

# PRODUCT GUIDE

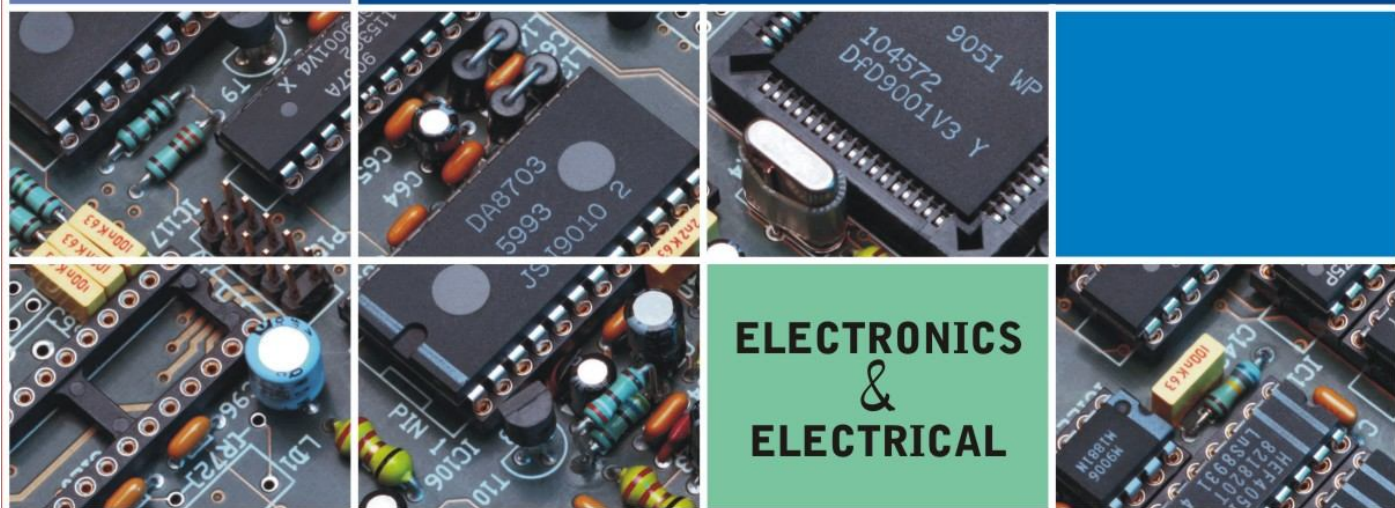


An ISO Certified Co.

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## TESTING MEASURING & LABORATORY INSTRUMENTS



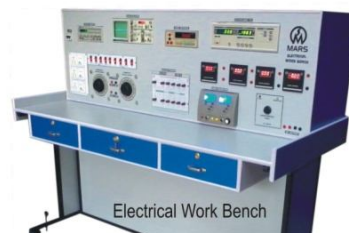
Cathode Ray Oscilloscope

- Analog Oscilloscopes
- Digital Storage Oscilloscopes
- Spectrum Analyzers
- Logic Analyser (PC Based)
- Function Generators / Frequency Counters / Soldering Stations



AF Function Generator

- DC Regulated Power Supplies Single Channel / Dual Channel
- Multimeters / Clamp Meter / Analog Meter / Wattmeters
- Decade Capacitance Box
- Decade Inductance Box
- Decade Resistance Box



Electrical Work Bench

**Electronic / Electrical Work Bench**  
Inbuilt option available CRO/DSO, Spectrum Analyser, Function Generator, Frequency Counter, Power Supply AC/DC, Multimeter, LCR Meter Soldering / Desoldering Station etc.

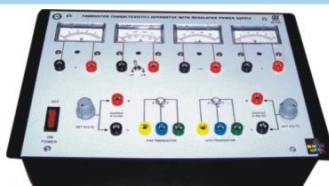
## ELECTRONICS LAB TRAINING MODULES



PN Junction Diode Characteristics Apparatus  
(Economy Model)

### Economical Model

- AL 521 Diode Valve Characteristics Apparatus
- AL 522 Triode Valve Characteristics Apparatus
- AL 523 Tetrode/Pentode Valve Characteristics Apparatus
- AL 524 Ionization Potential of Mercury using Thyatron Valve
- AL 527 Photo Cell Characteristics Apparatus
- AL 528 Work Function of Diode (Richardson Law)
- AL 529 Solar Cell Characteristics Apparatus
- AL 532 H' Parameters of PNP Transistor in Common Emitter mode
- AL 533 Transistor Characteristics Apparatus
- AL 534 SCR Characteristics Apparatus
- AL 535 FET Characteristics Apparatus
- AL 539 PN Junction Diode Characteristics Apparatus
- AL 542 Voltage Stabilization Characteristics of Zener diode
- AL 542RF Zener Diode V-I Characteristics Apparatus
- AL 543 PN / Zener Diode / LED Characteristics Apparatus
- AL 544 Energy Band Gap Apparatus
- AL 546 Thermistor Characteristics Apparatus
- AL 547B UJT Characteristics Apparatus & UJT as Relaxation Oscillator
- AL 548 Mosfet Characteristics Apparatus
- AL 551 Diac Characteristics Apparatus
- AL 552 Triac Characteristics Apparatus
- AL 554 LDR Characteristics Apparatus
- AL 556 LED Characteristics Apparatus
- AL 557 Opto Electronic Devices Characteristics (LED, LDR, Photo Transistor & Photo Diode)
- AL 558 Photodiode Characteristics Apparatus
- AL 559 Photo Transistor Characteristics Apparatus
- AL 560 Measurement of Peak, Average & RMS value of AC signal
- AL 561 Verification of KCL & KVL
- AL 562 Resistance in Series & Parallel Apparatus
- AL 563 Ohm's Law Apparatus
- AL 563P Ohm's Law Apparatus with 2 round Meters but with Standard Power Supply
- AL 564P Charging & Discharging of Capacitor
- AL 565 Flashing & Quenching of Neon Bulb without Meter
- AL 566 B.H. Curve Apparatus
- AL 567 Conversion of Galvanometer into Voltmeter & Ammeter
- AL 567A Conversion of Galvanometer into Voltmeter
- AL 567B Conversion of Galvanometer into Ammeter
- AL 568 Voltage Doubler & Tripler Circuit
- AL 570 LCR Resonance Apparatus
- AL 572 LCR Impedance Apparatus
- AL 577 Half Wave, Full Wave & Bridge Rectifier Apparatus
- AL 579 Ripple factor Apparatus (Half Wave, Full wave and Bridge rectifier)



