SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE
(An Autonomous Institution)
(Approved by AICTE, New Delhi & Affiliated to Pondicherry University)
(Accredited by NBA-AICTE, New Delhi, ISO 9001:2000 Certified Institution &
Accredited by NAAC with "A" Grade)
Madagadipet, Puducherry - 605 107

Research and Development

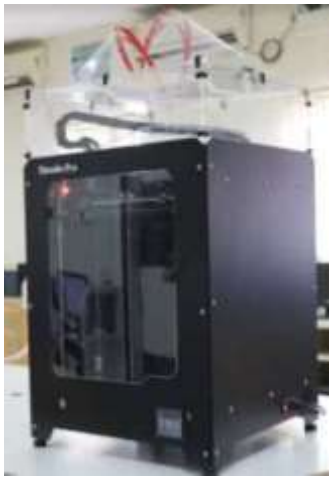
SMVEC Research Facilities

RESEARCH FACILITIES

Department of Mechanical Engineering

Sl.No	Name of Laboratory	Name of the Equipment	Purpose of the equipment for research and consultancy work	Equipment Photo
1.	Advanced Manufacturing Lab	CNC Turning Machine Hass USA	To perform precision machining operations on cylindrical workpieces. • Turning Operations • Complex Part Production. • Automation and Efficiency.	
2.		CNC Milling Machine Hass USA	Machining of various materials to produce complex and intricate parts. • Modern manufacturing Processes • Prototyping and Small-Batch Production. • CAD/CAM Integration.	
3.		Surface Grinding Machine (Industrial Version)	To produce smooth finish on flat surface and surface grinding operations. • Cylindrical Grinding Process. • Thread grinding Process. • Tool room applications. • Batch Production.	
4.		Tool and Cutter Grinder	To sharpening, reconditioning, and manufacturing a variety of cutting tools used in machining processes. • Drill Bit Sharpening. • End Mill Sharpening. • Grinding Complex Shapes. • High-Speed Steel and Carbide Tools.	

5.		Gear Hobbing Machine	To produce Gear on cylindrical workpieces. • High Precision. • Gear Tooth Generation. • High Production Rates.	
6.		Radial Drilling Machine	To provide a versatile and precise solution for drilling operations in various materials and workpiece sizes. • Tooling Flexibility. • Deep Hole Drilling. • Precision Drilling.	
7.		Unitech Lath machine	To perform various machining operations and manufacturing processes. • Turning Operations Thread Cutting. • Taper Turning. • Knurling.	
8.	Centre for Product Design and Development	PRO/ENGINEER 4.0 University Edition Perpetual license (50Users)	To addresses the diverse needs of industries involved in product design and manufacturing. • Product Design and Modeling • Digital Prototyping. • Product Lifecycle Management.	
9.		CATIA V6		
10.		ANSYS		
11.		INVENTOR		
12.		SOLID WORKS		

13.	Centre for 3 D Printing	G3D Thunder Pro Printing machine	• To develop new prototypes and Design validation. • It useful in engineering, product design, and industrial design research.	
14.	Metrology and Measurement Lab	Surface Roughness Tester with Comparator	To provide quantitative data about the texture of a surface, enabling industries to maintain quality standards and optimize manufacturing processes.	
15.		Profile projector	Measurement and inspection of 2D profiles and features of manufactured parts. • Surface Finish Inspection. • Verification of Form and Shape. • Tool and Die Inspection.	
16.		Autocollimator	Measurement of small angular deviations and alignments. • Flatness and Parallelism Measurement. • Angular Measurement. • Quality Control in Manufacturing Industry.	

17.	Material Testing and Metallurgy Lab	Hardness Testing Machine	• To measure the hardness of materials. • To ensure the quality, durability, and reliability of materials used in manufacturing processes. • Heat Treatment Monitoring.	
18.		Impact Testing Machine	Specialized machine used to assess the impact resistance and toughness of materials. • Material Toughness Assessment. • Structural Component Evaluation. • Evaluation of Temperature Effects.	
19.		Universal Testing Machine	To evaluate the mechanical properties of materials used in vehicle components, structures, and aircraft parts. • Tensile Testing • Compression Testing.	
20.		Spring Testing Machine	To assess the mechanical properties, durability, and performance characteristics of springs. • Load and Deflection Measurement. • Quality Control in Spring Manufacturing. • Verification of Design Specifications.	

