
LESSON PLAN

Date/ Revision July, 15, 2016
Faculty Business and Social Sciences
Approval Dr. Samuel Prasetya

SUBJECT : Innovation and Product Development

1. Identification of Subject:

Name of Subject : Innovation and Product Development
Code of Subject : PROD-2100
SKS / ECTS : 2/3
Semester : 3
Study Program : B-MGT/B-IBA/B-INR
Lecturer : Norman Yachya , ST, MM, Timotius A. Rachmat, MM & Astrid Wiriadijaja, MSi

2. Competency

After having the course, students are expected to:

- a) Identify and analyze the strategic elements of new product innovation, e.g., the process, different functions, and individual roles.
- b) Assess and evaluate advantages and disadvantages with an internal versus open innovation approach.
- c) Propose a framework suitable for the management of new product innovation processes.
- d) Describe the nature and techniques of innovation and new product development;
- e) Discuss the role marketing plays in the early stages of product innovation and how the pattern of consumption influences the likely success or failure of a new product;
- f) Evaluate the process of developing new products and many of the new product management issues faced by companies;
- g) Demonstrate the best level of practice in each problem situation within the context of innovation and new product development;
- h) After completing the course, students will be able to describe the core aspects of Innovation and product development.
- i) Through the successful participation in this course students are able to recognize how to implement innovation and create new product development.

3. Description of Subject:

This course provides students with an in-depth understanding of innovation and new product development using a management framework. It focuses on how to create value and growth through innovation in new and existing markets. Students will explore the concepts, methods and tools on how to organize and manage innovation process with the objective to better control cost and risk, examine the process of developing new products and many of the new product management issues faced by companies. Plenty of case studies will be discussed to help students to better understand the successes and failures in innovation and new product development, ultimately, to improve the chance of success.

4. Learning Approach

Approach : Classroom , One on one , group discussion and interactive activities.

Method : A combination of lectures, case studies, videos, live projects and in-class discussions will be employed to familiarize students with the theories and key concepts of the course. Students are required to participate actively in class discussion.

Student Task : Group Assignment
Media : LCD and Video

5. Evaluation

a) Absence maximum	: 25%
b) Participation in discussion	: 10 points
c) Group Assignment	: 20 points
d) Project Presentation	: 15 points
e) Daily Quiz	: 10 points
f) Final Examination	: 45 points
Total	: 100 points

6. Detail of Lecturing Activity (LESSON PLAN):

WEEK : 1
Duration : 2x50 minutes
Topic : Introduction to Innovation and Product Development

Sub-Topic:

- Characteristic of Successful Product Development
- Who Designs and Develops Products ?
- Duration and Cost of Product Development
- The Challenges of Product Development
- The Product Development Process
- Concept Development : the front end process
- Product Development Organizations

Learning Outcomes of Lesson:

After completing this chapter, the student should be able to:

- Know the important of creating new product development and Innovation.
- Know who will be design and develop products.
- Know the challenges of product development.
- Know the basic process of product development
- Know product development organizations

DETAIL OF LECTURING ACTIVITY

Phase	TOPIC: Lecturer / Facilitator Activity	Students activity	Method / Lecturing Tools / Remarks
Introduction	<ul style="list-style-type: none"> • Introducing Innovation and Product Development , Development process and Organizations 	Listening	Lecturing

Delivery	<p>Explain the sub topic below</p> <ul style="list-style-type: none"> • Characteristic of Successful Product Development • Who Designs and Develops Products ? • Duration and Cost of Product Development • The Challenges of Product Development • The Product Development Process • Concept Development : the front end process • Product Development Organizations 	<ul style="list-style-type: none"> • Listening • Read The Book • Discuss Case Study 	LCD & Laptop
Closing	<ul style="list-style-type: none"> • Inform the student the next meeting material and give assignment to the students. • Paper for Innovation and Product Development (one Semester assignment for 1 group) 	<ul style="list-style-type: none"> • Listening 	Lecturing
Evaluation	<ul style="list-style-type: none"> • Evaluate the student's activity during the lesson and how they solve the problem 		
Reference	Text Book Chapter 1& Chapter 2		

WEEK : 2
Duration : 2 x 50 Minutes
Topic : Opportunity Identification and Product Planning

Sub-Topic:

- What is an Opportunity ? types of Opportunities
- Opportunity Identification process
- Product planning process

Learning Outcomes of Lesson:

After completing this chapter, the Student should be able to:

- Understand types of Opportunities
- Identify Opportunity Process
- Know to do Product Planning Process

Phase	TOPIC: Lecturer / Facilitator Activity	Students activity	Method / Lecturing Tools / Remarks
Introduction	<ul style="list-style-type: none"> • Introducing Opportunity Identification and Product Planning 	Listening	Lecturing

