

ELECTRONICS TECHNOLOGY
GPI SARDAR GARHI PESHAWAR

Electronics DAE

Sr.#	Module/Trainer/ Description	Qty
01	<p>DC Fundamentals Trainer along with base unit .The trainer having the practical provision hardware wise on the following topics of the course.</p> <ul style="list-style-type: none"> • Circuit Voltage, Current, Resistance • DC Power Sources in Series and in Parallel Series • Opposing DC Sources • Switches Identification and Switching Concepts • Ohm’s Law: Circuit Resistance, Current, & Voltage • Resistance, Voltage and Current in a Series Resistive Circuit • Resistance, Voltage and Current in a Parallel Resistive Circuit • Resistance, Voltage and Current in a Series-Parallel Resistive Circuit • Power in a Series and/or Parallel Resistive Circuit • Rheostat and Potentiometer • Voltage and/or Current Dividers • Measuring: DC Ammeter, DC Ohmmeter, DC Voltmeter • Currents and Node Currents in a Two-Element Branch Circuit • Voltages in a Three-Element Series Circuit • Algebraic Sum of Voltages in a Series Circuit • Generating Loop Equations and Node Equations • Kirchoff’s Voltage and Current Laws with a Two-Source Circuit • Mesh Solutions, Superposition Solution and Millman's Theorem Solution of a Two-Source Circuit • Thevenizing a Single-Source Network and a Dual-Source Network • Thevenin Resistance (RTH) and Voltage (VTH) of a Bridge Circuit • Thevenin-to-Norton Conversion • Norton-to-Thevenin Conversion • Tee and Wye or Pi and Delta Networks • Transformation of Delta and Wye Networks • Magnetism, Magnetic Fields, Making a Magnet • Electromagnet, Solenoid, Relay <p style="text-align: center;">Have the Troubleshooting provision</p> <p>(Along with all standard accessories mention in the brochure, instructional manual and Student manual)</p>	01

02	<p>AC Fundamentals Trainer along with base unit .The trainer having the practical provision hardware wise on the following topics of the course.</p> <ul style="list-style-type: none"> • Measuring AC Voltage, Current and Impedance • Measuring and Setting Frequency • Inductors, Phase Angle, Series vs Parallel, Inductive Reactance and Impedance • Series and Parallel RL Circuits • Electromagnets, Solenoid, Relay • Transformer Windings, Mutual Inductance, Turns and Voltage Ratios, Secondary Loading • Capacitors, Series vs. Parallel, Capacitive Reactance • Series and Parallel RC Circuits • RC Time Constants • RC/RL Wave shapes <p>Troubleshooting the Basics AC Fundamental Circuits.</p> <ul style="list-style-type: none"> • Series and Parallel RLC Circuits • Series Resonant Circuits • Q and Bandwidth of a Series/Parallel RLC Circuit • Resonant Frequency in a Parallel RLC Circuit • Power Division and Power Factor • Filters: Low-Pass, High Pass, Band-Pass and Band-Stop <p>Have the Troubleshooting provision in the related circuits</p> <p>(Along with all standard accessories mention in the brochure and instructional manual and Student manual)</p>	01
03	<p>Solid state Devices (BJT, FET) Trainer along with base unit. The trainer having the practical provision hardware wise on the following topics of the course.</p> <ul style="list-style-type: none"> • Semiconductor Component Identification and Control of a Semiconductor Switch • Diode: DC Characteristics, Diode Wave shaping • Rectifiers: Half-Wave, Full-Wave Diode Bridge, Power Supply Filtering, Voltage Doubler • Zener Diode and Voltage Regulation • Transistor: Testing the Junctions, PNP Transistor Current Control Circuit, Emitter-Base Bias Potentials, Collector Current vs Base Bias, DC Circuit Voltages, Load Lines • Multistage Amplifier Introduction • Common Base, Common Emitter and Common Collector Circuits AC/DC Operation • Temperature Effect on Fixed Bias Circuit and Voltage Divider Bias Circuit • Transistor Parameters Familiarization and Understanding the Specification Sheet • RC Coupled Amplifier DC Operation, AC Voltage Gain and Phase 	01

