5th L A S EU Functions Course

FELASA accreditation ID: F056/16

September 30 - October 11, 2019

Preliminary Program

Day 1 – Monday September 30, 2019			[L, 405 min]
Time	**Title**	**Module**	**Learning Outcomes**
	Welcome, Course Introduction I Dontas		
09.00-09.15	**Current educational and training requirements in Europe** (L, 15') I Dontas	1. National and EU Legislation	
09.15-09.30	**Introduction to LAS** (L, 15') N Kostomitsopoulos	1. National and EU Legislation	
09.30-10.00	**National and EU Legislation** (L, 30') K Marinou	1. National and EU Legislation	1.1. Identify and describe the national and EU laws and guidance which regulate the scientific use of animals and in particular the activities of those carrying out scientific procedures involving them. 1.2. Identify and describe related animal welfare legislation. 1.4. List sources of information and support that are available (regarding national legislation). 1.5. Describe the role of the personnel mentioned in Article 24, 25 and 26, and their statutory duties and other responsibilities under the National Legislation. 1.7. Indicate who is responsible for compliance at an establishment and how this responsibility may be exercised (e.g. through the local AWB). 1.8. Describe when a procedure becomes regulated under National legislation (minimum threshold of pain, suffering, distress or lasting harm). 1.9. Indicate who bears primary responsibility for the animals undergoing procedures. 1.10. List which species, including respective stages of development that are included in the scope of the Directive / National law. 1.12. Describe the legislative controls over the killing of animals bred or used for scientific procedures
10.00-10.30	**Project authorization, Animal Welfare Bodies** (L, 30') P Andriopoulos	1. National and EU Legislation	1.3 Describe the authorization that is needed before acting as user, breeder or supplier of laboratory animals and especially the authorization required for projects and where applicable individuals. 1.6. Describe the roles and responsibilities of the local animal welfare bodies and the national committee for the protection of animals used for scientific purposes.
10.30-11.00	**Ethics, 3Rs, 5Fs** (L, 30') I Dontas	2. Ethics, animal welfare and the Three Rs (level 1)	2.1. Describe the differing views, within society, relating to the scientific uses of animals and recognize the need to respect these. 2.2. Describe the responsibility of humans when working with research animals and recognize the importance of having a respectful and humane attitude towards working with animals in research. 2.3. Identify ethical and animal welfare issues in their own work and be aware and able to reflect on the consequences of their own actions. 2.4. Recognize that compliance with ethical principles may contribute to the long-term trust and acceptance in scientific research from the general public. 2.6. Describe and discuss the importance of the Three Rs as a guiding principle in the use of animals in scientific procedures. 2.7. Explain the Five Freedoms and how these apply to laboratory species 2.13.a. Describe relevant sources of information relating to ethics and the implementation of the Three Rs. 2.14. Be aware of different search tools (e.g. EURL ECVAM Search Guide, Go3Rs) and methods of search (e.g. Systematic reviews, meta-analysis).
Coffee Break			
11.30-12.00	**Animal welfare, re-use** (L, PBL, 30') A Zacharioudaki	2. Ethics, animal welfare and the Three Rs (level 1)	2.5. Describe how the law is based on an ethical framework which requires 1) weighing the harms and benefits of projects (the harm/benefit assessment Briefly) 2) applying the Three Rs to minimise the harm, maximise benefits and 3) promote good animal welfare practices. 2.8. Describe the concept of harms to animals including avoidable and unavoidable suffering, direct, contingent and cumulative suffering 2.9. Describe the severity classification system, and give examples of each category. Describe cumulative severity and the effect this may have on the severity classification. Initial/core theory 2.10. Describe the regulations regarding re-use of animals.

