

'ज्ञान, विज्ञान आणि सुसंस्कार यांसाठी शिक्षण प्रसार' - शिक्षणमहर्षी डॉ. बापूजी साळुंखे

Shri Swami Vivekanand Shikshan Sanstha's



VIVEKANAND COLLEGE, KOLHAPUR

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NOTICE INVITING TENDER

Tenders in sealed cover are invited for supplying Instruments/apparatus/materials for following Science Departments under the FIST Programme of the College. Date of submission of tender is from 04/02/2017 at 11 a.m. to 19/02-2017 by 5 p.m.

Tender No.	Name of the Department
1	Department of Chemistry
2	Department of Physics
3	Department of Electronics
4	Department of Computer Science
5	Department of Zoology
6	Department of Biotechnology
7	Department of Micro-bilology
8	Department of Botany

Detailed description of Instruments/apparatus/materials for above stated departments may be seen on the website www.vivekanandcollege.org and the tender form may be obtained by paying cash amount of Rs.100/- from the college office.

Dr. Hindurao Patil
Principal

Date: 03/02-2017

1) Department of Chemistry

Under Teaching Faculty

Sr.No.	Name of the Instruments	Qty
1	Platinum Electrode Eq.	6
2	Conductivity Cell Eq. 0.1 Cell constant(Poly proplan body Mod- eq-708C)	6
3	Calomel Electrode Eq 705. with KCL Filled	6
4	Conductometer with inbuilt magnetic stirrer, Eq.665	10
5	PH Meter, with inbuilt magnetic stirrer, Eq. 614 A	5
6	Colourimeter Eq. 650A	5
7	Colorimeter Elico- CL 157	4
8	Potentiometer With inbuilt magnetic stirrer, Eq. . 602	10

Under Research Faculty

Sr. No	Name of the Instruments	Qty
1	Digital balance , Make- Simatzu,Mod- BL220H,Capa-220 gm,Accu.0.001gm	2
2	UV Chamber For TLC Plate	2
3	Digital Water bath , 12 holes,Make- BTI,Temp -5 to 99oc,Size 40x30x10	1
4	Magnetic Stirrer, Make- Remi,Model MS-500	10
5	Vacuum Pump, Make- J.B.Sawant Mod- V6	2
6	PH Meter, EQ- 610	4

2) Department of Physics

Under Teaching Facility

Sr. No.	Name of the equipment	Quantity
1	Digital Multimeter (Meco Make)	8
2	Ramsdent eyepiece with holder and cross wire	6
3	Regulated power supply 0 -30V., 1 amp.	4
4	Fresnel's Biprism (50 x 40mm) ½ angle	4
5	Spectrometer Prism Extra dense R.I. - 1.65 Size 32mm.	3
6	Spectrometer Prism Extra dense R.I. - 1.71 Size 32mm.	3
7	Digital Polarimeter (E 2801)	2
8	Fixed power supply (15, o, 15 Volts)	2
9	Digital meters (Table model)	2
9	Digital multirange D.C. Voltmeter	2
10	Digital multirange A.C. Voltmeter	2
11	Digital multirange A.C. current meter	2
12	Digital multirange D.C. current meter	2
13	Demorgan's Theorem (Both I st & II nd) with LED output	2
14	Field effect transistor (FET)	2
15	Photocell varying dist and intensity	2
16	Zener as a voltage regulator with two digital meters	2
17	Spectrometer 1 minute L.C.	2
18	Y by Cornu's Method app.(Complete set)	2
19	LCR Series resonance (Complete set)	2
20	Kit to identify electronic components like, diode, resistor transistor, etc	2
21	Thevinins Theorem (Set)	2
22	Kitchoff's law (current complete set)	2
23	Kitchoff's law (Voltage)	2
24	Calcite double refracting prism size 20mm.	2
25	Diffraction grating (15000 L.P.I.)	2
26	Balastic Galvanometer	2
27	Searle's Viscometer	2
28	Michelson Interferometer	1
29	CRO (Ablab Make)	04
30	0.1 Hz to 1 MHz Function Generator (Ablab Make)	04

Under Research Facility

Sr.No	Name of the Instrument/Material	Quantity
1	Silar System with Plotter : Model HO-TH-03, Silar Control Unit, Holmarc Opto-Mechatronics Make	1
2	Bosh DLE 40 Laser Ranefinder (Blue)	1
3	Programmable Sound Meter	1
4	Lutron SL-4030 Sound Level Meter	1
5	Raytek Infrared Non Contact (Model MT-4)	1
6	Digital Lux Meter (Model – TES 1332)	1
7	Anemometer	1
8	Digital Temperature Humidity Data Logger(Item Code: Easylog)	1
9	Process Sensor-Capacitive Type,Range:20 to 80% RH	1

3) Department of Electronics

Under Teaching Facility

Sr.No	Name of the Instrument	Quantity
1	Digital Multimeter	10
2	Digital Storage oscilloscope with logic analyzer	1
3	30 Mhz Oscilloscope	4
4	Multiple DC Power Supply (0-30v/2A,5V/2A,0-15V/1A)	4
5	Bench LCR Meter	1
6	8051 universal Development board	1
7	PIC Microcontroller Development board	1
8	ADC/DAC Modules	1
9	Motor Drive Module	1
10	Universal IC Tester	1

Under Research Facility

Sr.No	Name of the Instrument	Quantity
1	PLC Trainer	1
2	Solar Power Lab	2
3	Fuel Cell Trainer	1
4	Wind Energy Trainer	1
5	Bio Energy Trainer	1
6	Understanding DTH System	2

Specification of above Instruments

PLC Trainer

The Trainer Should have the Following Features:

- Freedom of select PLC of different make.
- Open platform to explore wide PLC applications.
- Toggle switches, Push to ON Switch, Limit switch, IR Sensor, LED's, Buzzer, DC Motor, Pilot Lamp, Relay Card.

