

This comprehensive subject is aimed to teach the main knowledge and skills, which are indispensable for veterinarians to ensure and control adequate safety and quality of food in the whole food chain (primary production, food processing, distribution and sale). Special emphasis is laid on the paramount concern to protect human health (veterinary public health), the importance of risk based own-check programs and the general and specific requirements of official controls at all stages of the food chain.

The EU-listed subject of Food Hygiene is taught in four interrelated parts including Fundamentals of Food Hygiene, Milk Hygiene, Meat Hygiene and Official Controls in Food Hygiene.

### Thematics of lectures

#### Semester 8

##### *1) Fundamentals of Food Hygiene (30 h lectures)*

<i>Hours</i>	<i>Subject</i>	<i>Topics</i>
3	Basic concepts, importance, historical aspects	<ul style="list-style-type: none"> <li>- food-borne hazards</li> <li>- food safety and food hygiene</li> <li>- food safety and the veterinary profession, veterinary public health</li> </ul>
9	Food microbiology	<ul style="list-style-type: none"> <li>- classification of microbes found in foods</li> <li>- the growth curve of microbes</li> <li>- factors affecting the microbial growth</li> <li>- destruction of micro-organisms</li> <li>- significance and detection of indicator microflora</li> <li>- significance and detection of pathogen and facultative pathogen bacteria</li> <li>- main viruses, prions, fungi and parasites in foods</li> <li>- microbiological qualification of foods</li> <li>- fast microbiological examination methods</li> <li>- food-borne infections and intoxications caused by Salmonella, Campylobacter, Clostridium, Bacillus, Staphylococcus, Listeria, Yersinia, Shigella, Vibrio spp.</li> </ul>
6	Chemical-toxicological food safety	<ul style="list-style-type: none"> <li>- classification of chemicals present in food</li> <li>- risk assessment/safety evaluation</li> <li>- residues of veterinary drugs</li> <li>- residues of pesticides</li> <li>- residues of environmental chemicals</li> <li>- biocontaminants</li> <li>- technological contaminants</li> <li>- natural toxicants</li> <li>- safety assessment of food additives</li> </ul>
6	Food spoilage, principles of food preservation	<ul style="list-style-type: none"> <li>- causes and significance of spoilage</li> <li>- factors affecting microbial spoilage</li> <li>- spoilage associations of certain foods</li> <li>- preservation approaches to control spoilage and pathogenic bacteria in food (physical, chemical and biological methods)</li> </ul>
3	Food legislation, control authorities	<ul style="list-style-type: none"> <li>- main international organizations and regulatory bodies dealing with food hygiene and food safety</li> <li>- food hygiene related legislation in the European Union</li> <li>- food legislation in the USA</li> </ul>
3	Basics of technological hygiene and the HACCP system	<ul style="list-style-type: none"> <li>- establishment design, buildings, rooms, equipment, layout</li> <li>- cleaning and disinfection in food establishments</li> <li>- concept of HACCP, its development and purpose</li> </ul>

		<ul style="list-style-type: none"><li>- elaboration of HACCP system</li><li>- analysis of results collected during the operation and maintenance of the HACCP system</li></ul>
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## 2) Milk Hygiene (15 h lectures)

<i>Hours</i>	<i>Subject</i>	<i>Topics</i>
3	Composition and general properties of milk, microbial processes in milk	<ul style="list-style-type: none"> <li>- gross composition of milk</li> <li>- factors affecting the composition</li> <li>- principal milk constituents</li> <li>- physical properties of milk</li> <li>- bacterial growth in raw milk</li> <li>- non-specific antibacterial effects</li> <li>- bacterial fermentation</li> </ul>
3	Defects of milk, mastitis, milk-borne diseases	<ul style="list-style-type: none"> <li>- defects of milk</li> <li>- effects of mastitis on the composition and cell count of milk</li> <li>- microbes causing mastitis</li> <li>- milk-borne bacterial infections and intoxications</li> <li>- viruses, fungi and parasites in milk</li> </ul>
3	Hygiene of machine milking	<ul style="list-style-type: none"> <li>- physiology of milk secretion and ejection</li> <li>- milking machines</li> <li>- practice of machine milking</li> <li>- cleaning and disinfection of milking machines</li> </ul>
3	Hygiene requirements of raw milk production, collection, treatment and processing	<ul style="list-style-type: none"> <li>- animal health requirements for raw milk</li> <li>- hygiene of the holding, collection of raw milk and its transport</li> <li>- hygiene requirements of raw milk</li> <li>- hygiene requirements for processing establishments</li> <li>- hygiene requirements of heat-treated milk</li> <li>- related legislation</li> </ul>
3	Production hygiene of milk-based products	<ul style="list-style-type: none"> <li>- hygiene and technology of butter and cheese manufacture</li> <li>- acidified milk products</li> <li>- long-life milk products</li> <li>- microbiological criteria of milk-based products</li> <li>- cleaning and disinfection in a dairy</li> </ul>