			2.11. Describe the importance of good animal welfare including its effect on scientific outcomes as well as for societal and moral reasons. 2.12. Describe the need for a culture of care and the individual's role in contributing to this. 2.13.b. Describe relevant sources of information relating to animal welfare. 7.7. Describe appropriate methods for the assessment of the welfare of animals with respect to the severity of procedures and know what appropriate action to take. 11.15. Identify, assess and minimise all of the welfare costs to animals throughout the animals' lifetime (including adverse effects relating to sourcing, transport, housing, husbandry, handling, procedures and humane killing); Explain and give examples of welfare assessment protocols. 3.1.9. Maintain and interpret accurate, comprehensive records of animals held in the animal facility, including the wellbeing of the animals
12.00-12.30	**Severity classification** (L, PBL, 30') I Dontas	2. Ethics, animal welfare and the Three Rs (level 1)	2.9. Describe the severity classification system, and give examples of each category. Describe cumulative severity and the effect this may have on the severity classification. 5.5. Describe the severity classifications included in the Directive and give examples of each category; explain cumulative severity and the effect this may have on the severity classification.
12.30-13.15	**How good welfare promotes good science. The influence of husbandry and care on experimental outcome** (L, 45') V Baumans	3.1 Basic and appropriate biology – species specific (theory)	3.1.3. Indicate how good welfare can promote good science: e.g. explain how the failure to attend to biological and behavioral needs may affect the outcome of procedures. 3.1.4. Indicate how husbandry and care may influence experimental outcome and the number of animals needed e.g. example where the place in the room influences the outcome, hence randomization. 23.1. Describe how environmental conditions may need to be varied according to the species, age, and life stage or specific care conditions (e.g. peri-operative care, immuno-deficient animals, genetically altered strains). 23.2. Discuss the possible effects of an uncontrolled environment on animal welfare and experimental results. 23.4. Explain how the Three Rs contribute to the continuous improvement of welfare, husbandry and enrichment practices.
Lunch Break			
14.15-15.00	**Stress and refinement of experimental procedures** (L, 45') V Baumans	3.1 Basic and appropriate biology – species specific (theory)	3.1.2. Recognize and describe life events that have the potential to cause suffering including sourcing, transport, housing, husbandry, handling and procedures (on a basic level). 3.1.6. Describe the importance of providing an enriched environment (appropriate to both the species and the science) including social housing and opportunities for exercise, resting and sleeping. 3.1.9. Maintain and interpret accurate, comprehensive records of animals held in the animal facility, including the wellbeing of the animals 7.8. Recognize that refinement is an on-going process and know where to find relevant, up-to date, information. 7.9. Describe the biological consequences of transport, acclimatization, husbandry conditions and experimental procedures on the species concerned and describe how these can be minimized. 4.2b. Identify the consequences for the animal resulting from inappropriate environmental conditions. 4.3. Recognize that changes to or disruption of circadian or photoperiod can affect animals.
15.00-15.45	**Laboratory animal nutrition** (L, 45') J Meijer	3.1 Basic and appropriate biology – species specific (theory)	3.1.5. Describe the dietary requirements of the relevant animal species and explain how these can be met.
Coffee Break			
16.15-17.45	**Anatomy, physiology, reproduction** (L, 90') A Tsingotjidou	3.1 Basic and appropriate biology – species specific (theory)	3.1.1. Describe basic anatomy, physiology, reproduction of the relevant species (mice, rats).

