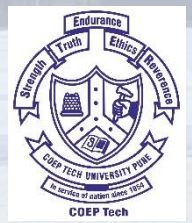
Offering to the Industry and possible Engagement By

Department of Manufacturing Engineering and Industrial Management



COEP Technological University Pune

Labs & Facilities @
Department of Manufacturing Engineering and Industrial Management

Robotics and Automation Lab (Central Facility):

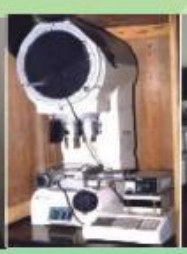



3D Make Lab - Rapid Prototyping Facility (Central Facility):

The Rapid Prototyping Laboratory has facilities for making physical objects directly from CAD mode
FDM (RP) machine is available for experimentation and product development for UG and PG stude



Metrology Lab:


Non-conventional Machining Lab:



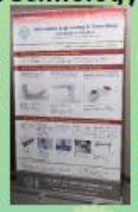
Machine tools Lab:

Machine Tools are grouped into production units, which are capable of performing all necessary operations on a certain group of workpieces. The department is equipped with 10 CNC Lathes and 2 CNC Milling Machines and a 3 axis CNC machining centre CNC engraving machine. In addition to this Machine tools lab has conventional Lathes, Milling Machines, Drillings Machines, Gridding Machines, Shaper, Planer etc.


Terotechnology Lab:




Bio Medical Engineering & Technology (Incubation) center

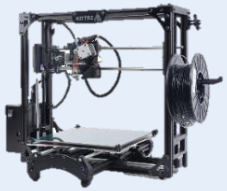




Mechatronics Lab



Facilities at Additive Manufacturing Lab

3D Printing



RapFab FDM

Stratasys
F 170 FDM

Stratasys Connex
350 PolyJet

SLM 280
Metal Printer

Formlabs
SLA

3D Scanning

Roland
PICZA-600

Rapid-I Precision
Measuring System

DAVID
SLS 2

ARTEC SPIDER

Contact Person: 1) Dr. Mrs. Arati Mulay 020-25507710 Email- avm.mfg@coeptech.ac.in
2) Mr.Sandesh Patil 020-25507742 Email- snp.mfg@coeptech.ac.in

Academic Courses

- One Year Post Graduate Diploma in 3D Printing (Additive Manufacturing): PGD 3DP in association with CMT

- Curriculum Course for Graduate Students with hands on experience to gain the practical knowledge of Additive Manufacturing Technology.

- Training on operating procedure of in-house RP machines for different groups like Satellite Team, Robotics Group, Supra and Baha Teams etc.

Skill Development Courses

Two days Short Term Training Program in

Additive Manufacturing and Product Development

- Integrated Skill Development Course for Students, Researchers, Industry People and everyone who wish to learn the latest Additive Manufacturing technology.
- Course will cover **theoretical as well as practical hands-on** content of :
  - Introduction to Various Additive Manufacturing Processes
  - Designing for Additive Manufacturing Processes
  - Slicing for Additive Manufacturing Processes
  - Additive Manufacturing real life applications (Product Development)
  - Reverse Engineering

Facility

Sr No	Machine	Material Charges		Process Charges
		Model Material Rate	Support Material Rate	
01	RAP FAB FDM 3D Printer	Rs. 2/- per gram	Rs. 2/- per gram	100/- Per Hour
02	Stratasys F170	24/- per cm^3 (ABS)	22/- per cm^3	500/- Per Hour
03	Stratasys Fortus450			500/- Per Hour
04	Connex 350	Rs. 30 per gram	Rs. 8 per gram	1000/- Per Hour
05	Form Labs	Rs. 20/- per ml (for regular resin) Rs. 40/- per ml (for Tough resin)		200/- Per Hour
06	3D Scanning	Rs. 500 Per Hour		
07	SLM 280	Rs. 60 Per Gram (for Stainless Steel and Aluminium)		750/- per Hour
08	Wax 3D printer	Rs.		

Equipments	Specifications
SLM Metal AM Machine (SS316L)	Technology: SLM Build Size: 280 x 280 x 365 mm Layer Thickness:20 µm - 90 µm
Stratasys Connex 350	Technology: Polyjet Build Size:342 x 342 x 200 mm Layer Thickness: 16 µm - 35 µm
Fortus 450 FDM Technology Machine (NYLON12)	Technology: FDM Build Size:406 x 355 x 406 mm Layer Thickness:0.127 mm – 0.335mm
Stratasys F170 FDM 3D Printer (ABS)	Technology: FDM Build Size:254 x 254 x 254 mm Layer Thickness:0.127 – 0.335mm
Solid Scape Wax 3D Printer (WAX)	Technology: Digital 3D printing Build Size:15x15x5 cm Layer Thickness: 6 – 25 microns
Form Labs SLA 3D Printer (Clear & Tough Resin)	Technology: SLA Build Size:14.5 × 14.5 × 18.5 cm Layer Thickness:25 – 300 microns
RapFab 3D Printer (ABS)	Technology: FDM Build Size:250 x 250 x 250 mm Layer Thickness:0.25 – 0.5mm