- Din rail Mounting for PLC.
- Powerful Instructions Sets.
- PC based Ladder Programming.
- High Execution Speed.

- Extremely easy and student friendly software to develop different programs.
- Several sample ladder programme.
- Choice of PLC and expansion modules.
- Easy downloading of Programs.
- Practice Troubleshooting Skills.
- Compact Tabletop ergonomic design.
- Ready experimental details
- Robust Construction.

Technical Specifications :-

Toggle switch	: 8 nos
Push to ON switch	: 5 nos
IR Sensor	: 1 no
Limit Switch	: 1 no
LED	: 8 nos
Buzzer	: 1 no
DC Motor	: 1 no
Pilot Lamp	: 1 no
Relay card	: 1 no
Operating Temperature	: 0-40°C, 80 % RH
Dimension (mm)	: W 600 x H 390 x D 300
Weight	: 8 Kg (approximately)
Included Accessories	: Interfacing cable: 1 no.
Mains cord	: 1 no.
PLC CPU Type	: 820 Series
Digital Input	: 12 (4 input shared with Analog input)
Digital output	: 7
Analog output	: 1
Boolean Execution speed Sec. per instruction	: 0.33 μ s/Sequential instruction in average
Program size	: 20Kbytes
Interfacing	: Ethernet
Expansion Module	: Expandable
Interface with Sensor module	

Solar Power Lab

The instrument should have following features:

- LCD display for Voltage and Current measurement
- Strong and durable housing

- Provided with stand to hold PV modules
- Online product tutorial

The instrument should have following Technical Specifications:

➤ **Solar PV Modules**

Wattage	: 5Wp
Quantity	: 4 Nos.
Open Circuit Voltage (Voc)	: 10V
Short Circuit Current (Isc)	: 0.61A
Maximum Power Voltage (Vmp)	: 8.80V
Maximum Power Current (Imp)	: 0.57A

➤ **Batteries**

Voltage	: 6V
Capacity	: 4Ah
Quantity	: 4nos.

➤ **LCD**

Voltmeter	: 0-40V
Ammeter	: 0-3A
Rheostat	: 110Ω, 5A

Experiments that can be performed:

Study of:

- Series combination of Solar PV Modules
- Parallel combination of Solar PV Modules
- Series-parallel combination of Solar PV Modules
- VI Characteristics of Solar PV Module
- Blocking diode and its working in Solar PV Module
- Bypass diode and its working in Solar PV Module
- Effect of inclination angle of Solar PV Module
- Different charging techniques
- Buck converter
- Boost converter
- Effect of change in solar radiation on Solar PV Module
Running different applications i.e. LEDs, Dusk to Dawn sensing

Experimentation with Fuel Cell

The instrument should have following features:

- Complete Training System to study the Solar-Hydrogen cycle
- Reversible Fuel Cell-both as an Electrolyzer and as a Fuel Cell
- Measurement and Application Modes
- Weather proof Solar Panel

- Portable and light weight
- Online product tutorial

The instrument should have following Technical Specifications:

➤ **Solar Panel**

Voltage (at optimum power point)	: 2.2V DC
Current (at maximum power point)	: 450mA
Dimensions (mm)	: W 125 x D 155 x H 8

Note: Solar Panel data is based on standard conditions (1000W/m², 25 °C)

➤ **Electrolyzer Function**

Input Voltage	: 1.8 ~ 2.6V DC
Input Current	: 0.7A
Hydrogen Production Rate	: 7ml / min at 1A
Oxygen Production Rate	: 3.5ml / min at 1A

➤ **Fuel Cell Function**

Output Voltage	: 0.9V DC
Output Current	: 360mA

Experimentation with Wind Energy

The instrument should have following features:

- Complete setup to study fundamentals of wind based DC power generator
- Measurement and Application modes
- On board Voltmeter and Ammeter
- Charging a battery using wind energy as the generator of DC Supply
- Portable and light weight
- Strongly supported by systematic operating instructions with theoretical and practical details
- Online product tutorial

The instrument should have following Technical Specifications:

➤ Wind Turbine Setup	: Contain 3 blades
Maximum Open Circuit Voltage	: 2.5V to 3.5V
Maximum Short Circuit Current	: Up to 220mA
➤ Voltmeter	: 0-10V
➤ Ammeter	: 0-500mA
➤ Potentiometer	: 1k
➤ AA Rechargeable NiCd Battery	: 1.2V
➤ Lamp	: 3V DC
➤ Fan	: 3V DC
FM Band Radio	: 3V DC

