

320224699 Processing Machinery and Equipment

Module Name	Processing Machinery and Equipment
Module Level, if applicable	Intermediate
Code if Applicable	320224699
Subtitle, if applicable	-
Courses, if applicable	320224699 Processing Machinery and Equipment
Semester(s) in which the module is taught	4th
Person responsible for the module	Devi Dwi Siskawardani, S.TP., M.Sc.
Lecturer	Devi Dwi Siskawardani, S.TP., M.Sc.
Language	Indonesian
Relation to curriculum	Compulsory Course for undergraduate program in the Food Technology Department, Faculty of Agriculture and Animal Science
Type of teaching	Lecture, project
Workload	<ul style="list-style-type: none"> • Lecture: 2 SKS X 50 minutes X 16 weeks • Project: 3 SKS X 60 minutes X 16 weeks • Independent learning: 3 SKS X 60 minutes X 16 week
Credit points	2 SKS X 1.5 = 3.0 ECTS
Requirements according to the examination regulations	<ol style="list-style-type: none"> 1. Registered in this course 2. Minimum 80% attendance in this course
Recommended prerequisites	Basic Physic
Module Objectives (Intended learning outcomes)	<p>On successful completion of this course, student should be able to:</p> <ol style="list-style-type: none"> 1. Identify and determine function of Packaging consist of: <ul style="list-style-type: none"> ○ Protection: It shields products from damage, contamination, and spoilage during handling, transportation, and storage. ○ Preservation: Packaging helps extend the shelf life of products by maintaining their freshness, flavor, and nutritional value. ○ Promotion: Packaging communicates information about the product, brand, and usage to consumers. It also serves as a

marketing tool to attract attention and differentiate the product from competitors.

- Convenience: Packaging facilitates easy handling, storage, and consumption of products for consumers.
2. Students can describe and give examples of packaging materials. It's depending on the product, its requirements, and environmental considerations. It could be:
- Plastic: Versatile, lightweight, and durable. Examples include PET, HDPE, LDPE, and PP.
 - Paper and cardboard: Renewable, recyclable, and customizable. Used for boxes, cartons, and labels.
 - Glass: Transparent, inert, and non-permeable. Suitable for preserving taste and quality but heavy and fragile.
 - Metal: Strong, impermeable, and recyclable. Commonly used for cans, bottles, and foil.
 - Biodegradable materials: Eco-friendly alternatives derived from plant-based sources like PLA (polylactic acid) or compostable materials.
3. Students can describe and give examples of edible films and coatings. The thin layers of edible materials applied to food products for various purposes:
- Preservation: They help extend the shelf life of perishable products by acting as barriers against moisture loss, oxidation, and microbial growth.
 - Convenience: Edible films can enhance the convenience of consuming certain foods, such as individually wrapped candies or edible casings for sausages.
 - Functional properties: They can improve the texture, appearance, and sensory attributes of food products.
 - Sustainability: Edible films and coatings offer eco-friendly alternatives to traditional packaging materials, reducing waste and environmental impact.

4. Students can understand and give examples of smart packaging incorporates sensors, indicators, or tracking devices to monitor and communicate information about the condition and quality of products:

- Time-temperature indicators: Monitor temperature fluctuations during storage and transportation to ensure product safety and freshness.
- RFID tags: Enable real-time tracking and tracing of products throughout the supply chain for enhanced visibility and efficiency.
- Oxygen scavengers: Absorb oxygen to prevent oxidation and extend the shelf life of packaged foods.
- Intelligent labels: Provide interactive features such as QR codes or augmented reality for consumer engagement and product information.

5. Students can explain and give example of modified Atmosphere Packaging (MAP). MAP involves modifying the atmosphere inside a package to extend the shelf life of perishable products:

- Gas flushing: The process replaces the air inside the package with a specific gas mixture (e.g., nitrogen, carbon dioxide, oxygen) tailored to the product's requirements.
- Reduced oxygen levels: Minimizing oxygen slows down oxidation and microbial growth, preserving the freshness and quality of the product.
- Controlled humidity: Maintaining optimal humidity levels prevents moisture loss or excess, preserving the texture and appearance of the product.

6. Students can explain food packaging and canning labeling. Proper labeling on food packaging and cans is essential for conveying important information to consumers:

	<ul style="list-style-type: none"> ○ Product name and description: Clearly indicate what the product is and any relevant details (e.g., flavor, variety). ○ Ingredients list: List all ingredients in descending order of predominance by weight, including allergens and additives. ○ Nutritional information: Provide a nutrition facts panel displaying serving size, calories, and amounts of nutrients per serving. ○ Expiry date or best before date: Ensure consumers know when the product should be consumed for optimal quality and safety. ○ Storage instructions: Recommend proper storage conditions (e.g., refrigeration, ambient temperature) to maintain product quality. <p>Country of origin and manufacturer information: Identify where the product was produced and by whom for traceability and accountability.</p>
Module Content	<p>This course introduces students to the principles, design, operation, and maintenance of processing machinery and equipment used across different industries. It covers a wide range of topics related to the selection, utilization, and management of machinery in manufacturing and production processes.</p>
Study and examination requirements and forms of examination	<p>Cognitive: Midterm exam, Final exam, Quizzes, Assignments Affective: Assessed from the element /variables achievement, namely (a) Contributions (attendance, active, role, initiative, and language), (b) Being on time, (c) Effort.</p>
Media employed	<p>Classical teaching tools with white board and power point presentation</p>
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Recommended Literature	For Class A. Compulsory 1. Saravacos, G.D. and Kostaropoulos, A.E., 2002. Handbook of food processing equipment (Vol. 2012, pp. 331-381). Kluwer Academic/Plenum. B. Option 1. Fellows, P.J., 2022. Food processing technology: principles and practice. Woodhead publishing. 2. Berk, Z., 2018. Food process engineering and technology. Academic press.
Date of Last Amendment	22 nd Augustus 2022