Equipments	Specifications
Roland Picza LPX600D	LASER 3D Scanner
Rapid-I Precision Measuring System	Vision Measurement System
David Scanner	Structured Light 3D Scanner
Artec Spider 3D Scanner	White Light 3D Scanner

Consulting Project work to solve specific business problems

- Research Areas of Additive Manufacturing Lab
  - Design for Additive Manufacturing
  - Rapid Assisted Manufacturing
  - Bio Medical Applications
  - Post processing

- Some Research Projects at Additive Manufacturing Lab
  - Development of FDM Machine
  - Development of Vapour Polishing setup using hot vapors and cold vapors.
  - Design and Development of Nozzle for FDM 3D Printing Machine.
  - Development of Different Material Filament Using Wire Extruder for FDM 3D Printing Machine.

Research Work

- Some Ongoing Research Projects at Rapid Prototyping Lab

  - Experimental Investigation Into Plasma Assisted Synthesis And Characterization of Spherical Steel Powder for Additive Manufacturing

  - Design for Additive Manufacturing and Optimization of Support Structures for Metal Additive Manufacturing

  - Development of Experimental Setup of Metal Rapid Prototyping Machine using Selective Laser Sintering Technology

Research Work

➢ Rapid Tooling

- (The research focuses on the application of additive manufacturing technology for the Rapid Production of Tools such as Dies and Mould for short Production Run to reduce the new product development time.)

➢ Metallization of Additive Manufactured Parts

- (The focus is to increase the applications of additive manufactured parts in various areas by metallization of the additive manufactured plastic parts. The process of metallization by electroless nickel, electroless nickel tungsten and copper electroplating is successfully tested on the Fussed Deposition Modelling (FDM) and Polyjet printed Acrylonitrile Butadiene Styrene (ABS) parts.)

Automation and IoT

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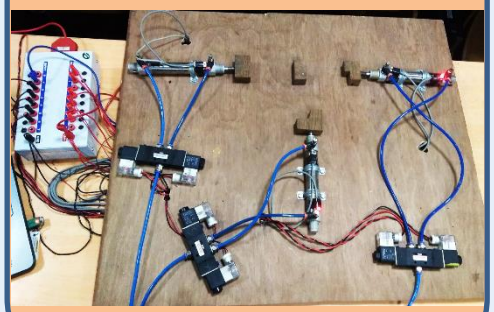
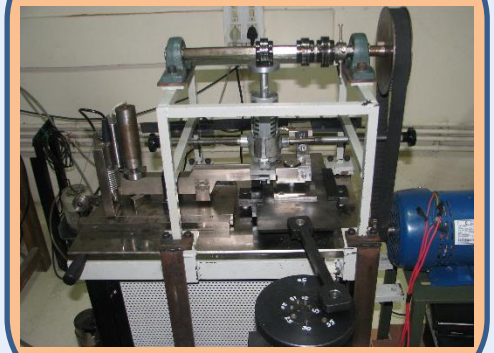
Major Area of Research:

- Manufacturing Engineering
- Mechatronics and Automation
- Tribology
- Fluid Power Automation





Industry Engagement or Interest Areas

- Design and development of fluid power automation systems
- Study of Tribological behavior of materials under static and dynamic conditions with and without lubrication
- PLC Based IoT enabled system development
- Fluid Power Simulation software support for Festo FluidSIM and Famic Technologies' Automation Studio.