Transistor Characteristics Apparatus  
(Deluxe Model)

### Deluxe Model

- ME 500 Discrete Component Trainer
- ME 510 Linear IC Trainer
- ME 525 IGBT Characteristics & Application
- ME 526 Planck's Constant Apparatus using Photo Cell
- ME 526L Planck's Constant Apparatus using LED
- ME 530 Transistor Designer Kit (Discrete Components Trainer)
- ME 532D H' Parameters of PNP Transistor in Common Emitter mode
- ME 533D Transistor Characteristics Apparatus
- ME 534D SCR Characteristics Apparatus
- ME 535D FET Characteristics Apparatus
- ME 536 Microphone and Loudspeaker Characteristics Apparatus
- ME 537 Tunnel Diode Characteristics Apparatus
- ME 539D PN Junction Diode Characteristics Apparatus
- ME 542D Voltage Stabilization Characteristics
- ME 542RFD Zener Diode V-I Characteristics Apparatus (Forward & Reverse)
- ME 543D PN / Zener Diode / LED Characteristics Apparatus
- ME 544D Energy Band Gap Apparatus
- ME 545 Energy Band Gap by Four Probe Method
- ME 545L Energy Band Gap by Four Probe Method with PC Interface
- ME 546D Thermistor Characteristics Apparatus
- ME 547BD UJT Characteristics Apparatus & UJT as Relaxation Oscillator
- ME 548D Mosfet Characteristics Apparatus
- ME 549 PUT Characteristics Apparatus
- ME 550 Characteristics & Application of Basic Thyristors (SCR, Diac, Triac, UJT)
- ME 550A Characteristics & Application of Semiconductors & Thyristors (SCR, Diac, Triac, UJT, Mosfet, FET, BJT, Diode & Zener)
- ME 551D Diac Characteristics Apparatus
- ME 552D Triac Characteristics Apparatus
- ME 553 Opto Coupler Characteristics Apparatus
- ME 554D LDR Characteristics Apparatus
- ME 556D LED Characteristics Apparatus
- ME 557D Opto Electronic Devices Characteristics (LED, LDR, Photo Transistor & Photo Diode)
- ME 558D Photodiode Characteristics Apparatus
- ME 559D Photo Transistor Characteristics Apparatus
- ME 560D Measurement of Peak, Average & RMS value of AC signal
- ME 561D Verification of KCL & KVL with Aluminum Panel & Square Meters
- ME 562D Resistance in Series & Parallel Apparatus with Aluminum Panel & Square Meters
- ME 566U Universal B.H Curve Apparatus
- ME 567D Conversion of Galvanometers into Voltmeter & Ammeter



Half Wave, Full Wave & Bridge Rectifier Apparatus  
(Premium Model)

- ME 568D Voltage Doubler & Tripler Circuit
- ME 569D DC Regulated Power Supply Trainer
- ME 570D LCR Resonance Apparatus
- ME 571D LCR Resonance Apparatus With built in Sine wave Oscillator
- ME 572D LCR Impedance Apparatus
- ME 573 RC Circuit as Low Pass & High Pass Filters
- ME 574 Study of AC Fundamentals
- ME 576 Clipping & Clamping Characteristics Apparatus
- ME 577D Half Wave, Full Wave & Bridge Rectifier Apparatus
- ME 578 Voltage Regulation using IC 317
- ME 578B Voltage Regulation using Zener Diode & Transistors
- ME 578C Voltage Regulation using 78 Series Voltage Regulators
- ME 579D Ripple factor Apparatus (Half Wave, full wave and Bridge rectifier)

### Premium Model

- ME 532P H' Parameters of PNP Transistor in Common Emitter mode
- ME 533P Transistor Characteristics Apparatus
- ME 534P SCR Characteristics Apparatus
- ME 535P FET Characteristics Apparatus
- ME 539P PN Junction Diode Characteristics Apparatus
- ME 542P Voltage Stabilization Characteristics
- ME 542RFP Zener Diode V-I Characteristics Apparatus (Forward & Reverse)
- ME 543P PN / Zener Diode / LED Characteristics Apparatus
- ME 544P Energy Band Gap Apparatus
- ME 546P Thermistor Characteristics Apparatus
- ME 547BP UJT Characteristics Apparatus & UJT as Relaxation Oscillator
- ME 548P Mosfet Characteristics Apparatus
- ME 551P Diac Characteristics Apparatus
- ME 552P Triac Characteristics Apparatus
- ME 554P LDR Characteristics Apparatus
- ME 556P LED Characteristics Apparatus
- ME 557P Opto Electronic Devices Characteristics (LED, LDR, Photo Transistor & Photo Diode)
- ME 558P Photodiode Characteristics Apparatus
- ME 559P Photo Transistor Characteristics Apparatus
- ME 560P Measurement of Peak, Average & RMS value of AC signal
- ME 561P Verification of KCL & KVL
- ME 562P Resistance in Series & Parallel Apparatus
- ME 563PD Ohm's Law Apparatus with 2 Meters & inbuilt DC Regulated Power Supply
- ME 567P Conversion of Galvanometers into Voltmeter & Ammeter
- ME 568P Voltage Doubler & Tripler Circuit
- ME 572P LCR Impedance Apparatus
- ME 577P Half Wave, Full Wave & Bridge Rectifier Apparatus
- ME 579P Ripple factor Apparatus (Half Wave, full wave and Bridge rectifier)

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## ELECTRONICS LAB TRAINING MODULES

### e/m Apparatus

- ME 580 e/m by Thomson Method
- ME 581 e/m by Helical's Method
- ME 584 e/m by Milikan's Oil Drop Method

