

**SENARAI INFRASTRUKTUR MAKMAL**  
**JABATAN KEJURUTERAAN MEKANIKAL DAN PEMBUATAN**

A) SENARAI MAKMAL

No	Makmal	Size (m <sup>2</sup> )	Lokasi
1	<b>Makmal Sistem Kawalan dan Instrumentasi</b> <i>Control System and Instrumentation Laboratory</i>	250	Blok G 2.1B, Fasa 2A
2	<b>Makmal Kekuatan Bahan</b> <i>Strength of Materials Laboratory</i>	500	Blok G KMP008, Fasa 1A
3	<b>Makmal Mekanik Bendalir</b> <i>Fluid Mechanics Laboratory</i>	250	Blok G 2.3, Fasa 2A
4	<b>Makmal Dinamik &amp; Getaran</b> <i>Dynamics &amp; Vibration Laboratory</i>	250	Blok G 2.1A, Fasa 2A
5	<b>Makmal Pembentukan Bahan</b> <i>Material Forming Laboratory</i>	550	1. Blok G KMP001, Fasa 1A 2. Blok G KMP002, Fasa 1A 3. Blok G KMP003, Fasa 1A
6	<b>Makmal Termodinamik</b> <i>Thermodynamics Laboratory</i>	250	Blok G 2.4, Fasa 2A
7	<b>Makmal Teknologi Pembuatan &amp; Pengautomatan</b> <i>Manufacturing Technology &amp; Automation Laboratory</i>	500	1. Blok G 2.2A, Fasa 2A 2. Blok G 2.2B, Fasa 2A
8	<b>Makmal CAD/CAM</b> <i>CAD/CAM Laboratory</i>	250	Blok G 2.1B, Fasa 2A
9	<b>Makmal Metrologi Jisim</b> <i>Mass Metrology Laboratory</i>	90	Blok B BTB008, Fasa 1A

## 1.1 LOKASI: MAKMAL SISTEM KAWALAN DAN INSTRUMENTASI

*Control System and Instrumentation Laboratory, (BLOK G2.1B)*

### ALATAN SISTEM KAWALAN

Bil	KeteranganAset	Kuantiti
1	<i>Process Control Simulator (Electronic System) &amp; PC</i>	2
2	<i>Flow/Level Control Trainer &amp; PC</i>	1
3	<i>Temperature Control Trainer &amp; PC</i>	2
4	<i>Engine Speed Controller &amp; PC</i>	1
5	<i>Pressure Control Trainer &amp; PC</i>	1

### ALATAN SISTEM INSTRUMENTASI

Bil	Keterangan Aset	Kuantiti
1	<i>Cole Parmer, Laser Sighting Thermometer</i>	1
2	<i>WBJ, Granite Surface Plate</i>	1
3	<i>Table Stand for Granite Surface Plate</i>	1
4	<i>Peacock, Caliper Gauge (Model LA-2)</i>	1
5	<i>Rhein Tacho, Digital Tachometer Contact Non- Contact</i>	1
6	<i>Tenma, Digital Sound Level Meter</i>	1
7	<i>Lafayette, Small Anthropometer</i>	1
8	<i>Lafayette, Large Anthropometer</i>	1
9	<i>Posture Evaluation Kit</i>	1
10	<i>Oriel Goldilux, Light Meter</i>	1
11	<i>Lafayette, Chest Caliper</i>	1
12	<i>Mahr, Surface Texture Measurement</i>	1
13	<i>Roundness Measurement Equipment (Run Out Gauge System</i>	1
14	<i>Wilson Wolpert, Digitronic Micrometer</i>	2
15	<i>Aditya, Steel Gauge Blocks Set</i>	1
16	<i>TTM, Martin -Type Anthropometer</i>	1
17	<i>Lafayette, Sit and Reach Flexibility Test</i>	1
18	<i>Lafayette, Adult Back and Leg Dynamometer</i>	1
19	<i>Tesa, Digital Height Gauge (Micro-HITE M600)</i>	1
20	<i>Mitutoyo, Profile Projector (PJA3010 F-200)</i>	1
21	<i>Shinko Denshi, Digital Balance</i>	1
22	<i>Mahr, Digital Dial Indicator</i>	1
23	<i>Mahr, Small Comparator Stand</i>	1
24	<i>Mahr, Digital Caliper (Order No: 4102204)</i>	3
25	<i>Ohaus, Analytical Balance</i>	1
26	<i>Illuminated Bench Magnifier - Adjustable Arm Type</i>	1
27	<i>Dickson Temperature Indicator Model: Tc200 Remote</i>	1