	<p>Relationship, Frequency Response</p> <ul style="list-style-type: none"> • Transformer Coupled Amplifier AC/DC Operation, Frequency Response • Direct Coupled Amplifier AC/DC Operation , Frequency Response • Single-Ended Power Amplifiers: Introduction, DC Operation, AC Operation, Voltage Gain, Power Gain • Phase Splitter DC Operation • Voltage Gain and Input/output Signal Phase Relationship • Push-Pull Power Amplifiers: DC Operation, AC Operation, Voltage and Power Gain • Complementary Power Amplifiers: DC Operation, AC Operation, Voltage Gain and Power Gain • Darlington Pair Current Gain Characteristics, Input and Output Impedance • Oscillators Operation: Unijunction, Hartley, Colpitts • JFET: Operating Characteristics, Effect fo Gate Bias on Pinch-Off, Dynamic Characteristics, DC Amplifier Operation, Voltage Gain, DC Current Source Operation and Power/Load Voltage Variation • MOSFET: Zero Bias Characteristic, Modes of Operation, Voltage Amplifier, Dual Gate MOSFET Mixer • UJT: Operating Characteristics, Waveform Generation • Thermistor and Photo resistor Operation • Fiber Optic Light Transfer <p>Have the Troubleshooting provision of the semiconductor devices, amplifiers, power amplifiers circuits.</p> <p>(Along with all standard accessories mention in the brochure , instructional manual and Student manual)</p>	
04	<p>Thyristors and Power Control Circuits Trainer along with base unit. The trainer having the practical provision hardware wise on the following topics of the course.</p> <p>Thyristor: Component Familiarization, Circuit Fundamentals</p> <ul style="list-style-type: none"> • Silicon Controlled Rectifier (SCR): Testing, DC Operation, Gate Trigger Voltage and Holding Current • Rectifiers: Half-Wave Rectifier, SCR Controlled Half-Wave Rectifier, Full-Wave Rectifier, Phase Control • UJT: Characteristics, Half and Full-Wave Phase Control • Bidirectional Conduction, Triggering Modes (4) • <p>Have the Troubleshooting provision in the thyristor circuits.</p> <p>(Along with all standard accessories mention in the brochure , instructional manual and Student manual)</p>	01

5	<p>Operational Amplifier Trainer along with base unit. The trainer having the practical provision hardware wise on the following topics of the course.</p> <p>Op Amp Types and Packages, Circuit Board Familiarization, Basic Op Amp Characteristics and Parameters</p> <ul style="list-style-type: none"> • Inverting and Non-Inverting Amplifiers Operation: DC and AC • Voltage Follower DC Operation, AC Operation • Typical Amplifiers Operation: Inverting Gain-of-One Amplifier, Inverting Summing Amplifier, Scaling, Averaging, Non-Inverting Summing, Difference Amplifier (AC/DC) • Open-Loop Operation, Zener-Clamped Operation • Sine Wave to Square Wave Converter • Component Location and Identification • Band Pass Filter Operation • Integrator and Differentiator • Low Pass and High Pass Filter Frequency Response, Phase and Transient Response • Band Pass Filter Operator, Frequency Response, Phase Response • DC Characteristics of an Active Voltage to Current Converter • AC Characteristics of an Active RMS or Average Calibrated Voltage to Current Converter <p>Have the Troubleshooting provision in the OP AMP Circuits</p> <p>(Along with all standard accessories mention in the brochure , instructional manual and Student manual)</p>	01
6	<p>Digital Logic Trainer Along with base unit. The trainer having the practical provision hardware wise on the following topics of the course.</p> <p>Component Location and Identification</p> <ul style="list-style-type: none"> • Operation of General Circuits and IC Package Fundamentals • Logic Functions: AND, NAND, OR, NOR, Exclusive OR, NOR Gates • Dynamic Response of XOR/XNOR Logic Gates • DC Operation of a NOT and an OR-TIE • Transfer Characteristics of a Schmitt and a Standard LS TTL Gate • Flip-Flops: Set/Reset, D-Type, Static JK, Dynamic Operation • Tri-State Gate: Output Enable Control, Sink and Source Control • TTL and CMOS: Static Trigger Levels, Dynamic Transfer Characteristics • Static and Dynamic Control of a Data Bus • Component Location and Identification • Operation of General Circuits and IC Package Fundamentals • Basic Counter Control Functions, Ripple Counter Waveforms, Synchronous Counter Circuit Waveforms and Glue Logic • Basic Operating Modes of the Shift Register • Shift Register Circuit Waveforms 	01