Experimentation with Bio Energy

The instrument should have following features:

- Easy illustration of energy generation using Bio Energy
- Complete set up provided with Bio fuel.
- Online product tutorial

The instrument should have following Technical Specifications:

- **Fuel cell**
 - Output Voltage : 1V DC
 - Output Current : 18.5mA
- **Isopropyl alcohol Storage Tank**
 - Volume : 60ml
- Buzzer : 1V DC
- Fan motor : 1V DC

Understanding DTH System with LED Display

The instrument should have following features:

- Compact design
- Comprehensive learning solution on DTH
- Functional block diagram indicated on main board
- Manual & Remote Control operation
- Composite Video output and RF output
- Fault creation and diagnosis

The instrument should have following Technical Specifications:

- RF Input : 950 - 2150 MHz
- Input Impedance : 75Ω
- RF Output : 470 MHz to 862MHz
- Dish Input : F - Connector
- Composite Video Output :RCA type
- Audio Output : RCA type (L/R)
- TV Output : RCA type
- Video Output : PAL
- IF Frequency : 70MHz
- Video Output level : 1Vpp (75 load)
- Uplink Satellite : INSAT 4B
- Controls : Channel Up/Down, Volume Up/Down, Power On/Off.
- Test Points : 17 nos.
- Product Tutorials : Online (Theory, procedure, reference results, etc),
- Power Supply : 110V - 260V AC, 50Hz/60Hz
- Operating Conditions : 0-40C, 85% RH
- **Included Accessories** : Mains cord, Power Supply, Remote, RF Cable, Audio/Video Card, Dish Antenna with accessories, LNB
- Pencil Cell : 2 nos.
- Dish Connecting wire : 10 meter (approx.)

Experiments that can be performed:

- Introduction and basics of DTH system
- Understanding various components of DTH receiver system
- Study of various blocks of DTH system
- Study of working principle of DTH system
- Various types of fault creation and troubleshooting

3¾ Digital Multimeter

The instrument should have following features :

- 3¾ Digital Multimeter
- 4000 Counts Large LCD Display with Auto/Manual Range
- No Power-OFF under natural operation
- Data Hold, Max. / Min. Value Hold
- Capacitance, Frequency / Duty Cycle, Temperature and Transistor Test.

The instrument should have following Technical Specifications :

Basic Function	Range	Basic Accuracy
DC Voltage	0.1mV ~ 1000V	$\pm (0.5\% + 4 \text{ digit})$
AC Voltage	0.1mV ~ 750V	$\pm (0.8\% + 6 \text{ digit})$
DC Current	0.1uA ~ 20A	$\pm (1.0\% + 5 \text{ digit})$
AC Current	.01uA ~ 20A	$\pm (1.5\% + 5 \text{ digit})$
Resistance	0.1 Ω ~ 40M Ω	$\pm (0.8\% + 2 \text{ digit})$
Capacitance	10pF ~ 200uF	$\pm (3.5\% + 8 \text{ digit})$
Frequency	0.1Hz ~ 30MHz	$\pm (0.5\% + 4 \text{ digit})$
Celsius	-40°C ~ 1000°C	$\pm (0.8\% + 4 \text{ digit})$
hhFE (NPN or PNP)	0 ~ 1000	

Special Specification :

- Diode Test : Yes
- Function Protection : Yes
- Transistor Test : Yes
- Input Impedance : 10M Ω
- Continuity Buzzer : Lower 30 $\Omega \pm 10\Omega$
- Sampling Rate : 3 times per second
- Low Battery Display : Lower 2.4V
- AC Frequency Response : 40-400Hz
- Auto Power OFF : Approx. 30min
- Power : F3V AAA

Included Accessories : Test Leads, Holster

TP01 Temperature Probe Bead type

70 MHz 4 Analog channels,16 Digital channels Mixed Signal Oscilloscope

Analog channel Bandwidth: 70MHz

4 Analog channels,16 Digital channels (MSO)

Max. Sample Rate up to 1G Sa/s

Memory Depth up to 12Mpts /24Mpts(Opt.)

Innovative "UltraVision" technology

Up to 30,000wfms/s Waveform Capture Rate

Up to 60,000frames Real-time Waveform Record(Opt.)

Low noise floor, Dynamic Range: 1mV/div to 10V/div

Multi- Levels intensity grading waveform display

Complete Connectivity: LAN(LXI),USB Host & Device, AUX, USB-GPIB(Opt.)