21.		Torsion Testing Machine	To assess the torsional properties of materials, providing valuable data for material selection, design optimization, and quality control. • Torsional Strength Testing. • Shear Modulus Determination. • Torsional Stiffness Measurement.	
22.		Muffle furnace	To provide controlled high-temperature environments for a variety of processes, including heat treatment, material testing, sample preparation, and thermal processing.	
23.		Inverted Trinocular Metallurgical Microscope	To facilitate detailed examination, analysis, and documentation of the microstructure of metallic and opaque materials. • Phases Identification. • Grain Size Measurement. • Failure Analysis.	
24	MODROB Lab	FSA Make Computer Controlled Universal Testing Machine 20kN	To provide advanced capabilities for precise, automated, and controlled mechanical testing of materials. • Tensile, flexural, compressive and shear strength. • Stress-Strain Curve Generation. • Precise Load and Displacement Control.	

25		Micro Vickers hardness tester Model: HVD 1000	Specialized instrument designed for measuring the hardness of small or thin specimens. • Coating Hardness Measurement. • Material Characterization. • Quality Control in Microelectronics.	
26		Digital Fatigue Testing Machine	To evaluate the fatigue behavior of materials and components under cyclic loading conditions. • Fatigue Life Assessment. • Material Durability Studies. • Failure Mode Analysis.	
27		Vacuum assisted Resin Transfer Molding (VARTM) Machine	To enable the efficient and cost-effective production of Fiber reinforced composite components for marine, aerospace, wind energy, and construction. • Manufacturing Composite Laminates. • Low-Cost Production.	

Department Of Electronics and Communication Engineering

Sl.No	Name of Laboratory	Name of theEquipment	Purpose of the equipment for research and consultancy work	Equipment Photo
1	Advanced digital communication Laboratory	Network Analyser ENA series E5061A 300KHz- 7 GHz	Performance testing and validation of antenna and microwave components	 **Model Number : E5061A**
		Spectrum Analyzer 1 GHz with TG HM 5014	Testing & validation antenna and telecommunication equipment etc in frequency domain	 **Model Number: TG HM 5014**
		4-Channel Digital Signal Oscilloscopes 100MHz,1GS/s	Time domain testing and validation of semiconductors devices, antenna and telecommunication	 **Model Number: TDS2014**
		Universal software radio peripheral (USRP)	Real time data transmission and reception, wireless channel modelling	 **Model Number: Xilinx Zynq**
		Optical time domain reflector meter (OTDR)	Real time optical cable testing and fault identification	 **Model Number: OFSA Lite 3**
2	Networking Laboratory	Artix -7 FPGA	Implementation and testing of VLSI based system design	 **Model Number: Artix -7**
		IoT Development Board	Real time implementation of internet of things	 **Model Number: Raspberry PI 3b+**

Sl.No	Name of Laboratory	Name of theEquipment	Purpose of the equipment for research and consultancy work	Equipment Photo
		VIVADO 2014.4 (25 User)	Implementing digital system functionality	
		MATLAB (Peripheral Licence)	Implementing digital image, signal processing etc.	

Department of Electrical and Electronics Engineering

Sl.No	Name of the Laboratory	Name of the Equipment	Purpose of the equipment	Equipment / Device Photo
1	Power Electronics and Drives Lab	Performance validation of electrical machine setup	The Performance validation of electrical machine set-up is useful for testing of electrical and mechanical parameters like current, Voltage, Speed, Power etc and to plot various performance characteristics. Also, it is very much useful to carry out the testing process for the newly designed machines.	
2		PLC Training equipment with motor Setup for industrial purpose learning	This set-up is useful for learning the PLC based control of motors which are used in industry. It is also enabled with IoT for cloud based control.	
3		DSP/FPGA based speed control of BLDC motor	The FPGA based speed control of BLDC motor set-up helps to clearly understand the open loop and closed loop control of BLDC motor. This in turn will help us to develop the converters with control algorithm for the BLDC motor used in E-Vehicle.	
4		Internet of Things Development kit	This set-up is useful for learning the various Multiple Onboard MCU such as STM and ESP. It is also enabled with the following Multiple Onboard Wireless Communication Protocols • Bluetooth • BLE • Wifi • Zigbee • LoRaWAN • Sigfox • NB-IoT which provides the platform for learning transmitting and receiving	