### Network Theorems Verifications (In DC Circuits)

- ME 590 Network Theorems (Norton's & Thevinin's, Superposition & Maximum Power Transfer)
- ME 592 Superposition Theorem
- ME 593 Norton's Theorem
- ME 594 Thevinin's Theorem
- ME 595 Maximum Power Transfer Theorem
- ME 596 Reciprocity Theorem
- ME 597 Tellegan's Theorem
- ME 598 Millman's Theorem

**Also Available in Permum Model**

### Amplifiers

- ME 606 Opamp Based Sinusoidal & Non Sinusoidal Wave Generator
- ME 607 IFT Tuned Amplifier
- ME 608 Class 'C' Amplifier
- ME 610 Darlington Pair Amplifier
- ME 611 Transistor Amplifier Circuits (CB, CE & CC Modes)
- ME 612 Audio Power Amplifier using IC TBA 810
- ME 613 FET Common Source Amplifier
- ME 614 Common Collector (Emitter Follower) Transistor Amplifier
- ME 617 Common Base Transistor Amplifier
- ME 618 Common Emitter Transistor Amplifier
- ME 619 Two Stage RC Coupled Amplifier
- ME 620 Transistor Push Pull Amplifier
- ME 621 Complementary Symmetry Amplifier
- ME 622 Class 'A', 'B', 'AB' & Push Pull Amplifier
- ME 623 Biasing of Transistor in Class 'A' Amplifier
- ME 624 Biasing Techniques of Transistor(BJT)
- ME 1160 Amplifier Lab Trainer with Power Supply (with Bread Board)
- ME 1161 Amplifier Lab Trainer with Built in Power Supply, AC Millivoltmeter & Function Generator (with Bread Board)

**Optional Ready** to use modules available for ME 1160 / ME 1161



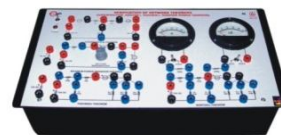
e/m by Thomson Method

### Operational Amplifiers

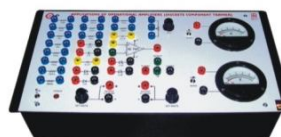
- ME 625 Operational Amplifier as Inverting, Non-Inverting, Summing & Difference Amplifier with one Digital Voltmeter
- ME 626 Operational Amplifier as Inverting, Non-Inverting, Unity Gain Amplifier & Frequency Response with Analog Voltmeter
- ME 627 Applications of Operational Amplifiers (Discrete)
- ME 627B Characteristics of Operational Amplifier (Discrete)
- ME 629 Operational Amplifier as Summing, Scaling, Averaging, Window Detector & Zero Crossing Detector
- ME 631 Operational Amplifier as Differentiator & Integrator
- ME 633 Operational Amplifier as Schmitt Trigger
- ME 634 Linear Wave Shaping Circuits (Study of Clipping, Clamping, Integrator, Differentiator)
- ME 635 Operational Amplifier as Square wave Generator
- ME 638 Operational Amplifier as Voltage Comparator
- ME 639 Operational Amplifier as Differential Amplifier
- ME 640 Operational Amplifier as V-I & I-V Converter
- ME 641 Feedback Amplifier Series & Shunt Voltage
- ME 644 Operational Amplifier as Voltage & Current Feedback Amplifier
- ME 645 Operational Amplifier as Instrumentation Amplifier
- ME 646 Operational Amplifier as Logarithmic Amplifier
- ME 647 Precision Rectifier using Operational Amplifier
- ME 649 Audio Power Amplifier (Class 'A' using BJT)

### Multivibrator & Oscillator

- ME 650 Application of IC 555
- ME 656 Bistable Multivibrator using Transistors
- ME 657 Monostable & Free running Multivibrator using Transistors
- ME 659 F-V & V-F Converter using IC 337
- ME 660 Oscillators Circuits (Hartley, Colpitt, Wein Bridge, Relaxation, Clap, Tuned, Crystal and RC Phase Shift Oscillator)
- ME 661 Hartley Oscillator
- ME 662 Colpitt Oscillator
- ME 664 Phase Shift Oscillator
- ME 664A Phase Shift Oscillator using OP-AMP
- ME 665 Wein Bridge Oscillator using Operational Amplifier IC 741
- ME 665A Wein Bridge Oscillator using Transistor
- ME 666 Relaxation Oscillator using UJT
- ME 667 Tuned Collector Oscillator
- ME 667A Oscillators Circuits (Hartley, Colpitt, Wein Bridge, phase shift oscillator)
- ME 668 Crystal Oscillator
- ME 669 Voltage Controlled Oscillator using PLL 565



Network Theorems  
(Norton's & Thevinin's, Superposition & Maximum Power Transfer)



Applications of Operational Amplifiers (Discrete)

## DIGITAL ELECTRONICS LAB TRAINING MODULES



4/8 Bit Analog to Digital Converter



4/8 Bit Digital to Analog Converter

- ME 675 Logic Gates using Six TTL IC's (6 in 1)
- ME 678 RTL Logic Gates (5 in 1)
- ME 679 Basic Logic Gate using Discrete Components(7in1)
- AL 680 Basic logic Gates using Discrete Components(5in1)
- AL 688 Demorgan's Theorams
- ME 690 Digital Logic Trainer (Logic Gates, Boolean Identities & Demorgan's Theorems)
- ME 691 Digital IC Trainer
- ME 692 Verification of truth tables of Logic Gates using Universal Gates
- ME 695 Pulse/ Clock Generator using NAND Gate
- ME 699 4 Bit Adder & Subtractor Circuits using IC 7483
- ME 701 Digital Full Adders & Subtractors using NAND Gates
- ME 702 Flip Flops using NAND Gates & TTL IC's
- ME 711 Decade / Modulo-N Counter
- ME 712 4 Bit Counters (Synchronous & Asynchronous)
- ME 716 4 Bit Shift Registers
- ME 718 Encoder & Decoder Circuits