Compact size, light weight, easy to use

7 Inch WVGA (800x480), multiple intensity levels waveform display

Analog channel:

Measurements of Period, Frequency, Rise Time, Fall Time, Positive Pulse Width, Negative Pulse Width, Positive Duty Cycle, Negative Duty Cycle, Time of Vmax, Time of Vmin, Positive SlewRate, Negative , Maximum, Minimum, Peak-Peak Value, Top Value, Bottom Value, Amplitude, Upper, Middle, Lower, Average, RMS, Overshoot, Pre-shoot, Area, Period Area, Period RMS, Variance

Digital channel:

Period, Frequency, Positive Pulse Width, Negative Pulse Width, Positive Duty Cycle, Negative Duty Cycle,

Display 5 measurements at the same time

Waveform Operation A+B, A-B, A×B, A/B, FFT, &&, ||, ^, !, intg, diff, sqrt, lg, ln, exp, abs

FFT Window Rectangle, Hanning, Blackman, Hamming,Flat Top, Triangle

FFT Display Split, Full Screen

FFT Vertical Scale dB/dBm, Vrms

30MHz Digital Readout Oscilloscope with Component Tester

The instrument should have following features :

- Built-in-Component Tester
- 30 MHz Bandwidth
- X10 Magnification

- 20 ns max sweep speed
- Stable Triggering upto 40 MHz
- Alternate Triggering
- Sharp display & Auto focus
- Digital Readout with backlit Color LCD

The instrument should have following Technical Specifications :

- **Operating Modes** : Channel I, Channel II, Channel I & II alternate or chopped (approximately 350 KHz), X-Y operation
(Ratio 1:1 Input via CH II), Add/Sub CH I \pm CH II
Invert CH II
- **Vertical deflection (Y) Identical channels**
 - Bandwidth : DC -30 MHz (-3 dB)
 - Risetime : 12 ns approximately
 - Deflection coefficients : Microcontroller based 12 calibrated steps 5 mV /div. - 20 V / div. (1-2-5 sequence). Electronic control. Display on Color LCD
 - Accuracy : ± 3 %
 - Input Impedance : 1 M Ω || 30 pF approximately
 - Input : BNC connector
 - Input coupling : DC-AC-GND
 - Maximum Input voltage : 400 V (DC + Peak AC)
- **Timebase**
 - Time coefficients : Microcontroller based 18 calibrated steps, 0.5 μ s/div.-0.2s/div. (1-2-5 sequence). Electronic control. Display on Color LCD
 - Accuracy : ± 3 % (in Cal position)
 - Magnifier : X10
 - Highest TB speed : 20 ns
- **Trigger System**
 - Trigger Bandwidth : 40 MHz
 - Modes : Auto/ Level
 - Source : CH I, CH II, ALT-CH I/ CH II, Ext.
 - Slope : Positive or Negative

- Sensitivity : Int 0.5 div., Ext 0.8 V approximately
- **Horizontal Deflection (X)** Input via CHII
- Bandwidth : DC -3 MHz (-3 dB)
- X-Y mode : Phase Shift
- Deflection coefficients : Microcontroller based 12 calibrated steps 5 mV/div.-20 V/div.
- (1 - 2 - 5 sequence) Electronic control. Display on color LCD
- Input Impedance : 1 MΩ || 30 pF approximately
- Input : BNC Connector
- Input coupling : DC-AC-GND
- Maximum Input voltage : 400 V (DC + Peak AC)
- **Component Tester (Built - in single touch)**
- Test Voltage : Max 8.6 V(Open)
- Test Current : Max 8 mA (Shorted)
- Test Frequency : 50 Hz, Test circuit grounded to chassis
- **Continuity Tester** : approximately Beeper sounds
- **General Information**
- Cathode Ray Tube : 140 mm Rectangular tube with internal graticule.P31 Phosphor

0-30V / 2A, ±15V / 1A Tracking, 5V/2A Multiple DC Power Supply

It should have following features :

- Three floating, independent DC supply voltages
- DC Outputs 0 -30 V/ 2 A, 5 V/ 2 A & 0 ± 15 V Dual Tracking /1 Amp. each
- Constant Voltage and Constant Current operation
- Short circuit protection
- Digital display for voltage and current
- Adjustable current limiter
- Excellent Line & Load Regulation
- Low Ripple voltage

It should have following Technical Specifications :

- DC Output : A : 0-30 V, 2 A, continuously variable by means of Coarse and Fine controls
- B : 5 V, 2 A adjustable from 4 V - 6 V
- C:0 - ±15 V, 1 A Dual Tracking adjustable
- Current Limit : 100 mA - 2 A continuously adjustable for

(0-30 V & 5 V)

100 - 1 A continuously adjustable for
(± 15 V)

- Resolution : Voltage : 100 mV
Current : 10 mA
- Internal Resistance : ≤ 15 mW
- Stability : 2.5 mV at (30 V / 2A, 5 V / 2 A, ± 15 V / 1 A)
- Recovery Time : ≤ 50 μ s
- Load Regulation : $\pm(0.05\% + 100$ mV)
- Line Regulation : $\pm(0.05\% + 100$ mV)
- Temp. Coefficient : $\pm(0.05\% + 5$ mV / $^{\circ}$ C)
- Ripple & Noise : ≤ 1 mVrms
- Display : 3 digit for voltage & 3 digit for current LED
indication for voltage & current
- Accuracy : $\pm(1\% + 1$ digit)
- Tracking Error : $\pm(0.1\% + 5$ mV) for ± 15 V
- Over Range Indication : Glowing 'ORA' or 'ORB', 'ORC' or 'ORC'
LEDs indicate Overload

General Information

- All outputs are floating.
- Built-in overheat, Over voltage & Short Circuit protections
- **Insulation**
Between Chassis & output terminals > 10 MW at 100 V DC

