KANDULA SRINIVASA REDDY MEMORIAL COLLEGE OF ENGINEERING (AUTONOMOUS)

Kadapa-516003. AP

(Approved by AICTE, Affiliated to JNTUA, Ananthapuramu, Accredited by NAAC)
(An ISO 9001-2008 Certified Institution)

DEPARTMENT OF MECHANICAL ENGINEERING

Certification Course on

"PRODUCT AND PROCESS DESIGN"

Resource Person : Sri P. Sreenivas, Assistant Professor, Dept. of ME, KSRMCE

Course Coordinators: S. Vijaya Kumar, Assistant Professor, Dept. of ME, KSRMCE

Date: 13/08/2019 to 30/08/2019

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Lr./KSRMCE/ME/2019-20/ Date: 12-08-2019

To
The Principal,
KSRMCE,
Kadapa.

Sub: Permission to Conduct Certificate Course on "**Product and Process Design**" from 13-08-2019 to 30-08-2019 – Reg.

Respected Sir,

The Department of Mechanical Engineering is planning to offer a certification course on "**Product and Process Design**" to B. Tech. students. The course will be conducted from 13-08-2019 to 30- 08-2019. In this regard, we are requesting you to grant permission to conduct certificate course.

Thanking you

Yours faithfully

(**S. VIJAYA KUMAR**),
(Asst. Professor)

Forwarded to Anbumpd Sir

Permitted
V.S.S. Murthy
12/08/2019

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Lr./KSRMCE/ME/2019-20/ Date: 12-08-2019

CIRCULAR

The Department of Mechanical Engineering is offering a certification course on "**Product and Process Design**" from 13-08-2019 to 30-08-2019 to B.Tech students. In this regard, interested students are required to register for the Certification Course.

Course Coordinator

S. Vijaya Kumar,
Department of Mechanical Engineering

HoD

Professor & Head
Department of Mechnical Engineering
K.S.R.M. College of Engineering
KADAPA - 516 003.

Copy to:
IQAC - KSRMCE

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DEPARTMENT OF MECHANICAL ENGINEERING

Certification Course on PRODUCT AND PROCESS DESIGN

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COORDINATOR

HoD

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SYLLABUS

PRODUCT AND PROCESS DESIGN

Chapter-1

Introduction:

Need for IPPD-Strategic importance of Product development - integration of customer, designer, material supplier and process planner, Competitor and customer - behavior analysis. Understanding customer-promoting customer understanding-involve customer in development and managing requirements-Organization process management and improvement.

Chapter-2

CONCEPT GENERATION, SELECTION AND TESTING:

Plan and establish product specifications. Task - Structured approaches - clarification – search externally and internally-Explore systematically - reflect on the solutions and processes - concept selection - methodology - benefits. Implications - Product change - variety - component standardization - product performance - manufacturability – Concept Testing Methodologies.

Chapter-3

PRODUCT ARCHITECTURE

Product development management - establishing the architecture - creation - clustering - geometric layout development - Fundamental and incidental interactions - related system level design issues - secondary systems -architecture of the chunks - creating detailed interface specifications-Portfolio Architecture.

Chapter-4

INDUSTRIAL DESIGN

Integrate process design – Managing costs – Robust design – Integrating CAE, CAD, CAM tools – Simulating product performance and manufacturing processes electronically – Need for industrial design – impact – design process – investigation of for industrial design – impact – design process – investigation of customer needs – conceptualization – refinement – management of the industrial design process – technology driven products – user – driven products – assessing the quality of industrial design.

Chapter-5

DESIGN FOR MANUFACTURING AND PRODUCT DEVELOPMENT

Definition – Estimation of Manufacturing cost – reducing the component costs and assembly costs – Minimize system complexity – Prototype basics – principles of prototyping – planning for prototypes – Economic Analysis – Understanding and representing tasks – baseline projectplanning – accelerating the project – project execution.

Learning References

1. Lawrence D. Miles; "Techniques of Value Analysis and Engineering", 2nd Edition, McGraw-Hill Book Company, Inc. New York.
2. Larry W. Zimmerman, Glen D. Hart; "Value Engineering", Reprint 1999, CBS Publishers and Distributors, New Delhi.
3. A. K. Chitale and R. C. Gupta, "Product Design and Manufacturing", 3rd Edition, Prentice-Hall of India.

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SCHEDULE

DEPARTMENT OF MECHANICAL ENGINEERING

Certification course on

"PRODUCT AND PROCESS DESIGN"

Date	Timing	Resource Person	Topic to be covered
13-08-2019	4 PM to 6 PM	P. Sreenivas	Need for IPPD-Strategic importance of Product development
14-08-2019	4 PM to 6 PM	P. Sreenivas	integration of customer, designer, material supplier and process planner, Competitor and customer - behavior analysis
16-08-2019	4 PM to 6 PM	P. Sreenivas	Understanding customer-promoting customer understanding-involve customer in development and managing requirements-Organization process management and improvement.
17-08-2019	4 PM to 6 PM	P. Sreenivas	Plan and establish product specifications
19-08-2019	4 PM to 6 PM	P. Sreenivas	Task - Structured approaches - clarification – search externally and internally-Explore systematically
20-08-2019	4 PM to 6 PM	P. Sreenivas	reflect on the solutions and processes - concept selection - methodology - benefits
21-08-2019	4 PM to 6 PM	P. Sreenivas	Implications - Product change - variety - component standardization - product performance - manufacturability – Concept Testing Methodologies.
22-08-2019	4 PM to 6 PM	P. Sreenivas	Product development management - establishing the architecture - creation - clustering - geometric layout development.
23-08-2019	4 PM to 6 PM	P. Sreenivas	Fundamental and incidental interactions - related system level design issues - secondary systems - architecture of the chunks - creating detailed interface specifications-Portfolio Architecture
24-08-2019	4 PM to 6 PM	P. Sreenivas	Integrate process design – Managing costs – Robust design – Integrating CAE, CAD, CAM tools
26-08-2019	4 PM to 6 PM	P. Sreenivas	Simulating product performance and manufacturing processes electronically – Need for industrial design – impact – design process – investigation of for

			industrial design
27-08-2019	4 PM to 6 PM	P. Sreenivas	impact – design process – investigation of customer needs – conceptualization – refinement – management of the industrial design process
28-08-2019	4 PM to 6 PM	P. Sreenivas	technology driven products – user – driven products – assessing the quality of industrial design
29-08-2019	4 PM to 6 PM	P. Sreenivas	Definition – Estimation of Manufacturing cost – reducing the component costs and assembly costs – Minimize system complexity – Prototype basics
30-08-2019	4 PM to 6 PM	P. Sreenivas	principles of prototyping – planning for prototypes – Economic Analysis – Understanding and representing tasks – baseline project planning – accelerating the project – project execution

Course Coordinator

HoD

Professor & Head
Department of Mechnical Engineering
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Report of
Value Added Course on "PRODUCT AND PROCESS DESIGN"
From 13th August 2019 to 30th August 2019

Target Group	:	**B.Tech Students**
Details of Participants	:	**75 Students**
Co-coordinator(s)	:	**Sri S. VIJAYA KUMAR**
Resource Persons	:	**Sri P. SREENIVAS**
Organizing Department	:	**Mechanical Engineering**
Venue	:	**Seminar Hall, Mechanical Department**

Description:

The Department of Mechanical Engineering conducted a certification course on "Product & Process Design" 13th August 2019 to 30th August 2019. The course duration was 30 hours .The course Resource Persons are Sri P. Sreenivas, Assistant Professor and Sri S. Vijaya Kumar, Assistant Professor Department Mechanical Engineering, KSRMCE.

