PRODUCT DESIGN AND VALIDATIONLAB

PRODUCT DESIGN AND VALIDATION is an art of facility where design and validation of a product can be executed. The lab is well equipped with software and hardware facility which enhances the art of learning.

The courses are well defined and curriculum is prepared by Siemens PLM software, one of the major giant in software development for CAD/CAM/CAE and PLM.Here one can learn in a systematic way and implement all their learning in making a new product right from the scratch and validate it.

WHAT IS PRODUCT DESIGN?

Product design process is the set of strategic and tactical activities, from idea generation to commercialization, used to create a product design. In a systematic approach, product designers conceptualize and evaluate ideas, turning them into tangible inventions and products

WHAT IS VALIDATION?

Ensuring the design meets the fit, form and functional requirements specified in the statement of requirement for a product, by means of analytical and / or physical testing, is commonly referred to as Design Validation.

Software's Installed:

- SIEMENS NX-11.0(Including bundle of CAD, CAE)
- FEMAP(CAE)
- TEAMCENTER(PLM)

CAD(Computer-aided design):

Computer-aided design (CAD) is the use of computer systems (or workstations) to aid in the creation, modification, analysis, or optimization of a design.CAD software is used to increase the productivity of the designer, improve the quality of design, improve communications through documentation, and to create a database for manufacturing.

CAD output is often in the form of electronic files for print, machining, or other manufacturing operations. The term CADD (for Computer Aided Design and Drafting) is also used

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.

- CAD software for mechanical design uses either vector-based graphics to depict the objects of traditional drafting, or may also produce raster graphics showing the overall appearance of designed objects.
- However, it involves more than just shapes. As in the manual drafting of technical and engineering drawings, the output of CAD must convey information, such as materials, processes, dimensions, and tolerances, according to application-specific conventions.
- CAD may be used to design curves and figures in two-dimensional (2D) space; or curves, surfaces, and solids in three-dimensional (3D) space.

CAE (Computer Aided Engineering):

- ✓ Computer-aided engineering (CAE) is the broad usage of computer software to aid in engineering analysis tasks. It includes finite element analysis (FEA), computational fluid dynamics (CFD), multibody dynamics (MBD), durability and optimization.\
- ✓ CAE tools are being used, for example, to analyse the robustness and performance of components and assemblies.
- ✓ The term encompasses simulation, validation, and optimisation of products and manufacturing tools. In the future, CAE systems will be major providers of information to help support design teams in decision making.
- ✓ Computer-aided engineering is used in many fields such as automotive, aviation, space, and shipbuilding industries

CAE areas covered include:

- Stress analysis on components and assemblies using Finite Element Analysis (FEA);
- Thermal and fluid flow analysis Computational fluid dynamics (CFD);
- Multibody dynamics (MBD) and Kinematics;
- Analysis tools for process simulation for operations such as casting, molding, and die press forming.
- Optimization of the product or process.
- In general, there are three phases in any computer-aided engineering task:
- Pre-processing – defining the model and environmental factors to be applied to it. (typically a finite element model, but facet, voxel and thin sheet methods are also used)
- Analysis solver (usually performed on high powered computers)
- Post-processing of results (using visualization tools)

PLM (Product Lifecycle Mangement):

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	CAD	Essentials for NX Designers	40	
2	CAD	NX Basic Design	16	
3	CAD	Synchronous Modeling Fundamentals	8	Essentials for NX Designers
4	CAD	Synchronous Modeling and Parametric Design	24	Essentials for NX Designers
5	CAD	Intermediate NX Design and Assemblies	40	Essentials for NX Designers
6	CAD	Drafting Essentials	24	Essentials for NX Designers Intermediate NX Design and Assemblies
7	CAD	Mechanical Freeform Modeling	40	Essentials for NX Designers Intermediate NX Design and Assemblies
8	CAD	NX Sheet Metal	16	Essentials for NX Designers Intermediate NX Design and Assemblies
9	CAD	Routing Electrical	16	Essentials for NX Designers Intermediate NX Design and Assemblies
10	CAD	Routing Mechanical	16	Essentials for NX Designers Intermediate NX Design and Assemblies
11	CAD	Mold Wizard	40	Essentials for NX Designers Intermediate NX Design and Assemblies Mechanical Freeform Modeling
12	CAD	Large Assemblies Management	24	Essentials for NX Designers Intermediate NX Design and Assemblies Mechanical Freeform Modeling
13	CAD	Industrial Design using NX	32	Essentials for NX Designers Intermediate NX Design and Assemblies Mechanical Freeform Modeling
14	CAD	PCB Exchange	8	Essentials for NX Designers Intermediate NX Design and Assemblies Routing Electrical
15	CAD	Sketching Fundamentals	16	
16	CAD	Product and Manufacturing Information	8	Essentials for NX Designers Intermediate NX Design and Assemblies Mechanical Freeform Modeling
17	CAD	Progressive Die wizard	40	Essentials for NX Designers Intermediate NX Design and Assemblies Mechanical Freeform Modeling
18	CAE	Motion Simulation	24	Essentials for NX Designers
19	CAE	Advanced Simulation Process	24	Essentials for NX Designers
20	CAE	Introduction to Finite Element Analysis with NX	24	Essentials for NX Designers Advanced Simulation Process
21	CAE	Advanced simulation Solutions	16	Essentials for NX Designers Advanced Simulation Process
22	CAE	Thermal and Flow analysis	24	Essentials for NX Designers Advanced Simulation Process
23	CAE	NX Response Simulation	24	Essentials for NX Designers Advanced Simulation Process
24	CAE	Laminate Composites	8	Essentials for NX Designers Advanced Simulation Process
25	CAE	NX Nastran Advanced Non- linear	24	Essentials for NX Designers Advanced Simulation Process Introduction to Finite Element Analysis with NX
26	CAE	Sensitivity and optimization with NX	16	Essentials for NX Designers Advanced Simulation Process Introduction to Finite Element Analysis with NX
27	CAE	Super Element Analysis with NX	16	Essentials for NX Designers Advanced Simulation Process Introduction to Finite Element Analysis with NX
28	CAE	Advanced Thermal and Flow Analysis	16	Essentials for NX Designers Advanced Simulation Process Thermal and Flow analysis (Basics)
29	CAE	Advanced Dynamic Analysis with NX	16	Essentials for NX Designers Advanced Simulation Process NX Response Simulation
30	CAE	Introduction to Dynamic Analysis with NX	24	Essentials for NX Designers Advanced Simulation Process Introduction to Finite Element Analysis with NX

31	CAE	DDAM analysis with NX	8	Essentials for NX Designers Advanced Simulation Process Introduction to Finite Element Analysis with NX