A Report

on

"Two Weeks Faculty Internship Program

at

ACE Designers Limited"

during

06.04.2026 to 18.04.2026

Submitted by

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(An Autonomous Institution under VTU, approved by AICTE, Accredited by NBA (CSE & ECE), NAAC with A+ Grade)

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Dr. Saleem Khan,
Assistant professor

Prof. Ajith Gopal Joshi,
Assistant professor

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Training Schedule

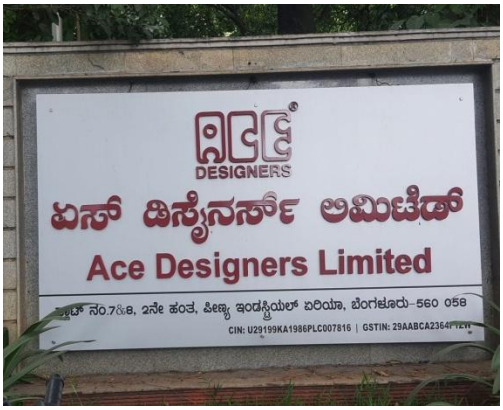
Day	Date	Venue	Department Visited	Key person of Interaction
MONDAY	06-04-2026	Machining Centre Division (MCD)	TSG (Marketing)	Mr. Sunil Senior Marketing Executive
TUESDAY	07-04-2026		Design and Development	Mr. Raghu B HOD
WEDNESDAY	08-04-2026		PPC	Mr. Bhaskar M S Senior Executive
THURSDAY	09-04-2026		SCM	Mr. Mahadevprasad R Senior Manager
FRIDAY	10-04-2026		Stores	Mr. Sudhakar K M Manager
SATURDAY	11-04-2026		Assembly	Mr. Nagaraj Bhat
SUNDAY	12-04-2026			
MONDAY	13-04-2026	TCD	5010 Assembly and Electrical	Mr. Nagendra Babu, Mr. Umesh Badigar, Mr. Rajesh, Mr. Purushottam
TUESDAY	14-04-2026		5010 Painting	Mr. Harish
WEDNESDAY	15-04-2026		5010 Quality	Mr. Rajagopal/ Mr. Nanda,
THURSDAY	16-04-2026		5010 CMD	Mr. Mahalingaiah, Mr. Thippeswamy
FRIDAY	17-04-2026		3010 Foundry	Mr. Narayana Naik
SATURDAY	18-04-2026		IFA 533	Mr. Kishan Daas

OBJECTIVES OF FACULTY INTERNSHIP

- To bridge the gap between industry and academia through contextual teaching pedagogy with the help of gained knowledge during internship.
- For identifying current technology that will be required for students in today's workplace.
- Collecting data from practical situations that can be used to develop relevant assignment material for students.
- Adapting industry standard technology into the present curriculum.
- Understanding the organization's culture, various project management approaches, such as Agile or Lean, and business ethics in today's workplace.
- To gain the knowledge, which will help to advice the students with relevant career counseling based on personal knowledge of today's hiring environment.

ACE DESIGNERS LIMITED

Introduction About The Company



Ace Designers was established in 1979 as a design consulting firm by a group of three experienced design engineers. Over time, it has grown into one of India's leading machine tool manufacturing companies, supported by a skilled workforce of more than 900 employees. The company operates from manufacturing facilities in Bengaluru, spread across over 50,000 square meters and equipped with advanced, state-of-the-art technology to ensure high-quality, large-scale production.

In its early years, the company focused on designing products for various machine tools, including special-purpose machines. By 1982, Ace Designers entered the manufacturing sector, producing import-substitution machines for the internal combustion (I.C.) engine valve industry. Since then, the company has experienced rapid growth and has emerged as India's largest manufacturer of CNC turning centers, maintaining a leadership position for nearly two decades.

With a strong emphasis on CNC turning center manufacturing, Ace Designers has developed a broad range of cost-effective, indigenously designed products tailored to meet evolving customer requirements. The company maintains high standards of product quality through well-structured manufacturing processes and world-class infrastructure.

