UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Scienze Agrarie, Alimentari e Forestali		
ACADEMIC YEAR	2020/2021		
MASTER'S DEGREE (MSC)	FIRM AND QUALITY FOR THE AGRICULTURAL AND FOOD SYSTEM		
INTEGRATED COURSE	PACKAGING AND HYGIENE OF FOOD OF ANIMAL ORIGIN - INTEGRATED COURSE		
CODE	21243		
MODULES	Yes		
NUMBER OF MODULES	2		
SCIENTIFIC SECTOR(S)	ING-IND/22, VET/04		
HEAD PROFESSOR(S)	BOTTA LUIGI	Professore Associato	Univ. di PALERMO
OTHER PROFESSOR(S)	BOTTA LUIGI CARACAPPA SANTO	Professore Associato Professore a contratto	Univ. di PALERMO Univ. di PALERMO
CREDITS	12		
PROPAEDEUTICAL SUBJECTS			
MUTUALIZATION			
YEAR	2		
TERM (SEMESTER)	1° semester		
ATTENDANCE	Not mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	**BOTTA LUIGI** Monday 15:00 17:00 Ufficio (Ed. 6, terzo piano) Thursday 15:00 17:00 Ufficio (Ed. 6, terzo piano)		

DOCENTE: Prof. LUIGI BOTTA

PREREQUISITES	Zootechnics and animal feeding.
LEARNING OUTCOMES	Knowledge and understanding Knowledge of processing methods and technological properties of the materias used for food packaging applications. Knowledge of the main food packaging technologies. Knowledge of the hygiene aspects of the main food control, audit methodologies applied to the animal production on the basis of the binding rules of Official Controls to the Food Sector Operators (OSA). Applying knowledge and understanding Ability to choose the most suitable materials and appropriate packaging systems for each type of food product, depending on the specific characteristics of the product and of its shelf life and are able to understand the differences between the types of official and self-control. Ability to manage hygiene and food safety in companies that produce and market animal foods in relation to the Official Controls. Making judgements After completing the teaching course, the student will be able to critically evaluate the suitability of a material for food packaging applications. Moreover, the student will be able to choose sustainable packaging, taking into account the environmental impact and the cost-benefit analysis. The student will also be able to critically evaluate product and process non-conformities with regard to the production and marketing of animal food. Communication The student will acquire the capability to communicate and express problems inherent the course topics. The student will be able to highlight questions related to the preparation and processing of different materials, exposing the information in an adequate technical language. The student will also be able to expose the results of a scientific research, to propose suitable materials and packaging systems and to explain eventual project plans connected with them and make an audit in a food industry. Finally, the student will have the ability to communicate and relate to the main hygienic-health issues relative to animal production and marketing. Lifelong learning skills At the end of the course, the student will have learnt how to choose the most suitable material for the packaging of a specific food product, by evaluating properties and functions. The learned skills in this course will allow to have the awareness to be able to make supported choices when realizing potential projects. The student must also be able to choose the most appropriate type of control for the different food production in order to reduce the health problems. The student will have the ability to learn the methods of managing food safety in relation to the regulatory obligations for OSA, knowing that they are properly interfacing with the Authorities responsible for the Official Control.
ASSESSMENT METHODS	The evaluation will be based on a written and/or oral test containing questions to be answered openly on topics described during the teaching classes. It aims to assess the competences and the knowledge learnt during the course. The written test duration is two hours. The questions will verify: acquired knowledge; elaboration capability; talking capability; ability to build autonomous connections not bound to the referring textbooks; capability to produce autonomous evaluations inherent the course topics; capability to understand theapplications connected with the discipline areas; capability to connect the discipline topics with the referring professional and technological context. The final assessment is on a 30 basis according to the criteria reported below: 30-30+: excellent knowledge of the topics, excellent language and vocabulary, good analytical capability, the student is able to apply knowledge to solve the proposed problems; 26-29: Good management of the topics, nice language and vocabulary, the student is able to apply knowledge to solve the proposed problems; 24-25: basic knowledge of the topics, fair language and vocabulary, limited capability to apply autonomously knowledge to solve the proposed problems; 21-23: the student does not show full management of the main topics while possessing the knowledge, satisfactorily language and vocabulary, poor capability to apply autonomously the acquired knowledge; 18-20: minimal basic knowledge of the main topics and of the technical language and vocabulary, poor or no capability to apply autonomously the acquired knowledge. The exam will be not passed if the student will show a not acceptable knowledge of the topics.
TEACHING METHODS	Lectures, exercises and laboratory.

MODULE
FOOD PRODUCTS PACKAGING

Prof. LUIGI BOTTA

SUGGESTED BIBLIOGRAPHY

L. Piergiovanni, S. Limbo. “Food packaging. Materiali, tecnologie e qualita' degli alimenti”, Springer-Verlag Italia (2010).
R. Coles, D. McDowell. M. Kirwan, editors. “Food Packaging Technology”, Blackwell Publishing, Oxford, UK (2003).
D. Sun Lee, K. L. Yam, L. Piergiovanni. “Food Packaging Science and Technology”, CRC Press, Taylor & Francis Group, New York.

