SREE VIDYANIKETHAN ENGINEERING COLLEGE

(AUTONOMOUS)

Sree Sainath Nagar, Tirupati – 517 102, A.P.

DEPARTMENT OF MECHANICAL ENGINEERING

❖ **Research laboratories**

Micro Machining Research Centre

The Micromachining Research Centre in the Department of Mechanical Engineering at Sree Vidyanikethan Engineering College, Tirupati draws upon expertise from academic faculty and interdisciplinary collaborative research and development group. With wide range of state-of-art high technology equipment and supported by specialist technicians/faculty of the department provides a unique opportunity to carry out activities from concept generation, simulation, micromachining extended to industrial applications and students/faculty research. The micromachining research centre facilities are continuously being enhanced to cater the ever expanding academic and research needs.

There has been a rapid growth in the development of harder and difficult-to-machine metals, composites and alloys during the last two decades. Conventional edged tool machining to micro level is uneconomical for such materials and degree of accuracy, surface finish attainable is poor. The micro scale manufacturing poses unique challenges with respect to machine tool design, development and the process dynamics. Micro systems find wide applications in bio-medical electronics, optics, micro-mechanics, micro fluidics, dies, moulds etc. Component parts used in these systems have feature dimensions in micrometers and part volumes less than $1mm^3$. Manufacture of these miniature components with high accuracy is a challenge.

The research centre is equipped with the latest technology incorporated micro machines, attachments and accessories to support production activities. The major equipment includes:

1. Electro Discharge Machine (EDM)
2. Wirecut EDM,

OBJECTIVES

- To perform feasibility study of modeling material removal processes (machining) at the micro level and to explore diverse areas of micro technology with the aim of identifying potential applications of interest.

- To machine alloys, composites at micron level surface finish on Wire Cut EDM.
- To provide solutions and technology transfer to support manufacturing industries.
- To design and implement a complete solution for an inline topography measurement and analysis for monitoring before, during and after the micro machining.

Figure: Inside view of Micromachining research center

a) Micro wire EDM (Make: CONCORD United Products, Bangalore)

Details of Micro wire EDM

Generic Name of Equipment	Model & Make	Year of purchase	Cost of the Equipment
Wirecut - Electro Discharge Machine (WEDM)	DK 7732 & Concord	2018	11,98,000.00

Figure: Micro wire EDM

Specification of the Machine	
• Table Travel X,Y Axis (mm)	: 250 x 320
• Work Table Size L x W (mm)	: 380 x 525
• Maximum Work Piece Thickness	: 300 (mm)
• Maximum Taper / 100 mm Thickness	: ±3° (Standard)
• Maximum Work Piece Weight (kgs)	: 300
• Machine Weight (kgs)	: 1600

Standard Features

- Maximum Speed : 80mm^2/Min
- Machining accuracy : 0.01mm
- Best Surface Finish : Ra 1.25 to 1.75
- BMXP pm-k system software controller works on Windows 7 operating platform

- Inbuilt database for cutting different materials.
- Coolant filtering system - Fine stainless steel wire mesh for coolant filter
- No need to change wire guide for different diameters
- Two axis DRO (Std.)
- 4-Axes synthesizer to cut different profiles at top and bottom
- Auto center and auto stop at the end of the job

b) IM7530 Trinocular Inverted bright field/Dark field metallurgical microscope

The Meiji Techno IM7500 Series Inverted Bright field/Dark field and simple Polarizing 12V/ 50W Metallurgical Microscope have an ergonomic slim triangular shaped design that saves bench space to maximize efficiency and offers ultimate stability with its cast aluminum alloy frame. This is the most rugged Inverted Microscope from Japan. Infinity Corrected Plan Semi Apo BD 5X, 10X, 20X and LWD 50X objectives are standard in all units. An integrated Incident High power 12V/50W vertical Koehler Halogen illuminator with variable intensity control and automatic voltage sensing power supply provides excellent specimen illumination and contrast. The 50W illuminator affords a brighter image as of a competitive 12V 100W system, reducing power consumption by almost 50 percent.

SPECIFICATIONS

Model	**:**	IM7530
Head	**:**	Ergonomic Trinocular
Type	**:**	Bright field/Dark field
Illumination	**:**	Koehler Vertical 12 volt 50 watt halogen
Eyepieces	**:**	SWH10x FN22
Objectives	**:**	Planachromat BD E5X,BDE10X, BDE20X, BDLWD E50X,E100X
Stage	**:**	Fixed mechanical 224mm(x) X 174mm(y)
Manufactured	**:**	100% Made in Japan.

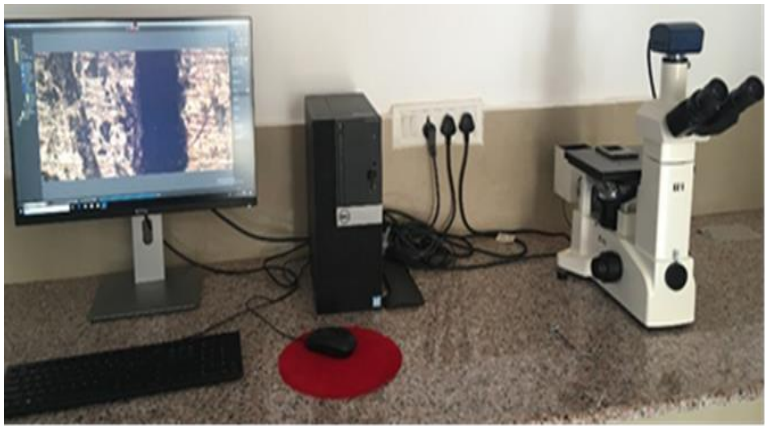

Figure: Metallurgical microscope

Details of Metallurgical microscope

Generic Name of Equipment	Model & Make	Year of purchase	Cost of the Equipment
Inverted Metallurgical Microscope	IM7530 & Meiji (Japan)	2018	13,00,000.00