Day 2 – Tuesday October 1, 2019			[L, 345 min]
Time	**Title**	**Module**	**Learning Outcomes**
09.00-09.30	**Animal models – Introduction** (L, 30') P Lelovas	3.1 Basic and appropriate biology – species specific (theory)	• Recognize what is an animal model in experimental research. • Describe different types of animal models. • Select the appropriate animal model.
09.30-10.15	**Genetically altered rodents** (L, 45') S Haralambous	3.1 Basic and appropriate biology – species specific (theory)	3.1.7. When relevant to the species, recognize that there are different strains, and that these can have different characteristics which can affect both welfare and science. 3.1.8. When relevant to the species, recognize that alterations to the genome can affect the phenotype in unexpected and subtle ways, and the importance of monitoring such animals very carefully. • Basic nomenclature.
10.15-10.35	**Genetically altered mouse models of bone and neurological diseases for the identification of novel disease targets** (L, 20') E Douni		• Understand different animal models.
10.35-10.55	**Generation and phenotyping of mouse models of human disease at BSRC "Al. Fleming": The INFRAFRONTIER approach** (L, 20') V Ntafis		• Understand different animal models.
10.55-11.10	**In vivo molecular imaging to reduce and refine the use of small animals in preclinical research** (L, 15') G Loudos	2. Ethics, animal welfare and the Three Rs (level 1)	2.2. Describe the responsibility of humans when working with research animals and recognize the importance of having a respectful and humane attitude towards working with animals in research.
Coffee Break			
11.30-11.50	**Rodent models in Neuroscience** (L, 20') A Tsingotjidou		• Understand different animal models.
11.50-12.10	**Rodent models of Osteoporosis** (L, 20') P Lelovas		• Understand different animal models.
12.10-12.30	**Rodent models of abdominal solid organ ischemia/reperfusion injury and treatment** (L, 20') T Karatzas		• Understand different animal models.

12.30-12.50	**Rodent models in Cardiovascular Research** (L, 20') P Lelovas		• Understand different animal models.
Lunch Break			
14.00-14.45	**Animal husbandry and care** (L, 45') N Kostomitsopoulos	4. Animal care, health and management – species specific (theory)	4.1. Describe suitable routines and husbandry practices for the maintenance, care and welfare for a range of animals used in research, to include small laboratory species. 4.2a. Describe suitable environmental and housing conditions for laboratory animals, how conditions are monitored 4.4. Describe the biological consequences of acclimatization, habituation and training 4.6. Describe how to provide water and an appropriate diet for laboratory animals including the sourcing, storage and presentation of suitable foodstuffs and water 4.10. Describe appropriate breeding programmes. 4.12. List the correct procedures for ensuring health, welfare and care of animals during their transport. 3.1.9. Maintain and interpret accurate, comprehensive records of animals held in the animal facility.
14.45-15.30	**Concepts of fidelity, discrimination, variability, possible causes of bias and ways of alleviating it – Part 1** (L, 45') T Sergentanis	*10. Design of procedures and projects (level 1) [Function B]*	10.1. Describe the concepts of fidelity and discrimination (e.g. as discussed by Russell and Burch and others). 10.2. Explain the concept of variability, its causes and methods of reducing it (uses and limitations of isogenic strains, outbred stocks, genetically modified strains, sourcing, stress and the value of habituation, clinical or sub-clinical infections, and basic biology). 10.3. Describe possible causes of bias and ways of alleviating it (e.g. formal randomisation, blind trials and possible actions when randomisation and blinding are not possible). 10.4. Identify the experimental unit and recognise issues of non-independence (pseudoreplication). 10.7. List the different types of formal experimental designs (e.g. completely randomised, randomised block, repeated measures [within subject], Latin square and factorial experimental designs). 10.8. Explain how to access expert help in the design of an experiment and the interpretation of experimental results.
Coffee Break			
16.00-16.45	**Concepts of fidelity, discrimination, variability, possible causes of bias and ways of alleviating it – Part 2** (L,PBL, 45') T Sergentanis	*10. Design of procedures and projects (level 1) [Function B]*	10.2. Explain the concept of variability, its causes and methods of reducing it (uses and limitations of isogenic strains, outbred stocks, genetically modified strains, sourcing, stress and the value of habituation, clinical or sub-clinical infections, and basic biology). 10.3. Describe possible causes of bias and ways of alleviating it (e.g. formal randomisation, blind trials and possible actions when randomisation and blinding are not possible). 10.4. Identify the experimental unit and recognize issues of non-independence (pseudoreplication). 10.7. List the different types of formal experimental designs (e.g. completely randomised, randomised block, repeated measures [within subject], Latin square and factorial experimental designs). 10.8. Explain how to access expert help in the design of an experiment and the interpretation of experimental results.