- ME 720 16 to 1 line Multiplexer & 1 to 16 Line Demultiplexer
- ME 720A Encoder/Multiplexer
- ME 720B Decoder/ DeMultiplexer
- ME 722 RAM Circuit using IC 7489
- ME 723 Parity Generator/Checker
- ME 724 4 Bit Digital Comparator
- ME 731 4/8 Bit Analog to Digital Converter
- ME 731E 4 Bit A/D Converter
- ME 732 4/8 Bit Digital to Analog Converter
- ME 732E 4 Bit D/A Converter
- ME 734 Transfer Characteristics of TTL and TTL Schmit Trigger Inverter
- ME 735 A to D & D to A Converter
- ME 737 TTL-CMOS, CMOS-TTL Interfacing
- ME 738 Arithmetic/Logic Unit (ALU)
- ME 739C TTL IC Characteristics Apparatus
- ME 739T CMOS IC Characteristics Apparatus
- ME 1154 Digital Lab Trainer (with Bread Board)

**Optional Ready** to use modules available for ME 1154

## BASIC & ADVANCE COMMUNICATION LAB TRAINING MODULES

- ME 741 Amplitude Modulation & Demodulation
- ME 742 Frequency Modulation and Demodulation
- ME 743 Pulse Amplitude Modulation & Demodulation
- ME 744 Pulse Width Modulation & Demodulation
- ME 745 Pulse Position Modulation & Demodulation
- ME 746 PAM/PPM/PWM Modulation & Demodulation
- ME 747 Phase Modulation and Demodulation
- ME 748 Frequency Shift Keying Modulation & Demodulation
- ME 749 Amplitude Shift Keying Modulation & Demodulation
- ME 750 Phase Shift Keying Modulation & Demodulation
- ME 751 Pulse Code Modulation and Demodulation
- ME 752 Delta Modulation and Demodulation
- ME 753 Adaptive Delta Modulation and Demodulation
- ME 754 Single Side Band Modulation & Demodulation
- ME 756 Sample & Hold Circuit using Op-Amp
- ME 757 Detection of FM using Phase locked loop (PLL)
- ME 758 Balanced Modulator/DSB-SC (DSB-SC Amplitude Modulation and Demodulation)
- ME 761 Frequency Division Multiplexer & Demultiplexer

- ME 762 QAM Modulation & Demodulation
- ME 763 Pre emphasis & De emphasis Kit
- ME 770 Frequency Modulation & Demodulation
- ME 771 Delta, Adaptive Delta and Delta Sigma Modulation & Demodulation
- ME 772 TDM Pulse Code Modulation Transmitter
- ME 773 TDM Pulse Code Modulation Receiver
- ME 774 Data Formatting and Carrier Modulation Transmitter
- ME 775 Data Formatting and Carrier Demodulation Receiver
- ME 776 Analog Signal Sampling & Reconstruction
- ME 777 TDM Pulse Amplitude Modulation & Demodulation
- ME 778 Vestigial Side Band(VSB) Modulation & Demodulation
- ME 780 8 Bit Variable Data Generator for Model (ME 774 & ME 775)
- ME 781 DSB/SSB AM Transmitter
- ME 782 DSB/SSB AM Receiver
- ME 785 Transmission Line Trainer
- ME 786 Mobile Phone Trainer
- ME 787 GSM Trainer
- ME 788A CDMA Trainer



DSB/SSB AM Transmitter & Receiver



PAM/PPM/PWM  
Modulation & Demodulation

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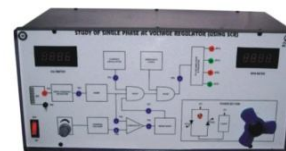
## POWER ELECTRONICS LAB TRAINING MODULES

ME 791	Light Intensity control using SCR & Triac
ME 792	SCR Firing Circuits
ME 793	SCR Commutation Techniques
ME 794	Phase control using Triac
ME 795	Switching Action of a BJT
ME 795A	Switching Action of a FET
ME 796	Thyristor Firing Circuit Kit (UJT Controlled SCR Time Delay)
ME 797	Zero Voltage Switching using SCR
ME 798	Step up Chopper
ME 799	SCR Single Phase Half Wave, Full Wave, Fully Controlled Bridge Rectifier/Converter
ME 800	DC Motor Control using SCR's (with tachometer)
ME 801	Three Phase Half Controlled bridge convertor with RL Load
ME 801B	Three Phase Half Controlled bridge convertor with R Load
ME 801M	Speed control of DC Motor using Three Phase Half Controlled bridge convertor
ME 802	Three Phase Fully Controlled Converter with R Load
ME 802B	Three Phase Fully Controlled Converter with RL Load

ME 802M	Speed control of DC Motor using Three Phase Fully Controlled Converter
ME 803	Three Phase Induction Motor Speed Controller
ME 803M	Speed Control of three phase induction motor using AC voltage regulator
ME 804	Single Phase Cycloconverter
ME 806	SMPS Trainer Kit
ME 807	Jone's Chopper
ME 808	Morgan's Chopper
ME 809	Series Inverter using SCR's
ME 810	Parallel Inverter using SCR's
ME 811A	Speed Control of Single Phase Induction Motor (with AC Voltage)
ME 812	Single Phase Inverter (using power mosfet)
ME 813	Chopper Circuit (using power mosfet with Motor)
ME 814	DC Drive Trainer
ME 815	Single Phase Half Controlled DC Drive
ME 816	SCR Ring Counter
ME 817	Buck Boost Converter Kit
ME 818	Current commutated chopper
ME 819	Voltage commutated chopper



3 Phase Fully Controlled Bridge Converter (with R & L Load)



Speed Control of Single Phase Induction Motor (AC Voltage Regulator)

## PHYSICS LAB EXPERIMENTAL SETUPS

ME 526	Planck's Constant Apparatus using Photo Cell
ME 526L	Planck's Constant Apparatus using LED
ME 545	Energy Band Gap by Four Probe Method
ME 545L	Energy Band Gap by Four Probe Method with PC Interface
ME 821	Measurement of High Resistance using Substitution Method
ME 822	Lissajous Figure Apparatus
ME 823	Stefan Constant Apparatus
ME 824	Dielectric Constant Apparatus (Solid & Liquid)
ME 825	Hall Effect Experiment
ME 826	Fourier Analysis Kit
ME 827	Measurement of Susceptibility of Paramagnetic Solution by Quinck's Tube Method
ME 828	Heat Efficiency of an Electric Kettle
ME 829	Choke Characteristics Apparatus
ME 830	Inductance Measurement (Impedance at Different Freq)
ME 831	Determine the Height of Tower with the Help of Sextant
ME 840	GM Counter Experimental Setup
ME 850	Determine The Ballistic Constant of a Ballistic Galvanometer
ME 851	The ECE of Copper using Tangent Galvanometer
ME 852	Determine the Wavelength of Sodium Light by Fresnel's Biprism Kit
ME 853	Determine the Focal Length of Two Lenses by Nodal Slide and Locate the Position of Cardinal Points

