2-20	SHAKER, ROTARY TYPE		CV-5-14	WAVE GENERATOR (PLUNGER FLOAT TYPE)	1			
ME-2-8	ERICHSEN CUPPING TESTING	1	CH-2-30	REFRIGERATOR	1						

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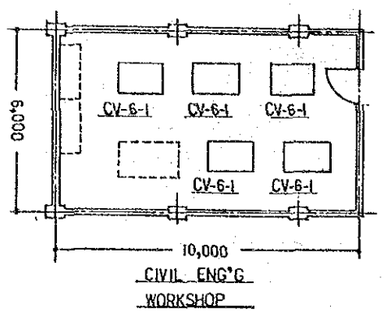
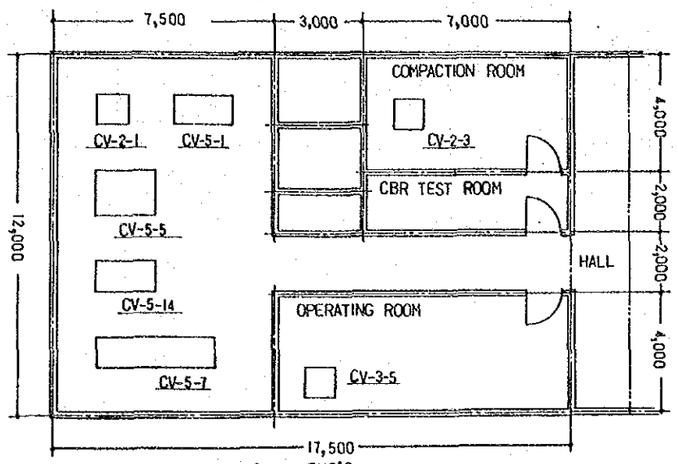
LABORATORY EQUIPMENT LAYOUT PLAN		
UNIVERSITY SRIWIJAYA		ENG' G FACULTY
DATE : OCT. 1990	DWG. NO.	SR-900
JICA		A-7-7



CIVIL ENG'G
WORKSHOP



CIVIL ENG'G

CODE NO.	EQUIPMENT NAME	Q'TY
CV-2-3	MULTI TRIAXIAL APPARATUS	1
CV-3-5	MARSHALL TEST APPARATUS	1
CV-2-1	DIRECT SHEAR APPARATUS	1
CV-5-1	FLOATING BODY EXPERIMENTAL APPARAT.	1
CV-5-5	UNIVERSAL HYDRAULIC EXP. APPARATUS	1
CV-5-7	RESISTANT LOSS MEASURING APPARATUS	1
CV-5-14	WAVE GENERATOR (PLUNGER FLOAT TYPE)	1
CV-6-1	PERSONAL COMPUTER	5

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LABORATORY EQUIPMENT LAYOUT PLAN

UNIVERSITY LAMPUNG | ENG' G FACULTY

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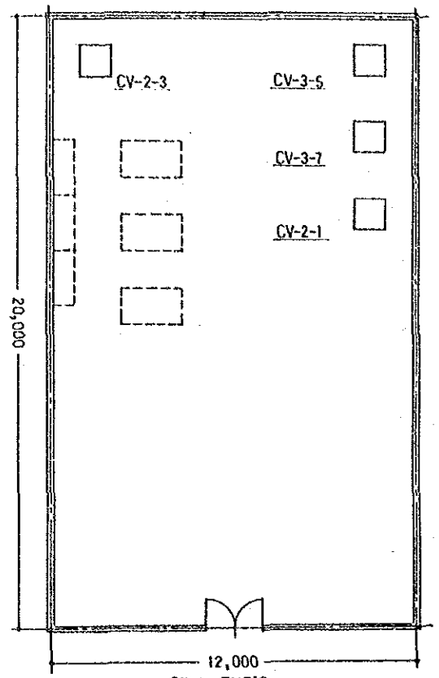
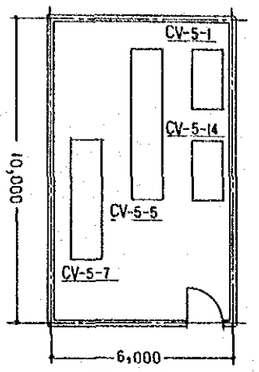
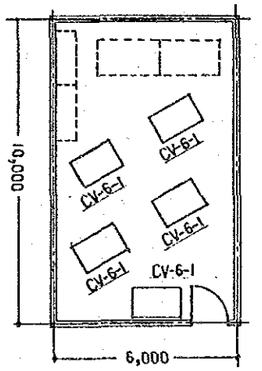
J I C A A-7-8



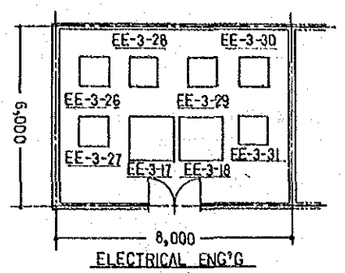
CIVIL ENG'G
CONCRETE & SOIL MECHANICS LAB.