Day 3 – Wednesday October 2, 2019			[L, 405 min]
Time	**Title**	**Module**	**Learning Outcomes**
09.00-09.45	**Scientific, ethical and welfare factors influencing the choice of an appropriate animal or non-animal model – pilot experiments** (L, 45') A Papalois	*11. Design of procedures and projects (level 2) [Function B]*	11.3. Describe the principles of a good scientific strategy that are necessary to achieve robust results, including the need for definition of clear and unambiguous hypotheses, good experimental design, experimental measures and analysis of results. Provide examples of the consequences of failing to implement sound scientific strategy. 11.4. Demonstrate an understanding of the need to take expert advice and use appropriate statistical methods, recognise causes of biological variability, and ensure consistency between experiments. 11.5. Discuss the importance of being able to justify on both scientific and ethical grounds, the decision to use living animals, including the choice of models, their origins, estimated numbers and life stages. Describe the scientific, ethical and welfare factors influencing the choice of an appropriate animal or non-animal model. 11.6. Describe situations when pilot experiments may be necessary. 11.7. Explain the need to be up to date with developments in laboratory animal science and technology so as to ensure good science and animal welfare 11.8. Explain the importance of rigorous scientific technique and the requirements of assured quality standards such as GLP.
09.45-10.30	**Stress, anxiety and welfare of laboratory animals** (L, 45') M Pavlidis	7. Minimally invasive procedures without anaesthesia – species specific (theory)	7.2. Describe the biological impact of procedures and restraint on physiology. 11.15. Identify, assess and minimise all of the welfare costs to animals throughout the animals' lifetime (including adverse effects relating to sourcing, transport, housing, husbandry, handling, procedures and humane killing);
Coffee Break			
11.00-11.45	**Recognition of abnormal behaviour, discomfort, pain, suffering, or distress, and signs of positive well-being** (L, 45') P Lelovas	5. Recognition of pain, suffering and distress – species specific	5.1. Recognize normal or desirable behavior and appearance of the individuals in the context of species, environment and physiological status. 5.2. Recognize abnormal behavior and signs of discomfort, pain, suffering, or distress, as well as signs of positive well-being and principles of how pain, suffering and distress can be managed. 5.3. Discuss factors to be considered and methods available for assessing and recording the welfare of animals e.g. score sheets.
11.45-12.30	**Humane end-points** (L, PBL 45') A Zacharioudaki	5. Recognition of pain, suffering and distress - species specific	5.4. Describe what a humane end point is. Identify criteria to be used to set humane endpoints. Define action to be taken when a humane endpoint is reached and consider possible options for refining methods to finish at an earlier endpoint. 11.16. Define and apply appropriate humane end-points; establish suitable criteria to identify when the humane endpoint has been reached.
12.30-13.00	**Laboratory Mouse and Rat Breeding** (L, 30') P Lelovas	23. Advanced animal husbandry, care and enrichment practices	Connection with 4.10. Describe appropriate breeding programmes (vi) Devise appropriate breeding programmes for laboratory animals given specified conditions 23.16. Summarize the basic breeding data of common laboratory animals 23.17. Describe in detail suitable breeding programmes for named species under specified conditions 23.18. Select suitable future breeding stock