Delivery	<p>Explain the sub topic below</p> <ul style="list-style-type: none"> • What is an Opportunity ? types of Opportunities • Opportunity Identification process • Product planning process 	<ul style="list-style-type: none"> • Listening • Read The Book • Discuss Case Study 	LCD & Laptop
Closing	<ul style="list-style-type: none"> • Inform the student the next meeting material and give assignment to the students 	<ul style="list-style-type: none"> • Listening 	Lecturing
Evaluation	<ul style="list-style-type: none"> • Evaluate the student's activity during the lesson and how they solve the problem 		
Reference	Text Book Chapter 3 & Chapter 4		

WEEK : 3

Duration : 2 x 50 Minutes

Topic : Identifying Customer Needs , Product Specifications

Sub-Topics:

- Choosing Customers
- The Art of Eliciting Customer Needs Data
- Documenting Interactions with Customers.
- What are Specifications ?
- What are Specifications Established ?
- Establishing Target Specifications
- Setting the Final Specifications

Learning Outcomes of Lesson:

After completing this chapter, the students should be able to:

- Know how to identify customer needs.
- Know how to gather information from customers.
- Know what is product specification and the function of product specification in Product Development process.
- Know how to setting the final specifications.

Phase	TOPIC: Lecturer / Facilitator Activity	Students activity	Method / Lecturing Tools / Remarks
Introduction	<ul style="list-style-type: none"> • Introducing Identifying Customer needs and product specifications course objective and expectations 	Listening	Lecturing
Delivery	<p>Explain the sub topic below</p> <ul style="list-style-type: none"> • Choosing Customers • The Art of Eliciting Customer Needs Data • Documenting Interactions with Customers. 	<ul style="list-style-type: none"> • Listening • Read The Book • Discuss Case Study 	LCD & Laptop

	<ul style="list-style-type: none"> • What are Specifications ? • What are Specifications Established ? • Establishing Target Specifications • Setting the Final Specifications 		
Closing	<ul style="list-style-type: none"> • Inform the student the next meeting material and give assignment to the students 	<ul style="list-style-type: none"> • Listening 	Lecturing
Evaluation	<ul style="list-style-type: none"> • Evaluate the student's activity during the lesson and how they solve the problem 		
Reference	Text Book Chapter 5 & Chapter 6		

WEEK : 4
Duration : 2 x 50 Minutes
Topic : Concept Generation

Sub-Topics:

- The Activity of Concept Generation
- A Five-Step Method
 - Step 1: Clarify the Problem
Decompose a Complex Problem into Simpler Sub problems
Focus Initial Efforts on the Critical Sub problems
 - Step 2: Search Externally
Interview Lead Users
Consult Experts
Search Patents
Search Published Literature
Benchmark Related Products
 - Step 3: Search Internally
Both Individual and Group Sessions Can Be Useful Hints for Generating Solution Concepts
 - Step 4: Explore Systematically
Concept Classification Tree
Concept Combination Table
Managing the Exploration Process
 - Step 5: Reflect on the Solutions and the Process

Learning Outcomes of Lesson:

After completing this chapter, the students should be able to:

- Know about basic Concept Generation.
- Know about five step method in concept generation.
- Know what is the function of Concept Generation in Product Development process.

Phase	TOPIC: Lecturer / Facilitator Activity	Students activity	Method / Lecturing Tools / Remarks
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Phase	TOPIC: Lecturer / Facilitator Activity	Students activity	Method / Lecturing Tools / Remarks
Introduction	<ul style="list-style-type: none"> Introducing Concept Generation objective and expectations 	Listening	Lecturing
Delivery	<p>Explain the sub topic below</p> <ul style="list-style-type: none"> The Activity of Concept Generation <i>A Five-Step Method</i> <ul style="list-style-type: none"> Step 1: Clarify the Problem <i>Decompose a Complex Problem into Simpler Sub problems</i> <i>Focus Initial Efforts on the Critical Sub problems</i> Step 2: Search Externally <i>Interview Lead Users</i> <i>Consult Experts</i> <i>Search Patents</i> <i>Search Published Literature</i> <i>Benchmark Related Products</i> Step 3: Search Internally <i>Both Individual and Group Sessions</i> <i>Can Be Useful Hints for Generating Solution Concepts</i> Step 4: Explore Systematically <i>Concept Classification Tree</i> <i>Concept Combination Table</i> <i>Managing the Exploration Process</i> Step 5: Reflect on the Solutions and the Process 	<ul style="list-style-type: none"> Listening Read The Book Discuss Case Study 	LCD & Laptop
Closing	<ul style="list-style-type: none"> Inform the student the next meeting material and give assignment to the students. Paper work for Innovation and Product Development Draft 1 Collected. 	<ul style="list-style-type: none"> Listening 	Lecturing
Evaluation	<ul style="list-style-type: none"> Evaluate the student's activity during the lesson and how they solve the problem 		
Reference	Text Book Chapter 7		

