



Sir P. T. Sarvajani College of Science
(AUTONOMOUS)

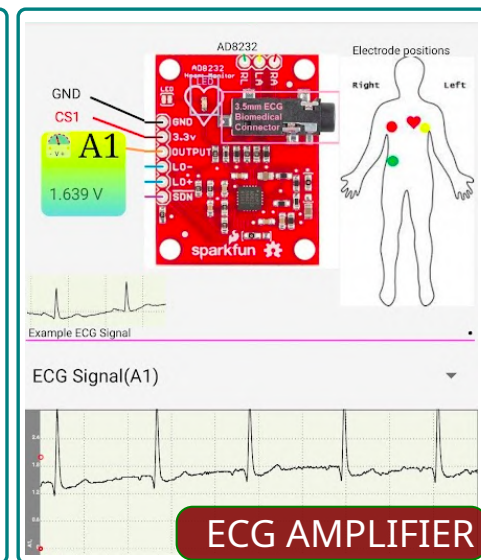
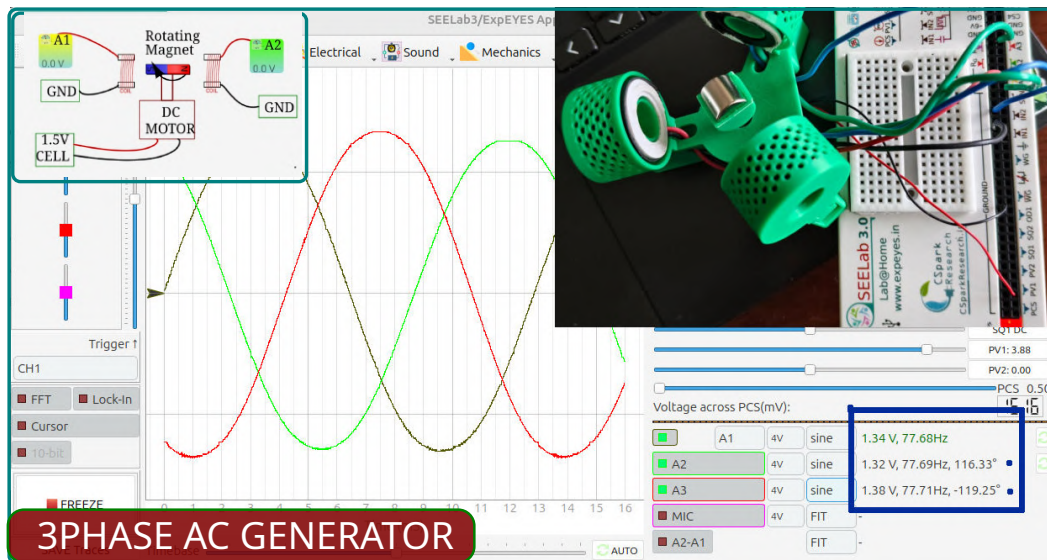
Re-Accredited 'A+' with CGPA 3.35

PRESENTS

**Training program on
Computer Interfaced Science Experiments**

12-13 December

The Future of Hands-On Science



Transform your approach to teaching science with this intensive two day workshop, designed to equip you with the skills to facilitate genuine discovery and exploration in the classroom. We shall focus on crucial learning takeaways such as real-time data acquisition and analysis, critical thinking through experimental design, and advanced graphical interpretation of physical phenomena. Leveraging the incredible computing power of modern mobile phones alongside affordable, multi-functional instruments for measurement and signal generation, such as the SEELab 3.0, this workshop will equip teachers, students, and citizen science enthusiasts to augment their experimental research !