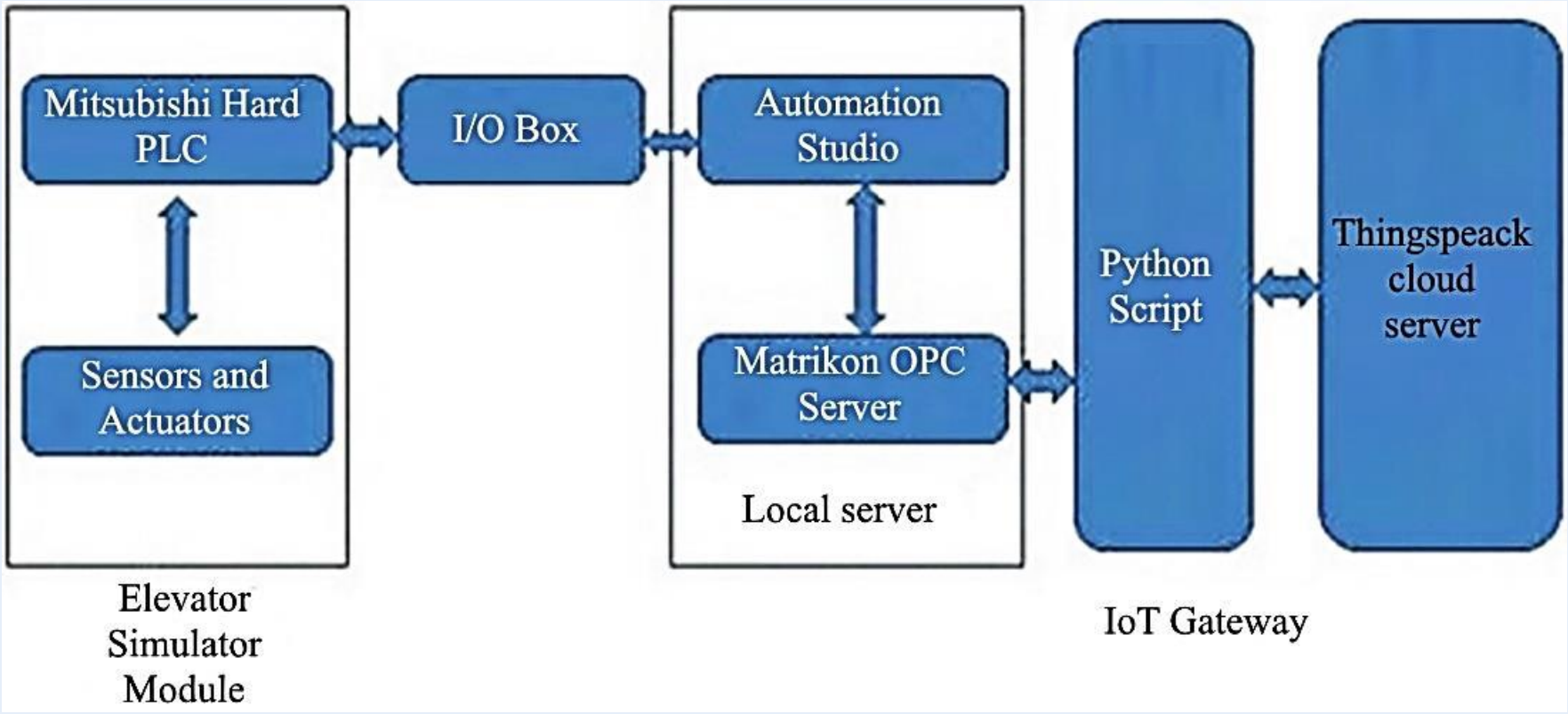
Few MTech Projects Guided

- Remote Monitoring and Control of the Elevator Simulator Module using Internet of Things.
- To improve predictive maintenance, remote diagnostics and troubleshooting.
- Add-on system is used which includes digital I/O signal box and soft PLC of Automation Studio software supporting OPC DA, which will enable IoT compatibility of the system.

Few MTech Projects Guided

- Motor controlled system development with force-assistance using force/torque sensor for four-axis ceiling suspension system
- Sugarcane Disease Detection Using CNN-Deep Learning Method
- Framework for deep learning-based model for human activity recognition (HAR) using adapted PSRA6 dataset

IoT enabled elevator simulator module



IoT projects

- IoT based ECG measurement setup
- IoT based garbage collection under Smart City project
- Remote Monitoring and Control of the Elevator Simulator Module using Internet of Things.
  - To improve predictive maintenance, remote diagnostics and troubleshooting.
  - Add-on system is used which includes digital I/O signal box and soft PLC of Automation Studio software supporting OPC DA, which will enable IoT compatibility of the system.

Reliability & Maintenance Management

Dr.M.D.Jaybhaye
Dr.B.Rajiv
Dr.B.U.Sonawane
Mrs.Avani Londhe

Dr.Maheshwer D.Jaybhaye

Associate Professor,

Department of Manufacturing Engineering and Industrial Management

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Major Area of Research:

- Reliability Engineering, FMEA & FTA, Reliability Assessment and Testing
- Oil analysis, Ferrography and Condition Monitoring
- Wear Particle Analysis
- Robotics and Automation

Research Contributions:

- Reliability estimation and assessment using Parametric & non-parametric methods (Consultancy projects for various organizations)
- Reliability Modelling & Life estimation
- FMEA & FTA of the system and Criticality Assessment and Testing
- Ferrography, Condition Monitoring and Condition Based Maintenance (RPS)
- Wear Particle Analysis through lubricating oils using Ferrography techniques
- Oil analysis-TAN,TBN,Soot, oil properties
- Dry bearing test rig development and testing of journal bearing
- Test rig for gear box testing and journal bearing
- Wear particle detection through Teachable machine & CNN Model

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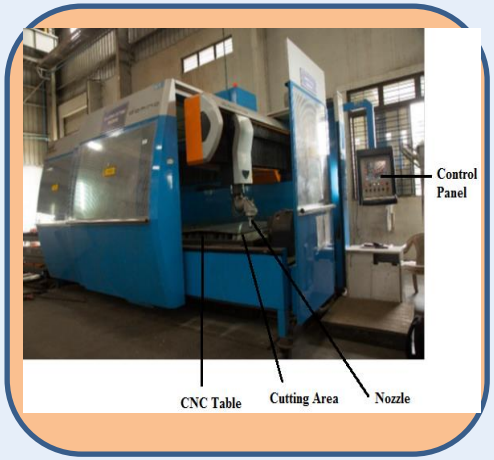
Major Area of Research:

- Reliability Engineering, FMEA , FTA, Reliability Assessment and Testing (Consultancy Works)
- Electrical Discharge Machining- AICTE RPS Project
- Laser Machining/Cutting
- Optimization Techniques

Electrical Discharge Machining-

Condition Monitoring



Laser Cutting

Dr. BHAGWAN U. SONAWANE, PhD .