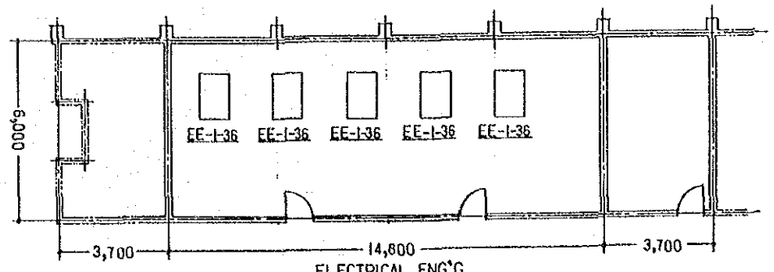
CIVIL ENG'G
HYDRAULICS LAB.



CIVIL ENG'G
TRANSPORTATION LAB.



ELECTRICAL ENG'G
HIGH VOLTAGE LAB.



TOILET

ELECTRICAL ENG'G
COMPUTER ROOM

STORAGE ROOM

CODE NO.	EQUIPMENT NAME	Q'TY	CODE NO.	EQUIPMENT NAME	Q'TY
CV-2-3	MULTI TRIAXIAL APPARATUS	1	EE-3-29	TRANSMISSION LINE DEMONSTRATOR	1
CV-3-5	MARSHALL TEST APPARATUS	1	EE-3-30	PORTABLE PROTECTIVE RELAY TEST SET	1
CV-3-7	LOS-ANGELES ABRATION TESTING MACHINE	1	EE-3-31	FAULT LOCATOR	1
CV-5-1	FLOATING BODY EXPERIMENTAL APPARATUS	1	EE-1-36	PERSONAL COMPUTER	5
CV-5-5	UNIVERSAL HYDRAULICS EXPERIMENTAL APP.	1	EE-3-17	AC HIGH VOLTAGE TEST SET	1
CV-5-7	RESISTANT LOSS MEASURING APPARATUS	1	EE-3-18	DC HIGH VOLTAGE TEST SET	1
CV-5-14	WAVE GENERATOR	1	CV-2-1	DIRECT SHEAR APPARATUS	1
EE-3-26	HIGH VOLTAGE EXPERIMENTAL UNIT	1	CV-6-1	PERSONAL COMPUTER	5
EE-3-27	AC DIELECTRIC WITHSTAND TEST SET	1			
EE-3-28	DC DIELECTRIC WITHSTAND TEST SET	1			

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LABORATORY EQUIPMENT LAYOUT PLAN

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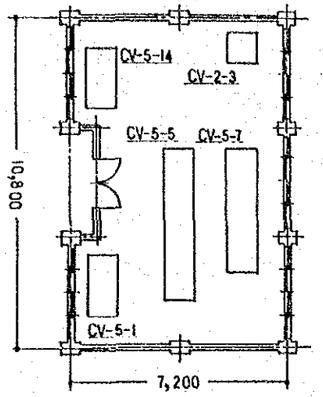
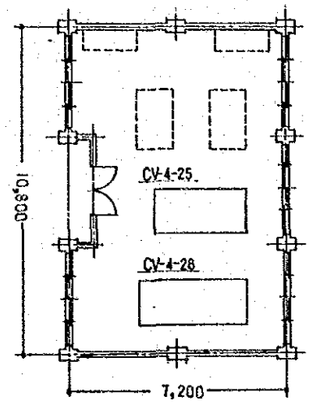


CIVIL ENG'G
STRUCTURE & HYDRAULICS LAB.



CIVIL ENG'G
ROAD LAB.

CODE NO.	EQUIPMENT NAME	Q'TY
CV-2-3	MULTI TRIAXIAL APPARATUS	1
CV-5-1	FLOATING BODY EXPERIMENTAL APPARATUS	1
CV-5-5	UNIVERSAL HYDRAULICS EXPERIMENTAL APP.	1
CV-5-7	RESISTANT LOSS MEASURING APPARATUS	1
CV-5-14	WAVE GENERATOR	1
CV-4-25	COMPRESSION TESTING MACHINE (100t)	1
CV-4-28	UNIVERSAL TESTING MACHINE (200t)	1