			the signals in wireless mode.	
5	Microcontroller and its Applications Lab	Universal programmer burnerTop 2008	Universal programmer burner is a device designed for programming various types of programmable devices, such as microcontrollers, EPROMs, EEPROMs, Flash memory, and other programmable integrated circuits (ICs).	
6		PIC 16F Development Board	To support the development and experimentation of projects based on Microchip's PIC 16F series microcontrollers	 
7	Embedded System Lab	ARM 7 Development Board	ARM 7 Development Board is used for both learning and practical implementation of various projects, in the fields of embedded systems	 

8	Renewable Energy Lab	Solar Charge Controller	Solar Charge Controller is used to protect the battery, optimize charging efficiency, and ensure the overall reliability and longevity of a solar power system	
9		Solar Power Meter	Solar Power Meter serves as a valuable tool for assessing solar radiation, estimating energy production, optimizing solar panel placement, and monitoring the performance of solar power systems. It plays a crucial role in ensuring the efficient and effective utilization of solar energy resources	
10	Industrial Automation Lab	PLC module	This PLC is designed as a compact CPU with integrated I/Os. It includes 4 input modules and 4 output modules. Its modular design can be used to increase configuration limits or to adapt the controller as per the requirements.	
11	Power Electronics Lab	DSP 2812 kit / DSP 5x /6x Digital signal Processor	Facility to retrieve Power Data & Harmonics signals using this board.	
12		Power & harmonics analyzer Model PHA-5850	Analysis of Total harmonic distortion up to 100th harmonic Order is possible to measure using this meter. And also, it is used to measure the True RMS value, Active Power, Apparent & Reactive Power (KVA, KVAR), Power Factor, Phase Angle (F) & Energy (WH,KWH,KVARH, PF)	

13		Digital Storage Oscilloscope 4 Channel, 70MHz	4 channel DSO is used to display the waveforms of the hardware setup which Provides advanced trigger, storage, display and measurement features. Also, provided with the PC interfacing for waveform capturing.	
14	Simulation Lab	Real time MATLAB interfacing Card with PC	To interface the real- time system with MATLAB Simulink using PC or Mac computer for the hardware system control.	

Department of Instrumentation and Control Engineering

Sl.No	Name of Laboratory	Name of theEquipment	Purpose of the equipment for research and consultancy work	Equipment Photo
1	Sensor and Transducer Lab	AC Synchro Transmitter & receiver	Measuring Instruments	
2.		Temperature Measurement using PC Based Data Acquisition System	Measuring Instruments	
3.		Level Measurement Trainer using strain gauge	Measuring Instruments	
4.		Measurement of Speed using magnetic pick up	Measuring Instruments	
5.		Calibration of DP transmitter used for Flow measurement.	Calibration Instruments	
6.		Calibration of Pressure Gauge using Dead weight tester	Calibration Instruments	
7.		Calibration of I to p converter	Calibration Instruments	
8.	Embedded Design Lab	8051 development board	Embedded Based Devices	

9.		ARM processor development kit	Embedded Based Devices	
10.	Lab View	NI DAQ 9172	Interfacing with hardware	
11.	Process Control	Control valve characteristics (linear+equal%+quick opening)	To study the characteristics of control valve	
12.		Temperature Process Analyzer	To study the basic principles of Temperature control	
13.		Pressure Process Analyzer Level Process Analyzer using PID controller (stand-alone)	To study the basic principles of pressureand level control	
14.		Flow Process Analyzer	To study the basic principles of flow control	
15.		Process Control Simulator	To study the characteristics ofP,PI and PID.	
16.		GE Fanuc PLC (14 inputs and 10 outputs)	Programmable device	

17.		PLC Real time application trainer- Batch Process.	To study the applications of PLC	
18.		Proto Type Process control using PLC	To study the applications of PLC	
19.		PLC Real time application trainer for bottle Filling process	To study the applications of PLC	