AMBIT	21005-Attività formative affini o integrative
INDIVIDUAL STUDY (Hrs)	90
COURSE ACTIVITY (Hrs)	60

EDUCATIONAL OBJECTIVES OF THE MODULE

The aim of the course is to provide a multidisciplinary approach to the knowledge of materials and of packaging systems for food products, in order to fully understand all the problems regarding the food packaging and design the best solutions in accordance with current standards, benefit–cost ratio and a sustainable development. In the first part of the course, it will be provided the rudiments of material science and technology, which are required to describe physical and chemical properties of materials and the related packaging systems. Thereafter, it will be studied the issues and the technologies related to processing methods of materials used for food packaging applications and the manufacturing of food packages. Finally, it will be studied the food packaging technologies aimed for extending the shelf life of packaged food products. For this purpose, some theoretical aspects of shelf life are described in order to provide the knowledge useful to improve the preservation of packaged food.

SYLLABUS

Hrs	Frontal teaching
2	Introduction. Terminology. Goals and characteristics of food packaging. Food packaging statistics.
3	Chemical properties of materials. Chemical structure of materials. Chemical properties of food packaging materials.
2	Physical properties of food packaging materials. Surface properties. Thermal properties. Mechanical properties. Electromagnetic properties.
5	Barrier properties of food packaging materials. Gas and water vapour permeation. Migration from packaging to foods. Legistation on materials and articles intended to come into contact with food.
3	Glass and glass packaging. Glass composition. Glass manufacture. Chemical and physical properties of glass. Glass container manufacture. Surface treatments of glass containers.
4	Metals and metal packages. Aluminium. Tinplate and other coated steels. Stainless steels. Properties of metals. Metal cans and can-making processes.
3	Paper and paperboard packaging. Cellulosic fibres. Corrugated cardboard. Coated cardboard. Pulp molded. Cellophane. Package types.
7	Plastics food packaging. Introduction to polymeric materials. Properties of polymers. Modification of polymers. Types of plastics used for food packaging applications. Processing methods of thermoplastic polymers and manufacture of plastics packaging.
3	Biopolymers and biopolymeric food packaging. Introduction to biopolymeric materials. Properties of biopolymers. Processing methods of biopolymers and manufacture of biopolymeric packaging.
3	Flexible multilayer food packaging. Manufacture of multilayer packaging. Liquid packaging cartons. Barrier properties of multilayer packaging.
3	Packaged product quality and shelf life. Factors affecting product quality and shelf life. Role of packaging.
3	Modified atmosphere packaging (MAP). Vacuum Packaging. Main gases used in MAP.
4	Active and intelligent packaging.

Hrs	Workshops
6	Processing of thermoplastic polymers: extrusion; co-extrusion; film blowing.
3	Mechanical tests.
3	IR and UV-visible spectroscopy.
3	Release tests.

MODULE
HYGIENE AND SAFETY OF FOOD OF ANIMAL ORIGIN

Prof. SANTO CARACAPPA

SUGGESTED BIBLIOGRAPHY

Appunti forniti dal docente.

AMBIT	21005-Attività formative affini o integrative
INDIVIDUAL STUDY (Hrs)	90
COURSE ACTIVITY (Hrs)	60

EDUCATIONAL OBJECTIVES OF THE MODULE

The main objective is the acquisition of the student's competence on the main hygienic-health issues arising from the production and marketing of animal production, with particular reference to the main types of supply chain. In particular, the course will focus on the study of technical regulations on hygiene and food safety, the definition of process and product standards for the main types of animal production, the main causes of "non-fitness for consumption". The food safety management in relation to Hygiene Package law.

SYLLABUS

Hrs	Frontal teaching
4	Introduction and presentation of the course. The Community approach to food safety and the food control system. The hygiene package. General Obligations and Responsibilities for the Food Sector Operator (OSA).
6	Certification and legal obligations for the marketing of animal production (traceability and labeling). Food Safety Management in Animal Production Industries.
10	The meat chain. The dangers of eating meat. Production, Product and Regulatory Requirements. Non-process and product conformance to fresh, prepared and processed meat.
8	The dairy chain. The dangers of consumption of dairy foods. Production, Product and Regulatory Requirements. No regular process and product related to milk and dairy products.
8	The fishery product line. The dangers of consumption of fishery products. Production, Product and Regulatory Requirements. No regular process and product related to fresh, prepared and processed fishery products.
4	The egg and derived products chain. The dangers of eating eggs and derived products. Production, Product and Regulatory Requirements. No regular process and product related to eggs and their derived.

Hrs	Practice
7	Realization of the HACCP system.
7	Inspection activities at a meat processing industries.
6	Inspection activities at a milk processing industries or fish processing industries.