HIGHER EDUCATION DEVELOPMENT SUPPORT PROJECT

LABORATORY EQUIPMENT LAYOUT PLAN

UNIVERSITY LAMBUNG MANGKURAT | ENG' G FACULTY

DATE: OCT. 1990 | DWG. NO. LM-900

J I C A

APPENDIX 8. LIST OF PRESENT CURRICULUM IN TARGET 11 UNIVERSITIES

Table A-8-1 (1) Present Curriculum for Civil Engineering

	UNSYIAH	USU	NOMMENSEN	UMA	UDA	UISU	UNAND	UNSRI	UNILA	UNTAN	UNLAM
1. Mathematics I	*	*	*	*	*	*	*	*	*	*	*
2. Physics I	*	*	*	*	*	*	*	*	*	*	*
3. Pancasila	*	*	*	*	*	*	*	*	*	*	*
4. Basic Culture	*	*	*	*	*	*	*	*	*	*	*
5. Basic Sociology	*	*	*	*	*	*	*	*	*	*	*
6. Indonesian	*	*		*		*	*				*
7. Mathematics II	*	*	*	*	*	*	*	*	*	*	*
8. Physics II	*	*	*	*	*	*	*	*	*	*	*
9. Industrial Drawing	*	*	*	*	*	*	*	*	*	*	*
10. Structural Analysis	*	*	*	*	*	*	*	*	*	*	*
11. Religion	*	*	*	*	*	*	*	*	*	*	*
12. English	*	*	*	*	*	*	*	*	*	*	*
13. Mathematics III	*	*	*	*	*	*	*	*	*	*	*
14. Military Training	*	*	*	*	*	*	*	*	*	*	*
15. Structural Analysis II	*	*	*	*	*	*	*	*	*	*	*
16. Fluid Mechanics	*	*	*	*	*	*	*	*	*	*	*
17. Survey I	*	*	*	*	*	*		*		*	*
18. Industrial Geology	*	*	*	*	*	*	*	*	*	*	*
19. Construction of Structure	*	*	*	*	*	*	*	*		*	*
20. Mathematics IV	*	*	*	*	*	*	*	*	*	*	*
21. Structural Analysis III	*	*	*	*	*	*	*	*	*	*	*
22. Fluid Mechanics	*	*	*	*	*	*	*	*	*	*	*
23. Survey II	*	*	*	*	*	*		*		*	*
24. Soil Mechanics/ Basic Mechanics	*	*	*	*	*	*	*	*	*	*	*
25. Statistics	*	*	*	*	*	*	*	*		*	*
26. Surveying Exercise		*	*	*	*						
27. Structural Analysis IV	*	*	*	*	*	*	*	*	*	*	*
28. Fluid Mechanics II	*	*	*	*	*	*	*	*	*	*	*
29. System Engineering		*									
30. Hydraulics	*	*	*	*		*	*	*	*	*	*
31. Concrete Construction	*	*	*	*	*	*	*	*	*	*	*
32. Steel Structure Construction I	*	*	*	*	*	*	*	*	*	*	*
33. Road I	*	*	*	*	*	*	*	*	*	*	*
34. Rail Road I	*	*	*		*	*	*	*	*		*
35. Manufacture Practice for Concrete Structure		*	*		*						
36. Manufacture Practice Steel Beam		*	*		*						
37. Structural Analysis V	*	*	*	*	*	*	*	*	*	*	*
38. Concrete Construction	*	*	*	*	*	*	*	*	*	*	*
39. Steel Beam Construction II	*	*	*	*	*	*	*	*	*	*	*
40. Wood Construction	*	*	*	*	*	*	*	*	*	*	*
41. Irrigation	*	*	*	*	*	*	*	*	*	*	*
42. Road II	*	*	*	*	*	*	*	*	*	*	*
43. Basic Mechanics II	*	*	*	*	*	*	*	*	*	*	*
44. Basic Mechanics Exercise	*	*	*		*						
45. Concrete Engineering Exercise		*	*		*						
46. Hydraulics	*	*	*	*	*	*	*	*	*	*	*
47. Water Structure	*	*	*	*	*	*	*	*			*
48. Air Port	*	*	*	*	*	*	*	*	*	*	*
49. Transportation Engineering	*	*	*	*	*	*	*	*	*	*	*
50. Computer Language	*	*	*	*	*	*	*	*	*	*	*
51. Structural Analysis	*	*	*	*	*	*	*	*	*	*	*
52. Blastic Theory	*	*	*						*		
53. Concrete Construction III	*	*	*	*	*	*	*	*	*	*	*
54. Steel Beam Construction	*	*	*	*	*	*	*	*	*	*	*
55. Senior Hydraulics	*	*	*	*		*	*	*	*	*	*

Table A-8-1 (2) Present Curriculum for Civil Engineering

	UNSYIAH	USU	NOMMENSEN	UMA	UDA	UISU	UNAND	UNSRI	UNILA	UNTAN	UNLAM
56. Sea Mechanics	*	*									
57. Senior Fluid Mechanics	*	*	*		*	*	*	*		*	*
58. Fluid Structure	*	*		*		*	*				
59. Senior Soil Mechanics	*	*	*		*	*	*	*	*	*	*
60. Soil Mechanics Survey		*									
61. Road Material		*									
62. Road Sewage		*									
63. Senior Soil Mechanics	*	*	*	*	*	*	*	*	*	*	*
64. Urban Planning	*	*		*	*	*					
65. Sanitary Engineering	*	*	*	*	*	*	*	*			*
66. Jetty	*	*	*	*	*	*	*	*	*	*	*
67. Industrial Economics	*	*	*	*	*	*	*			*	
68. Structural Analysis VII		*	*	*	*	*	*	*		*	*
69. Kinetics I		*									
70. Elasticity		*	*		*				*		
71. Environmental Engineering		*					*	*			
72. Effluent Engineering	*	*							*		
73. Transportation Planning		*									
74. Trafic Theory		*									
75. Stability Theory	*	*	*								
76. Senior Foundation Engineering	*	*	*	*	*	*		*	*	*	*
77. Real Work Study	*										
78. General Chemistry	*										
79. Geometrical Drawing	*										
80. Nomografi	*										
81. Numerical Analysis	*										
82. Theory of Mechanics	*										
83. Linnear Program	*										
84. Building Materials	*										
85. Building Materials Experiment	*										
86. Fluid Mechanics Experiment	*										
87. Theory of Earthquake	*										
88. Vibration Mechanics	*										
89. Continum Mechanics	*										
90. Hethod of Finite Element	*										
91. Structure Design	*										
92. Concrete Design	*										
93. Steel Design	*										
94. Wood Design	*										
95. Transportation Basics	*										
96. Project Development Administration	*										
97. Quantity Surveying	*										
98. Channel and Sluice	*										
99. Research Methodology	*										
100. Foundation Design	*										
101. Stability Design on Slope	*										
102. Harbour Design	*										
103. Dam Design	*										
104. Realization Assignment Design	*										
105. Supervision Assignment Design	*										
106. Road and Highway Design	*										
107. Mechanics Soil Moving Design	*										
108. Budget Planning	*										
109. Machine Knowledge	*										
110. Introduction of Area Development	*										