Between Chassis & AC plug > 50 MW at 500 V DC
- **Power Supply** : 230 V, $\pm 10\%$, 50 / 60 Hz
 - **LCR Meter**
 - **The LCRQ Meter Should have following Technical Specifications :**
 -
 - **Measuring parameter :**
 - Inductance : L
 - Capacitance : C
 - Resistance : R
 - Quality Factor : Q
 - Dissipation Factor : D
 - Measuring Frequency : 100Hz, 1kHz and 10kHz $\pm 0.02\%$
 - Test signal voltage level : 0.3Vrms $\pm 10\%$ (Open circuit)
 - Test speed : 5 meas/sec
 - Temperature : 0° C ~ 40° C
 - Humidity : $< 85\%$ RH
 - Line Voltage : 220V $\pm 10\%$, 50Hz $\pm 5\%$
 - Power consumption : < 20 W
 - **Display Range :**

Parameter	Frequency	Measuring Range
	100Hz, 120 Hz	1mH ~ 9999H
	1kHz	0.1mH ~ 999.9H

L	10kHz	0.01mH ~ 99.99H
C	100Hz, 120 Hz	1pF ~ 19999mF
	1kHz	0.1pF ~ 1999.9mF
	10kHz	0.01pF ~ 19.99mF
R		0.1mΩ ~ 99.99MΩ
Q		0.0001 ~ 9999
D		0.0001 ~ 9.999

➤ **Measurement Accuracy :**

Parameter	Frequency	Accuracy
L	100Hz,	$\pm[1\text{mH}+0.25\%(1+L/2000\text{H}+2\text{mH}/L)](1+1/Q)$
	120 Hz	$\pm[0.1\text{mH}+0.25\%(1+L/200\text{H}+0.2\text{mH}/L)](1+1/Q)L$
	1kHz	$\pm[0.01\text{mH}+0.25\%(1+L/$
	10kHz	$10\text{H}+0.04\text{mH}/L)](1+1/Q)$
C	100Hz, 120 Hz	$\pm[1\text{pF}+0.25\%(1+1000\text{pF}/C_x+C_x/1000\text{mF})](1+D_x)$
	1kHz	$\pm[0.1\text{pF}+0.25\%(1+100\text{pF}/C_x+C_x/100\text{mF})](1+D_x)$
	10kHz	$\pm[0.01\text{pF}+0.25\%(1+20\text{pF}/C_x+C_x/4\text{mF})](1+D_x)$
R		$\pm[1\text{m}\Omega+0.25\%(1+R/2\text{M}\Omega+2\Omega/R)](1+Q)$
Q	100Hz,120,1Khz,	$\pm[0.020+0.25(Q_x++1/Q/Q_x)]\%$
	10kHz	$\pm[0.020+0.3(Q_x++1/Q/Q_x)]\%$
D	100Hz,120Hz,	$\pm0.0010 (1+D_x^2)$
	1Khz,	$\pm0.0015 (1+D_x^2)$
	10kHz	

051 Universal Development Platform

The instrument should have following features :

- Core 8051 MCU clocked at 11.0592 MHz.

- User can enter op code using on board 20 keys Hex keypad
- For large program user can use on board PC based USB Programmer.
- On board LCD for both programming mode and run mode.
- Every pin is marked in order to make work easier
- User can write assembly codes in PC software and run on Nvis 5001A
- PC Programmer mode also supports other devices like AT89C51/52/55, AT89S51/52/53 , AT89S8252
- Input / Output & test points provided on board
- Self contained development board with on board DC Power Supply plug in modules and prototyping area
- On board breadboard for self circuit design
- CD with sample project code in assembly and C, Programmer software & useful documents
- 2 Year Warranty

The instrument should have following Technical Specifications :

- **Communication** : USB
- **Programming mode** : PC mode, Hex keypad mode
- **MCU** : 8051 core
- **Crystal Frequency** : 11.0592 MHz
- **DC Power Supplies** : +12V, -12V, +5V & - 5V
- **Programmer** : Ready to run programmer will program 8051 devices

- **Interconnection for modules** : 2 mm patch cords and FRC cables
- **Product Tutorial** : Online (Theory, procedure, reference results etc).
- **Power Supply** : 110V - 260V AC, 50/60Hz
- **Operating Conditions** : 0-40 °C, 85% RH
- **Included Accessories** : USB cable, Mains cord, Patch cords, 20 Pin FRC cable, TeckBook Power Supply

Other Microcontroller support PC programmer modes

AT89C51/52/55, AT89S51/52/53 , AT89S8252

Experiments that can be performed :

- Decimal Addition of two numbers.
- Hexadecimal Addition of two numbers.
- Hexadecimal Multiplication of two numbers.
- Hexadecimal Division of two numbers.
- Hexadecimal Subtraction of two numbers.
- Logical Operation AND, OR, XOR, NOR, NAND, and NOT.
- Factorial calculation
- Timer/Interrupt example.
- Square wave generation on port
- Ascending and descending order.
- Fibonacci series
- LCM calculation
- HCF calculation
- Multiplication by shifting
- Multiplication by adding

- Square root calculation of a byte.
- Square calculation of a byte
- 8 bit Array addition
- Flashing "Nvis 5001A" on LCD.
- Split bytes into two nibbles and display on LCD
- Program to find even or odd of a byte
- Interface various external MCXX series modules.