The main objective of this course is to identify the concept generation, selection and testing of a product Product & Process Design. It involves the importance of Product development, integration of customer designer, material supplier, process planner- their behavior analysis.

Students can learn product development management, establishing the architecture, creation , clustering –geometric layout development, fundamental and incidental interactions, technology driven products, user driven products assembling the quality of industrial design.

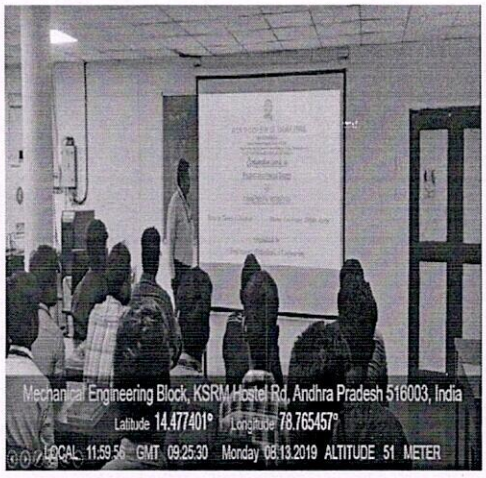
It involves the estimation of Manufacturing cost-reducing the component costs and assembly costs. Principles of prototyping , planning for prototypes, Economic Analysis.

Understanding and representing tasks base line project planning, accelarting the project , project execution.

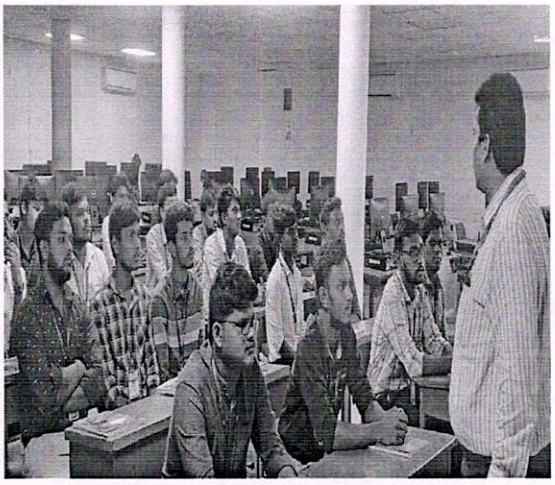
On final Day last session Value added course is Ended with oath of thanks and certificate distribution by coordinator & HOD to the Participants. Feedback from participants are collected.

Photos

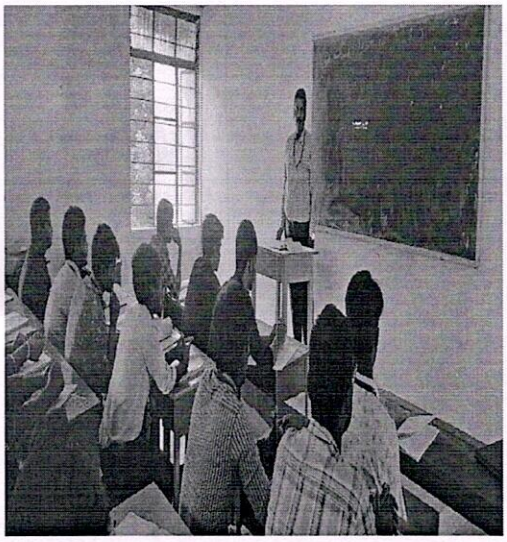
The pictures taken during the course are given below:



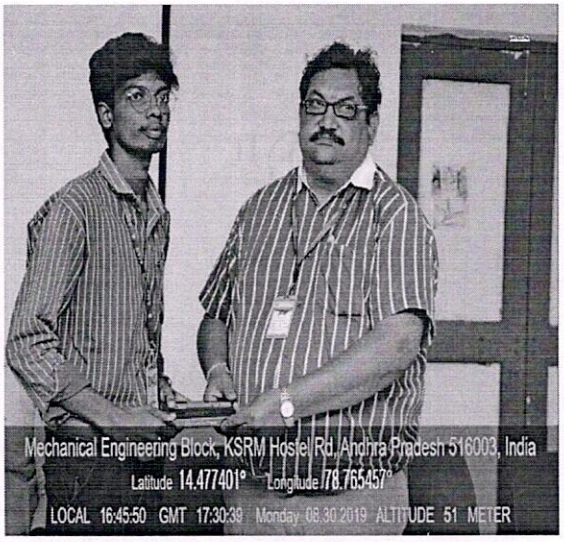
Inaguration of Programme



Students listening the lecture



Students listening the lecture



Certificate Distribution by HoD

Coordinators

HoD

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Certification Course on

"PRODUCT AND PROCESS DESIGN"

13/08/2019 to 30/08/2019

ORGANIZED BY

DEPARTMENT OF MECHANICAL ENGINEERING

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DEPARTMENT OF MECHANICAL ENGINEERING

Attendance Sheet of Certification Course on
PRODUCT AND PROCESS DESIGN
from 13th August 2019 to 30th August 2019