WEEK : 5
 Duration : 2 x 50 Minutes
 Topic : Concept Selection

Sub-Topics:

- Concept Selection Is an Integral Part of the Product Development Process
- All Teams Use Some Method for Choosing a Concept
- A Structured Method Offers Several Benefits
- Overview of Methodology
Concept Screening
 - Step 1: Prepare the Selection Matrix

- Step 2: Rate the Concepts
- Step 3: Rank the Concepts
- Step 4: Combine and Improve the Concepts
- Step 5: Select One or More Concepts
- Step 6: Reflect on the Results and the Process

Concept Scoring

- Step 1: Prepare the Selection Matrix
- Step 2: Rate the Concepts
- Step 3: Rank the Concepts
- Step 4: Combine and Improve the Concepts
- Step 5: Select One or More Concepts
- Step 6: Reflect on the Results and the Process

Learning Outcomes of Lesson:

After completing this chapter, the students should be able to:

- Know about basic Concept Selection.
- Know about the steps method in concept Selection.
- Know what is the function of Concept Selection in Product Development process.

Phase	TOPIC: Lecturer / Facilitator Activity	Students activity	Method / Lecturing Tools / Remarks
Introduction	<ul style="list-style-type: none"> • Introducing Digital Business Strategy class objective and expectations 	Listening	Lecturing
Delivery	<p>Explain the sub topic below</p> <ul style="list-style-type: none"> • Concept Selection Is an Integral Part of the Product Development Process • All Teams Use Some Method for Choosing a Concept • A Structured Method Offers Several Benefits • Overview of Methodology Concept Screening <ul style="list-style-type: none"> • <i>Step 1: Prepare the Selection Matrix</i> • <i>Step 2: Rate the Concepts</i> • <i>Step 3: Rank the Concepts</i> • <i>Step 4: Combine and Improve the Concepts</i> • <i>Step 5: Select One or More Concepts</i> • <i>Step 6: Reflect on the Results and the Process</i> <p>Concept Scoring</p> <ul style="list-style-type: none"> • <i>Step 1: Prepare the Selection Matrix</i> • <i>Step 2: Rate the Concepts</i> • <i>Step 3: Rank the Concepts</i> 	<ul style="list-style-type: none"> • Listening • Read The Book • Discuss Case Study 	LCD & Laptop

Phase	TOPIC: Lecturer / Facilitator Activity	Students activity	Method / Lecturing Tools / Remarks
	<ul style="list-style-type: none"> Step 4: Combine and Improve the Concepts Step 5: Select One or More Concepts Step 6: Reflect on the Results and the Process 		
Closing	<ul style="list-style-type: none"> Inform the student the next meeting material and give assignment to the students 	<ul style="list-style-type: none"> Listening 	Lecturing
Evaluation	<ul style="list-style-type: none"> Evaluate the student's activity during the lesson and how they solve the problem 		Quiz on Submission
Reference	Text Book Chapter 8		

WEEK : 6
Duration : 2 x 50 Minutes
Topic : Concept Testing

Sub-Topics:

- Steps Method in Concept Testing :
 - Step 1: Define the Purpose of the Concept Test
 - Step 2: Choose a Survey Population
 - Step 3: Choose a Survey Format
 - Step 4: Communicate the Concept
 - Matching the Survey Format with the Means of Communicating the Concept
 - Issues in Communicating the Concept
 - Step 5: Measure Customer Response
 - Step 6: Interpret the Results
 - Step 7: Reflect on the Results and the Process

Learning Outcomes of Lesson:

After completing this chapter, the students should be able to:

- Know about basic Concept Testing.
- Know about steps method in concept Testing.
- Know what is the function of Concept Testing in Product Development process.

Phase	TOPIC: Lecturer / Facilitator Activity	Students activity	Method / Lecturing Tools / Remarks
Introduction	<ul style="list-style-type: none"> Introducing Concept Testing course objective and expectations 	Listening	Lecturing
Delivery	Explain the sub topic below <ul style="list-style-type: none"> Steps Method in Concept Testing : <ul style="list-style-type: none"> Step 1: Define the Purpose of the Concept Test 	<ul style="list-style-type: none"> Listening Read The Book Discuss Case 	LCD & Laptop

Phase	TOPIC: Lecturer / Facilitator Activity	Students activity	Method / Lecturing Tools / Remarks
	<ul style="list-style-type: none"> Step 2: Choose a Survey Population Step 3: Choose a Survey Format Step 4: Communicate the Concept <i>Matching the Survey Format with the Means of Communicating the Concept</i> <i>Issues in Communicating the Concept</i> Step 5: Measure Customer Response Step 6: Interpret the Results Step 7: Reflect on the Results and the Process 	Study	
Closing	<ul style="list-style-type: none"> Inform the student the next meeting material and give assignment to the students 	<ul style="list-style-type: none"> Listening 	Lecturing
Evaluation	<ul style="list-style-type: none"> Evaluate the student's activity during the lesson and how they solve the problem 		Paper 1 Submission
Reference	Text Book Chapter 9		