Associate Professor

Department of Manufacturing Engineering and Industrial Management

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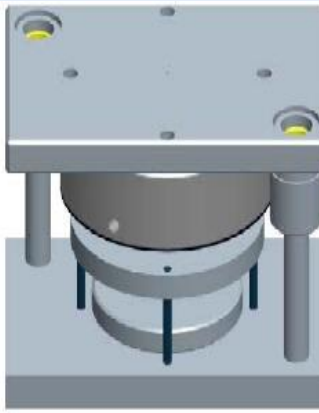
Major Research Areas:

- Tribology
- Reliability Engineering
- Sheet metal Forming
- Manufacturing Engineering



Research Contributions

- Co-investigator – Biomedical Technology Incubation Center (BETIC-COEP)
- Completed five consultancy projects on Reliability for DRDO and one consultancy projects on Reliability for Bharat Forge .
- Currently working on Two interdisciplinary minor research project
- Completed one AICTE RPS R & D Project.
- Received two gold medal for the best paper publication from IEI India

Reliability & Maintenance Management

- Focus Areas
- Lab Facilities
- Projects
- Skill Training
- Client awareness
- Engagement Model

Focus Areas

- Ferrography
- Oil Analysis
- Wear Analysis
- Vibration Analysis
- Non-Destructive Testing
- Tribology
- Reliability Engineering

Lab Facility -Terotechnology Lab

- A Terotechnology Lab takes care of oil based analysis of Industrial systems.
- The systems which uses oil as operating lubricating fluid is analyzed using ferrographic analysis of oil sample.
- The identification of iron base wear partials is carried out and nature of wear mechanism can be identified.

Terotechnology Lab

- To create awareness about condition Monitoring within the UG/PG students.
- To make available the state-of-art facilities to B.Tech, MTech, PhD students .
- To make use of equipments and devices for Industrial consultancy work related to ferrographic analysis.

Major equipment available in Terotechnology Lab

- Direct Reading ferrograph (DR-V) (@15 Lakhs)
- Dual Slide ferrogram Maker (FM-III) (@ 20 Lakhs)
- Bi-chromatic Optical Microscope (@15 Lakhs)
- Spectro Fluid Scan (Q1000) (@ 14 Lakhs)
- Density Meter, Electronic Flash Point Tester , Pour Point Tester (@6.7 Lakhs)
- Oil analysis solution Test Kit (@10.5 Lakhs)
- Atomic Absorption Spectrophotometer (@ 9.5 Lakhs)
- Vibration Analyzer (VA-12) (@3 Lakhs)
- Ultrasonic Flaw Detector (@5 Lakhs)

Direct Reading Ferrography (DR-5)

Specifications

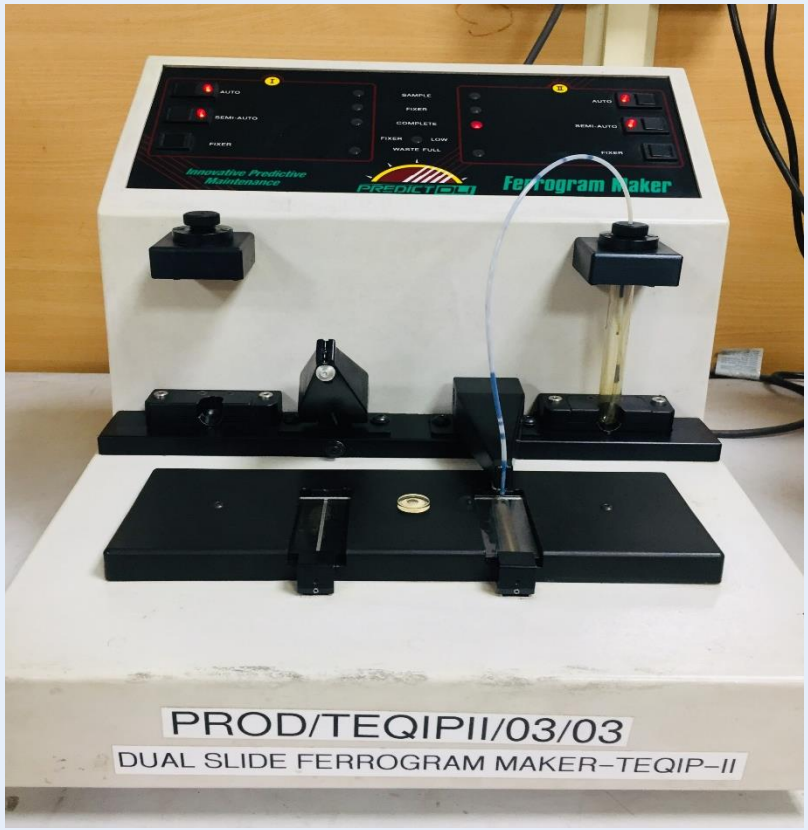
Length: 12 inch
Width: 10.75 inch
Height: 21.5 inch
Weight: 20.5 lbs
Power: 100 - 240v 50/60 Hz selectable

Utility

Quantitatively measures the concentration of wear particles in oil

Gives large size and small size particle concentration in the sample.