Ace Designers has played a significant role in the growth of India's industrial sector, and its machines are now widely accepted in global markets, including Europe, the United States, South America, the United Kingdom, the Middle East, China, Southeast Asia, Japan, and Australia.

Over the years, the company has also collaborated with and co-founded several organizations, contributing to the formation of the Ace Micromatic Group, which is recognized as India's largest machine tool manufacturing conglomerate.

In the late 1990s, Ace introduced its highly successful product, the "Jobber." This machine was developed as part of a strategic initiative to create demand for standardized, competitively priced CNC turning centers at a time when the industry primarily focused on customized solutions.

Company Profile

Name: Ace Designers Limited
Location: Peenya Industrial Area, Bengaluru
Established: 1979 (as design firm), incorporated in 1986
Industry: Machinery Manufacturing (CNC Machine Tools)

Ace Designers is the flagship company of the Ace Micromatic Group and is one of India's largest manufacturers of CNC turning centers.

Key Highlights

- Over 65,000+ machine installations worldwide
- Presence in 25+ countries
- Strong R&D and in-house product development
- ISO-certified manufacturing systems

Vision, Mission and Objectives of Organization

Vision

To be a global leader in machine tool manufacturing through innovation and quality.

Mission

- Deliver high-performance CNC machines
- Provide cost-effective automation solutions
- Ensure customer satisfaction through quality and service

Objectives

- Expand global market presence
- Improve manufacturing efficiency
- Develop advanced automation solutions

Products and Services

Ace Designers specializes in:

- CNC Turning Centers
- CNC Turn-Mill Centers
- Vertical Turning Lathes
- Automation and Robotic Solutions
- Special Purpose Machines

The company caters to industries like:

- Automotive
- Aerospace
- Electronics
- Medical equipment

Organizational Structure

The company follows a hierarchical organizational structure:

- Top Management (Directors & MD)
- Middle Management (Department Heads)
- Supervisors
- Technicians & Workers

Key departments include:

- Design & R&D
- Production
- Quality Control
- Sales & Marketing
- Human Resources

Manufacturing Process

The production process at Ace Designers involves:

1. **Design & Engineering**
    - CAD modeling and product design
2. **Material Procurement**
    - High-quality raw materials sourced
3. **Machining & Fabrication**
    - CNC machining, casting, and assembly
4. **Assembly Line Production**
    - Conveyor-based assembly system
5. **Quality Testing**
    - Rigorous inspection and testing
6. **Final Delivery**

Internship Activities

During the internship, the following activities were undertaken:

- Observed CNC machine operations
- Learned about production planning
- Studied quality control techniques
- Understood assembly line processes
- Assisted in documentation and reporting

Skills Gained

- Basic understanding of CNC machines
- Industrial safety practices
- Teamwork and communication
- Problem-solving in manufacturing

ACE DESIGNERS LIMITED: MACHINING CENTRE DIVISION

(Previously known as AMS (Ace Manufacturing Systems Ltd.))

• Introduction

ACE Machining Centre Division (previously known as AMS (Ace Manufacturing Systems Ltd.)) is a prominent Indian manufacturer of CNC machine tools and advanced machining solutions. Established in 1994, it operates as a key division of the Ace Micromatic Group, India's largest machine tool conglomerate.

ACE MCD specializes in designing and manufacturing a wide variety of advanced milling and machining centers, including

- Vertical & Horizontal Machining Centers (VMC & HMC)
- Drill Tap Machining Centers
- Twin Spindle & 5-Axis VMCs
- Turnkey, tooled-up, and customized manufacturing solutions

The plant unit at Bengaluru consist of following main departments:

- ✓ Technical Service Group (TSG)
- ✓ Design and Development
- ✓ Production Planning and Control (PPC)
- ✓ Supply Chain Management (SCM)
- ✓ Stores
- ✓ Assembly

- **Technical Service Group (TSG) Department**

The Technical Service Group (TSG) at Ace Designers plays a crucial role in ensuring customer satisfaction and machine performance after installation. This department acts as a bridge between the company and its customers by providing technical support, maintenance, and troubleshooting services.

