**Lembar 1. Identitas Laboratorium dan Departemen**

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| Nama Laboratorium | : | Lab Otomasi dan Kontrol |
| Nama Kepala Laboratorium | : | Dr. Ir. Ari Santoso, DEA |
| Jenis Laboratorium | : | Riset dan Praktikum |
| NIP | : | 19660218 199102 1001 |
| Telepon (Whatsapp) | : | +62 812-3139-086 |
| Departemen | : | Teknik Elektro |
| Menyetujui,  Kepala Departemen  …….  NIP. . | | Kepala Laboratorium    Dr. Ir. Ari Santoso, DEA  NIP. 19660218 199102 1001 |

**Lembar 2. Spek Alat Laboratorium**

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| **No** | **Nama Alat** | **Spesifikasi** | **Manfaat** | **Foto** |
| 1 | Ultrasonic Parking Sensor | https://www.tokopedia.com/the-bestore/feeldo-car-8-sensor-parking-sensor-with-2pcs-mini-ccd-faui | Mendeteksi objek dekat di mobil otonom, deteksi saat pengereman di mobil otonom |  |
| 2 | Long-range Radar | https://www.tokopedia.com/govastore/77ghz-long-distance-170m-car-forward-collision-avoidance-gvstre | Mendeteksi objek dekat di mobil otonom, mengklasifikasikan objek di mobil otonom, melacak perjalanan objek bergerak di mobil otonom, menjaga jarak aman di mobil otonom, menghindari tabrakan di mobil otonom |  |
| 3 | Medium-range Radar | https://www.tokopedia.com/laviemall/77g-middle-range-millimeter-wave-radar-sensor-is-suitable-for-vehicle?extParam=ivf%3Dfalse%26src%3Dsearch | Mendeteksi objek dekat di mobil otonom, mengklasifikasikan objek di mobil otonom, melacak perjalanan objek bergerak di mobil otonom, menjaga jarak aman di mobil otonom |  |
| 4 | Kamera 3D | https://www.tokopedia.com/tunggalcompany/diskon-3d-car-360-hd-surround-view-monitoring-system-360 | mendeteksi ruang kosong, mendeteksi objek, melacak perjalanan objek, mendeteksi marka jalan, memetakan lingkungan sekitar, mengikuti lintasan, bergerak dari titik asal ke tujuan, patroli di lintasan, memantau saat patroli, memarkir mobil, menghindari tabrakan, menghindari rintangan |  |
| 5 | Kamera Infrared | https://www.alibaba.com/product-detail/IP67-Vehicle-Infrared-Thermal-Imaging-Camera\_60799145662.html | bekerja di saat gelap, menghindari tabrakan, menghindari rintangan, melacak perjalanan objek bergerak, mendeteksi objek, mendeteksi marka jalan, |  |
| 6 | Lidar | https://halorobotics.com/shop/dji-zenmuse-l1-lidar/?srsltid=AR5OiO3dbRD7t3if3W2puDDXQyMjLWiW\_E4iEB87B7FfoycjLb2iia1J7Ko | mendeteksi ruang kosong, mendeteksi objek, melacak perjalanan objek, mendeteksi marka jalan, memetakan lingkungan sekitar, mengikuti lintasan, bergerak dari titik asal ke tujuan, patroli di lintasan, memantau saat patroli, memarkir mobil, menghindari tabrakan, menghindari rintangan |  |
| 7 | Potensiometer ejector injection | https://tokopedia.link/zZrMy2Gumtb | Linear Transducer KTC 75 mm Potentiometer ejector injection 75mm |  |
| 8 | PLC Siemens s7 1500 kit | https://www.tokopedia.com/cvebcshop/plc-siemens-s7-1500-training-kit | modul praktikum lanjut sistem pengaturan digital dan otomasi |  |
| 9 | PLC AB Control logix 5000 kit | https://www.bukalapak.com/p/industrial/mesin/suku-cadang-aksesoris-mesin/2dovr6d-jual-plc-allen-bradley-control-logix-5000-cpu5561-1set-di-do-ai-ao-ps-baseplate-siap-pakai | modul praktikum lanjut sistem pengaturan digital dan otomasi |  |
| 10 | 2 Buah Hand Valve 6mm drat ¼ (Pneumatic Trainer) | <https://www.tokopedia.com/jayatehniksby/sang-a-one-touch-hand-valve-fitting-thread-ghvsf-0206-6mm-1-4?extParam=ivf%3Dfalse%26src%3Dsearch> | Modul Pneumatik pada Praktikum Dasar Sistem Pengaturan |  |
| 11 | 10 buah Fitting lurus Pneumatic naple selang 4 mm drat ⅛ inch (Pneumatic Trainer) | <https://tokopedia.link/hgG3sRsVktb> | Modul Pneumatik pada Praktikum Dasar Sistem Pengaturan |  |