## 2.1 LOKASI: MAKMAL KEKUATAN BAHAN - 1

*Strength Of Materials -1, (BLOK G, KMP008)*

Bil	Keterangan Aset	Kuantiti
1	<i>Rotary Bending Machine, Shidmazu</i>	1
2	<i>Impact Tester</i>	1
3	<i>Rockwell Hardness</i>	1
4	<i>Torsion Machine</i>	2
5	<i>MicroVickers Hardness</i>	1
6	<i>Thick Cylinder</i>	1
7	<i>Universal Testing Machine, 10 kN (Dynamic)</i>	1
8	<i>Universal Testing Machine, 100 kN</i>	1
9	<i>Universal Testing Machine, 5 kN</i>	1
10	<i>Biaxial Servo Hydraulic Fatigue Test System</i>	1

## 2.2 LOKASI: MAKMAL KEKUATAN BAHAN – 2

### *Strength of Materials Laboratory-2, (BLOK G, KMP007)*

Bil	Keterangan Aset	Kuantiti
1	<i>Creep Test Apparatus, TQ</i>	1
2	<i>Creep Test Apparatus, TQR</i>	1
3	<i>Unsymmetrical Cantilever, Hitec</i>	1
4	<i>Unsymmetrical Cantilever, Lotus</i>	1
5	<i>Beam Apparatus, TQ</i>	1
6	<i>Beam Apparatus, TQR</i>	1
7	<i>Buckling/Strut Apparatus</i>	1
8	<i>Thin Cylinder Apparatus</i>	1
9	<i>Strain Gauges Apparatus</i>	1
10	<i>Rotary Bending Fatigue, Lotus</i>	1
11	<i>MS5 Microscope (stereo)</i>	1
12	<i>Metallurgical Microscope</i>	1
13	<i>Precision Cutter Saw</i>	1
14	<i>Grinder/Polisher</i>	1
15	<i>Fume Cupboard</i>	1
16	<i>High Temperature Furnace (Carbolite)</i>	1
17	<i>Oven (Shel-lab)</i>	1
18	<i>Oven (Memmert)</i>	1
19	<i>Spray Dryer</i>	1

## 3. LOKASI: MAKMAL MEKANIK BENDALIR

### *Fluid Mechanics Laboratory, (BLOK G2.3)*

Bil	Keterangan Aset	Kuantiti
1	<i>Hydraulic Bench</i>	7
2	<i>Orifice and Jet Apparatus</i>	1
3	<i>Pelton Impulse Turbine Apparatus</i>	1
4	<i>Impact of Jet Apparatus</i>	1
5	<i>Hydrostatic Pressure Apparatus</i>	1
6	<i>Metacentric Height Apparatus</i>	1
7	<i>Venturi Meter</i>	1
8	<i>Flow Weir Apparatus</i>	1
9	<i>Viscometer</i>	1
10	<i>Density Meter</i>	1
11	<i>Centrifugal Pump Trainer</i>	1
12	<i>Pipe Friction Apparatus</i>	1
13	<i>Free Jet Apparatus</i>	1
14	<i>Hydrology Apparatus</i>	1
15	<i>Hydrodynamic Journal Bearing Apparatus</i>	1
16	<i>Flow Visualization Apparatus</i>	1
17	<i>Francis Turbine Apparatus</i>	1
18	<i>Kaplan Turbine Apparatus</i>	1

## 4. LOKASI: MAKMAL DINAMIK & GETARAN

### *Dynamics & Vibration Laboratory, (BLOK G2.1)*

Bil	Keterangan Aset	Kuantiti
1	<i>Static and Dynamic Balancing Apparatus</i>	1
2	<i>Whirling of Shaft Apparatus</i>	2
3	<i>Centre of Gravity Apparatus</i>	1
4	<i>Gear Train Apparatus</i>	1
5	<i>Vibration Apparatus</i>	1
6	<i>Universal Mechanism's Apparatus</i>	1
7	<i>Belt Friction Apparatus</i>	1
8	<i>Gyroscope</i>	2