## Semester 9

### *Meat Hygiene (30 h lectures)*

<i>Hours</i>	<i>Subject</i>	<i>Topics</i>
2	Composition and structure of meat. Post-mortem changes in muscle	<ul style="list-style-type: none"><li>- chemical composition</li><li>- structure</li><li>- physical characteristics</li><li>- post-mortem acidification and rigor development</li><li>- resolution of rigor mortis and tenderization of meat</li><li>- other changes occurring during conversion of muscle to meat</li></ul>
2	Principles of meat inspection General rules of judgement	<ul style="list-style-type: none"><li>- historical background, aims</li><li>- elements of inspection procedure</li><li>- legislation</li><li>- integrated meat inspection</li><li>- future trends</li></ul>
2	On-farm inspection, transport to the slaughterhouse, ante-mortem inspection at the slaughterhouse, decisions	<ul style="list-style-type: none"><li>- on-farm inspections, certificates</li><li>- transport</li><li>- ante-mortem inspection at slaughterhouse</li><li>- decisions at ante-mortem inspection</li></ul>
6	Technological hygiene of the slaughter of pigs and ruminants	<ul style="list-style-type: none"><li>- pre-slaughter handling</li><li>- humane slaughter</li><li>- stunning methods</li><li>- slaughtering process</li><li>- carcass dressing</li><li>- carcass butchery</li><li>- by-products</li><li>- abattoir design, cleaning and disinfection</li><li>- critical points of carcass contamination</li><li>- assessing operational hygiene</li></ul>
6	Post-mortem inspection of swine, ruminants and equines	<ul style="list-style-type: none"><li>- post-mortem inspection of swine</li><li>- post-mortem inspection of cattle, sheep and equines</li><li>- decisions at post-mortem examination</li><li>- proposals to improve the current post-mortem procedures</li></ul>
2	Technological hygiene of poultry slaughter. Meat inspection of poultry	<ul style="list-style-type: none"><li>- legislation</li><li>- pre-slaughter health inspection</li><li>- catching and loading birds for slaughter</li><li>- stunning and slaughter</li><li>- processing</li><li>- control of microbial hazards in poultry processing</li><li>- poultry meat, inspection</li><li>- judgement</li></ul>
2	Technological hygiene of rabbit slaughter and game processing. Meat inspection of rabbit and game meat	<ul style="list-style-type: none"><li>- legislation</li><li>- technological hygiene of rabbit slaughter and processing</li><li>- dressing of games</li><li>- meat inspection of rabbit and game meat</li><li>- judgement possibilities</li></ul>

2	Hygiene of fish and shellfish processing. Inspection of fish and shellfish	<ul style="list-style-type: none"> <li>- legislation</li> <li>- hygiene standard for factory vessels, purification plants and processing establishments</li> <li>- handling and treatment of fish and shellfish at different stages up to retailing</li> <li>- examination of fish and shellfish</li> <li>- biochemical and microbiological standards</li> </ul>
2	Hygiene of shell eggs and egg products	<ul style="list-style-type: none"> <li>- legislation</li> <li>- anatomy and chemical composition of eggs</li> <li>- collection, transportation and grading of shell eggs</li> <li>- defects of shell eggs</li> <li>- processing of shell eggs</li> <li>- microbiological standards of egg products</li> </ul>
2	Technology and hygiene of meat products	<ul style="list-style-type: none"> <li>- legislation</li> <li>- plant construction and equipment</li> <li>- main steps of the manufacturing processes</li> <li>- examination of the process</li> <li>- monitoring the products</li> </ul>
2	Technological hygiene of the manufacture of food products of plant origin	<ul style="list-style-type: none"> <li>- main technological processes</li> <li>- hygiene of cereal products</li> <li>- hygiene of confectionery products</li> <li>- hygiene of alcoholic and soft drinks</li> </ul>