TARGETED PARTICIPANTS

**Faculty and students of Science/
Engineering disciplines**

REGISTER BY: 05/12/2025

COORDINATOR

Dr. Dhiraj Shah +91 94291 60805

Registration Link

Rs 800 for Teachers, 200 for Students


VENUE

**12TH DECEMBER 2025
13TH DECEMBER 2025**

**Sir P. T. Sarvajani College of Science
Athwalines, Surat 395001, Gujarat**



Familiarisation with test and measurement tools and software



SEELab3 : YOUR LAB @ HOME

100+ SCIENCE EXPERIMENTS

WAVEGEN **WG, WG**
The WG Pin outputs a 3 volt amplitude sine/triangle wave signal with adjustable frequency from 4Hz to 5kHz. The amplitude can also be adjusted down to 80mV, and a 180 phase shifted signal is available on WG

2MSPS OSCILLOSCOPE
A1, A2, A3, MIC, SEN, IN1
4 Input channels to record up to a million voltage readings within one second. Useful for studying voltage fluctuations, and calculating frequencies and phase shifts of periodic signal inputs. A1/A2 +/-16Volts, A3: +/-3V, Microphone Input, and an Internally pulled up SEN Input. Also used as 12 bit voltmeters

VOLTAGE SOURCES
PV1 PV2 OD1 5V +/-6V
12 bit programmable outputs PV1: +/-5V, PV2: +/-3 V, 5V Direct USB power. +6V and -6V for powering Op-Amp circuits. OD1 digital output

SQUARE WAVE **SQ1 SQ2**
0 to 5V Square wave outputs with adjustable frequency and duty cycle, 0.015Hz to 1MHz. Output impedance 100ohm.
Measure digital signal timings on IN2/SEN

RC METER **SEN IN1**
Measure resistance and capacitance
SEN GND IN1 GND

PIN DIAGRAMS AND FEATURES

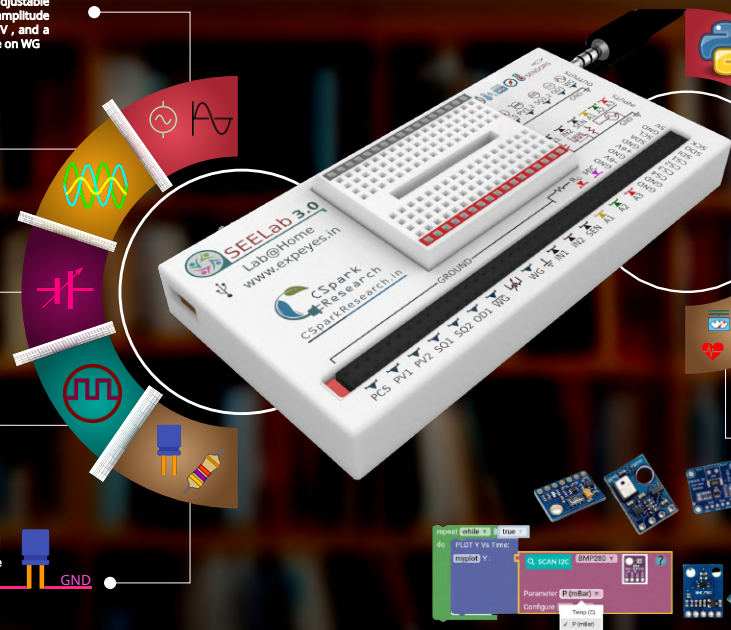
PYTHON PROGRAMMABLE
Access all control and measurement tools via the Python library or the PyQt based graphical software for Ubuntu/Windows
`dev=eyes17.open(); print(dev.get_voltage("A1"))`

VISUAL PROGRAMS
Connect easy drag and drop blocks to create programs which can collect, visualize, and analyze data

CROSS PLATFORM
Supported on Ubuntu/Windows/Android. Plug and play via USB.

DATA ANALYSIS TOOLS
Implements feature extraction tools such as curve fitting for sinusoidal and exponential decay data. Precisely determines frequencies, phase shifts, decay factors, offsets and amplitudes.