9	<i>Torsional Vibration Apparatus</i>	1
10	<i>Free and Forced Vibration Apparatus &amp; PC</i>	1
11	<i>Truss Apparatus &amp; PC</i>	1
12	<i>Moment of Inertia Apparatus</i>	1
13	<i>Balancing of Reciprocating Mass</i>	1
14	<i>Equilibrium of Rigid Body</i>	1
15	<i>Shock Absorber Test System</i>	1
16	<i>Isolating Damper</i>	1

**5.1 LOKASI : MAKMAL PEMBENTUKAN BAHAN – 1**

***Material Forming Laboratory-1,(BLOK G, KMP003)***

<b>Bil</b>	<b>Keterangan Aset</b>	<b>Kuantiti</b>
1	<i>Bench Saw</i>	1
2	<i>Belt and Disk Sander</i>	1
3	<i>Sand Mixer (Belle) Mini 150</i>	1
4	<i>Induction Melting Furnace</i>	1
5	<i>Jolt Squeeze Melting Furnace</i>	1

**5.2 LOKASI : MAKMAL PEMBENTUKAN BAHAN – 2**

***Material Forming Laboratory-2, (BLOK G, KMP002)***

<b>Bil</b>	<b>Keterangan Aset</b>	<b>Kuantiti</b>
1	<i>Arc Welding Set (WIM) AC 300</i>	4
2	<i>TIG Welding Set (WIM) AC 300P</i>	2
3	<i>TIG Welding Set (Inverter-Weldro)</i>	2
4	<i>MIG Welding Set (Kempp)</i>	2
5	<i>MIG Welding Set (EvoMIG-180)</i>	2
6	<i>MIG Welding Set (E Weld-E MIG)</i>	1
7	<i>Gas Welding Set</i>	1
8	<i>Plasma Cutter (SAF)</i>	1
9	<i>Milling Machine (John Ford 2VS)</i>	1
10	<i>Milling Machine (Sunlike 4KHV)</i>	1
11	<i>Lathe Machine (Harrison 600)</i>	1
12	<i>Lathe Machine (Pinacho S90/200)</i>	1
13	<i>Lathe Machine (ZMM-Sliven)</i>	2
14	<i>Surface Grinding Machine</i>	1
15	<i>Horizontal Band Saw (Metalis)</i>	1
16	<i>Drilling Machine (Arboga)</i>	1

**5.3 LOKASI : MAKMAL PEMBENTUKAN BAHAN – 3**

***Material Forming Laboratory-3,(BLOK G, KMP001)***

<b>Bil</b>	<b>Keterangan Aset</b>	<b>Kuantiti</b>
1	<i>Plastic Injection Moulding Machine (Boy 22)</i>	1
2	<i>Plastic Injection Moulding Machine (Boy 35M)</i>	1
3	<i>Plastic Crusher</i>	1
4	<i>Band Saw (Metabo)</i>	1
5	<i>Band Saw (Basato)</i>	1
6	<i>Hydraulic Press Machine</i>	1
7	<i>Power Press Machine</i>	1

**6. LOKASI : MAKMAL TERMODINAMIK**

***Thermodynamics Laboratory, (BLOK G2.4)***

<b>Bil</b>	<b>Keterangan Aset</b>	<b>Kuantiti</b>
1	<i>Mechanical Heat Pump</i>	1
2	<i>Marcet Boiler</i>	2
3	<i>Cooling Tower Test Unit</i>	1
4	<i>Steam Plant</i>	1
5	<i>Bomb Calorimeter</i>	1
6	<i>Concentric Tube Heat Exchanger</i>	1
7	<i>Twin Shaft Gas Turbine Simulator &amp; PC</i>	1
8	<i>Air Conditioning Test Unit &amp; PC</i>	1
9	<i>Refrigeration Test Unit</i>	1
10	<i>Engine Test Bed</i>	1
11	<i>Combustion Laboratory Unit</i>	1
12	<i>Thermal Expansion in Solid &amp; Liquid</i>	1
13	<i>Fundamentals of Temperature Measurement</i>	1
14	<i>Flow Boiling Apparatus</i>	1
15	<i>Unsteady Heat Transfer Apparatus (Transient Conduction Apparatus)</i>	1
16	<i>Convection Heat Transfer Unit &amp; PC</i>	1
17	<i>Speacific Heat Capacity of Metals &amp; PC</i>	1
18	<i>Speacific Heat Capacity of Water &amp; PC</i>	1
19	<i>Speacific Heat Capacity of Gases</i>	1
20	<i>Radiative Heat Transfer Unit &amp; PC</i>	1
21	<i>Heat Stress Monitor</i>	1