Dual Slide Ferrogram Maker (FM-III)



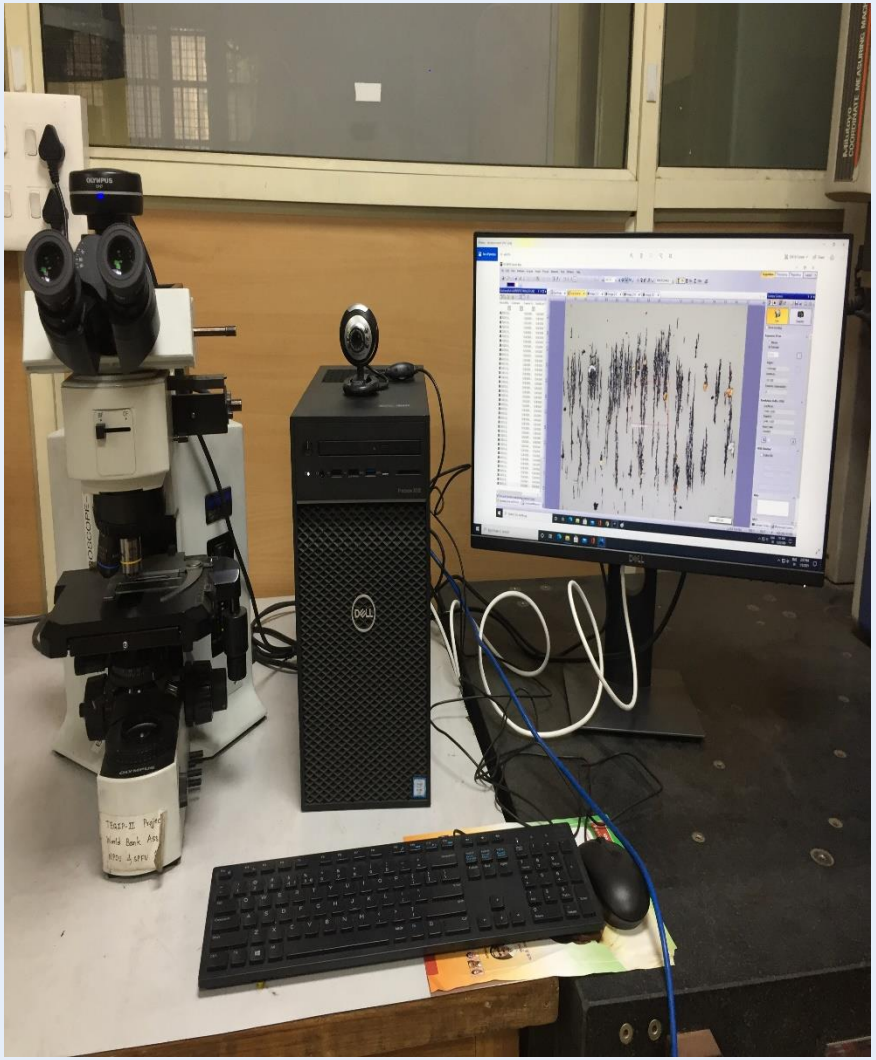
Specifications

Depth: 16 inches (406 mm)
Width: 14 inches (356 mm)
Height: 15 inches (380 mm)
Power: auto-switchable 110/220 V
Weight: 42 pounds (19 kg)

Utility

To prepare a Ferrogram slide by means of controlled flow of lubricant sample from the test tube.

Bi-chromatic Optical Microscope Olympus BX51



Specification

Bi-chromatic Optical Microscope along with 1.3 MP microscope Camera for image view and storage of images

5-position objective turret

Built-in: 6V- 30 watt power supply

Stage: X-Y drive 75mm x 50 mm travel

Illumination: Transmitted: 6V-30W Quartz Halogen Illuminator

Transmitted condenser

Observation Head:

3 Position Trinocular with one focusable eye-tube and one fixed eye-tube (100% Eyes, 80%-Camera/20%Eyes, 100% Camera)

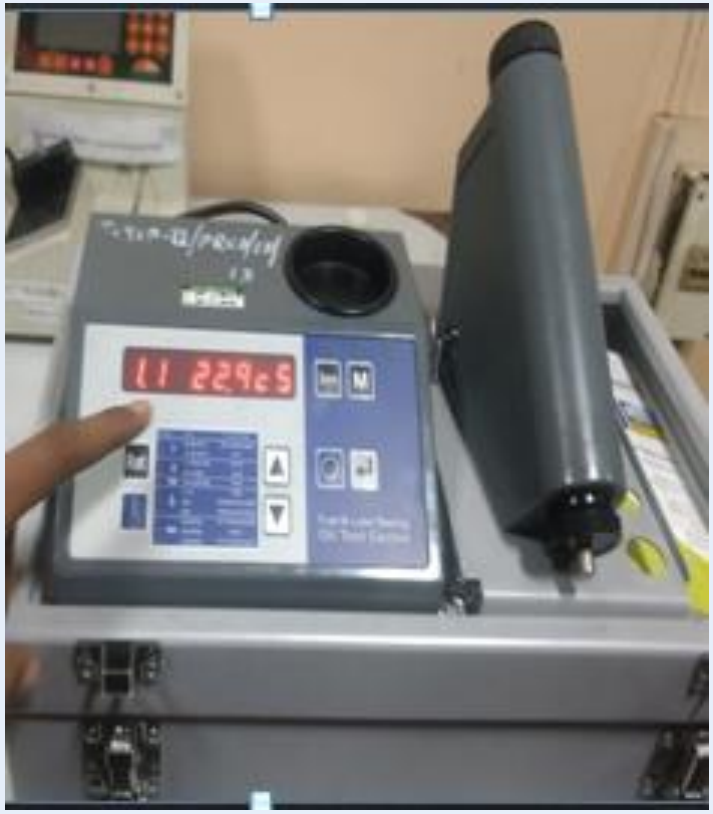
Spectro Fluid Scan Q1000

Utility:

Used for Measurement of oil condition parameters including:

- Total Acid Number (TAN)
- Total Base Number (TBN)
- Oxidation
- Nitration
- Sulfation
- Incorrect lubricant
- Additive depletion
- Soot
- Glycol/Antifreeze
- Water

Oil analysis solution Test Kit Viscosity Measurement



The oil analysis kit is a rugged, self-contained Oil Test Lab for key oil quality parameters covering Viscosity, Water, BN (formerly TBN), AN (formerly TAN) and Insoluble

Atomic Absorption spectrophotometer

Specifications:

- Fully automatic PC controlled high performance with window 2000/XP based wizard software for operation on 220V/50Hz.
- Optics are covered to protect against dust and corrosive vapour Reflective optical compartments are with protective coating.
- Monochromator Czereny-Turner type with focal length 300mm having grating with 1800 lines/mm for high energy throughput. Variable slits from 0.1 - 2.0 nm, user selectable.
- Wavelength range 190-900 nm.
- Reciprocal Linear Dispersion less than 1.6 nm/mm
- Background Correction - Unique Deuterium source, high speed simultaneous correction.
- 6-lamp motorized turret controlled through software.
- Sensitivity: An absorbance of 0.9 or better, for 5ppm Cu solution.

Density Meter

The Density meter can confirm the quantity of fuel delivered from the bunker barge, and provides CCAI (Calculated Carbon Aromaticity Index), Density in Vacuo, and Viscosity conversion.

Specification :

Accuracy: Typically within ± 0.1% (800-1010 kg/m³)
Calculations: Density in kg/m³at 15°C in vacuo, centiPoise to centiStokes, CCAI - Calculated Carbon Aromaticity Index
Correlation: ASTM D1298 IP160
Dimensions: 18 cm x 23 cm x 10 cm
Power: 110/240 VAC (auto selected)
Range: 800 to 1010 kg/m³ @ 15°C
Temperature: 50°C and 70°C
Test Time: Heating from 15°C 10 mins, Repeat test maximum 30 seconds
Weight: 2.20 kg

Pour Point Tester

- Pour point is the lowest temperature at which movement of the oil is observed
- Suitable for industrial, educational, scientific use.
- Water Resistant
- Switches between ˚C and ˚F.
- Range: -10˚C to +200˚C and +14˚F to +392˚F

Features :

✓ 110mm Stainless steel probe
✓ Long life battery included

Vibration Analyzer (VA -12)

Specification

Piezoelectric Accelerometer with curled cable Measuring Range:

Acceleration: 0.02 to 141.1 m/s^2 (rms) continuous measurement (1Hz to 5 KHz)

Instantaneous Max. Acceleration: 700 m/s^2

Velocity: 0.02 to 141.1 m/s^2 (rms) at 159.15Hz

Displacement: 0.02 to 40 mm (EQP-P)at 15.915 Hz

Measurement Frequency Range

Acceleration: 1Hz to 20 KHz

Velocity: 3Hz to 3KHz

Displacement: 3Hz to 500Hz

Display: Color TFT LCD Display

Memory: SD Cards

Store Files: Store upto 1000 data.

Wave File: upto 10 sec per file

Ultrasonic Flaw Detector (FD 350)

Frequency range	0.5 MHz to 12 MHz
Vertical linearity	+ 2%
Gain	140 dB
Gain control	80 dB in Steps of 2 dB + 6 dB stepless
Depth range	Upto 5 mtrs in steel
Delay	3 mtrs of steel
Ranges provided	1,5,10,50,100 cms with a multiplying factor of 5
Time base linearity	Better than 1%
PRF	Variable from 1 KHz to 125 Hz interlinked with range
Display	70 x 55 mm
Operating temperature	40C to 60C