PIC Microcontroller Development board with programmer

The instrument should have following features :

- PIC16F877A MCU clocked at 4 MHz
- Expansion connectors for plug in modules and prototyping area
- On board programmer
- RS232 interface to PC for programming
- Every pin is marked in order to make work easier
- Master Reset/Restart Key for hardware reset
- Input/Output & test points provided on board
- On board breadboard for connecting external components
- Self contained trainer with On board DC power supply
- CD with sample project code, Programmer software & useful documents
- Exhaustive course & reference material

The instrument should have following Technical Specifications :

Serial communication	:	RS232 Port
MCU	:	PIC16F877A
Crystal frequency	:	4 MHz
Size of Breadboard	:	175 x 67 x 8 mm
Tie points	:	1685
On board DC supply	:	$\pm 12V$ and $\pm 5 V$
Test points	:	30 Nos.
Interconnections	:	2 mm patch cords and FRC cables
Programmer unit	:	Ready to run programmer will program PIC
Devices		
Power supply	:	$\pm 230V$ 10%, 50 Hz
Fuse	:	1A
Power consumption	:	1VA (approx.)

Experiments that can be performed :

- Pin to pin study of MCU
- To study of initialization of internal fix PWM
- To study of initialization of internal PWM with variable duty cycle using internal ADC

ADC / DAC Module

The instrument should have following features :

- 8 Input 8 channel ADC interface
- DAC interface
- PC based programming
- Expansion connectors for plug in with Microcontroller unit and prototyping area
- Every pin is marked in order to make the work easier
- Input / Output & test points provided on board
- Exhaustive Learning Material
- 2 Year Warranty

Note :

1. This module is compatible with Nvis NV50XX series.
2. To run MC02 experiments, MC04 module is required.

The instrument should have following Technical Specifications :

- ADC : ADC0808
- DAC : DAC0808
- Power Supply : From Microcontroller development Platform NV50XX series

- Learning Material : CD (Theory, procedure, reference results, etc), Online (optional)

- Interface : 20 pin FRC cable
- Test points : 36 nos (Gold plated)
- Included Accessories :
 - Learning material CD : 1 no

 - Patch cord : 5 nos.

It should have performed following experiments :

- Study of ADC interfacing
- Study of DAC interfacing
- Study of timing and control signals of ADC and DAC
- Pin to pin study of ADC and DAC

Motor Drive Module

The instrument should have following features :

- Steeper Motor interface

- DC Motor interface
- Servo Motor interface
- Expansion connectors for plug in with Microcontroller unit and prototyping area
- Every pin is marked in order to make learning easier
- Input / Output & test points provided on board
- Exhaustive course & reference material
- 2 Year Warranty

Note :

The instrument should have following Technical Specifications :

- Stepper Motor : +5 V
- DC Motor : +12 V
- Servo Motor : +5 V
- Interface : 20 pin FRC cable
- Test points : 13 (Gold plated)
- **Power Supply** : From Microcontroller development platform NV50XX series

- **Learning Material** : CD (Theory, procedure, reference results, etc.) Online (optional)

- **Included Accessories :**
- Patch cord : 1 no.

- Learning material (CD) : 1 no

It should have performed following experiments :

- Study of Steeper Motor interfacing and its Direction and Angle Control.
- Study of DC Motor interfacing and its Direction Control.
- Study of Servo Motor interfacing and its Angle Control.
- Study of PWM concept.

Universal IC Tester

The instrument should have following features :

- Test a wide range of Digital IC's such as 74 Series, 40/45 Series of CMOS IC's
- Test Microprocessors 8085, 8086, Z80
- Test Peripherals like 8255, 8279, 8253, 8259, 8251, 8155,6264,62256,8288,8284.
- Test 7 segment display of common cathode & common anode type
- Auto search facility of IC's
- Test by Truth table/sequence table comparison
- 40 pin DIP ZIF sockets provided
- 28 Touch Key pad with numerical & functional keys
- 9 Digit Seven Segment Display