TSG is primarily responsible for the installation and commissioning of CNC machines at customer sites, ensuring that machines are set up correctly and operate efficiently from the beginning. It also handles preventive and breakdown maintenance, minimizing machine downtime and improving productivity for customers.

Another key function of TSG is troubleshooting technical issues**,** including mechanical, electrical, and software-related problems in CNC systems. The team works closely with the production and design departments to identify recurring issues and suggest improvements.

TSG also provides training to customers and machine operators**,** helping them understand machine operations, safety practices, and basic maintenance procedures. This enhances machine life and operational efficiency.

Additionally, the department manages spare parts support and service **coordination**, ensuring timely availability of components and quick resolution of service requests.

Overall, the Technical Service Group is essential for maintaining product reliability, strengthening customer relationships, and supporting the company’s reputation in the CNC machine tools industry.

- **Design and Development Department**

The Design and Development (D&D) department at Ace Designers is the core unit responsible for innovation, product design, and technological advancement. This department plays a vital role in developing new CNC machine tools and continuously improving existing products to meet evolving industry requirements.

The primary function of D&D is product design and engineering, where engineers create detailed designs of CNC turning centers using advanced CAD and simulation software. They focus on achieving high precision, reliability, and cost-effectiveness in every machine.

Another important responsibility is research and innovation**.** The team works on developing new technologies, improving machine performance, and integrating automation features to enhance productivity and efficiency.

The department also conducts prototype development and testing**,** where new machine models are built and rigorously tested to ensure they meet quality standards and customer expectations before full-scale production.

Additionally, D&D collaborates closely with other departments such as production, quality control, and Technical Service Group (TSG) to resolve design issues, incorporate feedback, and ensure smooth manufacturing and field performance.

Overall, the Design and Development department is essential for driving product innovation, maintaining competitive advantage, and ensuring that Ace Designers delivers high-quality, technologically advanced CNC machines.

- **Production Planning and Control (PPC) Department**

The Production Planning and Control (PPC) department at Ace Designers is responsible for managing and coordinating the entire manufacturing process to ensure timely and efficient production of CNC machines. It plays a key role in balancing demand, resources, and production capacity.

The primary function of PPC is production planning, which involves preparing schedules based on customer orders, delivery timelines, and available resources. This ensures that production targets are met without delays.

Another important responsibility is material planning and inventory control**.** PPC ensures that the required raw materials and components are available at the right time, avoiding shortages or excess inventory that could affect production flow.

The department also handles production control and monitoring**,** tracking the progress of manufacturing activities on the shop floor. It identifies bottlenecks, delays, or inefficiencies and takes corrective actions to maintain smooth operations.

PPC coordinates closely with departments like procurement, production, quality control, and design to ensure proper workflow and communication across all stages of manufacturing.

Additionally, it focuses on capacity planning and resource utilization**,** ensuring optimal use of machines, manpower, and time to improve productivity and reduce costs.

Overall, the PPC department is essential for maintaining production efficiency, meeting delivery commitments, and ensuring the smooth functioning of manufacturing operations.

- ## Supply Chain Management (SCM) Department

The Supply Chain Management (SCM) department at Ace Designers is responsible for managing the flow of materials, information, and resources from suppliers to the manufacturing unit and finally to customers. It ensures that the right materials are available at the right time, in the right quantity, and at optimal cost.

A key function of SCM is procurement and sourcing, where the department identifies reliable vendors and purchases high-quality raw materials, components, and equipment required for production. It also focuses on maintaining strong relationships with suppliers to ensure consistency and reliability.

SCM also handles logistics and transportation, coordinating the movement of materials to the factory and the delivery of finished CNC machines to customers. Efficient logistics planning helps reduce delays and transportation costs.