Table A-8-1 (3) Present Curriculum for Civil Engineering

	UNSYIAH	USU	NOMMENSEN	UMA	UDA	UISU	UNAND	UNSRI	UNILA	UNTAN	UNLAM
111. Electric Knowledge	*										
112. Ecology	*										
113. Building Physics	*										
114. Building Utility	*										
115. Comparative Study	*										
116. Decision Theory	*										
117. Field Soil Mechanics	*										
118. Rodk Mechanics	*										
119. Ethics			*								
120. Building Materials Sciences			*								
121. Physics Experiment			*								
122. Building Construction Assignment			*								
123. Hydraulics			*								
124. Matriks Analysis			*								
125. Road and Highway Assignment			*								
126. Prepressed Concrete			*								
127. Survey Research			*								
128. Building Dynamics			*								
129. Irrigation Assignment			*								
130. Dam Assignment			*								
131. Real Work Study			*								
132. Earthquake Calculation			*								
133. Hang Truss Bridge			*								
134. Rekastotatic			*								
135. Multistoried Concrete Structure			*								
136. Banking			*								
137. Water Power			*								
138. Controlling and Using of River			*								
139. Prevention of Errotion			*								
140. Special Building Statics			*								
141. Concrete Truss Construction			*								
142. Yield Line Theory			*								
143. Reservoir Operation			*								
144. Ocean Engineering			*								
145. Basic Chemistry								*			
146. Area Knowledge								*			
147. Building Material Sciences								*			
148. Numerical Analysis								*			
149. Project Management								*			
150. Project Financing Administration System								*			
151. Agriculture Hydraulics								*			
152. Pavement Materials								*			
153. Vibration/Earthquake Mechanics								*			
154. Real Field Work								*			
155. Building Material Science/Experiments					*						
156. Physics Experiments					*						
157. Survey Research					*						
158. Roof Assignment					*						
159. Technical Mechanics Assignment					*						
160. Numerical Analysis					*						

Table A-8-1 (4) Present Curriculum for Civil Engineering

	UNSYIAH	USU	NOMMENSEN	UMA	UDA	UISU	UNAND	UNSRI	UNILA	UNTAN	UNLAH
161. Vibration Mechanics					*						
162. Matrix Mechanics					*						
163. Road and Highway Assignment					*						
164. Electric Power Engineering					*						
165. Wood Construction Assignment					*						
166. Dam Construction Assignment					*						
167. Building Physics					*						
168. Chemistry										*	
169. Ecology										*	
170. Building Materials										*	
171. Transportation Basics										*	
172. Earthquake Engineering										*	
173. Project Financing Administration System										*	
174. Real Work Study										*	
175. Building Materials Sciences				*							
176. Studio				*							
177. Survey Research				*							
178. Vibration (Theory of Earthquake)				*							
179. Building Physics				*							
180. Survey Research		*									
181. Building Physics		*									
182. Basic Natural Sciences											*
183. Real Work Study											*
184. Numerical Analysis											*
185. Building Material											*
186. Reclamation and Tides											*
187. Area Development											*
188. Company Economics											*
189. Research Methodology											*
190. Agrioculture											*
191. Reolering											*
192. Technical Analysis									*		
193. Surveying									*		
194. Vibration Mechanics									*		
195. Numerical Method									*		
196. Structure Planning									*		
197. Electric and Mechanics Knowledge									*		
198. Earthquake									*		
199. Technical Steel									*		
200. Surveying and Maping									*		
201. Reinforced Concrete Structure									*		
202. Numerical Analysis									*		
203. Construction Management									*		
204. Hydro Power Engineering									*		
205. Transportation Basics									*		
206. Material Course									*		
207. Bridge Engineering									*		
208. Chemistry							*				
209. Numerical Analysis							*				
210. Building Materials							*				

Table A-8-1 (5) Present Curriculum for Civil Engineering

	UNSYIAH	USU	NOMMENSEN	UMA	UDA	UISU	UNAND	UNSRI	UNILA	UNTAN	UNLAM
211. Earthquake Engineering							*				
212. Introduction to Civil Engineering							*				
213. Surveying I							*				
214. Project Management							*				
215. Capita Selecto [general knowledge that related to the civil engineering field]							*				
216. Cost Estimation							*				
217. Building Realization Method							*				

