School of Mechanical Engineering

Course Code : MCDM5004 **Course Name: Product Design and Life cycle Management**

UNIT I

INTRODUCTION

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INTRODUCTION

TRENDS AFFECTING PRODUCT DEVELOPMENT

- Rate of innovation –
  - Critical design factor in the success of most products.
  - First innovative product is often the competitive winner in a "winner take all" market.
  - Time constraints will become an even greater factor in the development and production of new innovative products.
- Software tools, rapid prototyping, and virtual reality –
  - Competitive advantage is gained in the design process when software products or tools can improve or shorten product development and enhance service support.
  - Software tools such as computer aided engineering (CAE), expert systems, virtual reality, and prototyping tools can assist the design team in customer needs assessment, innovation, product layout, selection of components or materials, simulation testing and simulating the manufacturing process.

- Virtual reality utilizes interactive graphics software to create computer generated prototypes and simulations that are so close to reality that users believe they are participating in a real world situation or observing a real final product.

- Mass customization and customized "on-demand" production
  - Mass customization is the ability to provide specific product or service solutions while still realizing the benefits of large scale operations.
  - "Build to order" or "on demand" production, which requires manufacture of a customer, specified product only after it is ordered. This requires manufacturing to build many more versions of similar products, i.e. flexibility.
- Core competency, partnerships and outsourcing
  - Core competencies can be in any area of design, marketing, manufacturing, or service. These are the critical areas that make the company unique or better than the competition.

- Internet and telecommunication
- Electronic commerce
- Flexibility and agility
- Global manufacturing
- Automation
- Environmental consciousness

Global Business Perspective

- ❖Anticipate future market demands
- ❖Manage global relationships
- ❖Reduce time to market
- ❖Excel in customer service

Best practices for product development

- ❖Improves communication among all the members of the product development team.
- ❖Provides “what to” and “how to” recommendations that have been proven to be successful in industry.
- ❖Develops scientific recommendations for both current and future product development .
- ❖Helps measure the progress of the product development process and the technical risk of new technologies/methods.

COLLABORATIVE PRODUCT DEVELOPMENT

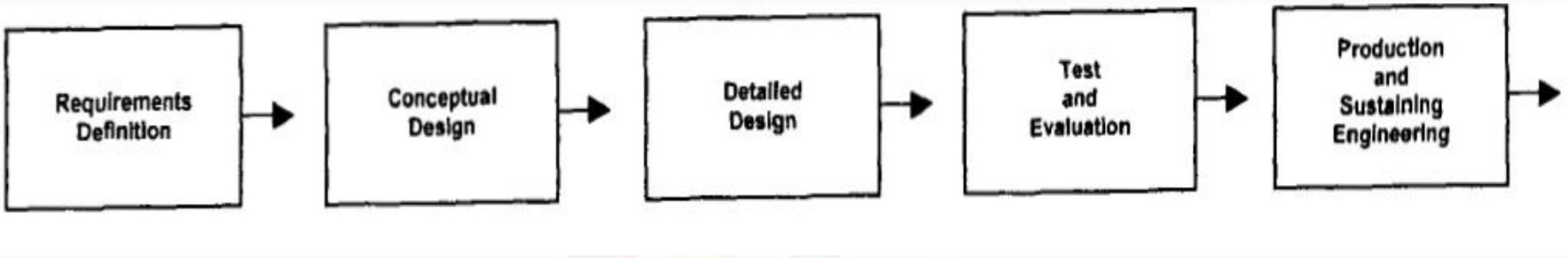
❖Process of people working in teams to pursue design innovation.

❖Information, ideas, and problem solving are actively shared among the team. It can be synchronous, where team members meet together either face to-face or via audio or video conferencing tools. Collaboration can also be asynchronous, where product development personnel log onto a computer network at different times and locations leaving their contributions for others to see and discuss.

❖On-line product development materials should be up to date, well organized and easy to use.

❖Product development project should be started with a short task or two to get each member of the team involved in collaboration and become familiar with the use of new technology.

PRODUCT DEVELOPMENT PROCESS



- Market research and analysis
- Customer requirements and needs
- Systems requirements, including producibility and reliability

- Trade studies
- Simulation and modeling
- Functional allocation
- System specifications
- Design requirements
- Design guidelines
- Design to cost
- Program plans

- Analysis, modeling simulation, and prototypes
- Detailed design specifications
- Circuit design
- Parts selection
- Component design
- Part qualification
- Mechanical design
- Thermal design
- Logistics engineering
- Human engineering
- Safety engineering
- Packaging design
- Software design
- Production design
- Quality engineering
- Design to cost
- Testability
- Documentation
- Make or buy analysis
- Test planning
- Producibility
- Quality specifications
- Manufacturing planning
- Environmental testing
- Off-line maturing of new technologies

- Developmental testing
- Test, analyze, and fix
- Process engineering
- Test software development
- Failure analysis
- Design to cost
- Producibility
- Manufacturing prototypes
- Environmental stress screening
- Configuration Management
- Customer tests

- Production readiness
- Specification verification
- Drawing release
- Documentation
- Manufacturing procedures
- Tooling design and release
- Quality control
- Configuration management
- Quality assurance
- Spares provisioning
- Environmental stress screening
- Sustaining engineering

References

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Thank you