	<ul style="list-style-type: none"> • Fundamental Binary Addition, Addition with Input and Output Carry • Fundamental Binary Comparisons • Comparators and Counter Modulus Control • Component Location and Identification • Operation of General Circuits and IC Package Fundamentals • Fundamentals: BCD Decoder Operation, Priority Encoder Operation, ADC Operation, DAC Operation • Data Selector, Multiplexer, 1-Line-to-8-Line Demultiplexer • 1-Line-to-8-Line Demultiplexer • LED Decoder/Driver, 7-Segment LED Display, ODD and EVEN Parity • ODD and EVEN Parity • Parity Generator/Checker Glue Logic <p>Have the Troubleshooting provision in the digital circuits</p> <p>(Along with all standard accessories mention in the brochure, instructional manual and Student manual)</p>	
7	<p>16-Bit Microprocessor Trainer.The trainer having the practical provision hardware wise on the following topics of the course.</p> <ul style="list-style-type: none"> • Read and Write Cycles • CPU Initialization • Memory Control Signals, Address Decoding, Data Transfers • Ports: DAC and ADC Ports, PPI and Keypad Interface, Display and Serial Ports • Non-maskable and Maskable Interrupts, Exceptions • Immediate, Register and Memory Addressing Modes • Instruction Formats and Using the 8086 CPU Instructions • DC Motor Control and Temperature Control application • <p>Have the Troubleshooting provision</p> <p>(Along with all standard accessories mention in the brochure, instructional manual and Student manual)</p>	01
8	<p>Analog Communication Trainer. The trainer having the practical provision hardware wise on the following topics of the course</p> <ul style="list-style-type: none"> • Analog Communication Concepts and Circuit Board Familiarization • Amplitude Modulation, RF Power Amplifier, Balanced Modulator, RF Stage • Mixer, IF Filter, Envelope Detector, Balanced Modulator, LSB Filter, RF Power Amplifier, Mixer, RF Stage • Mixer and RF Power Amplifier • RF Stage, Mixer, and IF Filter 	01

	<ul style="list-style-type: none"> • Product Detector and Automatic Gain Control • Frequency and Phase Modulation • Demodulation (Quadrature Detector) • PLL Circuit and Operation, FM Detection with a PLL <p>Have the Troubleshooting provision in the basics & analog communication circuits.</p> <p>(Along with all standard accessories mention in the brochure , instructional manual and Student manual)</p>	
9	<p>Transducer and Sensor Trainer. The trainer having the practical provision hardware wise on the following topics of the course.</p> <p>Introduction to Transducers and the Circuit Board</p> <ul style="list-style-type: none"> • Temperature Measurement, Control, RTD, Thermocouple • Capacitance Sensor, Touch and Position Sensing • Strain Gauge Characteristics • Bending Beam Load Cell (Strain Gauge) • Ultrasonic Principles, Distance Measurement • Infrared Transmission/Reception, IR Remote Control • Force Measurement • Computerized Temperature Control and Measurement <ul style="list-style-type: none"> • Control Panels • Plunger Switches • Magnetic Proximity Sensors • Shock/Vibration Sensors • Electronic Active Sensors • Electronic Passive Sensors • Have the provision of the troubleshooting <p>(Along with all standard accessories mention in the brochure , instructional manual and Student manual)</p>	01
10	<p>Digital Communications Trainer.The trainer having the practical provision hardware wise on the following topics of the course.</p> <ul style="list-style-type: none"> • Concepts of Digital Communications, Circuit Board Familiarization • PAM Signal Generation, Demodulation, PAM TDM Transmission and Reception 	01