Table A-8-2(1) Present Curriculum for Mechanical Engineering

Subject	UNSYAH	USU	UMA	UDA	UISU	UNAND	UNSRI	NOMMENSEN
Pancasila	*	*	*		*	*	*	*
Physics I	*	*	*	*	*	*	*	*
Drawing I	*	*	*	*	*	*	*	*
General Chemisny	*	*	*	*	*	*	*	*
Drawing II	*	*						
Indonesian Language	*	*	*	*	*	*	*	*
English	*	*	*	*	*	*	*	*
Religion	*	*	*	*	*	*	*	*
General Culture	*	*	*	*	*		*	*
Sociology	*	*	*		*	*	*	*
Physics II	*	*	*	*	*	*	*	*
Mathematics II	*	*	*	*	*	*	*	*
Engineering Drawing		*	*	*	*		*	*
Material Science	*				*		*	
Engineering Drawing II		*	*	*	*	*	*	*
General Industries	*	*		*			*	
Mathematics III	*	*	*	*	*	*	*	*
Industrialization Technology	*	*	*	*		*		*
Mechanical Engineering I		*	*	*	*	*	*	*
Machine Elements I	*	*	*	*	*	*	*	*
Metallurgy	*	*	*	*	*		*	*
Computer Languages	*	*	*		*	*	*	
General Studium	*	*		*		*		*
Medhanical Engineering II	*		*	*	*	*	*	*
Mechanical Technology II	*	*	*	*	*	*	*	*
Machine Elements II	*	*	*	*	*	*	*	*
Machanical Management	*		*	*	*		*	*
Introduction to Industiral Technology						*	*	
Metallurgical Engineering	*	*	*	*			*	
Thermodynamics I	*	*	*	*	*	*	*	*
Heat Transfer I	*	*	*	*	*	*	*	*
Testing Machines	*	*	*	*	*			*

Table A-8-2(2) Present Curriculum for Mechanical Engineering

Subject	UNSYAH	USU	UMA	UDA	UISU	UNAND	UNSRI	NOMMENSEN
Kinematics of Machinery	*	*	*	*	*		*	*
Fluid Machinery	*	*	*	*	*	*	*	*
Electronic Engineering	*	*	*	*	*	*	*	*
Electirc Power Engineering	*	*	*	*	*	*	*	*
Mechanical Management	*	*	*	*		*	*	*
Numerical Analysis	*					*	*	
Statistics	*					*	*	*
Thermodynamics II	*		*	*			*	*
Strength of Materials	*	*	*	*	*	*		*
Control Technique	*		*	*	*	*		
Computer Programming	*		*	*	*		*	*
Cost Estimation	*				*		*	
Fluid Machinery	*	*	*	*		*	*	*
Industrial Management	*	*	*		*	*	*	*
Heat Transfer II	*					*	*	
Job Trainning	*	*		*	*		*	
Applied Analysis	*					*	*	
Matrix	*					*		
Design for Fatique Limit	*							
Heavy Equipments	*	*						
Transportation Equipments	*							
Automatic Control Technique	*	*	*		*			*
Wear Limit	*							
Fluid Mechanism	*							
Solar Energy	*	*				*		
Wind Energy	*							
Gas Turbine	*	*	*	*	*		*	*
Boilor	*	*	*	*	*	*	*	*
Refrigerator	*	*	*		*	*	*	
Metallurgy	*	*						*
Means of Transportation	*							
Ruil Transportation System	*					*		
Production System	*					*		
Metal Corrosion	*							

Table A-8-2(3) Present Curriculum for Mechanical Engineering

Subject	UNSYAH	USU	UMA	UDA	UISU	UNAND	UNSRI	NOMMENSEN
Heat Treatment and Surface Treatment	*							
Final Graduate Seminar	*	*	*			*	*	
Industrial Probability	*							
Agricultural Machines	*	*				*		
Vehicle Industry	*							
Steam Turbine	*	*	*		*		*	*
Air Conditioning	*	*			*		*	*
Mechine Tool	*		*			*	*	
Production Management	*							
Welding	*					*	*	

Table A-8-3(1) Present Curriculum for Electrical Engneering

Laboratory Work	USU	UNSRI	UNTAN	UMA	UDA	UISU	UNOM
Pancasila & 45 Constitution	*	*	*	*	*	*	*
Kweiraan	*	*	*	*	*	*	*
P.S.P.B.	*		*		*	*	
Religion	*	*	*	*	*	*	*
Culture	*	*	*	*	*	*	*
Social Science Basic	*	*	*	*	*	*	*
Engilsh	*	*	*	*	*	*	*
Technical English	*						
Indonesian Language	*			*		*	
Ethics							*
Physics	*	*	*	*	*	*	*
Thermodynamics & Fluid Mechanics		*					
Modern Physics	*	*	*	*	*	*	*
Chemicstry	*	*	*	*	*	*	*
Mathematics	*	*	*	*	*	*	*
Complex Variables					*	*	
Differential Equation						*	
Linear Algebra					*	*	
Vector Analysis & Tensor		*					
Matrix		*					
Probablity & Statistics	*		*	*	*	*	*
Stochastic Process			*				
Numerical Analysis	*		*	*			*
Computation Method							*
Environmental Science	*	*	*	*	*	*	*
Engineering Drawing	*	*		*	*	*	*
Mechanical Engineering	*	*	*	*	*	*	*
Mathematical Engineering			*				
Concept of Technology			*				
Research Method			*				