Department of Civil Engineering

Sl.No	Name of Laboratory	Name of theEquipment & Model Number	Purpose of the equipment for research and consultancy work	Photo
1.	Concrete Laboratory	Compression Testing Machine Model No – AIM 317-E-DG-1	A Compression Testing Machine is employed in research and consultancy work to determine the compressive strength of materials, particularly in construction and engineering. It ensures quality control, assesses material performance, and aids in structural analysis, providing essential data for research and consultancy projects.	
2.		Flexural Testing Machine Model No – AIM331	A Flexural Testing Machine is used in research and consultancy work to evaluate the flexural strength and behavior of materials, especially in construction and engineering applications. It provides critical data for assessing material performance under bending forces, aiding in structural design, and ensuring quality control in various projects.	
3.	Strength of Material Laboratory	Universal Testing Machine Model No – AIE-UTE-100T	A Universal Testing Machine (UTM) is utilized in research and consultancy work to assess the mechanical properties of materials, including tensile, compressive, and bending strengths. This equipment helps in understanding material behavior under various conditions, ensuring quality control, and providing valuable data for engineering and construction projects	

4.	Survey Laboratory	Total Station Model No – 2LS	It is a instrument that combines electronic theodolite and distance measuring equipment. Its purpose in research and consultancy work is to precisely measure angles and distances on the field, enabling accurate mapping, topographic surveys, and construction layout for projects such as infrastructure development, urban planning, and environmental studies.	

5.		Torsion Equipment	The main purpose is to conduct the mechanical properties of materials. Material testing for MMC and PMC materials. Material characterization and structural analysis using metallurgical microscope	
6.	Geotechnical Engineering Laboratory	Direct shear Apparatus	The main purpose of this equipment to study the shear strength of soil. The compressive strength of soil is determined. To determine the safe bearing capacity of soil.	
7.		Unconfined Compression Test Apparatus	The main purpose of this equipment to study the shear strength of soil. The compressive strength of soil is determined. To determine the safe bearing capacity of soil.	
8.		Tri Axial Test Apparatus	The main purpose of this equipment to study the shear strength of soil. The compressive strength of soil is determined. To determine the safe bearing capacity of soil.	

9.	Environmental Engineering Laboratory	BOD	The main purpose of this equipment to conduct the inorganic chemical analysis and to determine the concentration of metal ions. To determine the mass of oxygen consumed per liter of solution.	
10.		Flocculation	The main purpose of this equipment to predict the quality of water and waste water. The main purpose is to conduct the settable solids	
11.		COD	The main purpose of this equipment to determine the concentration of metal ions.	
12.		Flame Photometry	The main purpose of this equipment to determine the mass of oxygen consumed per liter of solution. To predict the quality of water and waste water.	
13.	Transportation Engineering Laboratory	CBR	The main purpose of this equipment to determine the subgrade soil properties	

Department of Computer Science and Engineering

Sl.No	Name of Laboratory	Name of the Equipment	Purpose of the equipment for research and consultancy work	Equipment Photo
1	Computing Lab	NODES Lenovo Desktop PC - Intel H61 Express Chipset - InteL Core i3 3.3 GHZ Processor - 4 GB PC3 Memory - 500 GB SATA HDD - Lenovo Keyboard - Lenovo Mouse	Develop Novel Computing Paradigms for High-Performance Intelligence Computing and exploring innovations in the algorithm, architecture, system, and circuit designs for Artificial Intelligence.	
2	Artificial Intelligence Laboratory	WINDOWS SERVER 2008 R2 HP PROLIANT ML 150G3 Server - Intel Quad Core xeon Processor E5310(1.60 GHZ, 1066 MHZ FSB, 80W) - Integrated 2x4 MB Shared L2 CACHE / 1GB PC2 -5300 DIMMS (DDR2 - 667) 4 DIMM SLOTS - HP 146GB SAS 15K HOT PLUG / - Embedded HP NC7781 GIGABIT Server Adapter - 48 X IDE (AT API) Cd rom Drive - Microatxtower	Applied Intelligence Laboratories (AI Labs) is the research and technology arm of the BAE Systems' Digital Intelligence business. We provide research & development, consultancy, specialist manufacturing and technical services for BAE Systems businesses, Government departments and commercial entities.	
3	Software Engineering Lab	**Operating System:** Windows 11 Pro Processor: Intel H610 Core i7-12700 Memory: 8 GB DDR4 RAM, Up to 64 GB of Dual-channel DDR4 Storage: 512 GB HDD, SATA Ports: Front: 2USB 2.0, 2USB 3.2 G1, Rear: 2USB 2.0, 2USB 3.2 G2 Product Type: Desktop Computer	1.To understand the software engineering methodologies involved in the phases for project development. 2. To gain knowledge about open source tools used for implementing software engineering methods.	
4	Open Source Software lab	Operating System: Windows 11 Pro Processor: Intel H610 Core i7-12700 Memory: 8 GB DDR4 RAM, Up to 64 GB of Dual-channel DDR4	Open source fosters ingenuity; programmers can use pre-existing code to improve the software and even	