WEEK : 7 (Mid Semester Exam)

WEEK : 8 (Break)

WEEK : 9

Duration : 2 x 50 Minutes

Topic : Product Architecture , Industrial Design

Sub-Topics:

Product Architecture

- What Is Product Architecture?
- *When Is the Product Architecture Defined?*
- Implications of the Architecture
 - Product Change*
 - Product Variety*
 - Component Standardization*
 - Product Performance*
 - Manufacturability*
 - Product Development Management*
- Establishing the Architecture
 - Step 1: Create a Schematic of the Product*
 - Step 2: Cluster the Elements of the Schematic*
 - Step 3: Create a Rough Geometric Layout*
 - Step 4: Identify the Fundamental and Incidental Interactions*
- Delayed Differentiation
- Platform Planning
 - Differentiation Plan*
 - Commonality Plan*
 - Managing the Trade-Off between Differentiation and Commonality*
- Related System-Level Design Issues
 - Defining Secondary Systems*
 - Establishing the Architecture of the Chunks*
 - Creating Detached Interface Specifications*

Industrial Design

- What Is Industrial Design?
- Assessing the Need for Industrial Design
Expenditures for Industrial Design
How Important Is Industrial Design to a Product?
Ergonomic Needs
Aesthetic Needs
- The Impact of Industrial Design
Is Industrial Design Worth the Investment?
How Does Industrial Design Establish a Corporate Identity?
- The Industrial Design Process
 1. *Investigation of Customer Needs*
 2. *Conceptualization*
 3. *Preliminary Refinement*
 4. *Further Refinement and Final Concept Selection*
 5. *Control Drawings or Models*
 6. *Coordination with Engineering, Manufacturing, and External Vendors*
- Management of the Industrial Design Process
- *Timing of Industrial Design Involvement*
- Assessing the Quality of Industrial Design
 1. *Quality of the User Interface*
 2. *Emotional Appeal*
 3. *Ability to Maintain and Repair the Product*
 4. *Appropriate Use of Resources*
 5. *Product Differentiation*

Learning Outcomes of Lesson:

After completing this chapter, the students should be able to:

Identify the benefits and risks of e-procurement

- Knowing about Product Architecture
- When to defined Product Architecture
- Know about implication of the Product Architecture.
- Know about Platform Planning and how to create Platform Planning.
- Understand the meaning of Industrial Design.
- Know the important industrial design to a product
- Understand the impact of industrial design.
- Know the industrial design process.

Phase	TOPIC: Lecturer / Facilitator Activity	Students activity	Method / Lecturing Tools / Remarks
Introduction	<ul style="list-style-type: none"> • Introducing Product Architecture, Industrial Design objective and expectations 	Listening	Lecturing
Delivery	Explain the sub topic below Product Architecture <ul style="list-style-type: none"> • What Is Product Architecture? • <i>When Is the Product Architecture Defined?</i> • Implications of the Architecture <i>Product Change</i> <i>Product Variety</i> <i>Component Standardization</i> 	<ul style="list-style-type: none"> • Listening • Read The Book • Discuss Case Study 	LCD & Laptop

Phase	TOPIC: Lecturer / Facilitator Activity	Students activity	Method / Lecturing Tools / Remarks
	<p><i>Product Performance</i> <i>Manufacturability</i> <i>Product Development Management</i></p> <ul style="list-style-type: none"> • Establishing the Architecture <ul style="list-style-type: none"> <i>Step 1: Create a Schematic of the Product</i> <i>Step 2: Cluster the Elements of the Schematic</i> <i>Step 3: Create a Rough Geometric Layout</i> <i>Step 4: Identify the Fundamental and Incidental Interactions</i> • Delayed Differentiation • Platform Planning <ul style="list-style-type: none"> <i>Differentiation Plan</i> <i>Commonality Plan</i> <i>Managing the Trade-Off between Differentiation and Commonality</i> • Related System-Level Design Issues <ul style="list-style-type: none"> <i>Defining Secondary Systems</i> <i>Establishing the Architecture of the Chunks</i> <i>Creating Detached Interface Specifications</i> <p>Industrial Design</p> <ul style="list-style-type: none"> • What Is Industrial Design? • Assessing the Need for Industrial Design <ul style="list-style-type: none"> <i>Expenditures for Industrial Design</i> <i>How Important Is Industrial Design to a Product?</i> <i>Ergonomic Needs</i> <i>Aesthetic Needs</i> • The Impact of Industrial Design <ul style="list-style-type: none"> <i>Is Industrial Design Worth the Investment?</i> <i>How Does Industrial Design Establish a Corporate Identity?</i> • The Industrial Design Process <ol style="list-style-type: none"> <i>1. Investigation of Customer Needs</i> <i>2. Conceptualization</i> <i>3. Preliminary Refinement</i> <i>4. Further Refinement and Final Concept Selection</i> <i>5. Control Drawings or Models</i> <i>6. Coordination with Engineering, Manufacturing, and External Vendors</i> • Management of the Industrial Design Process • Timing of Industrial Design Involvement • Assessing the Quality of Industrial Design <ol style="list-style-type: none"> <i>1. Quality of the User Interface</i> <i>2. Emotional Appeal</i> 		