Hot Ferrography of sliding Pairs setup

Consultancy Projects Completed

Sr. No.	Year	Title of Consultancy Project	Agency
1	2010-11	FMEA and Reliability Analysis of Transport – Cum-Tilting (TCT) 2 Vehicle	VRDE Ahmednagar
2	2011-12	Reliability , Safety and Hazard Analysis for Air Storage System ‘Aditya’	Research and Development Establishment, Dighi, Pune-
3	2011-12	FMEA and Reliability Analysis of Transport – Cum-Tilting (TCT) 5 Vehicle	VRDE Ahmednagar
4	2013-14	Quantitative Risk Assessment and Determination of Life of TCT Vehicle Before and After Operation	VRDE Ahmednagar
5	2014-15	Reliability Assessment of UGV Vehicle	VRDE Ahmednagar
6	2015-2016	Reliability Analysis of CPCI Controllers TCT -4 Vehicles	VRDE Ahmednagar
7	2020-21	Reliability Estimation of Close In Weapon System (CIWS)	Bharat Forge Limited Pune
8	2020-22	FMEA and Reliability Analysis of Mounted Gun System (MGS)	VRDE Ahmednagar

Training/STTP Conducted

Organization	Course Details	Date
Vehicle Research Development Establishment, Ahmednagar DRDO	CAPSULE COURSE FOR SCIENTISTS	24 May 2013
Research & Development Engrs. DRDO	CEP for R& DE Engineers	28th August 2013
College of Engineering, Pune	STTP on " Six Sigma"	24th February 2017
College of Engineering, Pune	STTP on " Excellence in Maintenance Engineering"	4th March 2017
ARAI Academy Pune	Proficiency Improvement Programme on "Design and Analysis of Experiments "	19th April 2017
ARAI Academy Pune	Proficiency Improvement Programme on "Product Design & Life Cycle Management"	22nd June 2017
ARAI Academy Pune	Proficiency Improvement Programme on "Quality & Reliability Engineering"	5th October 2017
C.Q.A Pune	Training on Quality & Reliability Engineering	21/7/2021
C.Q.A Pune	Training on Quality & Reliability Engineering	21/2/2023

Product Design & Development.

Facilities and expertise offered:

- **Product Design and Development**
- **Biomedical device development**
- **Product conceptualization**
- **Product design**
- **Product prototyping and testing**
- **Design Thinking approach**

Contact-

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- Dr. J.S. Karajagikar- 020-25507361 E-mail: jsk.mfg@coeptech.ac.in

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Asst. Professor, Dept. of Manufacturing Engineering and Industrial M

College of Engineering Pune

ssa.mfg@coeptech.ac.in Office-+9120 2550 7364 Mob-900703481

Major Research Contributions:

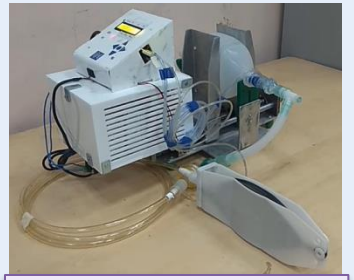
- **Micro Machining:** Design and Development of 3-axis CNC Meso/Micro machining set-up for Electrochemical Micromachining as well as Tool Based Micro-milling (Feature size accuracy up to 0.005 MM)

- **Biomedical Device Development:** Product development of medical devices

Problem Stat. → Ideation → POC → Prototype → Testing

ETT Obstruction detection Device
(technology Transferred to M/s Atmen Technovention Pvt Ltd.)

Skin Spray Gun
(technology Transferred to M/s Pacify Medical Pvt Ltd.)



Portable Mechanical Ventilator

Hand rehabilitation Device for Burn patients

Dr. Jayant S. Karajagikar
Asst. Professor
Manufacturing Engineering and Industrial Management Department
College of Engineering, Pune-411005.
Phone: 020-25507361 E-mail: jsk.prod@coep.ac.in

Major Areas of Research:

- Industrial Engineering: Method Study, Work study, and Work measurement, Facility planning
- Maintenance Engineering: Condition Based Maintenance (CBM) and Reliability Base Maintenance (RCM) study (Ferrography- DRF, Wear debris analysis, Morphological Analysis, Vibration Analysis)
- Product design and development: Concept development
- Automotive comfort study

•CBM & RCM based acceleration, Temp. and Noise measurement Device

Metrology, Measurements & Quality Control

Field of expertise

- Conventional Manufacturing
- Metrology
- Welding, Joining
- Quality Control
- Process Analysis and Optimization

Contact-

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- Mr. S. U. Ghunage 020-25507707 Email- sug.mfg@coeptech.ac.in

Metrology Lab: Facilities available

3D coordinate Measuring Machine

Hexagon make 3D scanning & Measurement arm

Metrology Lab: Facilities offered

Sr.No	Equipment
1	Profile projector
2	Counturograph
3	Floating Carriage Diameter Machine
4	3D coordinate Measuring Machine
5	Slip gauge Set
6	Surface Roughness Tester
7	Angle Dekkor
8	Articulated Arm
9	Atomic Force Microscope
10	Tool Dynamometer
11	Micro hardness Tester
12	Vision Measuring System

Metrology Lab: Facilities offered

Sr.No	Equipment
13	Tool makers microscope
14	Autocollimator
15	Monochromatic light source
16	Laser Scan Micrometer
17	Digital Height Gauge
18	Digital Comparator
19	Surface roughness tester Sj410
20	Surface roughness tester Sj201P
21	Laser Interferometer
22	2D Height Gauge

Industry Engagement / Interest areas:

- Low cost MEASUREMENT AND ANLYSIS solutions for MSME
- Quality Control and Process Optimization solutions
- On site Inspection and Quality Audit
- Design and Development of custom made special purpose tools/systems for company specific applications.
- Inhouse/Onsite training for engineers and managers on Metrology and Quality control, six sigma etc.