	<ul style="list-style-type: none"> • PTM Signal Demodulation and Generation • PCM Signal Generation and Demodulation, Signal Time-Division Multiplexing • DM Transmitter, Receiver and Noise • Channel Bandwidth and Noise • Circuit Board Familiarization and Introduction to Digital Transmission • Encoding and Decoding • FSK Signal Generation, Asynchronous Detection, Synchronous Detection • PSK Signal Generation and Synchronous Detection • ASK Signal Generation and Asynchronous Detection • Effects of Noise on ASK and PSK Signals • Effects of Noise on Asynchronously and Synchronously Detected FSK Signals • Operation of an FSK Modem and DPSK Modem <p>Have the provision of the trouble shooting in the digital communication circuits</p> <p>(Along with all standard accessories mention in the brochure , instructional manual and Student manual)</p>	
11	<p>Motors, Generators, And Controls Trainer Along with base unit.The trainer having the practical provision hardware wise on the following topics of the course.</p> <ul style="list-style-type: none"> • DC Motor Circuits Familiarization • Stepper Motor and AC Motor Circuits • Analog DC Motor Positioning, PWM DC Motor Positioning • Analog and Pulsed Speed Control of a DC Motor • Variable Frequency Control Motor 24V and above • The Tachometer Generator <p>Have the provision of the troubleshooting</p> <p>(Along with all standard accessories mention in the brochure , instructional manual and Student manual)</p>	01
12	<p>Microcontroller System (MCS-51 and PIC-16F) Trainer Along with base unit.The trainer having the practical provision hardware wise on the following topics of the course</p> <ul style="list-style-type: none"> • Inputs and Outputs, Digital vs. Analog, Clocking • Programming, Display a Message, Calculations, Input Conditioning, Decisions and Macros • The 7-Segment Display • String Variables and ASCII Code • LCD Display • How to Program the Microcontroller 	01

	<ul style="list-style-type: none"> • Control two LED's through controller • Control four 7 segments display through controller • Message display on LED through controller • Sequencer traffic light controller • Have the provision of the troubleshooting <p>(Along with all standard accessories mention in the brochure , instructional manual and Student manual)</p>	
13	<p>Digital logic trainer Breadboard base having the following facilities.</p> <ul style="list-style-type: none"> • Input Logic switches • Output LED's • Power supplies • Seven segment displays • TTL and CMOS provision • Clock Signals • Connecting wires • Breadboard size: 2400 tie points or above • Have the troubleshooting provision. <p>(Along with all standard accessories mention in the brochure , instructional manual and Student manual)</p>	05
14	<p>Analog Trainer Breadboard base having the following facilities.</p> <ul style="list-style-type: none"> • Breadboard size: 2400 tie points or above • Function generator (sine , square, Triangle, and Ramp) • Fixed and variable power supplies $\pm 0\sim 25V$, $\pm 12V$, $+5V$ • Have the troubleshooting provision. <p>(Along with all standard accessories mention in the brochure , instructional manual and Student manual)</p>	02
16	<p>Chopper/Inverter System Trainer.The trainer having the practical provision hardware wise on the following topics of the course</p> <ul style="list-style-type: none"> • Single phase full converter with • RL load. • Three-phase full converter RL load. • Step-Down (Buck) DC to DC Converters. • Step-up (Boost) DC to DC Converters. • Step-Down/up (Buck-Boost) DC to DC Converters CCM. • Step-Down/up(Buck-Boost) DC to DC Converters DCM • Forward DC – DC converter • Full bridge DC – DC converter • Three-Phase Half-Wave semi -converter • Single-Phase Full-converter • Single-Phase Bridge's Rectifier • Single-Phase semi & Full-converter with Resistive & Inductive load • Three-Phase semi-converter and Full-wave converter with Resistive and 	01

	<ul style="list-style-type: none"> Inductive load • DC to DC converters • Have the provision of the troubleshooting <p>(Along with all standard accessories mention in the brochure , instructional manual and Student manual)</p>	
17	<p>Thyristor Speed Controller Trainer.The trainer havingthe practical provision hardware wise on the following topics of the course.</p> <p>The Thyristor Speed Controller, Model is designed to control the speed of the DC motor/ generator module, in both the open-loop and closed-loop modes of control.</p> <p>The Thyristor Speed Controller module contains a thyristor single-phase bridge rectifier. Speed control of the DC motor 24V and above is provided by varying the firing angle of the thyristors. In the open-loop mode of control, the firing angle is set manually using a potentiometer while in the closed-loop mode; it is set by a controller which compares the motor armature voltage to a voltage reference set by the user.</p> <ul style="list-style-type: none"> • Have the provision of the troubleshooting <p>(Along with all standard accessories mention in the brochure , instructional manual and Student manual)</p>	01
18	<p>PLC Trainer having the following facilities.</p> <p>DC output:</p> <p>Voltage: 0 – 24V</p> <p>Current: 0 – 2A</p> <p>Ac Output:</p> <p>Voltage: 220V</p> <p>Current: 1 Amp</p> <p>Input/output terminals is 32 or above</p> <p>Memory: 32K or above</p> <p>Internal memory: 2K</p> <p>Timer/counter: 128/64</p> <p>Base Module: Din Rail</p>	01