LIST OF PARTICIPANTS

S. No.	Roll No.	Name of the Student	13/8	14/8	16/8	17/8	19/8	20/8	21/8	22/8	23/8	24/8	26/8	27/8	28/8	29/8	30/8
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3	179Y1A0303	B. RAVI JYOTHI KUMAR REDDY	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P
4	179Y1A0305	B. B. SURENDRA YADAV	P	P	P	A	P	P	P	P	P	P	A	P	P	P	P
5	179Y1A0307	BODIGARI RAMA KRISHNA REDDY	P	P	P	P	A	P	P	P	P	P	P	P	P	P	P
6	179Y1A0308	BOLLINENI HARIKRISHNA	P	P	P	P	P	P	P	P	P	P	P	A	P	P	P
7	179Y1A0309	BOYA NAVEEN	P	P	P	P	P	P	P	P	P	P	A	P	P	P	P
8	179Y1A0310	C .NARENDRA REDDY	P	A	P	P	P	P	P	P	P	P	P	P	P	P	A
9	179Y1A0311	CHIMMANI PAVAN KUMAR	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
10	179Y1A0312	DOLA PURNA VISEH SAGAR	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P
11	179Y1A0314	EPPARLA SARATH CHANDRA	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P
12	179Y1A0316	GANESHAM HANUMANTH REDDY	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
13	179Y1A0317	GANGIREDDY VEERASIVA REDDY	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
14	179Y1A0318	GAVIREDDYGARI YASWANTH REDDY	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P
15	179Y1A0319	G.VENKATA DILIP KUMAR REDDY	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
16	179Y1A0320	GURRAMPATI NITHIN	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P
17	179Y1A0322	J.PAVAN KUMAR	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P
18	179Y1A0323	KALLA VASU	P	A	P	P	P	P	P	P	P	P	P	P	P	P	P
19	179Y1A0324	KAMBHAM SREENATH REDDY	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P
20	179Y1A0325	KONDA LOKESWAR REDDDY	P	P	P	P	P	P	P	P	P	P	P	P	P	A	P
21	179Y1A0326	KOTAPATI DINESH KUMAR	P	P	P	P	P	P	P	P	P	P	P	P	A	P	P

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25	179Y1A0332	MEESALA PRASANTH PRANAY	P	P	P	P	P	P	P	P	P	P	P	P	A	P	P	P
26	179Y1A0333	MEKALA NEELESH RAHUL	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
27	179Y1A0334	MODDI SIVA SAI	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P	P
28	179Y1A0335	MUDE SURYAPRAKASH NAIK	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P
29	179Y1A0336	MUMMADI SUMANTH REDDY	P	P	P	P	P	P	P	P	P	P	P	A	P	P	P	P
30	179Y1A0338	ODETI SHARIEF	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	A
31	179Y1A0339	P. VENKATA RAVINDRA REDDY	P	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P
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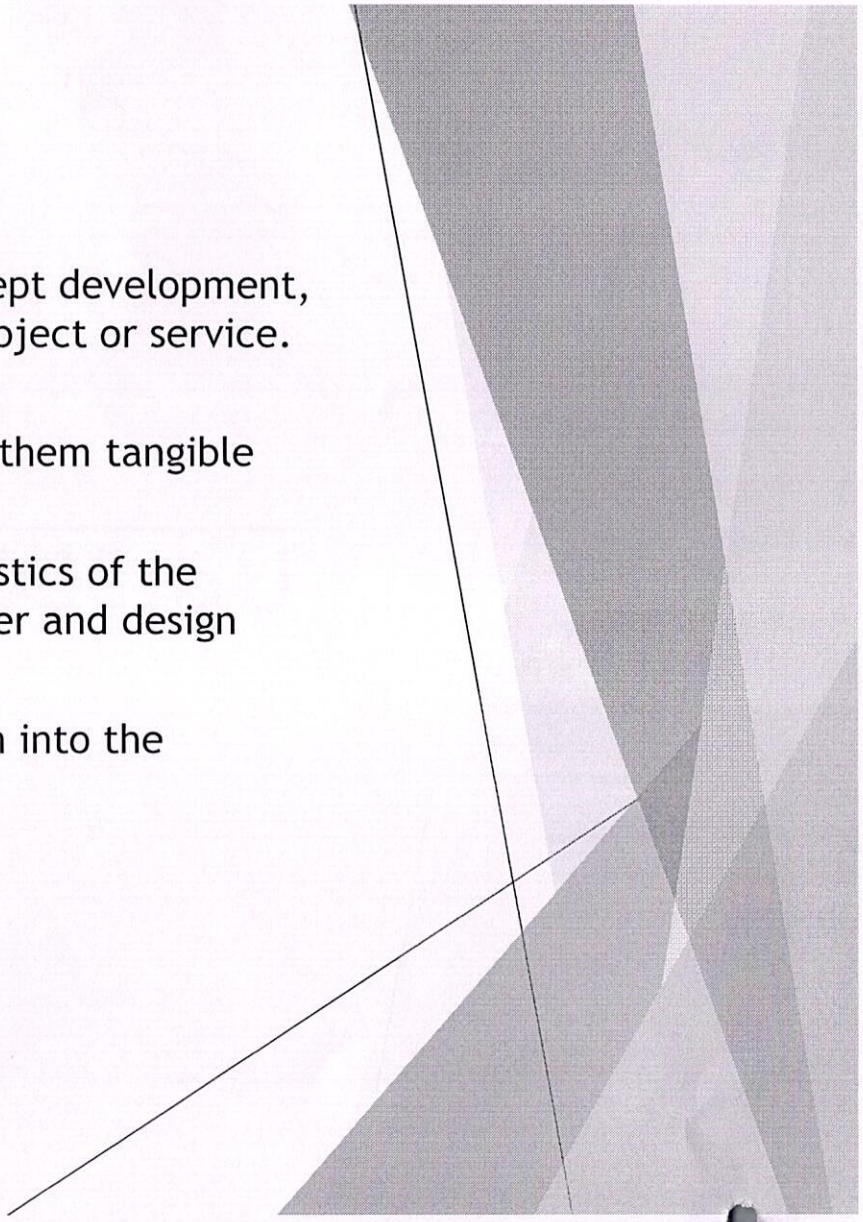
COORDINATOR