			23.19. List methods for determining oestrus, mating and confirming pregnancy in laboratory animals and evaluate their effectiveness. 23.20. Analyze breeding cards/data to describe the breeding performance of a breeding group. 23.21. Describe any identified problems and suggest appropriate remedial actions. (ix) Explain the use and problems associated with genetically altered animals [where appropriate to the species concerned] 23.22. Explain how genetically altered animals are used for research purposes. 23.23. Describe the potential problems associated with the use of genetically altered animals. 23.24. Describe methods for producing genetically altered animals.
Lunch Break			
14.00-14.30	**Euthanasia** (L, 30') A Zacharioudaki	6.1 Humane methods of killing (theory)	6.1.3. Explain why someone competent to kill animals should be available at all times (whether are staff or person carrying out procedures) Connection with: 1.11. Indicate the circumstances in which animals under the scope of the Directive should be humanely killed or removed from the study to receive veterinary treatment. 1.12. Describe the legislative controls over the killing of animals bred or used for scientific procedures.
14.30-15.15	**Description of the different euthanasia methods available** (L, 45') ZI Kakazanis	6.1 Humane methods of killing (theory)	6.1.1. Describe the principles of humane killing (e.g. what constitutes 'a good death') 6.1.2. Describe the different methods by which the relevant animals are allowed to be killed, the influence different methods can have on scientific outcomes, and how to select the most appropriate method. 6.2.2. Demonstrate how death is confirmed and how cadavers should be processed or otherwise disposed of.
15.15-15.45	**Tissue biopsy, correct recording and handling of samples** (L, 30') P Lelovas	7. Minimally invasive procedures without anaesthesia - species specific (theory)	7.6. Describe the need for rigor and consistency in conducting scientific procedures and the correct recording and handling of samples.
Coffee Break			
16.15-17.00	**Handling, sexing, identification and restraint** (L, 45') E Balafas	4. Animal care, health and management – species specific (theory) 7. Minimally invasive procedures without anaesthesia – species specific (theory)	4.7. List the methods, and demonstrate an understanding of appropriate, safe and humane handling, sexing and restraint of one or more named species for common scientific procedures. 4.8. Name different methods for marking individual animals and state an advantages and disadvantages for each method. 7.1. Describe appropriate methods and principles to be followed when handling animals (including methods of manual restraint and use of restricted environments). 7.2. Describe the biological impact of procedures and restraint on physiology. 7.3. Describe refinement opportunities for procedures and restraint e.g. through training (using positive re-enforcement), habituation and socialization of animals.
17.00-17.45	**Techniques/ procedures for injection, sampling and dosing (routes/volumes /frequency)** (L, 45') E Balafas	7. Minimally invasive procedures without anaesthesia – species specific (theory)	7.4. Describe techniques/procedures including, for example, injection, sampling and dosing techniques (routes/volumes/frequency), dietary modification, gavage, tissue biopsy, behavioral tests, use of metabolic cages. 7.5. Describe how to perform minor techniques and relate appropriate sample volumes and sampling frequencies for the relevant species. 7.6. Describe the need for rigor and consistency in conducting scientific procedures and the correct recording and handling of samples.

Day 4 – Thursday October 3, 2019

[L, 300 min – GA, 60 min – Suturing, 60 min]