ME 854	Determine of the Specific Rotation of the Cane Sugar Solution with the Help of Polarimeter
ME 855	Determine the Wavelength of Spectral Lines using Plane Transmission Grating
ME 856	Determine the Viscosity of a Liquid by Stoke's Method
ME 857	Determine the Frequency of AC Mains by Electrical Vibrator
ME 858	Determine the Wave Length of Sodium Lamp by Newton Ring Method
ME 859	Determine Magnetic Field using Stewart and Gee's Apparatus
ME 860	Determine the Velocity of Ultrasonic Waves by using a Crystal
ME 861	Laser Experimental Setup with Diode Laser
ME 861H	Laser Experimental Setup with He-Ne Laser
ME 862	High Resistance by Leakage Method
ME 863	Thermo electric e.m.f with temprature for a cooper iron thermo couple, by means of a potentiometer
ME 864	Calibration of Voltmeter using Potentiometer
ME 865	Determine Young's modulus's, modulus of rigidity and poisson's ratio of the material of a given wire by Searle's dynamical method
ME 866	Determine the Frequency of a Tuning Fork with the help of Sonometer
ME 867	Determine the Frequency of A.C. mains by Means of a Sonometer



Energy Band Gap by Four Probe Method with PC Interface

ME 868	Determine the Dispersive Power of the Material of the Prism for Violet & Yellow Colors of Mercury Light with the Help of Spectrometer
ME 869	Determine the Resolving Power of Telescope
ME 870	Determine the Wave Length of Sodium Lamp by Michelson Interferometer
ME 871	Determine the Refractive Index of Liquid using Diode Laser
ME 872	Determine the Malus Law using Diode Laser
ME 873	Determine the Brewster Angle using Diode Laser
ME 875	Determine the Refractive Index of Prism using white light & Spectrometer
ME 876	Carrey Foster Bridge with Four Gap
ME 880	Determine Thermal Conductivity using Lee's Disc
ME 891	Sodium Vapour Lamp 35 Watt fitted in Box with Transformer
ME 892	Sodium Vapour Lamp 55 Watt fitted in Box with Transformer
ME 893	Mercury Vapour Lamp 80 Watt fitted in Box with Choke

## FILTER CIRCUITS

ME 961	"T" type Passive Low Pass, High Pass, Band Pass & Band Stop filters
ME 966	M-Derived "T" type Passive Low Pass & High Pass Filters
ME 971	"p" type Passive Low Pass High Pass, Band Pass & Band Stop filter

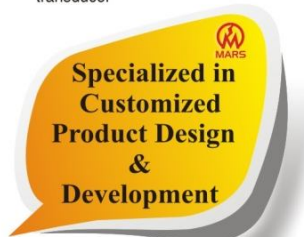
ME 983	Twin-T Active Notch Filter using Operational Amplifier
ME 984	Active Filters using Operational Amplifier
ME 985	Transient Response of RLC Circuit with built-in Square Wave Oscillator

ME 986	Cascaded Two Port Network
ME 987	"T", "p" & "Bridge T" Type Attenuators
ME 988	RC, Low Pass, High Pass, Band Pass & Band Stop Filters

## INSTRUMENTATION LAB TRAINING MODULES

ME 1050	Instrumentation Trainer Using Transducers LVDT, RTD, Thermocouple Thermistor, Opto Devices (Photo Diode, Photo Transistor, LDR, Zener, Diode), Wheatstone Bridge & Instrumentation Amplifier
ME 1051	Strain Gauge Trainer Kit (with Cantilever Beam)
ME 1052	LVDT Trainer Kit
ME 1053	RTD Trainer Kit
ME 1054	Thermocouple Trainer Kit
ME 1056	Speed Measurement Module using Photo Electric & Magnetic Sensor
ME 1056A	Speed Measurement Module using Photo Electric Sensor
ME 1056B	Speed Measurement Module using Magnetic Sensor
ME 1057	Inductive Pick Up
ME 1058	Capacitive Pick Up
ME 1059	Piezo Electric Transducer
ME 1060	Hall Effect Sensor
ME 1061	Pressure Measurement using Strain Gauge

ME 1062	Load Cell Trainer Kit
ME 1063	Temperature Sensors Kit
ME 1064	Study of Linear Potentiometer Instrument Trainer
ME 1065	Data Logger (Voltage, Current, Temperature & Pressure)
ME 1066	Measurement of water level using strain gauge
ME 1067	Measurement of water level using capacitive transducer




Transducer Trainer Kit

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## CONTROL LAB TRAINING MODULES

ME 1100 PID Simulator	ME 2300 Variac 2 Amps Single Phase	ME 1126 Linear System Simulator (Open loop & Close loop System of First order & Second order Systems)
ME 1101 PID Controller Kit (Model Process)	ME 463D AC Ammeter (Rectifier Type) 0-1A	
ME 1103 ON/OFF Temperature Controller	ME 463D AC Ammeter (Rectifier Type) 0-5A	
ME 1104 AC Servo Speed Torque Characteristics	ME 457D DC Voltmeter 0-300V (Internal shunt)	
ME 1105 DC Servo Motor Speed Torque Characteristics	ME 462D AC Voltmeter (Rectifier Type) 0-150V	
ME 1106 AC Position Control System Trainer	ME 240 DC Regulated Power Supply Dual Channel 0-±30VDC/2 Amps	
ME 1107 DC Position Servo Mechanism Trainer	ME 2364 Rheostat 50 Ohms/ 5 Amps. (Double Tube)	
ME 1108 AC Servo Voltage Stabilizer as Servomechanism	ME 2365 Rheostat 250 Ohms/ 3 Amps.	
ME 1109 Stepper Motor Controller Trainer (Manual & Microprocessor Control)	ME 1116 DC Voltage Regulator as a Closed Loop Relay Control System	
ME 1109D Stepper Motor Controller Trainer (Manual Control)	ME 1117 Relay Control System	
ME 1112 Potentiometer as Error Detector	ME 1119 Educational Analog Computer	
ME 1113 Synchro Transmitter Receiver Pair	ME 1122 Light Intensity Control	
ME 1114 Study of Compensation Network	ME 1123 Digital Control System	
ME 1115 Magnetic Amplifier	ME 1125 PLC Trainer Demonstration Unit	
Accessories for ME 1115	ME 1125L Advance PLC Trainer Kit with Interfacing Modules	