HoD

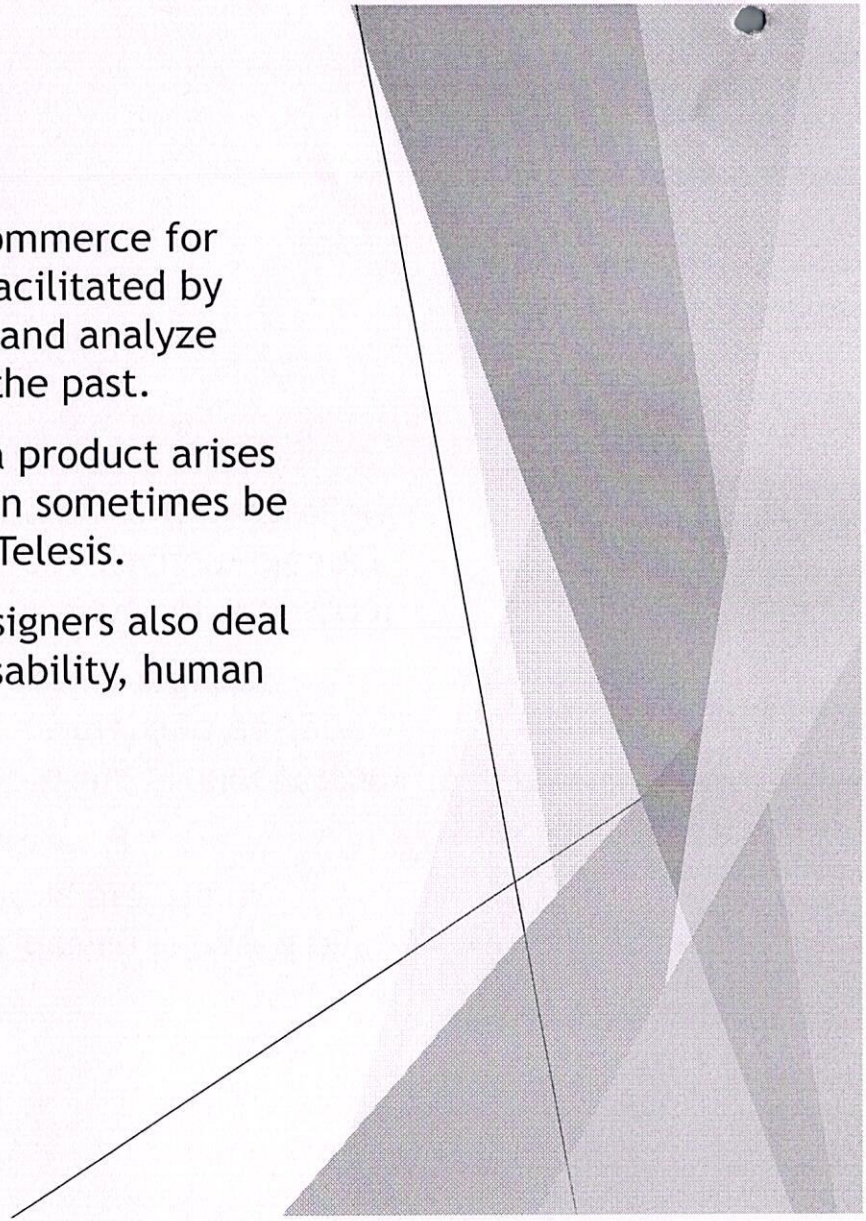
Professor & Head
Department of Mechnical Engineering
K.S.R.M. College of Engineering
KADAPA - 516 003.

Product & Process design

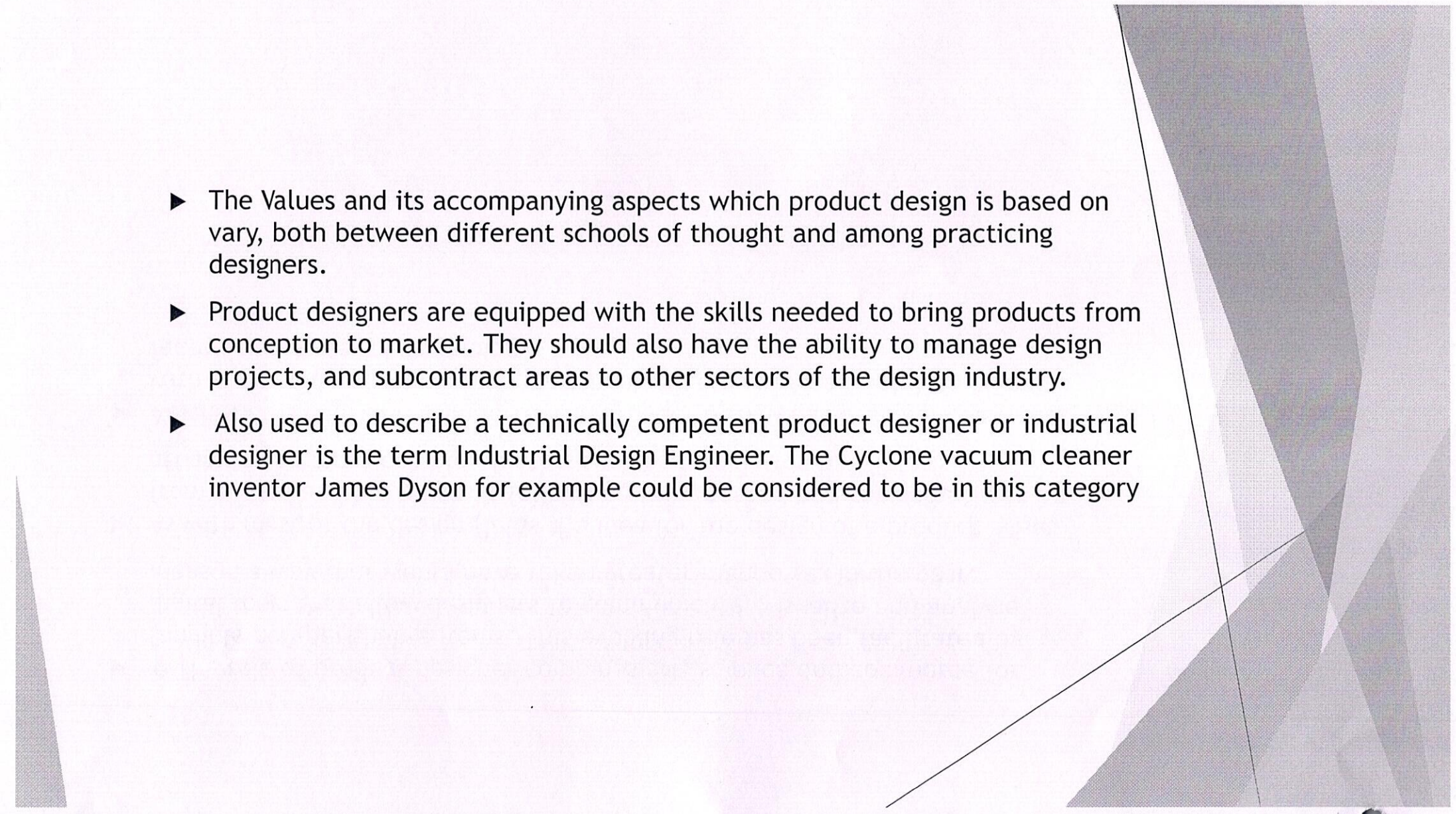
- **Product Design:**
- **Product Design** can be defined as the idea generation, concept development, testing and manufacturing or implementation of a physical object or service. It covers more than the discipline name - **Industrial Design.**
- Product Designers conceptualize and evaluate ideas, making them tangible through products in a more systematic approach.
- The role of a product designer encompasses many characteristics of the marketing manager, **Product management**, industrial designer and design engineer.
- The title name of Industrial designer has in many cases fallen into the category of an art.



