

ADVANCE MANUFACTURING LAB

- Advanced manufacturing involves the use of technology to improve products and/or processes, with the relevant technology being described as advanced, innovative, or cutting edge in virtual level.

The Virtual level of manufacturing deals with the technologies like CAM (Computer Aided Manufacturing), DM (Digital Manufacturing) and PLM (Product Lifecycle Management).

Software's Installed:

- SIEMENS NX-11.0(Including bundle of CAD, CAM)
- ROBCAD(DM)
- TECNOMATIX(DM)
- TEAMCENTER(PLM)

CAM(Computer-aided manufacturing):

Computer-aided manufacturing (CAM) is the use of software to control machine tools and related ones in the manufacturing of work pieces.

This is not the only definition for CAM, but it is the most common;

- ✓ CAM may also refer to the use of a computer to assist in all operations of a manufacturing plant, including planning, management, transportation and storage.
- ✓ Its primary purpose is to create a faster production process and components and tooling with more precise dimensions and material consistency, which in some cases, uses only the required amount of raw material (thus minimizing waste), while simultaneously reducing energy consumption.

CAM is a subsequent computer-aided process after computer-aided design (CAD) and sometimes computer-aided engineering (CAE), as the model generated in CAD and verified in CAE can be input into CAM software, which then controls the machine tool.

- ✓ Traditionally, CAM has been considered as a numerical control (NC) programming tool, where in two-dimensional (2-D) or three-dimensional (3-D) models of components generated in CAD.
- ✓ As with other “Computer-Aided” technologies, CAM does not eliminate the need for skilled professionals such as manufacturing engineers, NC programmers, or machinists.
- ✓ CAM, in fact, leverages both the value of the most skilled manufacturing professionals through advanced productivity tools, while building the skills of new professionals through visualization, simulation and optimization tools.

DM (Digital Manufacturing):

Digital Manufacturing is an integrated approach to manufacturing that is centered around a computer system. The transition to digital manufacturing has become more popular with the rise in the quantity and quality of computer systems in manufacturing plants.

- ✓ As more automated tools have become used in manufacturing plants it has become necessary to model, simulate, and analyze all of the machines, tooling, and input materials in order to optimize the manufacturing process.
- ✓ Overall, digital manufacturing can be seen sharing the same goals as computer-integrated manufacturing (CIM), flexible manufacturing, lean manufacturing, and design for manufacturability (DFM).

Three dimensional modeling:

Manufacturing engineers use 3D modeling software to design the tools and machinery necessary for their intended applications. The software allows them to design the factory floor layout and the production flow. This technique lets engineers analyze the current manufacturing processes and allows them to search for ways to increase efficiency in production before production even begins.

Simulation:

Simulation can be used to model and test a system's behavior. Simulation also provides engineers with a tool for inexpensive, fast, and secure analysis to test how changes in a system can affect the performance of that system.

These models can be classified into the following:

- Static - System of equations at a point in time
- Dynamic - System of equations that incorporate time as a variable
- Continuous - Dynamic model where time passes linearly
- Discrete - Dynamic model where time is separated into chunks
- Deterministic - Models where a unique solution is generated per a given input
- Stochastic - Models where a solution is generated utilizing probabilistic parameters

Applications of simulation can be assigned to:

- Product design (e.g. virtual reality)
- Process design (e.g. assisting in the design of manufacturing processes)
- Enterprise resource planning

PLM (Product Lifecycle Management):

In industry, product lifecycle management (PLM) is the process of managing the entire lifecycle of a product from inception, through engineering design and manufacture, to service and disposal of manufactured products.

PLM integrates people, data, processes and business systems and provides a product information backbone for companies and their extended enterprise.

Courses Offered:

S.No.	Domain	Course Name	Hours	Prerequisites
1	CAM	NX Manufacturing Fundamentals	24	Essentials for NX Designers
2	CAM	Turning Manufacturing Process	24	Essentials for NX Designers NX Manufacturing Fundamentals
3	CAM	Fixed Axis and Multi-Axis Milling	32	Essentials for NX Designers NX Manufacturing Fundamentals
4	CAM	NX CAM Customization	16	Essentials for NX Designers NX Manufacturing Fundamentals
5	CAM	Post Building Techniques	32	Essentials for NX Designers NX Manufacturing Fundamentals NX CAM customization
6	DM	RobCAD Basics	16	Essentials for NX Designers
7	DM	RobCADAdv Modelling & Kinematics	16	RobCAD Basics
8	DM	Process Designer Basic	24	RobCAD Basics RobCADAdv Modelling & Kinematics
9	DM	Process Designer for General Assembly	16	Process Designer Basic
10	DM	Process Designer for Body-In- White Processing	8	Process Designer Basic
11	DM	Process Simulate Part Flow	32	Process Designer Basic
12	DM	Process Simulate Human Simulation	40	Process Designer Basic
13	DM	Process Simulate Basic Robotics	40	Process Designer Basic
14	DM	RobCAD Spot	24	RobCAD Basics RobCADAdv Modelling & Kinematics
15	DM	RobCAD Paint	24	RobCAD Basics RobCADAdv Modelling & Kinematics
16	DM	RobCAD Arc	24	RobCAD Basics RobCADAdv Modelling & Kinematics
20	DM	RobCAD OLP	24	RobCAD Basics RobCADAdv Modelling & Kinematics
17	DM	Process Simulate Intermediate Robotics	32	Process Designer Basic Process Simulate Part Flow

18	DM	Process Simulate Advanced Robotics Simulation	24	Process Designer Basic Process Simulate Part Flow
19	DM	Variant Definition and Application	24	Process Designer Basic Process Simulate Part Flow
21	DM	Plant Simulation Methods, and Strategy	40	Process Designer Basic Process Simulate Part Flow
22	DM	Plant Simulation Adv. Modelling	32	Process Designer Basic Process Simulate Part Flow
23	DM	Plant Simulation 3D Visualization	16	Process Designer Basic Process Simulate Part Flow
24	PLM	Introduction to Teamcenter	8	
25	PLM	Using Teamcenter	32	Introduction to Teamcenter
26	PLM	Mockup	24	
27	PLM	Integration for NX users	8	Introduction to Teamcenter
28	PLM	Schedule Manager	16	Introduction to Teamcenter
29	PLM	Managing Requirements using Teamcenter	16	Introduction to Teamcenter
30	PLM	Manufacturing Assembly Process Planning	24	Introduction to Teamcenter
31	PLM	Manufacturing Assembly Part Planning	8	Introduction to Teamcenter
32	PLM	Managing Systems Design using Tc	16	Introduction to Teamcenter Using Teamcenter
33	PLM	Installation	40	Introduction to Teamcenter Using Teamcenter
34	PLM	Application and Data Model Administration	40	Introduction to Teamcenter Using Teamcenter
35	PLM	Customization	40	Introduction to Teamcenter Using Teamcenter
36	PLM	Advanced Workflow and Security Admin	24	Introduction to Teamcenter Using Teamcenter