| 12 | 10 buah Fitting elbow naple selang 4 mm drat ⅛ inch (Pneumatic Trainer) | <https://tokopedia.link/Ha5hekJVktb> | Modul Pneumatik pada Praktikum Dasar Sistem Pengaturan |  |
| 13 | Pressure Transmitter 0-5barg 0-10VDC | <https://www.first-sensor.com/en/products/pressure-transmitters/available-predecessor-models/cte-ctu8000/> | Modul PCT100 pada Praktikum Dasar Sistem Pengaturan |  |
| 14 | 5 Buah Pilot LED Hijau 10mm DC 24V | <https://www.tokopedia.com/dielectronics/nxd-211-pilot-lamp-10mm-dc-24v-lampu-indikator-led-signal-color-light-hijau?extParam=ivf%3Dfalse%26src%3Dsearch> | Lamp and Buzzer Module pada Pneumatic Trainer Kit |  |
| 15 | DCS Yokogawa Centum VP | Lisensi Habis, harga belum tahu | Modul DCS CS3000 |  |
| 16 | 6 Buah Baterai PLC LG 1.5V Lithium Ion | <https://www.tokopedia.com/tokoautomation/mitshubishi-lithium-baterai-q6bat-cr17335se-r-3v-plc-battery-pa08> | Modul PLC pada Praktikum Dasar Sistem Pengaturan |  |
| 17 | 2 buah USB Type A 1-2m | <https://www.tokopedia.com/rajaol/kabel-printer-usb-150cm-hp-original?extParam=ivf%3Dfalse&src=topads> | Modul PCT100 pada Praktikum Dasar Sistem Pengaturan |  |
| 18 | 1 buah Motor Valve di Tangki PCT100 | <https://www.ebay.com/itm/264592316616?hash=item3d9aee58c8:g:O3AAAOSwN4FeFc6P&amdata=enc%3AAQAHAAAA4PN30nEmkgddwsLuduxSeX23pOoHiuyk8BI0OW1C%2FpS2uVBV8khcaXzqlFMuTahz%2BNbEtteI7ta2%2BqQypNPXRr7Ni%2F0NWRwGe0vWOlvsTiotvfLsqvOrh7xa6ym4n3%2BV1KUUKJai5P9Qh8%2BbwSaqh1KSwXQtNMR%2Bjhw2f0LH6eOnY%2FVoF0cp09VA0oNP2Hq5WXsgu38qkZdFNF15Y2gAptjn01Wu%2FZFJksix9OUmCBTA99I6fOeo9KcULKGDMhYNVrVBq5jkJe%2FDSqNgolQ2pSqi9aBIe%2FZhzp%2FobtOmHtJs%7Ctkp%3ABFBMhv7k6vRg> | Modul PCT100 pada Praktikum Dasar Sistem Pengaturan |  |
| 19 | 4 buah Fitting Motor Valve PCT100 10mm |  | Modul PCT100 pada Praktikum Dasar Sistem Pengaturan |  |
| 20 | Autonomous Vehicle Research Studio | https://www.quanser.com/products/autonomous-vehicles-research-studio/ | Jump-start Your Autonomous Vehicles Research  Quanser’s new Autonomous Vehicles Research Studio is the ideal solution for academics looking to build an indoor multi-vehicle research lab in a short amount of time. Consisting of QDrone quadrotors and QBot 2e ground vehicles, ground control station, vision, and safety equipment, the Autonomous Vehicles Research Studio is the only option for research groups looking to jumpstart autonomous robotics research programs and be productive in a very short amount of time. |  |
| 21 | Qcar | https://www.quanser.com/products/qcar/ | Sensor-rich autonomous vehicle  QCar, the feature vehicle of the Self-Driving Car Research Studio, is an open-architecture, scaled model vehicle designed for academic research. Working individually or in a fleet, QCar is the ideal vehicle for validating dataset generation, mapping, navigation, machine learning, artificial intelligence, and other advanced self-driving concepts. |  |
| 22 | Walker UBtech Robotic | https://www.ubtrobot.com/EWalkerX/index.aspx | groundbreaking bipedal humanoid robot, autonomous intelligence, and human to robot interactions. Equipped with both hardware and artificial intelligence upgrades combined with the updated ability to adapt to complex environments |  |
| 23 | Imu Sensor Module | https://www.tokopedia.com/trijayateknologiraya/industry-imu-sensor-with-different-environments-measuring-and-meet | melacak perjalanan objek bergerak di mobil otonom, mengetahui posisi objek di mobil otonom |  |
| 24 | Gps Drone Sensor | https://www.tokopedia.com/pusatgpstracker/gps-tracker-4g-lte-eropa-penganti-gps-2g-yg-akn-berakhir | melacak perjalanan objek bergerak di mobil otonom, mengetahui posisi objek di mobil otonom |  |