## Semester 10

### *1) Meat Hygiene (15 h lectures)*

<i>Hours</i>	<i>Subject matter</i>	<i>Topics</i>
3	Decisions at post-mortem examination: organoleptic changes, pathological lesions indicating septic conditions, bacteriological examination of suspect carcasses	<ul style="list-style-type: none"><li>- principles of final judgement</li><li>- judgement of organoleptic changes (foreign odour, poor condition, cachexia, imperfect bleeding, muscle degeneration, traumatic muscle lesions, icterus, oedema, putrefaction)</li><li>- lesions and judgement of septicaemia</li><li>- bacteriological examination of suspect carcasses, judgement</li></ul>
6	Decisions at post-mortem examination: zoonoses, animal diseases of special importance	<ul style="list-style-type: none"><li>- legislative basis</li><li>- bacterial zoonoses (salmonellosis, brucellosis, tuberculosis, leptospirosis, listeriosis, anthrax, yersiniosis, tularaemia, Q-fever)</li><li>- viral and prion zoonoses (rabies, BSE)</li><li>- parasitic zoonoses (toxoplasmosis, sarcosporidiosis, cysticercosis, trichinellosis)</li><li>- particularly important animal diseases (swine fever, foot and mouth disease)</li></ul>
6	Important disease states of swine, cattle, sheep, horse and poultry	<ul style="list-style-type: none"><li>- swine: PSS, septic conditions, diseases of the gastrointestinal, respiratory and urinary system, swine erysipelas, atypical tuberculosis, Aujeszky-disease, SVD,</li><li>- ruminants horses: metabolic disorders, RPP, paratuberculosis, mastitis, metritis, diseases of the respiratory and the urinary system, traumatic injuries</li><li>- poultry: bacterial infections (salmonellosis, campylobacteriosis, mycoplasmosis, E. coli infections, fowl cholera, erysipelas, tuberculosis, yersiniosis, chlamydiosis), viral infections (Newcastle disease, avian influenza, infectious bronchitis, infectious laryngotracheitis, infectious bursal disease, avian leucosis, Marek's disease, fowl pox), parasitic infestations (coccidiosis, blackhead, roundworm infestations)</li></ul>

## 2) Official controls in food hygiene (15 h lectures)

<i>Hours</i>	<i>Subject</i>	<i>Topics</i>
6	Food hygiene and food safety legislation	<ul style="list-style-type: none"> <li>- legislative process in the EU and the currently existing food hygiene rules (regulations, directives)</li> <li>- changes in the existing legislation in accordance with the Commission's White Paper on Food Safety (the new food law, the new proposals for regulations on the hygiene of foodstuffs, laying down specific hygiene rules for food of animal origin, detailed rules of official controls on products of animal origin and on animal-health requirements)</li> <li>- legislative process in Hungary and the main food hygiene and food safety rules (food law and its implementing regulations, the new EU-harmonized regulations)</li> </ul>
9	Official controls in the practice	<ul style="list-style-type: none"> <li>- tasks of the official veterinarian in controls of foods</li> <li>- approval and controls of establishments (slaughterhouse, processing, packaging etc.)</li> <li>- controls of transport and storage of foods</li> <li>- controls at wholesale and retail trade</li> <li>- veterinary checks of imported foods</li> <li>- certificates, documentation</li> </ul>

### List and short description of the subjects

**Fundamentals of food hygiene:** essentials of microbial growth, main pathogens in food, chemical food safety, food spoilage, principles of technology of food of animal origin, EU and national legislation, processing hygiene, HACCP. The topics are taught theoretically in a lecture (30 h) and practically in a course (15 h).