ADD-ON SENSORS **SPI/I2C**
USE the SPI (SCK,SDI,SDO,CS1-4), or I2C(SCL,SDA pins) buses to enhance experiments. Plug and play over a dozen sensors for physical parameters such as pressure, magnetism, luminosity, humidity, distance etc. control precision waveform generators, servo motors, and robotic arms



OUTLINE

- Basic Circuits
- Mechanics
- Electrical
- Electronics
- Acoustics
- Sensors
- Programming

DAY 1

- + Introduction to test and measurement tools
- + Electronic characterisation and plotting
- + RC/LC Transient and Steady State Response
- + Digitization of a simple pendulum
- + EM Induction & AC generator. 3Phase demo
- + Acoustics : Measurement of Speed of sound, interference, and fourier transforms.
- + Add-on Sensors: Pressure, T, rH, Magnetism
- + Introduction to KiCAD EDA circuit design
- + Designing 3D printable parts with FreeCAD

DAY 2

- + Measure Gravity from time of flight (create your own setup)
- + Modification of Flywheel experiment Plot S,V,A !
- + Introduction to Programming : Python & Visual
- + Introduction to Opamps: Amplifiers
- + Using you phone's sensors for science experiments : acoustic stopwatch, gyro, luminosity sensor.
- +Design and development of products!


Introduction : Plug and Play Modules

Low cost add-ons : Simply plug 'n play

I2C/SPI communication interfaces, and software support for several common sensors