Another important responsibility is inventory management**,** where the department monitors stock levels to avoid shortages or excess inventory. This helps in maintaining a smooth production flow and minimizing holding costs.

The department works closely with Production Planning and Control (PPC), production, and stores to align supply with production schedules and demand forecasts. It also plays a role in **cost** optimization by negotiating with suppliers and improving supply chain efficiency.

Overall, the SCM department is vital for ensuring uninterrupted production, reducing operational costs, and supporting timely delivery of products to customers.

- **Stores Department**

The Stores Department at Ace Designers is responsible for the safe handling, storage, and management of all raw materials, components, and finished goods within the organization. It plays a critical role in supporting smooth production operations by ensuring material availability and proper inventory control.

One of its primary functions is receiving and inspection of materials**.** All incoming materials from suppliers are checked against purchase orders and inspected for quality before being accepted into the store.

The department is also responsible for proper storage and preservation of materials. Items are systematically arranged, labeled, and stored under suitable conditions to prevent damage, loss, or deterioration.

Another key activity is inventory management**,** where stock levels are monitored and recorded. The stores team maintains accurate records of material inflow and outflow, helping avoid shortages or overstocking.

The Stores Department handles material issue and distribution, supplying required components to the production department as per the schedule provided by PPC. This ensures uninterrupted manufacturing processes.

It also conducts stock verification and audits at regular intervals to maintain accuracy and accountability.

Overall, the Stores Department ensures efficient material handling, minimizes wastage, and supports timely production by maintaining a well-organized and controlled inventory system.

- **Assembly Department**

The Assembly Department at Ace Designers is responsible for putting together various machined and purchased components to build complete CNC machines. It is a critical stage in the manufacturing process where individual parts are transformed into fully functional products.

The primary function of this department is machine assembly, which includes fitting mechanical structures, installing sub-assemblies, and integrating electrical and electronic systems such as CNC controllers, drives, and wiring.

The department follows standard assembly procedures and layouts to ensure accuracy, consistency, and efficiency. Each stage of assembly is carried out as per detailed engineering drawings and specifications provided by the Design and Development team.

Another important responsibility is alignment and calibration. Precision is crucial in CNC machines, so components are carefully aligned and adjusted to achieve high accuracy and smooth operation.

The Assembly Department also works closely with quality control, where inspections and tests are conducted during and after assembly to ensure the machine meets required standards.

Additionally, the department coordinates with Production Planning and Control (PPC) to meet production targets and delivery schedules.

Overall, the Assembly Department plays a vital role in ensuring that the final product is reliable, precise, and ready for testing, delivery, and installation at customer sites.

ACE DESIGNERS LIMITED, THYAMAGONDLU PLANT, BENGALURU

Introduction

The Thyamagondlu plant is a major manufacturing facility of Ace Designers Ltd**,** located at Minnapura / Govenahalli village, Nelamangala Taluk (Bangalore Rural)**.** It is commonly called the HVM (High Volume Manufacturing) plant**.**

ACE designers Limited, Thyamagondlu plant, Bengaluru consist of following main departments:

- ✓ 5010 Assembly and Electrical Department
- ✓ 5010 Painting Department
- ✓ 5010 Quality Department
- ✓ 5010 Component Manufacturing Division.(CMD) Department
- ✓ 3010 Foundry Department

Assembly Department

The assembly department is the core production area where CNC machines are physically built using a flow-line (conveyor-based) system, similar to automobile manufacturing.

Key activities:

- **Machine build-up:** Starts with the machine base (cast iron bed) and gradually adds components
- **Sub-assemblies:**
  - Mechanical parts (spindle, turret, slides)
  - Hydraulic and lubrication systems
- **Guarding assembly:** Installation of covers, doors, and safety enclosures
- **Line-based production:** Machines move station-by-station for efficient high-volume output

Electrical Department

The electrical department works alongside assembly and handles all electrical integration and control systems of the CNC machines.