PID Controller Kit (Model Process)

## BREAD BOARD TRAINERS

ME 1150 Bread Board Trainer with Power Supplies (General Purpose)
ME 1151 Operational Amplifier Trainer (Bread Board Model)
ME 1152 Digital Electronics Circuit Trainer (Bread Board Model)
ME 1152 OP Set of 20 IC's & Instruction Manual for more than 60 Experiments
ME 1153 Analog Lab Trainer (with Bread Board)
ME 1154 Digital Lab Trainer (with Bread Board)



Digital Lab Trainer

ME 1155 Analog & Digital Lab Trainer (Bread Board Model)
ME 1160 Amplifier Lab Trainer with Power Supply (with Bread Board)
ME 1161 Amplifier Lab Trainer with Built in Power Supply, AC Millivoltmeter & Function Generator (with Bread Board)

**Note :** Optional Ready to use modules available for ME 1153, ME 1154, ME 1155, ME 1160, ME 1161

## DYNAMIC DEMONSTRATORS & TRAINERS

ME 1200 Black & White Television Demonstrator ( with 14" CRT)	ME 1212 Telephone Trainer
ME 1201 Color Television Demonstrator (with 20" CRT)	ME 1213 AM Radio Receiver Demonstrator (Two Band)
ME 1201A Color Television Demonstrator (with 14" CRT)	ME 1214 UPS Trainer 500 VA
ME 1201L LED TV Demonstrator ( 22")	ME 1215 Video Cassette Recorder Demonstrator
ME 1203 Digital Versatile Disc Player Demonstrator	ME 1217 EPBAX Demonstrator
ME 1204 PA System Demonstrator with speaker	ME 1218 Fax Demonstrator
ME 1205 Stereo Tape Recorder Trainer	ME 1219 Walkie Talkie Demonstrator
ME 1206 Analog Multimeter Trainer	ME 1221 Battery Monitoring System
ME 1207 Digital Multimeter Trainer	ME 1223 Washing Machine Trainer (Automatic)
ME 1208 Analog Fiber Optic Voice Transmission Demonstrator	ME 1224 Washing Machine Trainer (Semi Automatic)
ME 1209 CRO Demonstrator (20MHz Dual Channel)	ME 1225 Microwave Oven Demonstrator
ME 1210 Function Generator Demonstrator	ME 1226 Two in One Trainer
ME 1211 FM Radio Receiver Demonstrator	ME 1227 AM / FM Radio Receiver Demonstrator
	ME 1250 Pattern Generator (For TV)



LED TV Demonstrator ( 22")

## MICROPROCESSOR & MICROCONTROLLER LAB

ME 1300 8031 Microcontroller Training Kit with Inbuilt Power Supply	ME 1302 8085 Microprocessor Training Kit with Inbuilt Power Supply	ME 1303 8086 Microprocessor Training Kit with Inbuilt Power Supply
ME 1300L 8031 Microcontroller Training Kit with Inbuilt Power Supply (LCD Display, ASCII Keyboard)	ME 1302L 8085 Microprocessor Training Kit with Inbuilt Power Supply (LCD Display, ASCII Keyboard)	ME 1303L 8086 Microprocessor Training Kit with Inbuilt Power Supply (LCD Display, ASCII Keyboard)