Table A-8-3(2) Present Curriculum for Electrical Engneering

Laboratory Work	USU	UNSRI	UNTAN	UMA	UDA	UISU	UNOM
Introduction to optimization			*				
Linear Programming & Optimization							*
Introduction to Electricity			*				
Electricity & Magnetism			*				
Electrical Measurement	*	*	*	*	*	*	*
Electromagnetic Field	*	*	*	*	*	*	*
Electric Power Conversion			*	*			
Electric Machines	*		*	*	*	*	*
D.C. Electric Machine	*	*	*	*	*	*	*
A.C. Electric Machine	*	*	*	*	*	*	*
Motor		*		*			*
Electric Materials	*	*	*	*	*	*	*
Electric Power Engineering	*	*	*		*	*	*
Transformer	*	*	*	*	*	*	*
Generator			*	*	*	*	
Power Station	*	*		*	*	*	*
D.C. Transmission	*		*	*	*		*
A.C. Transmission	*	*		*	*	*	*
High Voltage Technology	*	*	*	*	*	*	*
Distribution	*	*	*	*	*	*	*
Electric Power System		*	*	*			
Electric Power System Analysis	*	*	*	*	*	*	*
Electric Power System Protection	*	*	*	*	*	*	*
Electric Power System Stability	*						
Electric Power System Grounding	*		*		*		
Insulation			*			*	
Network							*
Electronics	*	*	*	*	*	*	*
Power Electronics	*	*	*	*	*	*	*
Electromagnetic Waves	*				*	*	*
Telecommunication	*	*	*	*	*	*	*
Digital Signal			*				

TableA-8-3(3) Present Curriculum for Electrical Engneering

Laboratory Work	USU	UNSRI	UNTAN	UMA	UDA	UISU	UNOM
Microprocessor			*				
Computer	*	*	*	*	*	*	*
Computer Programming	*	*		*		*	*
Simulation			*				
Logic Circuit	*	*	*	*	*	*	*
Analog Circuit							*
CAD			*				
Signal Processing							*
Control System	*	*	*	*	*	*	*
Control Engineering			*				*
Optimum Control			*				
Electronic Measurement System			*				*
Robot			*				
Electric Power Techniques in the Villege			*				
Lighting		*		*	*	*	*
Telemetering			*				
System Engineering	*		*	*	*	*	
Engineering Economy	*	*	*	*	*	*	*
Labour Law		*					
Management		*		*	*	*	*
Installation Engineering			*				
Industrial Management			*				
Physics Experiment		*		*	*		*
Electric Circuit Practice	*	*	*	*	*	*	*
Electrical Measurement Practice	*	*	*	*	*	*	*
Electric Power Engineering Practice	*		*		*	*	*
Electric Machine Practice	*		*	*	*	*	*
Electric Power System Practice					*		
Power System Protection Practice			ITB				

Table A-8-3(4) Present Curriculum for Electrical Engneering

Laboratory Work	USU	UNSRI	UNTAN	UMA	UDA	UISU	UNOM
High Voltage Technology Proctice	*	ITB	ITB	*	*	*	
Transmission Practice		ITB					
Power Conversion Practice				*			
Transformer Practice					*		
Distribution System Practice	*			*		*	
Telecommunication Practice	*	*		*		*	*
Electronics Practice	*	*	*	*	*	*	*
Power Electronics Practice	*		*				
Logic Circuit Practice	*			*			*
Computer Practice			*				
Control System Practice		*	*	*		*	*
Mechanical Engineering Practice		*					
Practice at Factories	*	*		*	*	*	*
Tesis	*	*	*	*	*	*	*
Design		*					
Seminar		*					
Public Services		*	*	*			
General Study					*		

Table A-8-4(1) Present Curriculum for Chemical Engineering

Curriculum	UNSYIAH	USU	UNSRI	Remarks
1. Ideology and 1945 Constitution	*	*	*	
2. English	*	*	*	
3. Basic Anthropology	*	*	*	
4. Mathematics I	*	*	*	
5. Physics I	*	*	*	
6. General Chemistry	*	*	*	
7. Basic Sociology	*	*	*	
8. Drawing Technique	-	*	*	
9. Chemical Analysis	-	-	*	
10. Report Writing	-	-	*	
11. National Outlook Indoctrinations	-	*	-	
12. Indonesian	*	*	-	
13. Analytical Chemicstry I	*	*	-	
14. Mathematics II	*	*	*	
15. Physics II	*	*	*1/	1/ Experiment
16. Chemical Quantum Theory	-	*	-	
17. Physics Exercise	-	*	-	
18. Analytical Chemicstry Exercise	-	*	-	
19. Mathematics II	*	-	-	
20. Introduction to Technology	*	-	*2/	2/ Divided to two curriculum
21. Chemical Engineering Mathematics	*	-	-	
22. Value Analysis	*	*	*	
23. Chemical Industrial Construction Materials	*	*	*	
24. Religion	-	*	-	
25. Analytical Chemistry II	-	-	*	
26. Fluid Mechanics	-	-	*	
27. Two Phase Flow	-	*	-	
28. Mass Transfer	-	-	*	
29. Industrial Mechanics I	*	*	-	

