

INNOMEATEDU PLATFORM: COURSE OVERVIEW

COURSES	TIME (h)
1. MEAT PRODUCTION AND MEAT QUALITY	62
2. MEAT PROCESSING FUNDAMENTALS	47
3. ADVANCES IN MEAT PROCESSING AND NOVEL MEAT PRODUCTS	51
4. SAFETY, QUALITY AND REGULATORY AFFAIRS	46
5. ENVIRONMENTAL IMPACT OF MEAT PRODUCTION AND CONSUMPTION AND SUSTAINABILITY IN THE MEAT SECTOR	34
6. ENTREPRENEURSHIP/MARKETING	50
CASE STUDIES	10
Total hours	300
Total ECTS	30

COURSE 1. MEAT PRODUCTION AND MEAT QUALITY

Duration 62 h

Theory Topics (48 h)

1.1. A general view of meat production systems (8 h)

- 1.1.1. Beef production systems.
- 1.1.2. Small ruminants production systems.
- 1.1.3. Pork production systems.
- 1.1.4. Poultry production systems.

1.2. Carcass quality and jointing (8 h)

- 1.2.1. General principles. Carcass yield and composition, and meat cuts.
- 1.2.2. Methods for carcass-quality evaluation.
- 1.2.3. New and emergent methods of predicting body and carcass composition.

1.2.4. Commercial carcass grading and classification.

1.3. Basics of meat science and meat quality (8 h)

1.3.1. Meat science lexicon, muscle structure and composition

1.3.2. Conversion of muscle to meat

1.3.3. Meat colour and flavour

1.3.4. Meat texture - juiciness and hardness

1.4. Production factors and meat quality (8 h)

1.4. 1. Effect of animal species, breed, genetic type, gender and age (slaughter weight)

1.4.2. Effect of feeding and nutrition on meat quality

1.4.3. Effect of environmental farm conditions and animal welfare on meat quality

1.4.4. Off-farm factors and meat quality

1.5. Meat handling and storage procedures (8 h)

1.5.1. Meat chilling and conventional chilled storage

1.5.2. Meat packaging

1.5.3. Meat preservation by freezing

1.5.4. Meat aging

1.6. Consumers' perception of meat quality and meat consumption (8 h)

1.6.1. Sensory perception and factors influencing the sensory perception of meat.

1.6.2. Consumer attitudes and beliefs. Perception of specialty meats.

1.6.3. Consumer decision-making. Communication and marketing. Meat purchase.

1.6.4. Cross-cultural and regional differences. Globalization and meat consumption patterns.

Practicals (14 h)

Topics

- Meat pH
- Meat water holding capacity
- Meat myoglobin content
- Meat colour
- Meat texture
- Total aerobic microbial counts
- Thiobarbituric acid reactive substances content in meat

COURSE 2. MEAT PROCESSING FUNDAMENTALS

Duration 47 h

Theory Topics (34 h)

2.1. Raw materials and additives (5 h)

- 2.1.1. Characteristics of meat types for processed meat production (meat classes)
- 2.1.2. Fat and offal as raw materials in meat preparation production
- 2.1.3. Functional ingredients and additives for meat preparation production

2.2. Traditional meat preservation methods (8 h)

- 2.2.1. Drying
- 2.2.2. Smoking
- 2.2.3. Salting and curing
- 2.2.4. Fermentation

2.3. Units in meat processing and equipment (9 h)

- 2.3.1. Curing
- 2.3.2. Tumbling
- 2.3.3. Chopping, grinding and cutting
- 2.3.4. Mixing and stuffing
- 2.3.5. Heating and cooling

2.4. Processed meat products (12 h)

- 2.4.1. Fresh and cooked sausages
- 2.4.2. Raw-fermented sausages
- 2.4.3. Dry-cured whole cuts products
- 2.4.4. Cooked whole meat cuts
- 2.4.5. Offal products (precooked-cooked meat products)
- 2.4.6. Pasteurised canned meat products
- 2.4.7. Sterilised canned meat products
- 2.4.8. Other meat products

Practicals (13 h)

1. Analysis of sodium chloride content in meat products
2. Determination of the degree of reaction of meat dyes
3. Determination of nitrites content in meat products

Making Process Manuals of some typical meat products of Poland, Greece, Italy, Portugal and Spain:

* Kaibala Biala PL	* Alheira PO	* Prosciutto Crudo di Parma IT	* Lacón ES
* Kabanosy PL	* Choriça de carne PO	* Mortadella IT	* Androlla ES
* Loukaniko GR	* Siglino Manis GR	* Chorizo ES	* Morcilla de León ES

COURSE 3. ADVANCES IN MEAT PROCESSING AND NOVEL MEAT PRODUCTS

Duration 51 h

Theory (26 h)

3.1. Emerging technologies in meat processing (12 h)

3.1.1. Cold plasma

3.1.2. High pressure processing

3.1.3. Infrared and light-based technologies

3.1.4. Ohmic heating and pulsed electric fields

3.1.7. Radio Frequency

3.1.8. Ultrasound

3.2. Novel strategies for developing healthy meat products (8 h)

3.2.1. Clean label meat products

3.2.2. Meat products as functional foods

3.2.3. Replacing animal fat with healthier lipids

3.2.4. Low-salt meat products

3.3. Advances in meat packaging technology (6 h)

3.3.1. Active packaging based in biopolymers and natural antioxidants

3.3.2. Edible films/coatings

3.3.3. Biosensors and smart food packaging applications

Practicals (25 h)

