Winter Internship Program on CNC Turning and Milling-Jan 2025

Introduction: The Department of Mechanical Engineering is excited to announce a Winter Internship Program focusing on CNC Milling, CNC Turning. This program aims to provide students with hands-on experience in CNC Manufacturing, Practical training in operating CNC milling and turning machines, offering insights into precision manufacturing and machining processes.

A CNC Milling and Turning internship will provide an immersive experience in precision manufacturing. This internship will offer an excellent opportunity to gain hands-on experience in precision machining, combining theoretical knowledge with practical skills. This program will teach participants to operate CNC machines, program G-code, and apply quality assurance techniques to create high-precision components. This internship prepares individuals for successful careers in the fast-evolving manufacturing and engineering sectors. The program emphasizes practical skills in quality control, material handling, and troubleshooting, ensuring a well-rounded understanding of machining processes. By combining technical expertise with real-world application, this internship prepares individuals for rewarding careers in advanced manufacturing and engineering.

Internship objective:

The CNC Milling and Turning Internship aims to provide interns with a comprehensive understanding of CNC technology, including machine operation, programming (G-code and M-code), and setup. Interns will gain hands-on experience with both CNC milling and turning machines, learning to safely operate, calibrate, and troubleshoot the equipment. The program focuses on developing proficiency in writing and modifying CNC programs, using CNC simulation software, and performing quality control using precision measuring tools.

Outcomes:

By the end of this internship, the intern will gain a solid understanding of CNC turning and milling operations. They will become proficient in using CAD/CAM software to design and program CNC tool paths, select appropriate tools, set up fixtures, and ensure precision through quality control. The intern will also learn to write and optimize G-code, handle machine maintenance, and address common machining issues while adhering to safety protocols. This experience will equip them with the practical skills and problem-solving techniques needed for success in the manufacturing industry.

Benefits of the Internship:

This internship offers valuable hands-on experience with CNC turning and milling operations,

providing the intern with practical skills that are highly sought after in the manufacturing and engineering industries. The intern will gain proficiency in CAD/CAM software, CNC programming, and machine operation, enhancing their technical capabilities. Additionally, they will have the opportunity to network with professionals in the field, gaining insights into industry practices and career opportunities. Upon successful completion, the intern will receive a certificate, which will further bolster their resume and demonstrate their expertise in CNC machining to future employers.

Session Wise Program Details:

Week-1		Resource Persons
Module-1	**Introduction to CNC**	
Day 1 (20th Jan. 2025)	**CNC Introduction**	
Session-1	Overview of CNC Machining principles, Advantages, and applications in modern manufacturing. General safety and Maintenance	Dr. Farooq Ahmad Najar
Session-2	Comparison Of CNC Machining with conventional Machining techniques.	Dr. Suhail Ahmad Manroo
Day 2 (21th Jan. 2025)	**CNC Machine Components and Operations**	
Session-1	Understanding The Major Components Of CNC Machines: Spindle, tool changing , axis , etc	Dr. Suhail Ahmad Manroo
Session-2	Classification of tools, understanding basic terms like feed rate, tool load, offsets etc	Dr. Suhail Ahmad Manroo
Day 3 (22th Jan. 2025)	**Part Programming for CNC Turning Centre**	
Session-1	Introduction to CNC programming languages and formats. Understanding the Cartesian coordinate system	Dr. Summera Banday

	and machine zero, reference points and machine homing	
Session-2	Introduction to G-codes and M-codes	Ms. Sania Qadri
Day 4 (23th Jan. 2025)	**G-code and M-code Programming**	
Session-1	Writing and interpreting G-code commands for CNC machining operations. Utilizing M-codes for auxiliary functions such as tool changes, coolant control etc.	Dr. Summera Banday
Session-2	Understanding basic CNC operations, Facing, Contouring, Milling, Turning etc	Dr. Ishfaq Ahmad Maekai
Day 5 (24th Jan. 2025)	**CAD/CAM Software Usage**	
Session-1	Overview Of Computer-Aided Manufacturing Software like Fusion 360, Solid works etc	Dr. Ishfaq Ahmad Maekai
Session-2	Creating Tool Paths, Generating G codes And Simulating	Ms. Sania Qadri
Week-2		**Resource Person/s**
Module-2	**Introduction to CNC Programming**	
Day 1 (28th Jan. 2025)	**Part Programming for CNC Operations**	
Session-1	Understanding how to write a program in a CNC machine.	Ms. Sania Qadri
Session-2	Writing a simple program for a simple milling operation (Point to point Machining Along a straight line)	Dr. Shariq Ahmad Bhat