Table A-8-4(2) Present Curriculumr for Chemical Engineering

Curriculum	UNSYIAH	USU	UNSRI	Remarks
30. Electrical Power Engineering	*	*	*	
31. Analytical Chemistry II Exersice	-	*	-	
32. Mathematics III	*	-	*	
33. Nomograph	*	-	-	
34. Introduction to Chemical Engineering	*	-	-	
35. Physical Chemistry II	*	*	* 3/	3/ Experiment
36. Outline of Chemical Engineering	*	-	*	
37. Basic Chemical Engineering	*	-	-	
38. Environmental Science	*	*	-	
39. Thermodynamics	*	*	*4/	4/ Divided to I and II
40. Electronics Engineering	-	*	-	
41. Physical Chemistry Exercise	-	*	-	
42. Theory of Statistics	*	-	-	
43. Introduction to Heat and Mass Transfer	*	-	-	
44. Physical Chemistry III	*	-	-	
45. Military Training	*	*	-	
46. Organic Chemistry I	*	*	-	
47. Theory of Chemical Engineering	-	*	-	
48. Industrial Micro Biology	*	*	* 5/	5/ Experiment
49. Practical Chemical Engineering I	-	*	-	
50. Construction Materials	-	*	-	
51. Micro Biology Exercise	-	*	-	
52. Analytical Chemistry III	*	-	-	
53. Unit Operation for Chemical Engineering	*	-	-	
54. Process Control	*	-	-	
55. Organic Chemistry	-	*	*6/	6/ Organic Chemistry II, Lxperim
56. Practical Chemical Engineering II	-	*	-	
57. Mathematics II	-	-	*	

Table A-8-4(3) Present Curriculum for Chemical Engineering

Curriculum	UNSYIAH	USU	UNSRI	Remarks
58. Inorganic Chemistry	-	-	*	
59. Coal Chemistry	-	-	*	
60. Experimental Organic Chemistry	-	-	*	
61. Organic Chemistry/Experiment	-	-	*	
62. Catalyst and Reactin Kinetics	*	*	-	
63. Production Management	-	*	-	
64. Chemical Industrial Process I	-	*	-	
65. Computer Programming I	*	*	*	
66. Organic Chemistry Exercise	-	*	-	
67. Chemical Industrial Machine	*	-	*	
68. Organic Chemistry IV	*	-	-	
69. Project Management	*	-	-	
70. Cehmical Industrial Process II	*	*	-	
71. Chemical Reactor	*	*	-	
72. Practical Chemical Engineering III	-	*	-	
73. Machine Design I	-	*	-	
74. Industrial Drafting	-	*	-	
75. Elective Technical Subject	-	*	-	
76. Practical Chemical Engineering Exercise	-	*	-	
77. Chemical Plant Design	*	-	*	
78. Industrial Economics	*	*	*	
79. Industrial Management	*	-	-	
80. Industrial Water and Supply	*	*	-	
81. Machine Design II	-	*	-	
82. Chemical Factory	-	*	-	
83. Production Plan and Management	-	*	-	
84. Practice	-	*	-	
85. Chemical Process Exersice	-	*	-	
86. Feasibility Study	*	-	-	
87. Introduction to Machine	*	-	-	

Table A-8-4(4) Present Curriculum for Chemical Engineering

Curriculum	UNSYIAH	USU	UNSRI	Remarks
88. Heat Transfer	-	-	* 7/	7/ Divided to I and II
89. Colloid Chemistry	-	-	*	
90. Graduate Research	-	*	*	
91.	*	*	*	
92. Seminar	*	*	*	
93. Design of Chemical Apparatus	*	-	*	
94. Food Technology	*	-	*	
95. Graduate Manufacture	-	*	*	
96. Field Work	*	-	-	
97. Fertilizer Process Technology	*	-	-	
98. Heat Transfer Process	*	-	*	
99. Petroleum and Lubricant Technology	*	-	-	
100. Industrial Waste Engineering	*	-	-	
101. Industrial Psycology	*	-	-	

Table A-8-5(1) Present Curriculum for Industrial Engineering

Curriculum	USU	UDA	UISU	UMA	Remarks
1. Ideology and 1945 Constitution	*	*	*	*	
2. English	*	*	*	*	
3. National Outlook Indoctrinatron	*	*	*	*	
4. Mathematics I	*	*	*	*	
5. Physics I	*	*	*	*	
6. Basic Chemistry	*	*	*	*	
7. Production Engineering/Introduction to Production Management	*	-	*	*	
8. Islam	-	-	*1/	*	1/
9. Engineering Management	-	-	*	*	
10. Religion	*	*	*	*	
11. Indonesian	*	-	*	*	
12. Basic Cultural Science	*	-	*	*	
13. Mathematics II	*	*	*	*	
14. Physics II	*	*	*	*	
15. Industrial Mechanics	*	-	-	-	
16. Inorganic and Organic Chemistry	*	-	-	*	
17. Structural Mechanics	-	*	-	-	
18. Mathematics III	*	*	-	*	
19. Basic Sociology	*	*	-	-	
20. Senior Physics	*	-	-	-	
21. Mechanical Engineering	*	*	*	*	
22. Physical Chemistry	*	-	-	*	
23. Industrial Statistics I	*	*	*	*	
24. Electrical Power Engineering	*	*	*	*	
25. Themodynamics	*	-	*	*	
26. Basic Chemistry Exercise	*	-	*	*	
27. Metalic Materials	-	-	*	-	
28. Cost Estimation	-	*	-	-	
29. Macro Economics	-	*	-	-	
30. Energy Conversion	*	-	*	*	