Device Support

- **Digital IC's (T.T.L. 74XXX Series)**

7400 7401 7402 7403 7404 7405 7406 7407 7408 7409 7410 7411

7412 7413 7414 7415 7416 7417 7418 7419 7420 7421 7422 7423

7424 7425 7426 7427 7428 7430 7432 7433 7437 7438 7439 7440

7442 7443 7444 7445 7446 7447 7448 7449 7450 7451 7453 7454
7462 7464 7465 7470 7471 7472 7473 7474 7475 7476 7478 7483
7485 7486 7489 7490 7491 7492 7493 7495 7496 7497 74107 74109
74112 74113 74114 74116 74121 74122 74123 74125 74126 74128
74132 74133 74134 74135 74136 74137 74138 74139 74140 74141
74145 74147 74148 74150 74151 74152 74153 74154 74155 74156
74157 74158 74159 74160 74161 74162 74163 74164 74165 74166
74168 74169 74170 74172 74173 74174 74175 74176 74177 74180
74181 74182 74183 74184 74185 74189 74190 74191 74192 74193
74194 74195 74196 74197 74198 74200 74221 74238 74240 74241
74242 74243 74244 74245 74246 74247 74248 74249 74251 74253
74256 74257 74258 74259 74260 74266 74273 74279 74280 74283
74290 74293 74298 74299 74322 74340 74341 74344 74347 74348
74350 74351 74352 74353 74354 74365 74366 74367 74368 74373
74374 74375 74377 74378 74379 74381 74382 74386 74390 74393
74395 74398 74399 74412 74423 74425 74426 74445 74447 74490
74521 74534 74540 74541 74590 74591 74595 74543 74544 74563
74564 74573 74574 74575 74577 74580 74589 74596 74620 74621
74622 74623 74638 74639 74640 74641 74642 74643 74645 74646
74647 74648 74649 74652 74657 74668 74669 74670 74688 74689
74786 74800 74802 74804 74805 74808 74832 74841 74874 74901
74902 74903 74904 74906 74C923 74C925 74C926 74C927 74C928
74C929 74989 741244 741245 741623 741621 741639 741640
741641 741642 741643 741644 741645 743037 743038 74H01
74LS51 74H54 74L54 74L71 74H71 74LS73 74LS76 74LS78 74L85
74L86 74C89 74L93 74L95 74LS107 8280 8281 8290 8291

➤ **CMOS (CD 4XXX Series)**

4000 4001 4002 4006 4007 4008 4009 4010 4011 4012 4013 4014 4015
4017 4018 4019 4020 4021 4022 4023 4024 4025 4026 4027 4028 4029
4030 4031 4032 4033 4034 4035 4038 4040 4041 4042 4043 4044 4046

4047 4048 4049 4050 4051 4052 4053 4054 4055 4056 4060 4063 4066
4067 4068 4069 4070 4071 4072 4073 4075 4076 4077 4078 4081 4082
4085 4086 4093 4094 4095 4096 4098 4099 40105 40106 40107 40109
40147 40160 40161 40162 40163 40174 40175 40181 40182 40192 40193
40194 40195 40244 40245 40257 40373 40374 40097 40098 4490 4502
4503 4504 4506 4507 4508 4510 4511 4512 4514 4515 4516 4518 4519
4520 4522 4526 4527 4528 4531 4532 4534 4538 4539 4541 4543 4544
4555 4556 4558 4562 4566 4572 4584 4585 4599 4723 4724 4727

➤ **Memories**

2102 2114 2115 2125 2147 2148 2149 6116 6264 62256 621024 9101
91L22 93412 93422 93425 41256 4256 50256

➤ **NV RAMS**

➤ 1220 1225 1230 1235 1240 1245 2210 2212

➤ **CPU**

➤ 8085 8086 V20 8088 8400(Z80) 6502 65C02 65SC02

➤ **Peripherals**

8155 8156 8205 8212 8216 8226 8237 8251 8253 8254 8255 8257 8259

8279 8282 8283 8284 8286 8287 8288 8250 82450 6350 6820 6821 6822

6840 6844 6845 6850 6851 6852 6854 6520 6521 6522 6524 6551 65C51

8420(Z80PIO) 8430 (Z80CTC) 8440(SIO-0) 8441 (SIO-1) 8442 (SIO-2) 8449

(SIO-90) 1852 1871 1879 2681

➤ **Transistor Arrays**

➤ **ULN**

2001 2003 2004 2005 2011 2013 2014 2015 2021 2023 2024 2025 2064

2065 2066 2067 2801 2803 2804 2805 2811 2813 2814 2815 2821 2823

2824 2825

➤ **RCA**

➤ 3083 3086 75468 75491 75492

➤ **Latch/drivers**

➤ UCN4801 UCN5801

➤ **Line Drivers & Receivers**

➤ 26LS31 26LS32 743037 743038 75174 75175 75176 75182 75183

➤ 75450 75451 75452 75453 75454 8820 8830 96174 96175

➤ **Power:** 230 V AC, 50Hz.

4) Department of Computer Science

Under Teaching Facility

Sr.No.	Description	Quantity
1	TP link wireless PCI Express Wifi Adapter	40
2	Accessories Keyboard and Mouse wireless	40
3	Multimedia Head Phone with Mike	40
4	Quick heal Endpoint Security	30
5	Laserjet Mono single Function Printer - LBP 2900	6
6	Epson Dot Matrix Printer 24 pin-LQ-310	2
7	Canon Photo Scanner - LIDE 120	2
8	D-Link Passive copper G600 Cat 6 LAN cable 305 meter - [art No. NCB-C6UGRYR-305	1
9	D-Llink Crimping Tool	1
10	I-Ball LAN Tester	1
11	D-Link Punching Tool	1
12	Audio Podium IP 60W - Model No-IP60W	1
13	Canon Laserjet Mono single Function	1
14	DELL LED Touch Screen Monitor -22"(S 2240T)	3
15	D-Link Wireless ADSL + Router DSL-2750U	1
16	Sony 32 GB Pendrive	1