Key activities:

- ✓ **Complete Wiring of Machines**
  - Motors, sensors, switches, lubrication units, coolant systems
- ✓ **CNC Controller Installation**
  - The controller acts as the "brain" of the machine
- ✓ **Panel & Cable Management**
  - Proper routing, labeling, and color coding of wires
- ✓ **Electrical Testing & Debugging**
  - Ensures correct connections and safety before machine trials

Painting Department

The painting department is responsible for surface finishing and protection of CNC machine components before final assembly and dispatch.

Purpose

- Protect machine parts from corrosion, coolant, and environmental damage
- Improve appearance and brand finish
- Ensure long-term durability of machines used in industrial conditions

Process Flow

1. **Surface Preparation**
   - Cleaning (degreasing, washing)
   - Removal of oil, rust, and dust
   - Sometimes shot blasting / sanding for better adhesion

2. **Pre-treatment**
    - Chemical treatment (like phosphating)
    - Improves paint bonding and corrosion resistance
3. **Primer Coating**
    - Anti-rust primer applied as base layer
4. **Top Coat Painting**
    - Final color coat (typically industrial-grade paints)
    - Applied using spray painting booths
5. **Drying / Curing**
    - Oven drying or air drying
    - Ensures strong, uniform coating

Quality Department

The Quality Department at ACE designers ensures that every CNC machine and component meets design specifications, accuracy standards, and customer requirements before dispatch. The Main Objective is to Maintain high precision and reliability of CNC machines, Detect defects early and prevent rework, Ensure consistent product quality across high-volume production.

Component Manufacturing Division (CMD) Department

The CMD is the core machining division at ACE designers, where raw castings and materials are converted into precision components used in CNC machines. The main Purpose of the department is to produce high-accuracy mechanical parts required for CNC machines, Ensure components meet tight tolerances and quality standards and Support high-volume production with consistent output. The Component Manufacturing Division (CMD) is responsible for precision machining of all major CNC machine parts**,** ensuring they meet required tolerances before moving to assembly.

Foundry Department

The Foundry Department at ACE designers is where raw metal is melted and cast into machine components, forming the base structure of CNC machines. The main Purpose of this department is to produce high-quality cast iron components, Provide strong, vibration-resistant bases for CNC machines, and ensure consistent material properties for machining in CMD.

The process flow of foundry department is:

1. Pattern Making
2.Moulding
3.Melting
4. Pouring
5. Cooling & shakeout
6. Fettling and cleaning
7. Inspection.

ACE DESIGNERS LIMITED, IFA 533 PEENYA PLANT-2, BENGALURU

Introduction

The IFA 533 plant is one of the key manufacturing units of Ace Designers Limited, located at: Plot No. 533, 10th Main Road, 4th Phase, Peenya Industrial Area, Bengaluru – 560058. It is part of the company's core Peenya industrial cluster, which houses multiple divisions and the company headquarters. It is internally known as the HVM / IFA (Integrated Factory Assembly) unit. It Focuses on Assembly of CNC turning centres (lathes), Machine tool manufacturing and integration, Testing and quality checks before dispatch, Supports high-volume production using flow-line assembly systems.

Key Areas Suggested by Industry Expert to Train the Students

Based on the various inputs like interview feedback, interns' performance, etc., gaps in the following key area were identified by the experts from ACE Designers Pvt. Ltd. Bengaluru, hence suggested to train the students on the same to make them ready for interviews.

Sl. No.	Key Area
1	Manufacturing process required for the component
2	Understanding and visualization of component views
3	Drafting Conventions
4	Estimation and Costing
5	Different types of material
6	Different type of standard material size and shapes available in market
7	Different type of Heat treatment process, its purpose and usage
8	Basic Fundamental like Volume, Surface area, Stress strain diagram, material strength etc...
9	Design of machine element in detail understanding and its usage
10	Part Numbering, BOM, ERP knowledge
11	How industry work in different domine(IT/machine Tool/Process/Food etc..)
12	How a department in a industry works(Design/mkt/Quality/Service etc..)
13	individual department working details.
14	Individual growth in a industries with respect to capability,performance,carrier growth..
15	Standard parts available(Catlogue Products like fastners,Bearing, Cylinders…)
16	Electrical Component understanding
17	Electrical Equipment understanding
18	Exposure on advance technology like CNC,Servo,FEA, Automation, Robots Etc…
19	Asthetic,Egronomics Minimum knowledge
20	Sheet metal knowledge(Raw material availability, Forms, Usage)
21	Surface finish, Surface production knowledge, Process,Usage, purpose