Table A-8-5(2) Present Curriculum for Industrial Engineering

Curriculum	USU	UDA	UISU	UMA	Remarks
31. Mathematics IV	*	-	-	*	
32. Industrial Drafting	*	*	*2/	*	2/ Perencanaan Eksperimen
33. Metallurgy	*	*	-	-	
34. Methodology Engineering	*	*	-	-	
35. Industrial Statistics II	*	*	*	*	
36. Physics Exercise	*	-	-	*	
37. Mechanical Engineering Exercise	*	-	-	*	
38. Chemical Industry	*	-	-	*	
39. Industrial Sociology	-	*	-	*	
40. Spin Technology	-	*	-	-	
41. Military Training	*	-	-	-	
42. Basic Optimization	*	-	-	*	
43. Computer Programming	*	-	-	-	
44. Factory Site Selection	*	-	*3/	*	3/ Tala Hikong Ohgkos
45. Economics	*	*	*	-	
46. Methodology Engineering Exercise	*	-	-	*	
47. Statistics Engineering Exercise	*	-	-	-	
48. Hydraulics	-	-	*	*	
49. Industrial Materials	-	*	*	-	
50. Operational Research	*	-	-	-	
51. Industrial Economics	*	-	-	*	
52. Planning and Management	*	-	*	*	
53. Production Management and Inventory Control	*	-	-	*	
54. Industrial Organization and Production Control	*	-	*4/	*	4/ Organisasi & Menajemen Industri
55. Labour Safety Engineering	*	-	*	-	
56. Factory Site Selection Exercise	*	-	*	-	
57. Processing Material Exercise	*	-	*	-	
58. Work Engineering	-	-	*5/	-	5/ Prakiek Teknik Falctor

Table A-8-5(3) Present Curriculum for Industrial Engineering

Curriculum	USU	UDA	UISU	UMA	Remarks
59. Human Engineering	-	-	*	-	
60. Machine Components	*	*	*	*	
61. Experimental Report Preparation	*	-	-	-	
62. Operational Research II	*	-	-	*	
63. Manufacturing Process Control	*	-	-	*	
64. Management Engineering	-	-	*	*	
65. Chemical Engineering	-	-	*	*	
66. Manufacturing Technology	-	-	*	*	
67. Introduction to Industry	*	*	-	*	
68. Industry and Planning Technology	*	-	*	-	
69. System Model	*	-	-	*	
70. Commercial Law and Labour Law	*	-	-	*	
71. Personnel Affairs	*	*	*	*	
72. Marketing Engineering	*	-	-	-	
73. Elective Subject	*	-	-	-	
74. Project Management	*	-	*	*	
75. Quality Control and Statistics	-	-	*	*	
76. Theory of Dicision	*	-	-	-	
77.	*	-	*	*	
78.	*	-	*	*	
79. Graduate Research	*	-	-	*	

Table A-8-6 (1) Present Curriculam for Mining Engineering

	Subject	UNSRI	UDA
I.	1.Mathematics I	*	*
	2.Basic Physics practice I	*	*
	3.Basic chemistry practice I	*	*
	4.English	*	*
	5.Religion	*	*
	6 Basic geology practice I	*	*
	7 Crystallography practice	*	*
	Total		
II.	1.Mathematics II	*	*
	2.Basic physics practice II	*	*
	3.Chemical analysis practice II	*	*
	4.Basic analytical science	*	*
	5.Basic sociology	*	*
	6.Mineralogy practice	*	*
	7.Basic geology practice II	*	*
	8.Drawing	*	*
	Total		
III.	1.Mathematics III	*	*
	2.Pancasila & 45 constitution	*	*
	3.Physics chemistry practice I	*	*
	4.Introduction to mining engineering	*	*
	5.Mineralogy	*	*
	6.Electrical power engineering	*	*
	7.Prime movers	*	*
	8.Report writing	*	*
	Total		
IV.	1.Mathematics IV	*	*
	2.Environmental science	*	*
	3.Physical chemistry practice II	*	*
	4.Structure geology	*	*
	5.Petrology practice	*	*
	6.Explosion technique	*	*
	7.Excursion study	*	*
	Total		
V.	1.Statistics	*	*
	2.Sedimentology	*	*
	3.Underground mining exploitation	*	*
	4.Geodesy practice	*	*
	5.Introduction to petroleum engineering I	*	*
	6.Mining mechanics	*	*
	7.Geo-structure of Indonesia	*	*
	8.Field training	*	*
	Total		
VI.	1 Coal mining	*	*
	2.Mining expoitation	*	*
	3.Mechanics and hydraulic machine	*	*
	4.Soil mechanics	*	*
	5.Introduction to petroleum engineering II	*	*
	6.Ore microscopy	*	*
	7.Geology mapping	*	*
	8.Field training	*	*

Table A-8-6 (2) Present Curriculam for Mining Engineering

	Subject	UNSRI	UDA
	Total		
VII.	1.Ore mining I	*	*
	2.Mining geometry	*	*
	3.Introduction to mineralogy with practice	*	*
	4.Mining ventilation	*	*
	5.Foundation engineering	*	*
	6.Industrial mineral resources	*	*
	7.Mineral analysis	*	*
	8.Computer programming	*	*
	Total		
VIII.	1.Ore mining II	*	*
	2.Metallurgy	*	*
	3.Industrial management	*	*
	4.Labour law	*	*
	5.Production/Exploration technique	*	*
	6.Mineral resources in Indonesia	*	*
	7.Mineral dressing I	*	*
	8.Lecture/field assignment	*	*
	Total		
IX.	1.Mechanics of stones	*	*
	2.Economy of mineral resources	*	*
	3.Mining geophysics	*	*
	4.Mining machine design	*	*
	5.Mining administration and safety control	*	*
	6.Mineral dressing II	*	*
	7.Mining seminar	*	*
	8.Graduation thesis	*	*
	Total		