Under Research Facility

Sr.No	Description	Quantity
1	D-Link Wall Mount Rack 9U-NWR-9U-5045-GR	1
2	D-Link Smart Switches Gigabit - DGS-1210-28	2
3	D-Link Passive (Copper) Patch Pannel - Part No : NPP-C61BLK241 24 port UTP	2
4	d-Link Passive (Copper) Information outlet - Part No:NK3-C6WHI1821 & NFP-0WH11	50
5	D-Link Passive (Copper) Back box - Part No : NBB-011	50
6	D-Link Passive (Copper) Patch cord UTP cat 6 24 AWG - 1 meter	50
7	D-Link Passive (Copper) Patch cord UTP cat 6 24 AWG - 2 meter	50
8	D-Link Unmanaged Switch Gigabit - DGS-1008A	1
9	Labour Charges	
10	DELL Server PwerEdge - T420	1
11	Microsoft VL Acdmc	1

5) Department of Zoology

Under Teaching Facility

Sr.No.	Name of the Instruments	Quantity
1	Stero Zoom Microscope	01
2	Haemocytometer	06
3	Haemoglobinometer	06
4	Sphygmomanometer	06
5	Noise Meter	06
6	Lux Meter	6
7	Digital Ph Meter	1
8	Digital Balance	01
9	E.S.R. Stand With tube	12
10	Olympus HB Model Microscope	05

Under Research Facility

Sr.No.	Name of the Instrument	Quantity
1	Penta Head Research Microscope	01

6) Department of Biotechnology

Under Teaching Facility

Sr.	Name of the equipment	Quantity
1	Bottle top liquid dispenser	01
2	Micropipettes 10-100ul	02
3	Micropipettes 0.5-10ul	02
4	Ets-3 (Small vertical electrophoresis with power pack)	01
5	Colorimeter	02
6	Ph Meter	01
7	Huzo maxi standard horizontal submarine gel electrophoresis unit	01
8	Vacuum desiccators	01
9	Digital Magnetic stirrer & Hot plate	01
10	Cryogenic container IR-3	01
11	Digital Balance citizen German with battery backup 2-3hrs, 300GM capacity, 1MG ACC	02

Under Research Facility

Sr.	Name of the equipment	Qty.
1	Research trinocular Microscope model CH-20i- TR OLYMPUS	01
2	Magnus Digital Microphotography System OLYMPUS (18 Megapixel canon EOS, CMOS sensor with USB 8GB Memory Card)	01
03	X-Cell surelock midi cell for leak free electrophoresis 1- 4midigel	01

7) Department of Microbiology

Under Teaching Facility

Sr.No.	Name of Instrument	Quantity
1	U.V. Cabine with Long wave(365 mm) short wave(254mm) & day light	01 Nos.
2	REVOLUTIONARY MICRO CENTRIFUGE with speed regulator, safety lid lock, digital speed meter & timer, with 24 X 1.5 ml angle Head (with Tapered bottom polypropylene tubes) with reduction adaptors of 1ml & 0.4ml RM -12C	01 Nos.
3	Student Microscope HB Model (with oil immersions)	03 Nos.
4	Student compound microscope ISA Mark PZ-9 Eyepieces 10x and 15x Objectives 10x, 40x and 100x oil immersion	03 Nos.
5	Binocular Microscope model Eco star-B Binocular tube, 45 ⁰ inclined, 360 ⁰ rotatable Eyepices 10x objectives 4x, 10x, 40x, & 100x oil Illumination system 6V-20W halogen with intensity control regulator	01 Nos.
6	Electrophoresis Unit Horizontal power supply 300V constant current with digital voltmeter & Current meter with timer for auto off-micro processor based	01 Nos.
7	Hotl plate regular with thermostatic control Size : 10 x 12"	01 Nos.
8	Digital Colorimeter EQ-650	01 Nos.
9	Incubator 18X18X18	01 Nos.
10	Autoclave 12"X20"	01 Nos.
11	Water Bath 12 vale	01 Nos.
12	Digital Colony counter	01 Nos.
13	Cyclomixer (Vortexmixer)	01 Nos.

Under Research Facility

Sr.No.	Name of Instrument	Quantity
1	Laminar air flow (Horizontal) Labline	01 Nos.
2	Digital spectrophotometer (Equiptronics)	01 Nos.
3	Refrigerator double door (LG)	01 Nos.
4	Microscope with Oil (Olympus)	01 Nos.

8) Department of Botany

Under Teaching Facility

Sr. No	Name of the equipment	Quantity
1.	Binocular Microscope Advanced	01
2.	Crafts advanced Research Microscope	01
3.	Crafts Chromatography cabinet Large size	01
4.	Digital eye piece Camera	01
5.	Stage Micrometer (Imported- 0.01mm)	01
6.	Ocular Micrometer (Imported)	01
7.	Laminar Air flow	01
8.	Buchner Funnel with pump	01
9.	Craft Microscope Cabinet Large size	
10	Vertical gel electrophoresis unit	01
11.	Double Distillation unit	01

Sr. No	Name of the equipment	Quantity
01	Bioera Steam Sterilizer(Autoclave) cat No. BI/CI/BSS/A/23	01