**7.1 LOKASI : MAKMAL TEKNOLOGI PEMBUATAN & PENGOTOMATAN – 1**

***Manufacturing Technology & Automation laboratory-1, (BLOK G2.2, B)***

<b>Bil</b>	<b>Keterangan Aset</b>	<b>Kuantiti</b>
1	<i>Working Station (Pneumatic/Electro-Pneumatic)</i>	10
2	<i>Pneumatic Trainer</i>	10 set
3	<i>Electro-Pneumatic Trainer</i>	10 set
4	<i>Hydraulic Trainer</i>	1
5	<i>PLC Trainer</i>	15
6	<i>PLC Software</i>	10
7	<i>MasterCAM</i>	5
8	<i>FMS System</i>	1
9	<i>Personal Computer</i>	20

**7.2 LOKASI : MAKMAL TEKNOLOGI PEMBUATAN DAN PENGOTOMATAN – 2**

***Manufacturing Technology & Automation Laboratory-2, (BLOK G2.2, B)***

<b>Bil</b>	<b>Keterangan Aset</b>	<b>Kuantiti</b>
1	<i>CNC Milling Machine</i>	1
2	<i>CNC Turning Machine</i>	1
3	<i>Rapid Prototyping Machine, 3D Printer</i>	1
4	<i>Rapid Prototyping Machine, Vacuum Casting</i>	1
5	<i>Oven</i>	2
6	<i>Fume Cupboard</i>	1

**8. LOKASI : MAKMAL CAD/CAM****CAD/ CAM Laboratory, BLOK G (KMP102)**

<b>Bil</b>	<b>Keterangan Aset</b>	<b>Kuantiti</b>
1	<i>Server</i>	1
2	<i>Personal Computer (IDEC)</i>	40
3	<i>LCD Projector</i>	2
4	<i>Plotter</i>	1
5	<i>Catia Software</i>	41
6	<i>Ansys Software</i>	25
7	<i>Mold Flow Software</i>	25
8	<i>Lusas Software</i>	10
9	<i>Cambridge Engineering Material (CES) Software</i>	10
10	<i>Abaqus Software</i>	20

**9. LOKASI : MAKMAL METROLOGI JISIM****Mass Metrology Laboratory, BLOK B (BTB 008b)**

<b>Bil</b>	<b>Keterangan Aset</b>	<b>Kuantiti</b>
1	<i>1.5hp Wall Split Type Air Compressor</i>	1
2	<i>1.5hp Wall Split Type Air Compressor</i>	1
3	<i>Mettler Toledo Xp56 Comparator (Range 1mg To 50g)</i>	1
4	<i>Mettler Toledo Ax2005 Comparator (Range 100g To 2kg)</i>	1
5	<i>Mettler Toledo Xp10003s Comparator (Range 2kg To 10kg)</i>	1
6	<i>Mettler Toledo Standard Weight Set Premium Line M</i>	1
7	<i>Mettler Toledo Standard Weight Set Premium Line 1</i>	1
8	<i>Mettler Toledo Standard Individual Weight Premium</i>	1
9	<i>Mettler Toledo Mc Link Software Complete With Dell</i>	1
10	<i>Mettler Toledo Electronic Balance Scale; Model : Jp</i>	1
11	<i>Foc Granite-Top Anti-Vibration Weighing Table</i>	1
12	<i>Kkinstruments Thermohygrometer</i>	3
13	<i>Aipo Dry Cabinet - 700l</i>	1
14	<i>Compactability Tester</i>	1
15	<i>Double Level Hand Truck</i>	4