Phase	TOPIC: Lecturer / Facilitator Activity	Students activity	Method / Lecturing Tools / Remarks
	<p>3. Ability to Maintain and Repair the Product</p> <p>4. Appropriate Use of Resources</p> <p>5. Product Differentiation</p>		
Closing	<ul style="list-style-type: none"> Inform the student the next meeting material and give assignment to the students Paper Innovation and Product Development Draft 2 Collected. 	<ul style="list-style-type: none"> Listening 	Lecturing
Evaluation	<ul style="list-style-type: none"> Evaluate the student's activity during the lesson and how they solve the problem 		
Reference	Text Book Chapter 10& Chapter 11		

WEEK : 10
Duration : 2 x 50 Minutes
Topic : Design for Environment

Sub-Topics:

- What Is Design for Environment?
 - Two Life Cycles
 - Environmental Impacts
 - History of Design for Environment
 - Herman Miller's Journey toward Design for Environment
- The Design for Environment Process
 - Step 1: Set the DFE Agenda: Drivers, Goals, and Team
 - Identify the Internal and External Drivers of DFE
 - Set the DFE Goals
 - Set Up the DFE Team
 - Step 2: Identify Potential Environmental Impacts
 - Step 3: Select DFE Guidelines
 - Step 4: Apply the DFE Guidelines to the Initial Product Design
 - Step 5: Assess the Environmental Impacts
 - Compare the Environmental Impacts to DFE Goals
 - Step 6: Refine the Product Design to Reduce or Eliminate the Environmental Impacts
 - Step 7: Reflect on the DFE Process and Results

Learning Outcomes of Lesson:

After completing this chapter, the students should be able to:

- Understand what is Design for Environment.
- Understand what is the impact from design in environment
- Know Design for environment process.
- Know how to set the Design for environment goals.

Phase	TOPIC: Lecturer / Facilitator Activity	Students activity	Method / Lecturing Tools / Remarks
Introduction	<ul style="list-style-type: none"> Introducing Design for Environment objective and expectations 	Listening	Lecturing
Delivery	<p>Explain the sub topic below</p> <ul style="list-style-type: none"> What Is Design for Environment? <i>Two Life Cycles</i> <i>Environmental Impacts</i> <i>History of Design for Environment</i> <i>Herman Miller's Journey toward Design for Environment</i> The Design for Environment Process Step 1: Set the DFE Agenda: Drivers, Goals, and Team <i>Identify the Internal and External Drivers of DFE</i> <i>Set the DFE Goals</i> <i>Set Up the DFE Team</i> Step 2: Identify Potential Environmental Impacts Step 3: Select DFE Guidelines Step 4: Apply the DFE Guidelines to the Initial Product Design Step 5: Assess the Environmental Impacts <i>Compare the Environmental Impacts to DFE Goals</i> Step 6: Refine the Product Design to Reduce or Eliminate the Environmental Impacts Step 7: Reflect on the DFE Process and Results 	<ul style="list-style-type: none"> Listening Read The Book Discuss Case Study 	LCD & Laptop
Closing	<ul style="list-style-type: none"> Inform the student the next meeting material and give assignment to the students 	<ul style="list-style-type: none"> Listening 	Lecturing
Evaluation	<ul style="list-style-type: none"> Evaluate the student's activity during the lesson and how they solve the problem 		
Reference	Text Book Chapter 12		

WEEK : 11

Duration : 2 x 50 Minutes

Topic : Design for Manufacturing

Sub-Topics:

- Design for Manufacturing Defined
DFM Requires a Cross-Functional Team
DFMIs Performed throughout the Development Process
Overview of the DFM Process :
 - Step 1: Estimate the Manufacturing Costs
Transportation Costs
Fixed Costs versus Variable Costs