Time	Title	Module	Learning Outcomes
09.00-09.45	**Basic Anesthesia** (L, 45') P Lelovas	20. Anaesthesia for minor procedures	20.1. Define sedation, local and general anaesthesia 20.2. Identify the three components of the triad of anaesthesia and understand that different anaesthetic agents produce these to different degrees. 20.3. Define balanced anaesthesia and indicate that this is best achieved by using drugs in combinations to achieve all components of the anaesthetic triad to an acceptable degree 20.4. Relate why and when sedation or anaesthesia might be used for restraint. 20.5. List the factors to be considered in pre-anaesthetic evaluation of animals - how to perform a basic health check, consider physiological or pathological status of the model they are working with and how these may influence the choice of anaesthetic agent. 20.6. Discuss the relative merits / drawbacks and principles of selection of different agents and their application, including calculation of doses, in relevant species, volatile agents (or dissolved agents in the case of aquatic species), including local anaesthesia regimes including injectable and volatile agents (or dissolved agents in the case of aquatic species), including local anaesthesia regimes. 20.7. Indicate the importance of minimising stress prior to anaesthesia in reducing the likelihood of complications due to anaesthesia. 20.8. Recognise when premedication is beneficial to incorporate into an anaesthetic regime. 20.9. Describe and demonstrate the correct set-up, operation and maintenance of anaesthetic equipment appropriate to the species concerned. 20.10. Evaluate and appreciate the different levels and planes of anaesthesia (voluntary excitement, involuntary excitement, surgical anaesthesia (light, medium & deep), excessively deep). 20.12. Describe methods of optimising post anaesthetic recovery (e.g. heat blankets, analgesia, reversal agents, access to food and water, environmental conditions) to ensure a smooth and rapid recovery from anaesthesia. 20.13. Demonstrate an understanding of safe / good working practices with regard to use, storage and disposal of anaesthetic and analgesic agents.
09.45-10.15	**Analgesia and pain relief** (L, 30') M Katsimpoulas	21. Advanced anaesthesia for surgical or prolonged procedures	• Present common analgesics for mice and rats. 5.6. Describe the circumstances when anaesthesia or analgesia may be necessary to minimise pain, suffering, distress or lasting harm 21.22. Demonstrate a sufficiently detailed understanding of analgesics to be able to administer safely, including routes of administration and potential adverse effects. 21.21. Indicate some of the problems associated with pain recognition and pain management in animals.
10.15-11.00	**Advanced Anesthesia** (L, 45') P Lelovas	21. Advanced anaesthesia for surgical or prolonged procedures	21.1. Relate why and when anaesthesia might be used, including additional factors relevant for long term anaesthesia. 21.2. Relate the need for and list the factors to be considered in pre-anaesthetic evaluation of animals, including acclimatisation. 21.3. Discuss the use of pre-anaesthetic agents and analgesics as part of a balanced anaesthetic regime. 21.4. Indicate that a range of drugs are commonly used for premedication and the induction and maintenance of anaesthesia in relevant laboratory species, and identify where to get advice on the different drug available and their use. 21.5. Describe how an animal's concurrent pathology many require specific anaesthetic regimen, monitoring or nursing care. 21.6. Indicate types of agents used for the induction and maintenance of general anaesthesia, their advantages and disadvantages and when each might be used. 21.7. Describe how anaesthetic agents interact to produce the three components of the anaesthetic triad to different degrees, and how balanced anaesthesia might be best achieved by using combinations. 21.8. Demonstrate a sufficient understanding of anaesthetic agents having a low analgesic effect, potentially requesting the use of an additional analgesia. 21.12.a. Describe and demonstrate the correct set-up, operation and maintenance of anaesthetic equipment appropriate to the species concerned. 21.15. Demonstrate an understanding of mechanical ventilation. 21.16. Describe methods to optimise post anaesthetic recovery to ensure a smooth and rapid recovery from anaesthesia, as in Basic Module but with additional methods required, including analgesia and fluid replacement, for animals having undergone lengthy anaesthesia of surgical procedure. 21.17. Consider the consequences of anaesthesia and the surgical procedures on recovery. 21.18. Appreciate how the choice of anaesthetic agent will determine the rate of recovery and describe how duration and quality of anaesthesia governs the rate of recovery. 21.19. Describe the problems that can arise (in the post-operative period), and indicate how to avoid these, or manage them if they occur. 21.20. Discuss how to integrate a program of pain management into an overall scheme of perioperative care. 21.23. Demonstrate an understanding of safe / good working practices with regard to use, storage and disposal of anaesthetic and analgesic agents.
Coffee Break			