1. Extraction of bioactive compounds with Ultrasound Assisted Extraction
2. Extraction of bioactive compounds with Pulsed Electric Fields
3. Oil extraction with Supercritical Fluid Extraction

COURSE 4. SAFETY, QUALITY AND REGULATORY AFFAIRS

Duration 46 h

Theory (34 h)

4.1 Regulatory framework on meat and meat products (12 h)

- 4.1.1 Legislation on hygiene
- 4.1.2 Mandatory food information to consumers (general labeling)
- 4.1.3 Voluntary food information to consumers (quality labels and others)
- 4.1.4 Nutrition and health claims
- 4.1.5 Novel foods regulation
- 4.1.6 Food contact materials

4.2. Meat and Meat Products Safety (13 h)

- 4.2.1 Prerequisite programme for meat industry
- 4.2.2 Hazards: biological, chemical, physical and others
- 4.2.3. Risk Analysis
- 4.2.4 HACCP applied to meat preparations
- 4.2.5. HACCP applied to meat products (sausages)
- 4.2.6. Microbiological Hazards identification/Predictive microbiology

4.3. Meat Quality Control and Assurance (9 h)

- 4.3.1 Quality assurance schemes for the meat industry from the stable to the table
- 4.3.2 Quality control
- 4.3.3 Quality certification for meat and meat products

Practicals (12 h)

1. How to determine CCP using a decision tree
2. Web search for nutritional and health claims
3. Keeping updated about authorised novel food
4. Web search for food additives
5. Web search for quality products
6. Risk Analysis Tools in the Meat Industry
7. HACCP verification Tools in the Meat Industry
8. Meat Products Quality Control (Nitrates, fat, protein)
9. Environmental Monitoring as a prerequisite for certification schemes in the meat industry

COURSE 5. ENVIRONMENTAL IMPACT OF MEAT PRODUCTION AND CONSUMPTION AND SUSTAINABILITY IN THE MEAT SECTOR

Duration 34 h

Theory Topics (22 h)

5.1. Role of meat in the food system (5 h)

- 5.1.1. Nutritional value of meat and meat products and nutritional recommendation for meat consumption
- 5.1.2. Global and local meat consumption and its structure
- 5.1.3. Relations between meat processing and other branches of industry

5.2. Meat production in relation to energy and water consumption (5 h)

- 5.2.1. Carbon footprint
- 5.2.2. Water footprint

5.3. Production systems of animals and its relation with the environment (4 h)

- 5.3.1. Extensive, semi-intensive and intensive production system
- 5.3.2. Organic meat production – sustainability from field to fork on the example of a selected meat processing plant

5.4. Alternatives for meat proteins (8 h)

- 5.4.1. Cultured meat (lab-grown meat)
- 5.4.2. 3D-printed meat
- 5.4.3. Meat analogues
- 5.4.4. Edible insects

Practicals (12 h)

1. Calculations of the student's environmental footprint
2. Characteristics and evaluation of innovative meat products: meat snack and meat analogues

COURSE 6. ENTREPRENEURSHIP/MARKETING

Duration 50 h

Theory Topics (50 h)

6.1. The entrepreneurial mindset: Strategies to continuously create opportunities (6 h)

- 6.1.1. Entrepreneurship define
- 6.1.2. The traits of entrepreneur
- 6.1.3. Entrepreneurship is a team sport

6.2. The competitive advantage and the role of Strategies (6 h)

- 6.2.1. Vision, mission, values and objectives
- 6.2.2. Useful tools: PESTEL, SWOT, 5 Forces
- 6.2.3. The role of technological change and innovation

6.3. The economics of the business concept (8 h)

- 6.3.1. How to prepare a business plan
- 6.3.2. Business Model Canvas
- 6.3.3. Funding opportunities: options, costing methods

6.4. Intro to Marketing (5 h)

- 6.4.1. MARKET analysis: consumer trends, new consumer segments and niche markets
- 6.4.2. Tools for Marketing: marketing mix, product placement, promotion and sales, pricing

CASE STUDIES

Duration 10 h

- CS1. Innovative Packaging - course 3
- CS2. Functional meat products development - course 3
- CS3. *L. monocytogenes* and meat product export - course 4
- CS4. Dioxins in poultry - course 4
- CS5. Alternative sources of proteins of animal origin: the case of edible insects - course 5

INNOMEATEDU VIDEOS	COURSE
<ul style="list-style-type: none"> ● Production of Black Pig Sausages ● Near-Infrared Spectroscopy (NIRs) ● Electronic Nose and Electronic Tongue 	1
<ul style="list-style-type: none"> ● Food Additives on Meat Production ● Production of Italian Cooked Ham ● Production of Chicken Block ● Production of White Sausage ● Production of Cecina (Dry-Meat, Spain) 	2
<ul style="list-style-type: none"> ● Elaboration of Dry- Fermented Sausage with Quinoa Fat Extracted by a Supercritical Fluid Equipment ● Elaboration of Patties with Bioactive Compounds (BACs) of Sweet Potato Peels ● Reduced-Meat Sausage Reformulated with chickpea 	3
<ul style="list-style-type: none"> ● Black Pigs Wild Breeding 	5