- The Bill of Materials
- Estimating the Costs of Standard Components
- Estimating the Costs of Custom Components
- Estimating the Cost of Assembly
- Estimating the Overhead Costs
- Step 2: Reduce the Costs of Components
 - Understand the Process Constraints and Cost Drivers
 - Redesign Components to Eliminate Processing Steps
 - Choose the Appropriate Economic Scale for the Part Process
 - Standardize Components and Processes
 - Adhere to "Black Box " Component Procurement
- Step 3: Reduce the Costs of Assembly
 - Keeping Score
 - Integrate Parts
 - Maximize Ease of Assembly
 - Consider Customer Assembly
- Step 4: Reduce the Costs of Supporting
 - Production
 - Minimize Systemic Complexity
 - Error Proofing
- Step 5: Consider the Impact of DFM Decisions on Other Factors
 - The Impact of DFM on Development Time
 - The Impact of DFM on Development Cost
 - The Impact of DFM on Product Quality
 - The Impact of DFM on External Factors

Learning Outcomes of Lesson:

After completing this chapter, the students should be able to:

- Know how to defined Design for Manufacturing
- Understand overview of the Design for Manufacturing process
- Understand how to determine the cost of Design for Manufacturing.

Phase	TOPIC: Lecturer / Facilitator Activity	Students activity	Method / Lecturing Tools / Remarks
Introduction	<ul style="list-style-type: none"> • Introducing Design for Manufacturing objective and expectations 	Listening	Lecturing
Delivery	Explain the sub topic below <ul style="list-style-type: none"> • Design for Manufacturing Defined <i>DFM Requires a Cross-Functional Team</i> <i>DFMs Performed throughout the Development Process</i> • Overview of the DFM Process : <ul style="list-style-type: none"> • Step 1: Estimate the Manufacturing Costs <i>Transportation Costs</i> <i>Fixed Costs versus Variable Costs</i> <i>The Bill of Materials</i> <i>Estimating the Costs of Standard Components</i> <i>Estimating the Costs of Custom Components</i> <i>Estimating the Cost of Assembly</i> <i>Estimating the Overhead Costs</i> 	<ul style="list-style-type: none"> • Listening • Read The Book • Discuss Case Study 	LCD & Laptop

Phase	TOPIC: Lecturer / Facilitator Activity	Students activity	Method / Lecturing Tools / Remarks
	<ul style="list-style-type: none"> Step 2: Reduce the Costs of Components <i>Understand the Process Constraints and Cost Drivers</i> <i>Redesign Components to Eliminate Processing Steps</i> <i>Choose the Appropriate Economic Scale for the Part Process</i> <i>Standardize Components and Processes</i> <i>Adhere to "Black Box " Component Procurement</i> Step 3: Reduce the Costs of Assembly <i>Keeping Score</i> <i>Integrate Parts</i> <i>Maximize Ease of Assembly</i> <i>Consider Customer Assembly</i> Step 4: Reduce the Costs of Supporting Production <i>Minimize Systemic Complexity</i> <i>Error Proofing</i> Step 5: Consider the Impact of DFM Decisions on Other Factors <i>The Impact of DFM on Development Time</i> <i>The Impact of DFM on Development Cost</i> <i>The Impact of DFM on Product Quality</i> <i>The Impact of DFM on External Factors</i> 		
Closing	<ul style="list-style-type: none"> Inform the student the next meeting material and give assignment to the students 	<ul style="list-style-type: none"> Listening 	Lecturing
Evaluation	<ul style="list-style-type: none"> Evaluate the student's activity during the lesson and how they solve the problem 		
Reference	Text Book Chapter 13		

WEEK : 12

Duration : 2 x 50 Minutes

Topic : Prototyping , Robust Design

Sub-Topics:

Prototyping

- Understanding Prototypes
Types of Prototypes
What Are Prototypes Used For
- Principles of Prototyping
Analytical Prototypes Are Generally More Flexible Than Physical Prototypes
Physical Prototypes Are Required to Detect Unanticipated Phenomena
A Prototype May Reduce the Risk of Costly Iterations

- A Prototype May Expedite Other Development Steps
- A Prototype May Restructure Task Dependencies
- Prototyping Technologies
 - 3D CAD Modeling and Analysis
 - Free-Form Fabrication
- Planning for Prototypes
 - Step 1: Define the Purpose of the Prototype
 - Step 2: Establish the Level of Approximation of the Prototype
 - Step 3: Outline an Experimental Plan
 - Step 4: Create a Schedule for Procurement, Construction, and Testing
- Planning Milestone Prototypes

Robust Design

- What is Robust Design ?
- Design of Experiments
- The Robust Design Process
 - Step 1: Identify Control Factors, Noise Factors, and Performance Metrics
 - Step 2: Formulate an Objective Function
 - Step 3: Develop the Experimental Plan
- Experimental Designs
- Testing Noise Factors
 - Step 4: Run the Experiment
 - Step 5: Conduct the Analysis
- Computing the Objective Function
- Computing Factor Effects by Analysis of Means
 - Step 6: Select and Confirm Factor
- Setpoints
 - Step 7: Reflect and Repeat

Learning Outcomes of Lesson:

After completing this chapter, the students should be able to:

- Understanding prototypes
- Know principles of prototyping
- Know how to make plan for prototypes
- Understand Robust Design and Robust Design Process

Phase	TOPIC: Lecturer / Facilitator Activity	Students activity	Method / Lecturing Tools / Remarks
Introduction	<ul style="list-style-type: none"> • Introducing Prototyping , Robust Design objective and expectations 	Listening	Lecturing
Delivery	Explain the sub topic below Prototyping <ul style="list-style-type: none"> • Understanding Prototypes <i>Types of Prototypes</i> <i>What Are Prototypes Used For</i> • Principles of Prototyping <i>Analytical Prototypes Are Generally More Flexible Than Physical Prototypes</i> <i>Physical Prototypes Are Required to Detect Unanticipated Phenomena</i> <i>A Prototype May Reduce the Risk of Costly Iterations</i> <i>A Prototype May Expedite Other Development Steps</i> 	<ul style="list-style-type: none"> • Listening • Read The Book • Discuss Case Study 	LCD & Laptop

Phase	TOPIC: Lecturer / Facilitator Activity	Students activity	Method / Lecturing Tools / Remarks
	<p><i>A Prototype May Restructure Task Dependencies</i></p> <ul style="list-style-type: none"> Prototyping Technologies <i>3D CAD Modeling and Analysis</i> <i>Free-Form Fabrication</i> Planning for Prototypes <i>Step 1: Define the Purpose of the Prototype</i> <i>Step 2: Establish the Level of Approximation of the Prototype</i> <i>Step 3: Outline an Experimental Plan</i> <i>Step 4: Create a Schedule for Procurement, Construction, and Testing</i> <i>Planning Milestone Prototypes</i> <p>Robust Design</p> <ul style="list-style-type: none"> What is Robust Design ? <i>Design of Experiments</i> <i>The Robust Design Process</i> Step 1: Identify Control Factors, Noise Factors, and Performance Metrics Step 2: Formulate an Objective Function Step 3: Develop the Experimental Plan <i>Experimental Designs</i> <i>Testing Noise Factors</i> Step 4: Run the Experiment Step 5: Conduct the Analysis <i>Computing the Objective Function</i> <i>Computing Factor Effects by Analysis of Means</i> Step 6: Select and Confirm Factor Setpoints Step 7: Reflect and Repeat 		
Closing	<ul style="list-style-type: none"> Inform the student the next meeting material and give assignment to the students 	<ul style="list-style-type: none"> Listening 	Lecturing
Evaluation	<ul style="list-style-type: none"> Evaluate the student's activity during the lesson and how they solve the problem 		Paper Submission
Reference	Text Book Chapter 14& Chapter 15		

WEEK : 13
Duration : 2 x 50 Minutes
Topic : Patents and Intellectual Property

Sub-Topics:

- What Is Intellectual Property?
Overview of Patents
Utility Patents
Preparing a Disclosure
- Step 1: Formulate a Strategy and Plan
Timing of Patent Applications

- Type of Application
- Scope of Application
- Step 2: Study Prior Inventions
- Step 3: Outline Claims
- Step 4: Write the Description of the Invention
- Figures
- Writing the Detailed Description
- Defensive Disclosure
- Step 5: Refine Claims
- Writing the Claims
- Guidelines for Crafting Claims
- Step 6: Pursue Application
- Step 7: Reflect on the Results and the Process

Learning Outcomes of Lesson:

After completing this chapter, the students should be able to:

- Understand what is Intellectual Property
- Know how to prepare the disclosure
- Know how to formulate a strategy and plan regarding to Patents and intellectual strategy.

Phase	TOPIC: Lecturer / Facilitator Activity	Students activity	Method / Lecturing Tools / Remarks
Introduction	<ul style="list-style-type: none"> • Introducing Patent and Intellectual property objective and expectations 	Listening	Lecturing
Delivery	<p>Explain the Sub topic below :</p> <ul style="list-style-type: none"> • What Is Intellectual Property? <i>Overview of Patents</i> <i>Utility Patents</i> <i>Preparing a Disclosure</i> • Step 1: Formulate a Strategy and Plan <i>Timing of Patent Applications</i> <i>Type of Application</i> <i>Scope of Application</i> • Step 2: Study Prior Inventions • Step 3: Outline Claims • Step 4: Write the Description of the Invention <i>Figures</i> <i>Writing the Detailed Description</i> <i>Defensive Disclosure</i> • Step 5: Refine Claims <i>Writing the Claims</i> <i>Guidelines for Crafting Claims</i> • Step 6: Pursue Application Step 7: Reflect on the Results and the Process 	<ul style="list-style-type: none"> • Listening 	LCD & Laptop
Closing	Inform the student the next meeting material and give assignment to the students	<ul style="list-style-type: none"> • Listening 	Lecturing
Evaluation	Evaluate the student's activity during the lesson and how they solve the problem		
Reference	Text Book Chapter 16		