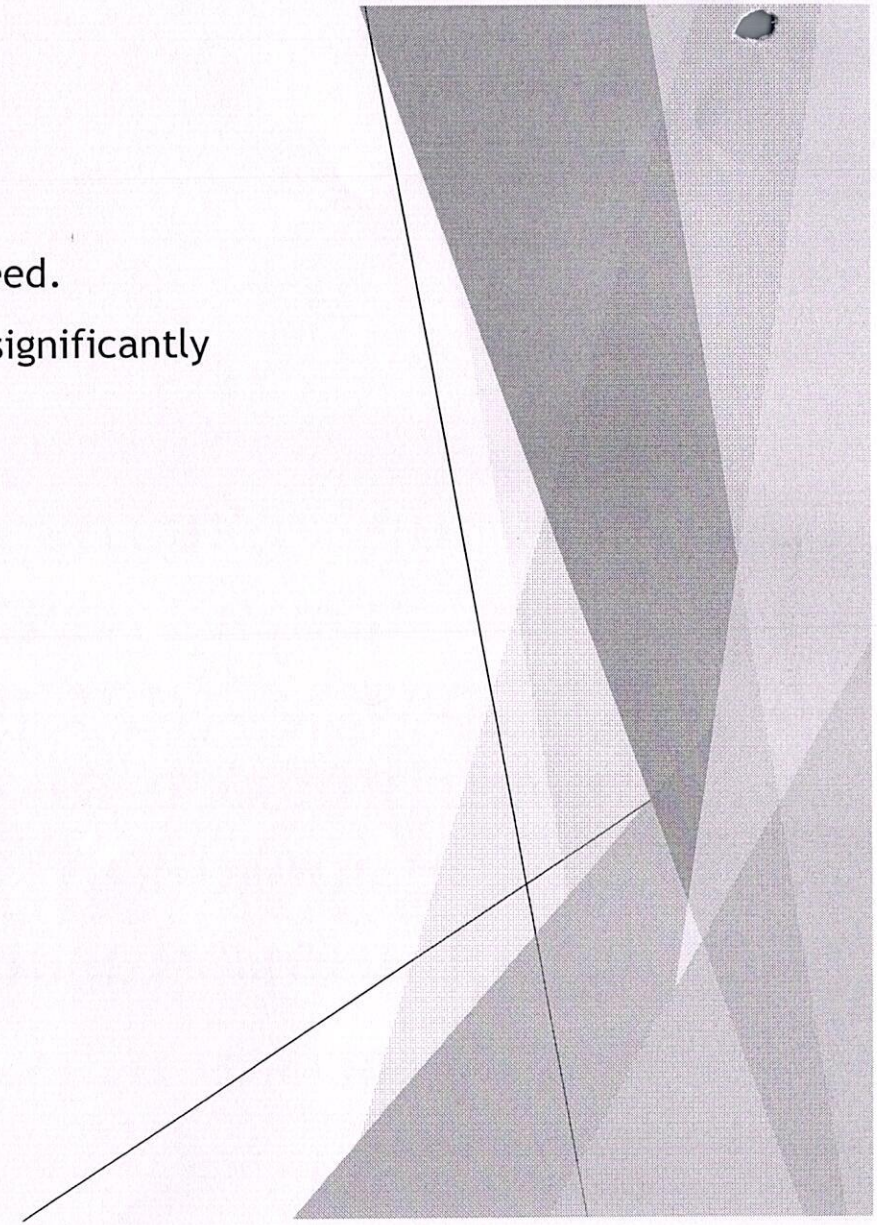
- ❖The role of product designer combines art, science and commerce for tangible non-perishable items. This evolving role has been facilitated by digital tools that allow designers to communicate, visualize and analyze ideas in a way that would have taken greater manpower in the past.
- As with most of the design fields the idea for the design of a product arises from a need and has a use. It follows certain method and can sometimes be attributed to more complex factors such as association and Telesis.
- Aesthetics is considered important in Product Design but designers also deal with important aspects including technology, ergonomics, usability, human factors and material technology.



- The Values and its accompanying aspects which product design is based on vary, both between different schools of thought and among practicing designers.
- Product designers are equipped with the skills needed to bring products from conception to market. They should also have the ability to manage design projects, and subcontract areas to other sectors of the design industry.
- Also used to describe a technically competent product designer or industrial designer is the term Industrial Design Engineer. The Cyclone vacuum cleaner inventor James Dyson for example could be considered to be in this category



- A **Product** is anything that is capable of satisfying a felt need.
- A **New Product** is the one which is truly innovative and is significantly different from the other existing products.
- The stages through which a new product passes through
- 1) Needs Identification.
- 2) Advance product planning.
- 3) Advanced design, Detailed engineering
- 4) Production process design and development
- 5)Product Evaluation
- 6) Product use & support



The various aspects in product design are as follows:

- **Design for function:** A product must perform the function which its customers expects it to do. If a product is designed by taking its functional features in to account, then it will create satisfied customers, and will further lead to having more repeat customers. The factors which are to be considered for functional design are strengths and wearbility of the product and its components.

- Design for making: A product design that solves the functional problem smoothly, but is impossible to manufacture, is of no use. Attention must be given to materials, fastening devices, etc., while designing a product.
- The hardness of the material specified at the design stage must be within the permitted range while machining.
- Making use of standard parts in an important aspect of product design. Also, operational convenience of the machineries must be taken into account at the design stage.

PROCESS DESIGN

- **Process is that part of an I-P-O System, with a sequence of activities that is intended to achieve some result (output) and/or to add value for the output in tune with customers requirements. A process converts inputs into output in a production system.**
- **To enable a better product design we necessarily require a suitable process planning cum design to make the design aspects reflect in the product.**
- **It is a known fact that process based design changes in a production system are long lasting than the product based design changes.**

Process Selection: It refers to the way, in which the production of goods and services are organized. It make the vital decisions such as

- Capacity Planning
- Facilities layout
- Equipments and design of work systems

The primary questions to be addressed here are:

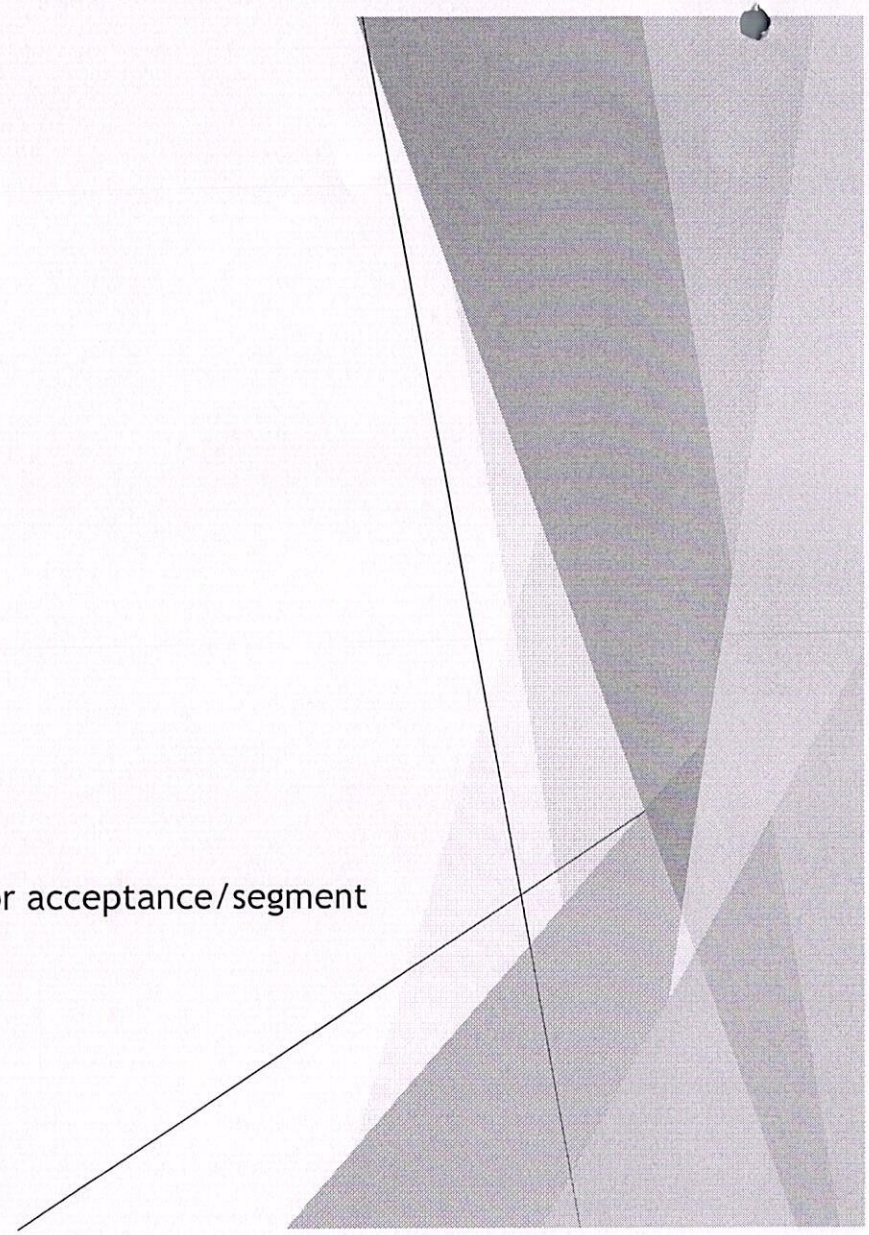
- How much variety of Products / Services will the system requires to handle ?
- What degree of equipment flexibility is required?
- What is the Quality & Quantity level expected in the Output etc.
- Whether it is a New product or already established Product etc.

Product Life Cycle

- The conditions a product is sold under will change over time. The Product Life Cycle refers to the succession of stages a product goes through. Product Life Cycle Management is the succession of strategies used by management as a product goes through its life cycle.
- The product lifecycle goes through many phases and involves many professional disciplines and requires many skills, tools and processes.
- Product life cycle (PLC) is to do with the life of a product in the market with respect to business/commercial costs and sales measures; whereas Product Lifecycle Management (PLM) is more to do with managing descriptions.

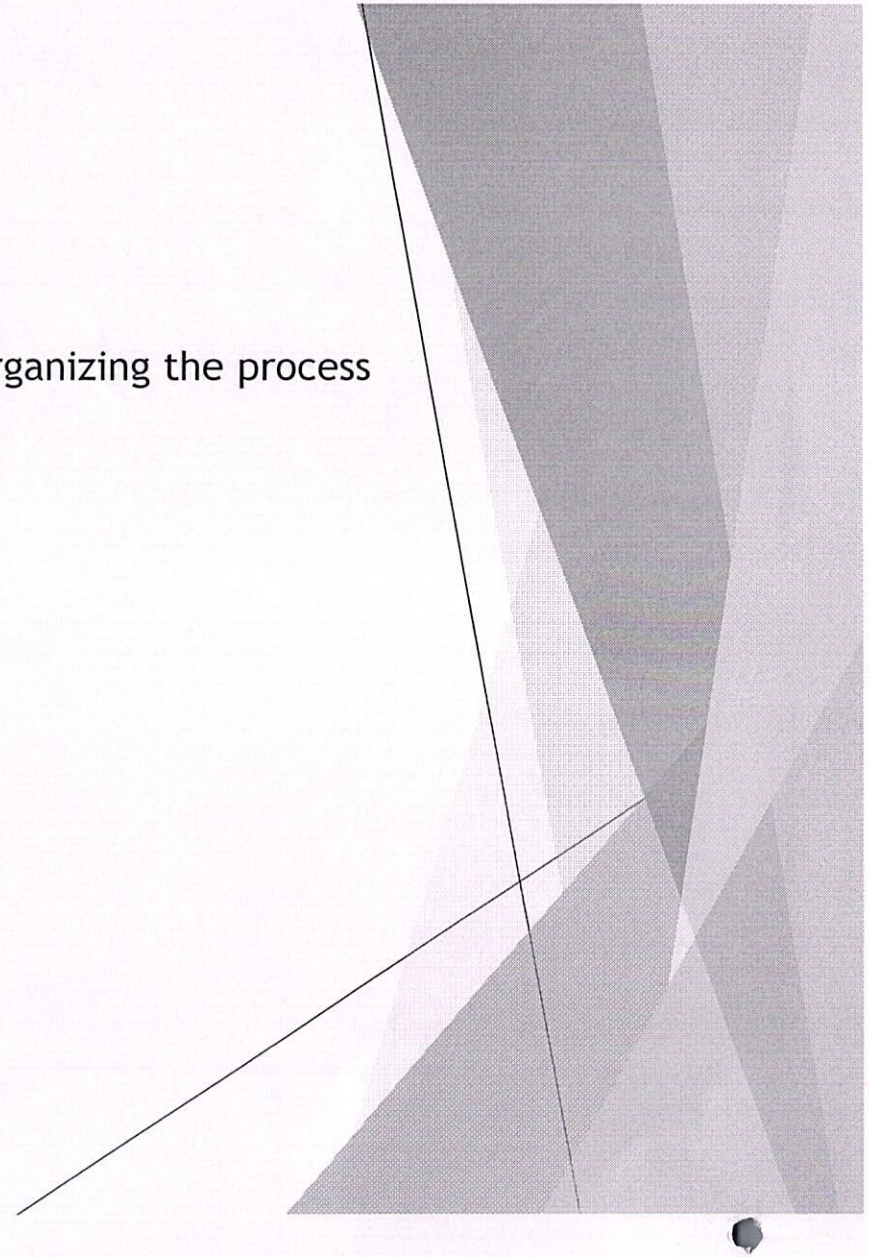
Product Life Cycle

- Products tend to go through five stages:
- 1.New product development stage
- very expensive
- no sales revenue
- losses
- 1.Market introduction stage
- cost high
- sales volume low
- no/little competition - competitive manufacturers watch for acceptance/segment growth
- Losses
- demand has to be created