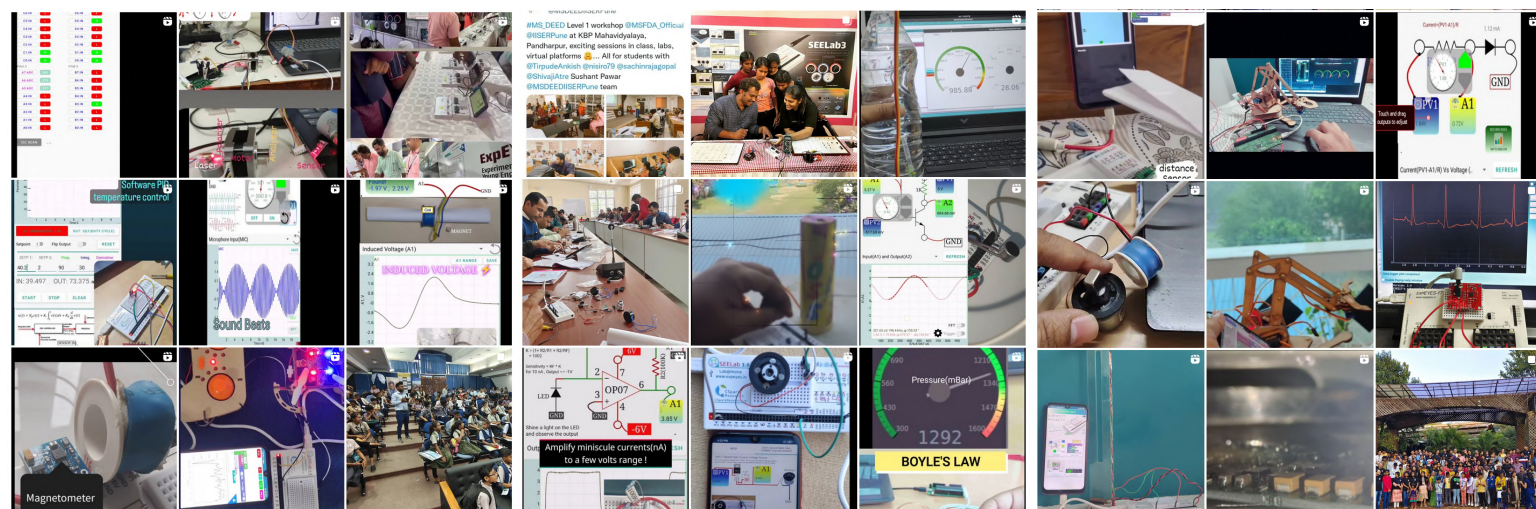
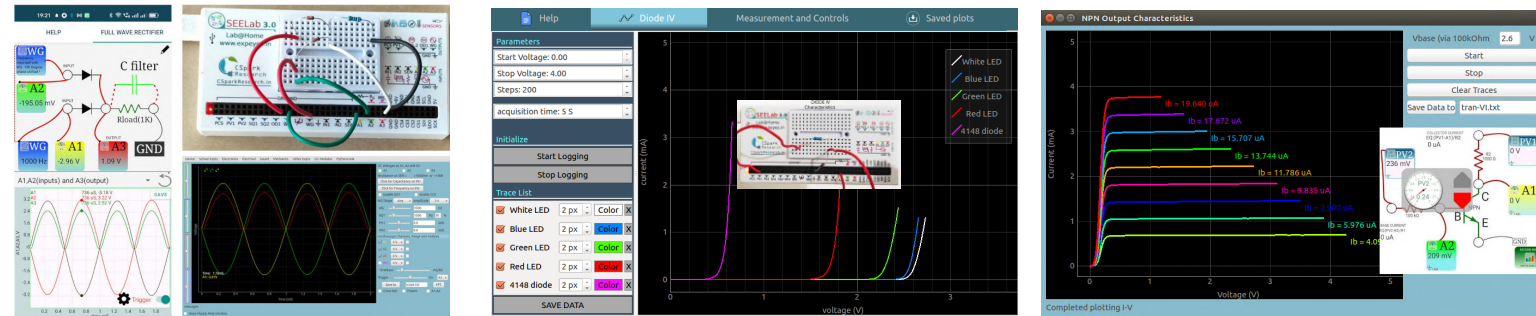
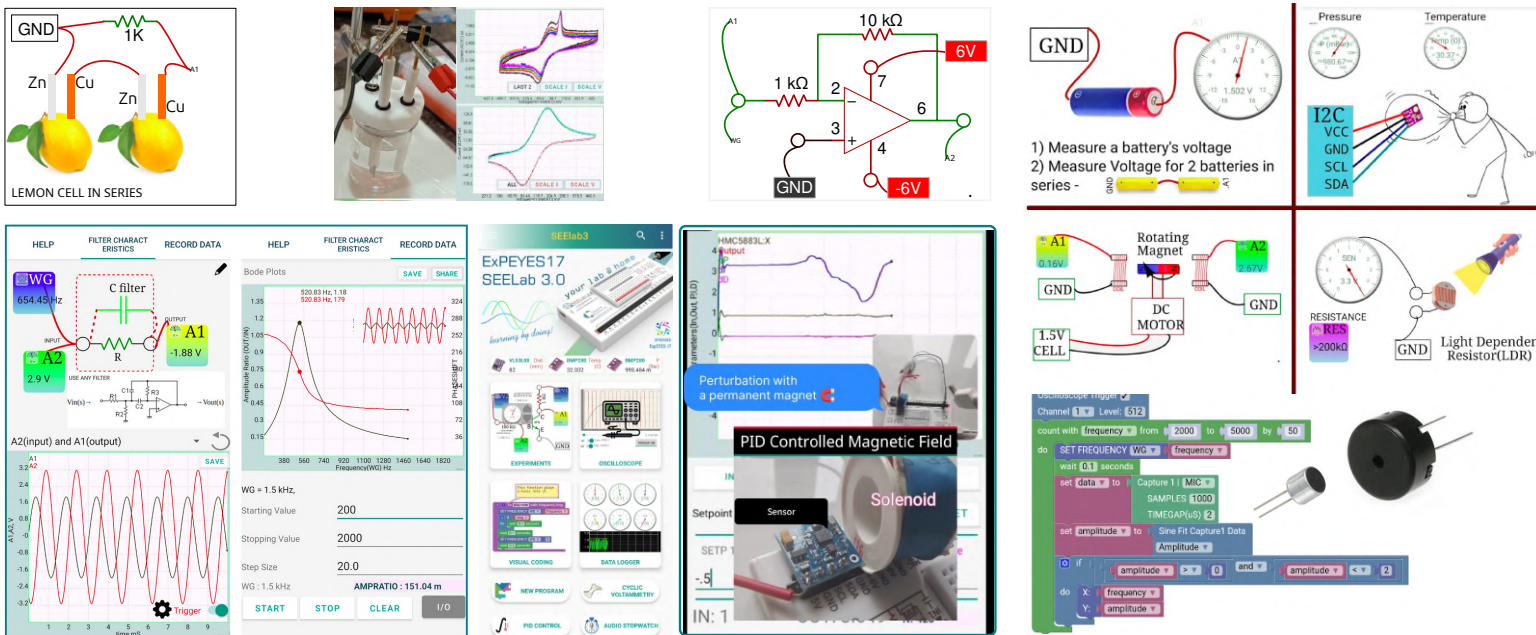
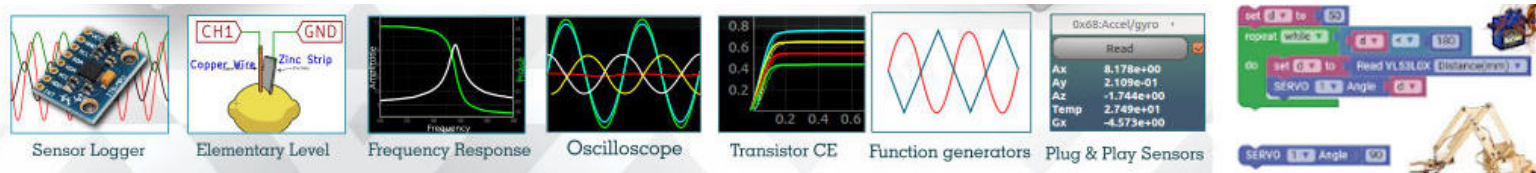
- BMP280 : Pressure and temperature Sensor
- BME280: Humidity measurement
- TSL2561/BH1750: Light intensity sensor
- MPU6050: Gyroscope, accelerometer
- MPU9250 : Accel/Gyro/Magnetic Fields
- VL53LOX : Distance measurement (LIDAR)
- MLX90614: Passive IR temperature sensor
- AD8232 : ECG instrumentation amplifier
- AD9833: Precision Sine Wave generator
- Servo Motors via SQ1, SQ2, or PCA9685
- AHT10: Humidity Sensor
- MAX44009: Visible Spectrum Luminosity sensor
- QMC5883L/HMC5883L : 3 Axis Magnetometer
- ML8511 : UV sensor
- MAX30100: Heart rate and pulse oximetry
- INA219 : High Side Current Sensing
- ADS1115 : 16 bit , 4 channel voltmeter
- TCS34725 : RGB Color sensor
- ADXL345: 3 axis accelerometer
- SR04 : Distance sensor (Sound based)

repeat 10000 times
do
PLOT Y vs Time
PLOT VALUE: Read MAX30100 RED LED



Accessories

- Super Magnets
- Assorted Resistors, Capacitors, Diodes, Transistors & Inductors
- multi color LEDs & USB
- Power Supplies, 5000 Turns Solenoid, connected wires
- Radio Module, DC motor
- 170 point bread board



CHIEF PATRON

Shri Ashish Vakil

Chairman - Sarvajanik Education Society

PATRON

Dr. Pruthul R. Desai

Principal, Sir P. T. Sarvajanik College of Science
(Autonomous)



CERTIFICATES will be issued and distributed to all the participants on the last day upon successfully completing all the sessions, and submitting the Feed-Back Form.