WEEK : 14
Duration : 2 x 50 Minutes
Topic : Product Development Economics , Managing Project

Sub-Topics:

Product Development Economics

- Elements of Economic Analysis
Quantitative Analysis
Qualitative Analysis
When Should Economic Analysis Be Performed?
Economic Analysis Process
- Step 1: Build a Base-Case Financial Model
Estimate the Timing and Magnitude of Future Cash Inflows and Outflows
Compute the Net Present Value of the Cash Flows
The Base-Case Financial Model Can Support
Go/No-Go Decisions and Major Investment Decisions
- Step 2: Perform Sensitivity Analysis
Development Cost Example
Development Time Example
- Step 3: Use Sensitivity Analysis to Understand Project Trade-Offs
Six Potential Interactions
Trade-Off Rules
Limitations of Quantitative Analysis 366
- Step 4: Consider the Influence of the Qualitative
- Factors on Project Success
Projects Interact with the Firm, the Market, and the Macro Environment
Carrying Out Qualitative Analysis

Managing Projects

- Understanding and Representing Tasks
Sequential, Parallel, and Coupled Tasks
The Design Structure Matrix
Gantt Charts
PERT Charts
The Critical Path
- Baseline Project Planning
The Contract Book
Project Task List
Team Staffing and Organization
Project Schedule
Project Budget
Project Risk Plan
Modifying the Baseline Plan
- Accelerating Projects
- Project Execution
Coordination Mechanisms
Assessing Project Status
Corrective Actions
- Postmortem Project Evaluation

Learning Outcomes of Lesson:

After completing this chapter, the students should be able to:

- Understand Elements of Economic analysis
- Understand the Economic Analysis Process
- Understanding and Representing Tasks
- Understand baseline Project Planning.

Phase	TOPIC: Lecturer / Facilitator Activity	Students activity	Method / Lecturing Tools / Remarks
Introduction	<ul style="list-style-type: none"> Introducing Product Development Economics, Managing Projects objective and expectations 	Listening	Lecturing
Delivery	<p>Explaining the sub topic below :</p> <p>Product Development Economics</p> <ul style="list-style-type: none"> Elements of Economic Analysis <ul style="list-style-type: none"> <i>Quantitative Analysis</i> <i>Qualitative Analysis</i> <i>When Should Economic Analysis Be Performed?</i> <i>Economic Analysis Process</i> Step 1: Build a Base-Case Financial Model <ul style="list-style-type: none"> <i>Estimate the Timing and Magnitude of Future Cash Inflows and Outflows</i> <i>Compute the Net Present Value of the Cash Flows</i> <i>The Base-Case Financial Model Can Support Go/No-Go Decisions and Major Investment Decisions</i> Step 2: Perform Sensitivity Analysis <ul style="list-style-type: none"> <i>Development Cost Example</i> <i>Development Time Example</i> Step 3: Use Sensitivity Analysis to Understand Project Trade-Offs <ul style="list-style-type: none"> <i>Six Potential Interactions</i> <i>Trade-Off Rules</i> <i>Limitations of Quantitative Analysis 366</i> Step 4: Consider the Influence of the Qualitative Factors on Project Success <ul style="list-style-type: none"> <i>Projects Interact with the Firm, the Market, and the Macro Environment</i> <i>Carrying Out Qualitative Analysis</i> <p>Managing Projects</p> <ul style="list-style-type: none"> Understanding and Representing Tasks <ul style="list-style-type: none"> <i>Sequential, Parallel, and Coupled Tasks</i> <i>The Design Structure Matrix</i> <i>Gantt Charts</i> <i>PERT Charts</i> <i>The Critical Path</i> Baseline Project Planning <ul style="list-style-type: none"> <i>The Contract Book</i> <i>Project Task List</i> <i>Team Staffing and Organization</i> <i>Project Schedule</i> <i>Project Budget</i> <i>Project Risk Plan</i> <i>Modifying the Baseline Plan</i> Accelerating Projects Project Execution 	<ul style="list-style-type: none"> Listening Read The Book Discuss Case Study 	LCD & Laptop

Phase	TOPIC: Lecturer / Facilitator Activity	Students activity	Method / Lecturing Tools / Remarks
	<i>Coordination Mechanisms</i> <i>Assessing Project Status</i> <i>Corrective Actions</i> <ul style="list-style-type: none"> Postmortem Project Evaluation 		
Closing	<ul style="list-style-type: none"> Inform the students the next meeting will be final exam Paper Innovation and Product Development Final Draft Collected 	<ul style="list-style-type: none"> Listening 	Lecturing
Evaluation	<ul style="list-style-type: none"> Evaluate the student's activity during the lesson and how they solve the problem 		
Reference	Text Book Chapter 17 & Chapter 18		

WEEK : 15 (Final Exam)