11.30-12.00	**Anesthesia Monitoring** (L, 30') A Zacharioudaki	21. Advanced anaesthesia for surgical or prolonged procedures	20.11. List the factors indicating that an animal is suitably anaesthetized (stable and of appropriate depth) to enable procedures to be undertaken and what actions should be taken if an adverse event occurs. This will include basic "hands n" and "observational" anaesthetic monitoring techniques, including assessment of reflexes appropriate for species. 21.9. List the factors to be considered when monitoring anaesthesia both for anaesthetic depth and physiological stability. Indicate how to determine that an animal is sufficiently deeply anaesthetised to enable painful procedures to be undertaken, and what action should be taken if an adverse event occurs. 21.10. List methods which can used to assist monitoring of anaesthesia (e.g. ECG, BP, Urine output, Oxygen saturation, CO_2) and how these can be monitored. 21.11. Monitor anaesthetic depth and the animals' vital signs, using both clinical signs, and electronic apparatus if appropriate. 21.12.b. Describe and demonstrate the correct set-up, operation and maintenance of anaesthetic monitoring equipment appropriate to the species concerned. 21.13. Demonstrate competence in maintaining and interpreting records of pre- and post- anaesthetic induction and whilst an animal is anaesthetised, as well as in managing the animal care adequately 21.14. Indicate the problems that may occur during anaesthesia, and understand how to avoid these, or manage them if they occur.
12.00-12.45	**Principles of Surgery – Perioperative Considerations** (L, 45') P Ypsilantis	22. Principles of surgery	22.1. Explain the relevance and need for pre-operative assessment and, where appropriate, conditioning. 22.3. Describe the process of tissue healing and relate to this to the importance of asepsis and hygienic practices, wound creation, the principles of tissue handling and selection of a suitable surgical approach 22.4. Discuss possible causes of delayed or impaired wound healing or other post-surgical complications and describe ways in which these can be avoided or, if they occur, treated 22.6. List the principles of successful surgery (e.g. Halstead's principles) and indicate how to achieve these 22.11. Describe common post-surgical complications and their causes 22.12. Relate the principles of post-surgical care and monitoring 22.15. Describe particular aspects of care appropriate for animals before, during and after surgical or any other potentially painful intervention 22.2. Identify sources of reference for good surgical practice
Lunch Break			
13.45-14.30	**Principles of Surgery – Surgical techniques** (L, 45') M Katsimpoulas	22. Principles of surgery	22.13. Describe the planning of surgical procedures and discuss the competencies required of all personnel involved 22.5. Describe in general terms how personnel, animals, instruments and equipment should be prepared for aseptic surgery 22.14. Demonstrate competence in surgical techniques, including ablations and incisions and their closure by methods appropriate to the tissue concerned 22.10. Demonstrate how to place a suture correctly 22.9. Indicate the characteristics of different suture patterns and their applicability to different situations 22.8. Relate the importance of good technique in accessing surgical sites, handling tissues and repairing incisions 22.7. Describe the characteristics of different, commonly-used instruments, suture materials and needles 22.2. Identify sources of reference for good surgical practice
14.30-15.00	**Practical aspects of aseptic technique** (L, 30') M Katsimpoulas	22. Principles of surgery	22.5. Describe in general terms how personnel, animals, instruments and equipment should be prepared for aseptic surgery. 22.2. Identify sources of reference for good surgical practice.
15.00-15.30	**Project design** (L, 30') A Zacharioudaki	*11. Design of procedures and projects (level 2)*	• Guidelines for completing the application for project authorization. 11 (ii) Good scientific practice 11 (iii) Implement the Three Rs 11.16. Define and apply appropriate humane end-points; establish suitable criteria to identify when the humane endpoint has been reached. 23 (xi) Accurately apply the legislation that governs the use of research animals *The students will be divided in groups of 5 and will be assigned a scientific project. The task involves organizing the project and filling in the application for project authorization and non-technical project summary.*
Coffee Break			
16.00-17.00	**Suturing (or Project work – in groups)** (60') M Katsimpoulas	22. Principles of surgery	22.10. Demonstrate how to place a suture correctly (practice on suturing model)
17.00-18.00	**Project work (or Suturing – in groups)** (GA, 60') ID, PL, AZ	*11. Design of procedures and projects (level 2) [Function B]*	• Group work on student projects.

Day 5 – Friday October 4, 2019

[L, 300 min – GA, 285 min]