	<p>Powersupply module: input:120/230 V (AC)</p> <p>Output: 24 V DC/5 A</p> <p>PC interface: USB or Ethernet</p> <p>With software supported (LAD, FBD, and STL).</p> <p>Accessories: Connection cords, PC cable, ac power cord, Program CD, Manual.</p> <p>PLC Application Modules:</p> <ul style="list-style-type: none"> • Traffic Lights • Electro-Pneumatics • Electro-Mechanical – DC Motor • Electro-Mechanical – Stepper Motor • Level Process Control • Have the provision of the troubleshooting <p>(Along with all standard accessories mention in the brochure , instructional manual and Student manual)</p>	
19	<p>Digital storage oscilloscope</p> <p>100 MHz Bandwidth with 2Input Channels with color display.</p> <p>(With all accessories mention in the brochure and instructional manual)</p>	05
20	<p>Spectrum AnalyzerFrequency Range: 150kHz ~1GHz</p> <p>(With all accessories mention in the brochure and instructional manual)</p>	02
21	<p>RF signal generator</p> <p>Frequency Range: up to 150 MHz</p> <p>(With all accessories mention in the brochure and instructional manual)</p>	03
22	<p>Digital Function Generator</p> <p>20MHz, Sine, Square, Ramp, Noise waveformAmplitude, DC Offset and other key setting information shown on the 5~8 digit display</p> <p>(With all accessories mention in the brochure and instructional manual)</p>	04
23	<p>FM/AM standard signal generator</p> <p>Frequency Range:</p> <p>100kHz ~ 110MHz</p>	03

	(With all accessories mention in the brochure and instructional manual)	
24	<p>Switching DC Regulated powersupply</p> <p>Three independent, isolated output</p> <p>CH3 adjustable output : 5V/3A</p> <p>0-30V x 2, 0-3A x 2</p> <ul style="list-style-type: none"> * 2 Independent Isolated Output * Four "3 Digits" LED Displays * 0.01% Load and Line Regulation * Low Ripple and Noise * Tracking Operation and Auto Series/Parallel Operation * Output ON/OFF Switch <p>Over Load and Reverse Polarity Protection</p> <p>(With all accessories mention in the brochure and instructional manual)</p>	03
25	<p>Digital Multimeter with dual measurement displays (Bench Type)</p> <p>DC Voltage :100 mV ~1000V DC Current: 100μA ~ 10A</p> <p>Resistance : 100Ω ~100 MΩ</p> <p>AC Voltage: 100mV ~750V</p> <p>AC Current: 100mA ~ 10A</p> <p>Power Source: 230 V</p> <p>(With all accessories mention in the brochure and instructional manual)</p>	7
26	<p>Digital Clamp on Meter</p> <p>AC Amp: 0~200A</p> <p>AC Vtg: 600V</p>	05

	DC Vtg: 600V Ohms: 20MΩ (With all accessories mention in the brochure and instructional manual)	
27	Digital Multimeter (Hand Held) DC Voltage : 1000 V DC Current: 10A Resistance : 20 MΩ AC Voltage: 600 V AC Current: 10 A (With all accessories mention in the brochure and instructional manual)	7
28	Digital LCR Meter bench type Resistance : 0.00001Ω ~ 99999kΩ Capacitance: 0.00001pF ~ 99999uF Inductance : 0.00001mH ~ 99999H Quality Factor : 0.0001 ~ 9999 Impedance : 0.00001Ω ~ 99999kΩ (With all accessories mention in the brochure and instructional manual)	3
29	Digital Frequency Counter 10HZ-120 MHZ Range 8 Digit Display Frequency and Period measurement	02

	<p>Along with complete Accessories.</p> <p>(With all accessories mention in the brochure and instructional manual)</p>	
30	<p>Logic Probe and Pulser</p> <p>For In circuit testing of TTL and CMOS</p> <p>(With all accessories mention in the brochure and instructional manual)</p>	10
31	<p>Digital IC Tester TestRange:TTL 74/54</p> <p>CMOS 40/45</p> <p>Test voltage 2.5-5v</p> <p>Display 16 characters or more in 1 line LCD</p> <p>Power Source AC 100-240 v,50Hz</p> <p>(With all accessories mention in the brochure and instructional manual)</p>	05
32	<p>AC Power Source</p> <p>Input 120v AC</p> <p>Variable Output</p> <p>0 to 300v AC</p> <p>(With all accessories mention in the brochure and instructional manual)</p>	03