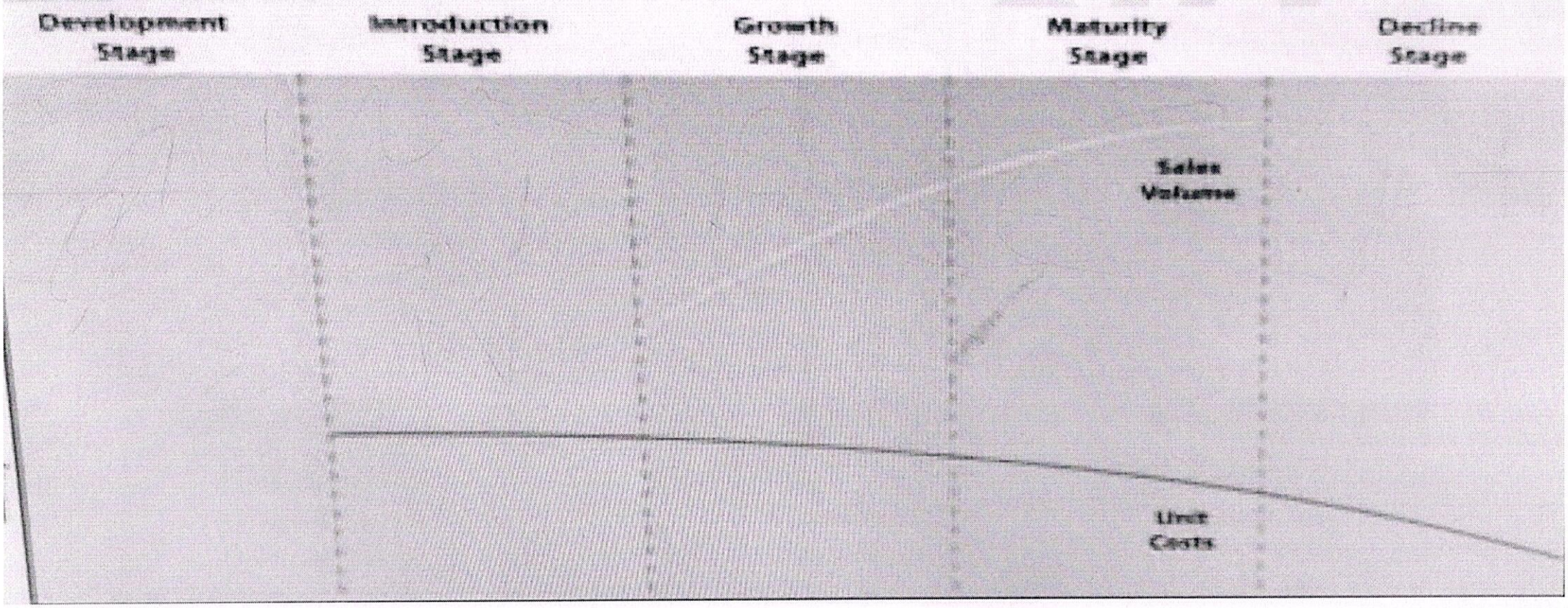


- Key decisions relating to Process design is related to organizing the process flows necessary to manufacture new products.
- **Organizing process flow**

1. Five types of Processes are distinguished
2. Project
3. Job Shop
4. Batch
5. Assembly line
6. Continuous



Product Life Cycle



Product Life Cycle

Process Flow Structures

- Job shop (ex. Copy center making a single copy of a student term paper)
- Batch shop (ex. Copy center making 10,000 copies of an ad piece for a business)
- Assembly Line (ex. Automobile manufacturer)
- Continuous Flow (ex. Petroleum manufacturer)

Break-Even Analysis

- A standard approach to choosing among alternative processes or equipment
- Model seeks to determine the point in units produced (and sold) where we will start making profit on the process or equipment
- Model seeks to determine the point in units produced (and sold) where total revenue and total cost are equal

Break-Even Analysis (Continued)

Break-even Demand=

$$\frac{\text{Purchase cost of process or equipment}}{\text{Price per unit - Cost per unit}}$$

or

$$\frac{\text{Total fixed costs of process or equipment}}{\text{Unit price to customer - Variable costs per unit}}$$

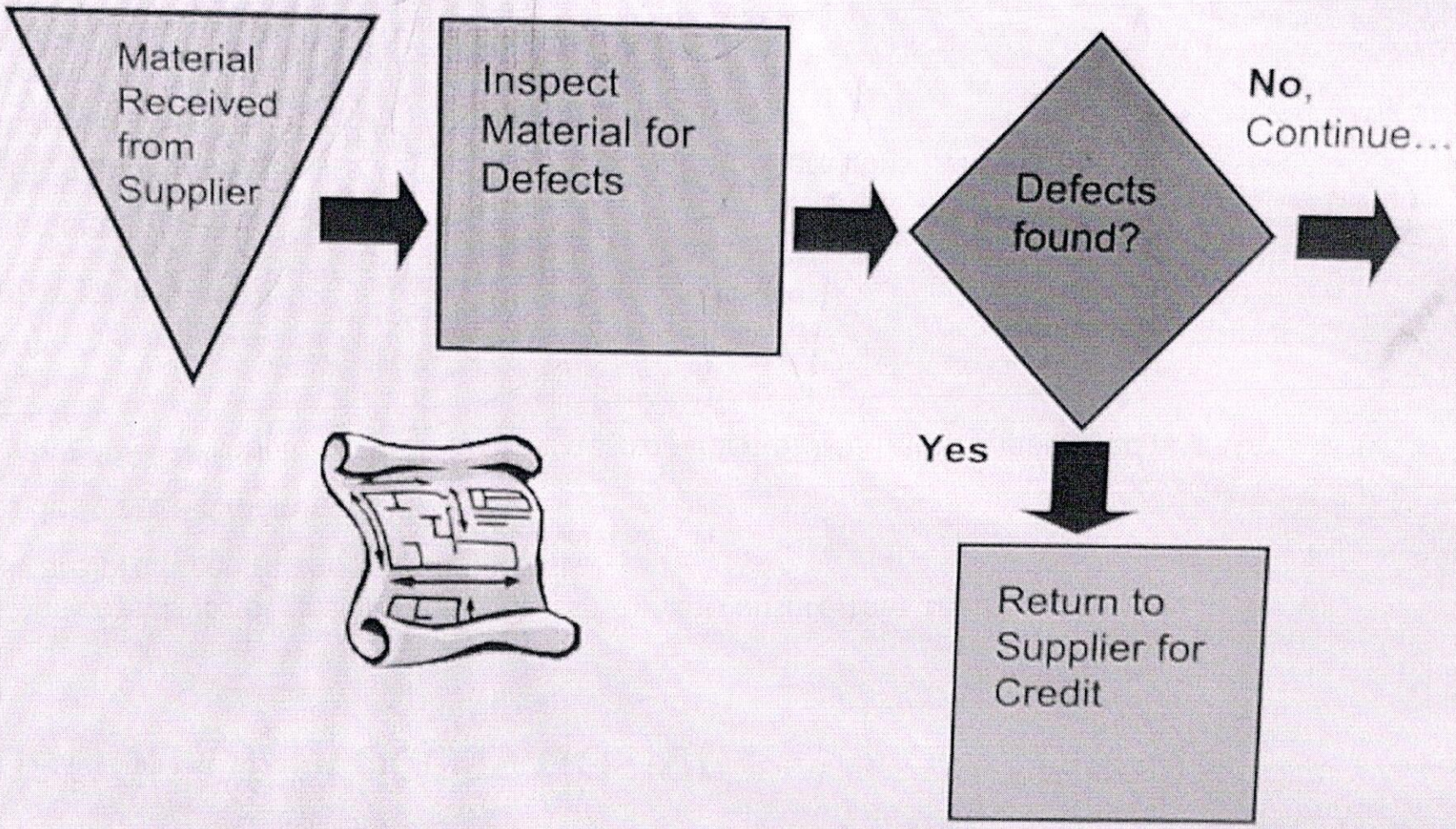
This formula can be used to find any of its components algebraically if the other parameters are known