Day 2 (29th Jan. 2025)	**Part Programming for CNC Operations**	
Session-1	Coordinate system – absolute and incremental coordinate system	Dr. Summera Banday
Session-2	Program for cutter radius compensation Part	Dr. Shariq Ahmad Bhat
Day 3 (30th Jan. 2025)	**Part Programming for CNC Operations**	
Session-1	Program using subroutines	Dr. Ishfaq Amin Maekai
Session-2	Program using Do loops	Dr. Summera Banday
Day 4 (31th Jan. 2025)	**Part Programming for CNC Milling Operations**	
Session-1	Programing Grooving cycle, multiple turning cycle	Dr Suhail Ahmad Manroo
Session-2	Program using canned cycles for CNC Milling Machine	Dr Shariq Ahmad Bhat
Day 5 (3rd Feb. 2025)	**Part Programming for CNC Operations**	
Session-1	Program multiple Thread Cutting Operations	Dr. Ishfaq Amin
Session-2	Program Multiple facing cycle and Internal operation-drilling	Dr. Shariq Ahmad Bhat
Week 3		**Resource Persons**
Module-3	**Hands-on machining on vertical machining center**	
Day 1 (4th Feb. 2025)	**Hands on machining for VMC**	
Session-1	Hands-on Machining using Linear Interpolation	Er. Shoaib Ajaz/ Dr. Summera Banday
Session-2	Hands-on Machining using circular Interpolation	Er. Shoaib Ajaz
Day 2 (5th Feb. 2025)	**Hands-on machining for VMC**	
Session-1	Canned cycles for CNC Milling Machine- Drilling cycle	Ms. Sania Qadri
Session-2	Canned cycles for CNC Milling Machine-Deep hole	Dr. Suhail Ahmad Manroo

	Drilling Cycle (Peck Drilling Cycle)	
Day 3 (6th Feb. 2025)	**Hands-on machining for VMC**	
Session-1	Canned cycles for CNC Milling Machine- Boring cycle	Er. Shoaib Ajaz/Dr. Shariq Ahmad Bhat
Session-2	Canned cycles for CNC Milling Machine- Threading (Tapping) cycle	Er. Shoaib Ajaz
Day 4 (7th Feb. 2025)	**Hands-on Training on CNC Machine**	
Session-1	Hand-on pocket operation on CNC machine	Er. Shoaib Ajaz/ Dr. Ishfaq Amin Maekai
Session-2	Hands-on contouring operation.	Er. Shoaib Ajaz
Day 5 (10th Feb. 2025)	**Hands-on Training on CNC Machine**	
Session-1	design a part using cad/cam software	Er. Shoaib Ajaz/Ms Sania Qadri
Session-2	Generate and run gcode from cad/cam software	Er. Shoaib Ajaz
Week 4		**Resource Persons**
Module-4	**Hands-on machining on lathe machine**	
Day 1 (11th Feb. 2025)	**Hands-on Training on CNC lathe Machine**	
Session-1	Setting job offsets , homing and tool offsets etc	Er. Najeeb Shafi/ Ms. Sania Qadri
Session-2	Part programming Practice simple turning, Facing operations	Er. Shoaib Ajaz
Day 2 (12th Feb. 2025)	**Hands-on Training on CNC lathe Machine**	
Session-1	Part programming Practice step turning, taper turning operations	Er. Najeeb Shafi/ Dr. Ishfaq Amin Maekai
Session-2	part programing on thread cutting operation	Er. Shoaib Ajaz
Day 3 (13th Feb. 2025)	**Hands-on Training on CNC lathe Machine**	

Session-1	Hands-on Machining using Linear Interpolation	Er. Najeeb Shafi/ Dr. Summera Banday
Session-2	Hands-on Machining using circular Interpolation	Er. Najeeb Shafi
Day 4 (14th Feb. 2025)	**Hands-on Training on CNC lathe Machine**	
Session-1	Practicing grooving cycle and multiple turning cycle	Er. Najeeb Shafi/Dr. Shariq Ahmad Bhat
Session-2	hands on multiple facing cycle and internal operation-drilling	Er. Najeeb Shafi
Day 5 (17th Feb. 2025)	**Hands-on Training on CNC lathe Machine**	
Session-1	Canned cycle for turning on CNC Lathe	Er. Najeeb Shafi/ Dr. Suhail Ahmad Manroo
Session-2	Canned cycle for threading on CNC Lathe	Er. Najeeb Shafi

During the winter Internship Program **(Er. Sajad Lab Assistant)** shall provide/function as technical support throughout.

Sd/-
Coordinator
Dept. Mechanical Engineering