**Milk hygiene:** basic knowledge of milk composition, microbial and chemical contamination of milk, hygiene of milking, technology and hygiene of milk and dairy production, related regulations. This is taught in a lecture (15 h) and a practical course (15 h).

Year: 4

Term (semester): 8

Lectures: 30 + 15 (Fundamentals of food hygiene and Milk hygiene, respectively)

Practicals: 15 + 15 (Fundamentals of food hygiene and Milk hygiene, respectively)

Examination: Terminal examination (Fundamentals of food hygiene)

Teaching staff: Péter Laczay, Olivér Reichart, Géza Szita, István Szatmári, Orsolya Erdős, Katalin Szakmár

**Meat hygiene:** composition, organoleptic properties and quality of meat, meat plant construction and equipment, technological hygiene of cattle, pig and poultry slaughter, veterinary ante and post mortem inspection, judgement of infectious diseases, parasitic infections and metabolic disorders, inspection of rabbits, hares and games, fish and eggs, production technology and examination of meat products. The topics are thought in a lecture (45 h) and practically in a course (30 h).

**Official controls in food hygiene:** legislative background, main types and elements of official controls, approval of food establishments, veterinary controls on farms, establishments and during the marketing of products, certification in food controls. This part is thought theoretically in a lecture (15 h).

Year: 5th

Term (semester): 9th, 10th

Lectures: 30 and 30 h/semester, respectively in semesters 9th and 10th

Practicals: 30 (semester 9)

Examination: Practical note (Meat and milk hygiene) and State examination with defense of the thesis of diploma assay

Teaching staff: Péter Laczay, Géza Szita, Olivér Reichart, Péter Székely Körmöczy, István Szatmári, Orsolya Erdős, Katalin Szakmár

## **Requirements**

### **Programme of extramural food-hygiene practice**

The purpose of the three-week exercise is to overview the system and obtain some experiences and manual skill in veterinarian meat inspection and food hygiene-control.

Programme of the extramural practice is as follows:

#### **ABBATOIR (MEAT PLANT)**

1) The layout and operation of the slaughter-house. Humane aspects.

2) Ante-mortem inspection and belonging conditions.

Delayed and special slaughters, retain of suspect animals in suspect pen, etc.

Animal welfare aspects also should be considered.

3) Obtain practice in the manual technique of post mortem meat inspection!

4) Retain rail, suspect cooler.

Sampling for supplementary laboratory examinations, etc.

5) Technological hygiene (Primary processing, production of meat products, water supply, waste disposal, handling of condemned material, sewage, rodent/insect programs, etc.)

6) Pathogen-reduction program and belonging methods (sampling, criteria, determinations).

7) Official documentations, certificates should be studied

8) The applied quality/safety assurance systems should be evaluated including the applied

HACCP system

9) Review of the related food hygiene regulations

#### **CONTROL OF FOOD DISTRIBUTION/MARKETING**

1) Food hygiene control of food-selling and storage units

2) Control system of distribution in the given country

3) Conditions of marketing, possible restrictions and measures

4) Method of destroying of condemned food and related regulations

5) Review of related legislation

#### **LABORATORY CONTROL OF FOOD**

Visit of the responsible (National and/or Independent-certificating) laboratory

Practical Trainings are organized in cooperation with the State Veterinary and Food Control Stations under supervision of the official veterinarian responsible for the corresponding establishment. Students must prepare a short, 10-15 pages of PC and handwritten-form description (work book) on their activity, observations and critical evaluation of the technological hygiene of the given plant. The supervisor veterinarian should evaluate this written-work in some sentences and sign it. Practical trainings are regularly controlled by members of the Department of Food Hygiene. The PC and handwritten-form of work book should be submitted to the Department within 2 weeks after finishing the exam period. Törölni: Prior to extramural work four hours of practical training in meat inspection is to be absolved at the contract slaughterhouse of the Faculty in Üllő under supervision of the teaching staff of the Department.