		Storage: 512 GB HDD, SATA Ports: Front: 2USB 2.0, 2USB 3.2 G1, Rear: 2USB 2.0, 2USB 3.2 G2 Product Type: Desktop Computer	come up with their own innovations. Open source comes with a built-in community that continuously modifies and improves the source code. Open source provides great learning opportunities for new programmers.	

Department of Information Technology

Sl.No	Name of Laboratory	Name of the Equipment	Purpose of the equipment for research and consultancy work	Equipment Photo
1.	Application Development Laboratory	**Dell OptiPlex 390 Micro Tower** - INTEL Core i3-2100 @ 3.1 GHZ - 512 KB L2 CACHE MEMORY - 3 MB L3 CACHE MEMORY - INTEL MOTHERBOARD - 8 GB PC3-10600 DDR3 1330 MHZ DIMM MEMORY - 320 GB SATA @ 7200 RPM HARDDISK - DELL PS/2 STANDARD KEYBOARD - DELL 2 BUTTON OPTICAL SCROLL MOUSE - Inbuilt RJ-45 - 6 USB 2.0 - 2 Front USB 2.0 - HDMI - Front 1 MIC-IN, 1 AUDIO-OUT - DELL 18.5" TFT MONITOR **HP DX2480 Desktop** – Intel Core 2 Duo Processor (2.80 GHz, 1066 MHz FSB) – 2 GB DDR2 RAM – 160 GB SATA HDD – HP USB Keyboard – HP Optical USB Scroll Mouse - HP 18.5"Wide LCD Monitor **HP PRO 3090 MT Desktop** – Intel Core 2 Duo Processor (2.93 GHz, 1066 MHz FSB) – 2 GB DDR2 RAM – 320 GB SATA HDD – HP USB Keyboard – HP Optical USB Scroll Mouse - HP 18.5"Wide LCD Monitor	Equipment available for use by student and research scholars for software application development	 

DEPARTMENT OF PHYSICS

Sl. No	Name of Laboratory	Name of the Equipment	Purpose of the equipment for research and consultancy work	Equipment Photo
1.	**Nanotechnology Research Centre (NRC) Lab**	Laboratory Hot Plate	To prepare the Nano fluid by using Hydrothermal technique	
2.		Fabrication of Transistor and designing	To testing for transistor fabrication and checking	
3.		Nano fluid and testing	To test the Nano drug and Multi- medical purpose	
4.		PN junction testing and Planck's constant	To analyses the Behavior of particle and waves at atomic level as well as the particle nature of light	
5		Fabrication of Integrated circuit	To fabricate the different switching functions and combinational logic circuits.	

Department of Chemistry

Sl.No	Name of Laboratory	Name of the Equipment	Purpose of the equipment for research and consultancy work	Equipment Photo
1.	ChemistryLab	Conductivity Meter	To measure conductance	
2.		Hot Plate	For Heating Purpose	
3.	ChemistryLab	Colorimeter	To measure absorption	
4.		Flame Photometer	To measure emission	
5.		COD Apparatus	To measure COD	

Department of English

Sl.No	Name of Laboratory	Name of the Equipment	Purpose of the equipment for research and consultancy work	Equipment Photo
1	Language Lab (Globarena Software)	Lenovo SR250: Intel Xeon E-21244 core3.3 Ghz/Open RAM Bay/ 1 * ITB SATA 3.5" Simple Swap SATA (up to 4Bays) RAID 0,1,5,10 Headphone W/mic	Linguistics and Applied Linguistics Online Writing reference Survey research relating to students Performance inthe lab.	

Department of Mathematics

Sl. No	Name of Laboratory	Name of the Equipment	Purpose of the equipment for research and consultancy work	Equipment Photo
1	Mathematics Lab	MAT LAB Software	To find the solution of Mathematical problems by using MAT lab Software with time efficiency.