**Interfacing Cards & Study Cards available**

## ELECTRICAL BRIDGES, TRANSFORMER, VARIAC, AC/DC MOTORS & ALTERNATORS

<p><b>Electrical Bridges</b></p> <p>ME 2200E Anderson Bridge</p> <p>ME 2201E Schering Bridge</p> <p>ME 2202 Kelvin Bridge (Industrial)</p> <p>ME 2203 Kelvin Bridge (Student)</p> <p>ME 2204E Maxwell Inductance Bridge</p> <p>ME 2205E Weins Bridge (Capacity Measurement)</p> <p>ME 2206E Weins Bridge (Frequency Measurement)</p> <p>ME 2207 Wheatstone Bridge (Portable)</p> <p>ME 2208E Desauty Bridge</p> <p>ME 2209E Hay's Bridge</p> <p>ME 2214 Owen's Bridge</p> <p>ME 2217 Callender and Griffith's Bridge</p> <p>ME 2228 Cornpton Potentiometer</p> <p><b>Isolation Transformers</b></p> <p>ME 2240A Single Phase Transformer 0.5KVA/230VAC With Tappings at 50% &amp; 86.6%</p> <p>ME 2240 Single Phase Transformer 1KVA/230VAC With Tappings at 50% &amp; 86.6%</p> <p>ME 2241 Single Phase Transformer 2KVA/230VAC With Tappings at 50% &amp; 86.6%</p> <p>ME 2242 Three Phase Transformer 3KVA/440VAC (Air cooled)</p> <p>ME 2242B Three Phase Transformer 1KVA/440VAC (Air cooled)</p> <p>ME 2243 Three Phase Transformer 3KVA/440VAC (Oil cooled)</p> <p>ME 2244 Three Phase Transformer 5KVA/440VAC (Oil cooled)</p>	<p><b>Rheostat</b></p> <p>ME 2260 Rheostat 10 Ohms / 10Amps</p> <p>ME 2262 Rheostat 300 Ohms / 2Amps</p> <p>ME 2263 Rheostat 100 Ohms / 5Amps</p> <p>ME 2264 Rheostat 50 Ohms / 5Amps ( Double Tube)</p> <p>ME 2265 Rheostat 250 Ohms / 3Amps</p> <p><b>Auto Transformer / Variac (Closed Type)</b></p> <p>Single Phase Variac 2 Amp / 4 Amp / 8 Amp / 10 Amp / 15 Amp</p> <p>Three Phase Variac 4 Amp / 8 Amp / 10 Amp / 15 Amp</p> <p><b>Loading Rheostat</b></p> <p>ME 2321 Loading Rheostat 1 KW Single Phase in 4 Steps of 250 Watt Each</p> <p>ME 2322 Loading Rheostat 2 KW Single Phase in 8 Steps of 250 Watt Each</p> <p>ME 2323 Loading Rheostat 3 KW Three Phase (Each Phase of 1 KW) in 8 Steps.</p> <p>ME 2323B Loading Rheostat 1.5 KW Three Phase (Each Phase of 0.5 KW) in 4 Steps.</p> <p>ME 2325 Inductive Load 10A Three Phase</p> <p>ME 2326 Capacitive Load 10A Three Phase</p> <p>ME 2327E Resistive lamp Load 500W in 5 steps</p> <p>ME 2328 Resistive Lamp Load 1 KW</p> <p>ME 2328E Resistive lamp Load 1000W in 5 steps</p> <p>ME 2329 Capacitive Load 200mfd Single Phase in 20 Steps</p> <p>ME 2330 Inductive Load 5Amp. Single Phase in 5 Steps</p> <p>ME 2331 Resistive Lamp Load 3 KW</p> <p>ME 2332 Resistive Lamp Load 5 KW</p> <p>ME 2333 Three Phase Resistive Lamp Load 1 KW</p> <p>ME 2335 Current Transformer (CT 30/5Amp)</p> <p>ME 2336 Potential Transformer (PT 220/100V)</p>	<p><b>Starter for Motor</b></p> <p>ME 2340 2 Point DC Motor Starter</p> <p>ME 2341 3 Point DC Motor Starter</p> <p>ME 2342 4 Point DC Motor Starter</p> <p>ME 2343 Direct On Line ( DOL ) Starter</p> <p>ME 2344 Star Delta Starter (Manual)</p> <p>ME 2345 Star Delta Starter (Semi Automatic)</p> <p>ME 2346 Star Delta Starter (Automatic)</p> <p>ME 2347 Rotor resistance Type Starter for Slip Ring Motors</p> <p>ME 2348 Auto Transformer Type Starter</p> <p><b>AC / DC Motos &amp; Alternators</b></p> <ul style="list-style-type: none"> <li>- Squirrel Cage Induction Motors ( Single or Three Phase)</li> <li>- Slip Ring Induction Motors</li> <li>- Synchronous Motors</li> <li>- AC Series Motors</li> <li>- AC/DC Universal Motors</li> <li>- DC Shunt Motors</li> <li>- DC Series Motor</li> <li>- DC Compound Motors</li> </ul> <p><b>Motor Generator Sets</b></p> <ul style="list-style-type: none"> <li>- DC Shunt Motor Coupled with DC Shunt Generator</li> <li>- DC Shunt Motor Coupled with DC Series Generator</li> <li>- DC Compound Motor Coupled with DC Compound Generator</li> <li>- Induction Motor Coupled with DC Shunt Generator</li> <li>- DC Shunt Motor Coupled with AC Alternator</li> <li>- DC Shunt Motor Coupled with Salient Pole AC Alternator</li> <li>- Synchronous Motor Coupled with DC Shunt Generator</li> <li>- Slip-Ring Induction Motor Coupled with AC Slip-Ring Induction Motor</li> </ul>
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## ELECTRICAL LAB TRAINING MODULES & EQUIPMENTS



CT Test Set



Motor Generators Sets

### Experimental Control Panel for Electrical Lab

- ME 2400A Measurement of Power in Three Phase Circuit by Three Wattmeter Method.
- ME 2400 Measurement of Power in 3 Phase Circuit by Two Wattmeter Method
- ME 2401 Measurement of efficiency of Single Phase Transformer (Direct Loading)
- ME 2402 Parameter and Losses in a Single Phase Transformer by OC and SC Test
- ME 2402B Panel for OC & SC Test on A 3 Phase Transformer
- ME 2403 Study of Single Phase Energy Meter

### Economical Model also Available of

**ME 2400A, ME 2400, ME 2401, ME 2402 & ME 2403**

- ME 2404 Earth Resistance by Fall of Potential Method (Complete Setup)
- ME 2405 Calibration of Wattmeter by DC Potentiometer (Complete Setup)
- ME 2406 Calibration of Voltmeter & Ammeter by DC Potentiometer (Complete Setup)
- ME 2407 Single Phase Energy Meter with Phantom Loading
- ME 2410 Sumpner's (Back to Back) Test on Single Phase Transformer
- ME 2411 Parallel Operation of Single Phase Transformer
- ME 2411A Sumpner test & Parallel Operation of Single Phase Transformer
- ME 2411B Panel for Parallel Operation of Two 3 Phase Transformers with Two No of 3 Phase Transformer 1KVA/440VAC
- ME 2412 Voltage Relationship of Three Phase Transformer in Various Connections
- ME 2414 Scott Connection of a Transformer
- ME 2414E Scott Connection of a Transformer (Economical Model)

- ME 2417 Different Type of Contactor Control Circuit with Remote Control Circuit (ME 2411B), Time Delay & Sequential Circuit (ME 2419C) & Interlocking Circuit
- ME 2418 Panel For Study of Different Type of Fuses,MCBs & ELCBs
- ME 2422 Power & Power Factor in Single Phase Circuit
- ME 2422E Power & Power Factor in Single Phase Circuit (Economical Model)
- ME 2423 Power in 3 Phase Circuit using 3 Phase Wattmeters, CT & PT
- ME 2423A Power in 1 Phase Circuit using 1 Phase Wattmeters, CT & PT
- ME 2424 Load Test of DC Series Motor
- ME 2425 Starting and Reversing of DC Shunt Motor
- ME 2425B Load Test of DC Shunt Motor
- ME 2426 Speed Control of D.C. Shunt Motor (Voltage, Armature and Field Current Control Method)
- ME 2426A Efficiency by Swinburn's test & Speed Control of D.C. Shunt Motor (Voltage, Armature and Field Current Control Method)
- ME 2426B Efficiency of DC Shunt Motor by Swinburne's Test
- ME 2427 Losses & Efficiency of DC Machine by Hopkinson's Test
- ME 2429 Starting & Reversing the Direction of Rotation of a 1 Phase Induction Motor
- ME 2429B Load Test & Torque Speed Characteristics of 1 Phase Induction Motor
- ME 2430 Starting & Reversing the Direction of Rotation of a 3 Phase Induction Motor
- ME 2431 Block Rotor Test of 3 Phase Induction Motor
- ME 2432 OCC and Load Characteristics of DC Shunt Generator
- ME 2433 Magnetizing Curve of a DC Series Generator