Process Flow Design
Defined

- A process flow design can be defined as a mapping of the specific processes that raw materials, parts, and subassemblies follow as they move through a plant

- The most common tools to conduct a process flow design include assembly drawings, assembly charts, and operation and route sheets

Example: Process Flow Chart



Evaluation of process design

- The major objectives of designing a Process flow isto ensure that the goods and services are produced at the minimum cost.
- Process design is a dynamic activity
- A process engineer should be alert to changes to which of the below mentioned factors
- 1) Volume.
- 2) Product quality.
- 3) Equipments.
- Careful Planning ensures a complete coverage of all operations in manufacturing a product and the costs involved.

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Certificate of Completion

This to certify that Mr/Mrs. **M.NEELESH RAHUL** Bearing the Roll Number **179Y1A0333** has Successfully Completed Value Added Course on **"PRODUCT AND PROCESS DESIGN"** from **13/08/2019 to 30/08/2019**, Organized by Department of Mechanical Engineering, KSRMCE, Kadapa.

COORDINATOR

HOD

PRINCIPAL

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This to certify that Mr/Mrs. **O.SHARIEF** Bearing the Roll Number **179Y1A0338** has Successfully Completed Value Added Course on **"PRODUCT AND PROCESS DESIGN"** from **13/08/2019 to 30/08/2019,**

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This to certify that Mr/Mrs. **P.PREM KUMAR** Bearing the Roll Number **189Y5A0361** has Successfully Completed Value Added Course on **"PRODUCT AND PROCESS DESIGN"** from **13/08/2019 to 30/08/2019**,

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DEPARTMENT OF MECHANICAL ENGINEERING

FEEDBACK of
Certification Course on
PRODUCT AND PROCESS DESIGN
from 13th August 2019 to 30th August 2019

LIST OF PARTICIPANTS

S. No.	Roll No.	Name of the Student	Is the Course content meet your expectation	Is the lecture sequence well planned	Is the level of course high	Is the course exposed you to the new knowledge and practices	Rate the Knowledge of the Speaker	Rate the value of Course in increasing your skills	Any Issues
1	179Y1A0301	ACHUKATLA SHAIK FAZAL	Excellent	Excellent	good	Excellent	Excellent	Excellent	
2	179Y1A0302	ALAMURU IMAMBASHA	Good	Excellent	Satisfactory	Excellent	Excellent	Excellent	
3	179Y1A0303	B. R JYOTHI KUMAR REDDY	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	
4	179Y1A0305	B. B. SURENDRA YADAV	Excellent	Satisfactory	Excellent	good	Excellent	good	
5	179Y1A0307	B RAMA KRISHNA REDDY	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	
6	179Y1A0308	BOLLINENI HARIKRISHNA	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	
7	179Y1A0309	BOYA NAVEEN	Satisfactory	Excellent	Excellent	Excellent	good	Excellent	
8	179Y1A0310	C .NARENDRA REDDY	Excellent	Excellent	Satisfactory	Excellent	Excellent	good	
9	179Y1A0311	CHIMMANI PAVAN KUMAR	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	
10	179Y1A0312	DOLA PURNA VISEH SAGAR	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	
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26	179Y1A0333	MEKALA NEELESH RAHUL	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	
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61	189Y5A0321	K.HARSHAVARDHAN BABU	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	
62	189Y5A0322	K.VEERA HEMANTH KUMAR	Excellent	Excellent	Excellent	Excellent	Excellent	good	
63	189Y5A0332	NAGA MAHESWAR REDDY E	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	
64	189Y5A0333	N.THARUN KUMAR REDDY	Excellent	good	Excellent	Excellent	Excellent	Excellent	
65	189Y5A0334	N.MOHAMMED ABID	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	
66	189Y5A0335	N.MAHESWARA REDDY	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	
67	189Y5A0336	N.PATTABHI REDDY	Excellent	Excellent	Excellent	Satisfactory	Excellent	Excellent	
68	189Y5A0338	P.SURYA PRAKASH REDDY	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	
69	189Y5A0355	V.CHANDRAHASA REDDT	Excellent	Excellent	Excellent	Satisfactory	Excellent	Excellent	
70	189Y5A0356	Y.BHARGAV	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	
71	189Y5A0357	Y.GANESH	Excellent	good	Excellent	Excellent	Excellent	Excellent	
72	189Y5A0358	Y.HARINATH REDDY	Excellent	Excellent	Excellent	Satisfactory	Excellent	Excellent	
73	189Y5A0359	Y.RAMMOHAN	Excellent	Excellent	Excellent	Excellent	Excellent	good	
74	189Y5A0360	Y.YESWSANTH REDDY	Excellent	Excellent	Excellent	Satisfactory	Excellent	Excellent	
75	189Y5A0361	P.PREM KUMAR	Excellent	good	Excellent	Excellent	Excellent	Excellent	

COORDINATOR

HoD

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