**LEMBAR 3: Harga dan Kebutuhan Anggaran**

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| **No** | **Nama Alat** | **Satuan** | **Harga Satuan (Rp)** | **Jumlah Unit** | **Total (Rp)** |
| 1 | Ultrasonic Parking Sensor |  | 17.000.000 | 1 | 17.000.000 |
| 2 | Long Range Radar |  | 18.000.000 | 1 | 18.000.000 |
| 3 | Medium Range Radar |  | 12.000.000 | 1 | 12.000.000 |
| 4 | Camera 3D |  | 21.000.000 | 1 | 21.000.000 |
| 5 | Camera Infrared |  | 180.000.000 | 1 | 180.000.000 |
| 6 | Lidar High Precission |  | 30.000.000 | 1 | 30.000.000 |
| 7 | Linear Transducer KTC 75mm |  | 850.000 | 4 | 3.500.0003 |
| 8 | PLC Siemens S7 1500 Trainer Kit |  | 48.000.000 | 1 | 48.000.000 |
| 9 | PLC AB Control logic 5000 Trainer Kit |  | 15.000.000 | 3 | 45.000.000 |
| 10 | Hand Valve 6mm drat ¼ (Pneumatic Trainer) |  | 105.000 | 2 | 210.000 |
| 11 | Fitting lurus Pneumatic naple selang 4 mm drat ⅛ inch (Pneumatic Trainer) |  | 2.500 | 10 | 25.000 |
| 12 | Fitting elbow naple selang 4 mm drat ⅛ inch (Pneumatic Trainer) |  | 3.000 | 10 | 30.000 |
| 13 | Pressure Transmitter 0-5barg 0-10VDC |  | 1.000.000 | 1 | 1.000.000 |
| 14 | Pilot LED Hijau 10mm DC 24V |  | 5.000 | 5 | 25.000 |
| 15 | DCS Yokogawa Centum VP |  | 00 | 1 | 0 |
| 16 | Baterai PLC LG 1.5V Lithium Ion |  | 100.000 | 6 | 600.000 |
| 17 | USB Type A 1-2m |  | 20.000 | 2 | 40.000 |
| 18 | Motor Valve di Tangki PCT100 |  | 1.000.000 | 1 | 1.000.000 |
| 19 | Fitting Motor Valve PCT100 10mm |  | 10.000 | 4 | 40.000 |
| 20 | Autonomous Vehicle Research Studio |  | 275.000.000 | 1 | 275.000.000 |
| 21 | Qcar |  | 250.000.000 | 1 | 250.000.000 |
| 22 | Walker UBtech Robotic |  | 150.000.000 | 1 | 150.000.000 |
| 23 | Imu Sensor Module |  | 15.000.000 | 1 | 15.000.000 |
| 24 | Gps Drone Sensor |  | 1.000.000 | 1 | 1.000.000 |
| **TOTAL** | | | | | **1.104.970.000** |