- ME 2434 OCC and Load Characteristics of DC Compound Generator
- ME 2435 Domestic Home Wiring Demonstration Panel
- ME 2436 Angular Displacement Measurement of Synchronous Motor
- ME 2439 3 Phase Alternator Experimental Setups (i) To Study the Characteristics, Perform Load Test , Voltage Regulation by Synchronous Impedance Method & To Determine Losses & Efficiency of an Alternator.
- ME 2440 DC Motor Drive Trainer with DC shunt motor 0.5HP (ME 2368A)
- ME 2443 V & Inverted V Curves of a Synchronous Motor
- ME 2444 Thyristor / IGBT Controlled AC Motor Drive with VVVF Controls
- ME 2445 OC & SC Test of 3 Phase Synchronous Machine Xd and Xq of a Salient Pole Synchronous Machine by Slip Test.
- ME 2445A Voltage Regulation of a Salient Pole Synchronous Machine by Slip Test.
- ME 2446 Speed Control of DC Shunt Motor by Ward Leonard Method.
- ME 2448 Start & Control of Universal AC/DC Motor
- ME 2453 Load Test & Torque Speed Characteristics of 3 Phase Induction Motor
- ME 2456 Speed Control of 3 Phase Slip-Ring Induction Motor By Rotor Resistance Control
- ME 2457 Speed Control of 3 phase Induction Motor by Cascading Method .
- ME 2458 Voltage Regulation of an Alternator by Zero Power Factor (Z.P.F.) method.
- ME 2459 Negative Sequence & Zero Sequence Reactance of Synchronous Machines.
- ME 2460 Synchronization and parallel operation of Two Alternator by two bright & one dark lamp method
- ME 2460A Synchronization of Alternator with Infinity Bus Bar.

## POWER SYSTEM / RELAY LAB TRAINERS

- ME 2465 Transmission Line trainer(ABCD ,T & Pi Parameters,Ferranti Effect Load test)
- ME 2471R IDMT Over Current Relay Testing Kit (Electromechanical Type)
- ME 2472R Earth Fault Realy Testing Kit (Electromechanical Type)
- ME 2473R Percentage Bias Differential Relay Testing Kit (Electromechanical Type with Rheostat)
- ME 2473RS Transformer Protection using Percentage Biased Differential Relay (Static Type)
- ME 2473RD Transformer Protection using Percentage Biased Differential Relay (Microprocessor Type)
- ME 2474R Thermal Over Load Relay Testing Kit
- ME 2475R Bucholz Relay Test Setup (with compressor & Oil)
- ME 2476 CT Test Set (with Reference CT & CT under Test )
- ME 2328E Resistive lamp Load 1000W in 5 steps Without Lamp
- ME 2479R Under Voltage / Over Voltage Relay Testing Kit (Static Type)

- ME 2481R Instantaneous Earth Fault Relay Testing Kit (Electromechanical Type)
- ME 2482R Under / Over Frequency Relay Testing Kit (with MG Set DC Shunt Motor 1 HP coupled with 0.5KVA Alternator) for Frequency Variation
- ME 2483R Over Voltage Relay Testing Kit (Electromechanical Type)
- ME 2484R Under Voltage Relay Testing Kit (Electromechanical Type)
- ME 2485R Over Current & Earth Fault Relay Testing Kit (Three Phase Static Type)
- ME 2486R Over Current Relay (Directional Type) Testing Kit (Electromechanical Type with Rheostat)
- ME 2487R Over Current Relay Testing Kit ( Static Type)
- ME 2488R Negative Sequence Relay Testing Kit.(with Three Phase 3 HP Induction motor)
- ME 2489R Reverse Power Relay Testing Kit (Static Type)
- MARS Oil Testing Kit
- MARS Current Injector 100A



Percentage Bias Differential Relay Testing Kit

## ELECTRICAL WORK BENCH

- ME 2601 Work Bench For DC Motor Shunt Type
- ME 2602 Work Bench For DC Series Motor
- ME 2603 Work Bench For DC Motor Compound Type
- ME 2611 Work Bench For DC Generator Shunt Type
- ME 2613 Work Bench For DC Generator Compound Type
- ME 2631 Work Bench For AC Squirrel Cage Induction Motor
- ME 2651 Work Bench For Motor Generator Set (DC TO AC)
- ME 2652 Work Bench For Motor Generator (AC to DC)
- ME 2700 Electrical Machine Trainer
- ME 2701 Advanced Electrical Machine Trainer Set of 5 Panels
- ME 2702 Electrical Machine Trainer Set of 2 Panels For 15 Experiments
- ME 2740 Test Bench for Single and Three Phase Energy Meters
- ME 2750 Work Bench for Transformers (Single Phase & Three Phase) Experiments



Electrical Work Benches

## RF & MICROWAVE EXPERIMENTAL TRAINERS

- ME 6000 Experiments of Reflex Klystron
- ME 6010 Experiments on Gunn Diode
- ME 6020 Experiments to measure the Polar Pattern & gain characteristics of the antenna
- ME 6030 Experiment to measure dielectric constant of Solids & Liquid and to measure Phase Shift & 'Q' of a cavity.
- ME 6040 Study of Microwave components (Magic T, Directional Coupler, Isolator, Circulator)
- ME 6050 Satellite Lab Trainer
- ME 6060 Antenna Trainer Manual
- ME 6061 Antenna Trainer Motorized
- MARS Microwave Power Meters**
- OP 6000 Microwave Power Meters 8.2GHz ~ 12.4GHz
- OP 6000A Microwave Power Meters 10MHz ~ 18GHz

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