Dr. Prakash D. Pantawane

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https://www.coep.org.in/mycoep/pdpantawaneprodcoepacin

Major Areas of Research:

- Manufacturing Engineering
- Metrology
- Quality Control and Six Sigma

Mr. S. Ghunage
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020-25507707,Email: sug.mfg@coeptech.ac.in

Major Areas of Research:

- Welding and Joining Processes
- Manufacturing Systems Engineering
- Quality Assessment and optimization

Advanced Manufacturing

Group Offerings

1. Conventional Machining solutions (Development jobs)
2. CNC programming and machining skill based courses
3. CNC Turning and Milling solutions (Development Jobs)
4. CNC Routing
5. EDM die sinking
6. MicroEDM
7. MicroTurning
8. Micro ECM
9. Soft Prototyping

The Team

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Dr. P.D. Pantawane 020-25507711 Email pdpantawane.mfg@coeptech.ac.in

Facilities

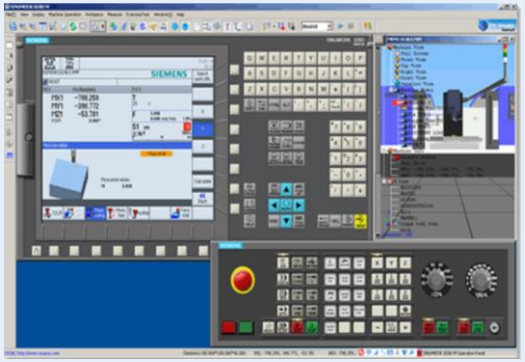
PVM-60 VMC

CNC Turning

Micromachining system

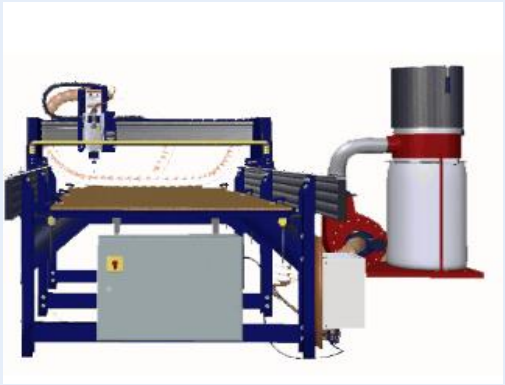
For Micro turning, Micro Laser machining, MicroEDM

Conventional Machine shop

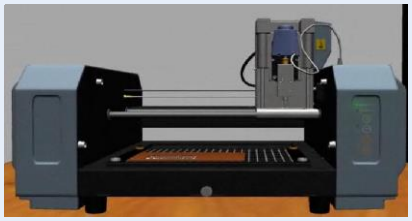


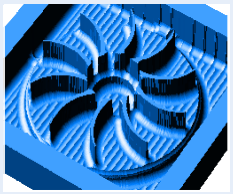
CNC Simulation software

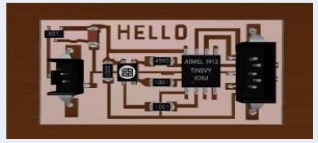
Facilities@ Digital fabrication Lab



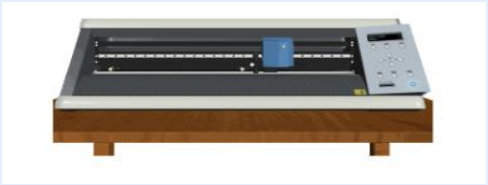
CNC Wood Router



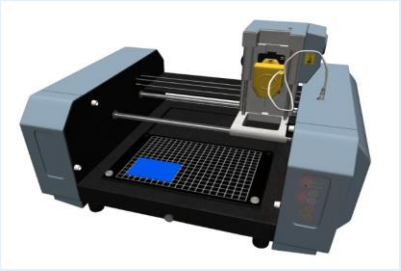




3D Machining PCB design & fabrication



Digital Fabrication of Flexible Circuit board

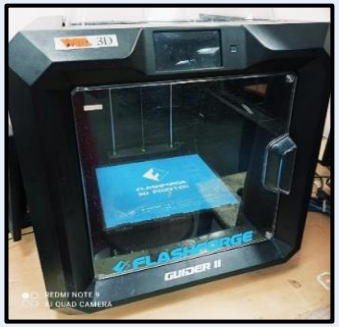


3D scanning

Molding and casting of polyurethane parts

120 W CO_2 Laser Cutter & Engraver

Advanced Electronics Workbench



3D Printer

Mini Lathe

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Major Area of Research:

- CAD-CAM
- Manufacturing Engineering
- Workshop Technology
- Maintenance Management

Research Contributions:

- **Testing of fabricated structures**
- **Inspection & Quality checking**

Thank You!