22	Raw material knowledge(Steel, Cast steel, Alloy Steel, Aluminium, HRCS, CRCSA)
23	Reading Capability of 2D drawing
24	Visualization of the component
25	Shop Floor Visit to understand the assembly process
26	Should have basic knowledge on the Machine Tool Industry
27	Drawing understanding capability
28	Should have basic knowledge on the Mechatronics
29	Should not have a mindset of software work environment
30	Understanding of 3D drawing
31	Material Selection
32	Basic Calculations covering stress strain, deflection, force transmission, Cutting force, etc.,
33	Knowledge on Casting/Forging
34	Team Work
35	Basic Simulation
36	2D drawing Creation
37	Basic knowledge on GD&T
38	Mechanical Engineer Mindset with respect to industry domain
39	Part model creation in any modelling software
40	Projection angle
41	Understanding of BOM
42	Process of making 3D Part model
43	Process of making Assembly Model
44	Understanding of Sectional View in 2D Drawing
45	Basic Difference of Part drawing and Assembly Drawing
46	Understanding of Basic Symbols used in Circuits(Hyd,Pneumatic.Electrical)
47	Importance of Machining symbols in drawing
48	Basic knowledge on Cutting tools

KEY LEARNING

- The process flow in the AMS, starting from the customer order to the dispatch of machine
- Production process involved in different types of machines i.e., standard machine production and design & production of machines based on the requirement, as well as customer order.
- The necessity and criticality involved in alignment of each component during assembly.
- The challenge and laborious job involved in scrapping during alignment of components.
- The significance of micro-metrology in the production of machines.
- Exposure to the advanced metrology systems like laser and ball bar calibration/testing.
- Exposure to ball screw application, no-bake casting, flow line loop casting systems
- Exposure to Semi-automatic painting process which involves, pre-processing, painting and post-processing stage.
- Exposure to Quality analysis using CMM, surface metrology, etc.
- Exposure to stages, color coding and job sheet in each sub-station of assembly line.
- Exposure to 4 hr and 8 hr assembly line, which illustrates the concept of FMS in assembly process for the production of standard machines. Also, application of lean and agile manufacturing systems concepts in implementation of Industry 4.0.
- Understood the importance and application of GD&T concepts, strong fundamental mechanical engineering concepts, application of hydraulics and pneumatics in machine tools, accuracy and precision with the challenges involved in achieving the same.
- Understood the process in stores, SCM, PPC, marketing and design, subsequently the role of engineers in respective department.
- Scope for the improvement in quality of production and production rate through automation in each department.
- Necessary to understand and implementation of quality principles like KAIZEN, 5S, etc.
- Implementation of robots for automation in combination with regular machines.

OUTCOME OF INTERNSHIP

- The industry oriented technologies like no-bake casting, automated loop line casting process is recommended for inclusion in mechanical engineering curriculum of our institute.
- The detailed concepts of Industry 4.0 comprising automation process, agile, lean concepts and brief introduction to Industry 5.0 is recommended for including in manufacturing technology subject.
- Recommended the students to get trained on the use of Solidworks, SAP® or any other ERP software, GD&T as well as better understanding of engineering drawing with focus on symbols involved in it.
- As faculty interns, we were exposed to the application of engineering concepts which were taught during theory classes. It has tremendously helped us to deliver the same concepts in a better practical approach.
- Also, it has helped to learn new technologies in application oriented approach like robots on shop floor, store, and production systems.

FEW PHOTOS CAPTURED DURING INTERNSHIP