Time	Title	Module	Learning Outcomes
09.00-09.30	**Communication of appropriate information to the public – Dissemination of LAS information** (L, 30') K Marinou	*9. Ethics, Animal Welfare & the 3Rs (level 2) [Function B]*	9.6. Understand the need to communicate appropriate information to a wider public audience, and be able to prepare an appropriate non-technical project summary to facilitate this. 9.7. Describe the importance of disseminating information that will promote understanding of ethical issues, good animal welfare, good science and application of the Three Rs.
09.30-10.00	**Transport** (L, 30') N Kostomitsopoulos	23. Advanced animal husbandry, care and enrichment practices	(x) Know procedures for the safe and legal transportation of animals 23.25. Identify the key pieces of legislation controlling the transportation of animals. 23.26. Describe the procedures, equipment, legislative responsibilities and responsible persons in transport of animals. 23.27. Explain how health status & animal welfare standards are maintained throughout the transport. Connection with 4.12. List the correct procedures for ensuring health, welfare and care of animals during their transport.
10.00-10.45	**Advanced husbandry and enrichment** (L, 45') N Kostomitsopoulos	23. Advanced animal husbandry, care and enrichment practices	Enrichment: 23.3. Discuss how environmental enrichment is achieved. 23.5b. Describe enrichment for the relevant animal species Advanced husbandry: (i) Demonstrate a thorough understanding of how animal welfare is maintained in the animal unit 23.1. Describe how environmental conditions may need to be varied according to the species, age, and life stage or specific care conditions (e.g. peri-operative care, immuno-deficient animals, genetically altered strains). 23.2. Discuss the possible effects of an uncontrolled environment on animal welfare and experimental results. 23.4. Explain how the Three Rs contribute to the continuous improvement of welfare, husbandry and enrichment practices. (ii) Know suitable environmental conditions for laboratory animals and how they are monitored 23.5.a. Describe suitable environmental conditions for the relevant animal species and how these conditions are monitored. 23.6. Be able to use environmental measure equipment, read charts, graphs or tables generated by environmental monitoring equipment and evaluate potential problems. (iii) Explain how the organization of the animal facility maintains an appropriate health status for the animals and the scientific procedures. 23.7. Describe suitable routines and housing conditions or laboratory animals housed for different scientific purposes. 23.8. Explain how routines and housing conditions may change given specified conditions. 23.9. Evaluate the use of barriers in controlling the animals' health status
Coffee Break			
11.15-11.45	**Ethics, Animal Welfare & the 3Rs (level 2)** (L, PBL, 30') I Dontas	*9. Ethics, Animal Welfare & the 3Rs (level 2) [Function B]*	9.4. Explain that legislation requires that the justification for programmes of work is assessed by weighing potential adverse effects on the animals against the likely benefits; that harms to animals must be minimized, and benefits maximized. 9.5. Understand and provide the information necessary to enable a robust harm/benefit assessment to be performed; and explain why they personally consider that the potential benefits outweigh the likely adverse effects.
11.45-12.30	**On-going critical evaluation of the justification for using animals.**	*9. Ethics, Animal Welfare & the 3Rs (level 2) [Function B]*	9.1. Understand that there is a broad range of ethical, welfare and scientific perspectives on the use of animals in scientific procedures, and that thinking on all of these matters evolves over time and is influenced by culture and context.

	Implementation of the 3Rs at all stages of a project. (L, 45') I Dontas	*11. Design of procedures and projects (level 2) [Function B]*	9.2. Understand that this means there is need for on-going critical evaluation of the justification for using animals and of implementation of the Three Rs at all stages of the life of a project. 9.3. Recognize that there are ethical limits to what it is considered permissible to do under the Directive and that even within these legal constraints, there are also likely to be national and institutional differences in this respect. 11.10. Demonstrate a comprehensive understanding of the principles of replacement, reduction and refinement, and of how these ensure good science and good animal welfare. 11.11. Explain the importance of literature and internet searches, discussion with colleagues and with relevant professional bodies in identifying opportunities for applying each 'R' 11.12. Describe relevant sources of information relating to ethics, animal welfare and the implementation of the Three Rs. 11.13. Explain how to use different search tools (e.g. EURL ECVAM Search Guide, Go3Rs) and methods of search (e.g. Systematic reviews, meta-analysis). 11.14. Describe examples of alternative methods and research strategies that replace, avoid or complement the use of animals in different types of research programme. 11.15. Identify, assess and minimise all of the welfare costs to animals throughout the animals' lifetime (including adverse effects relating to sourcing, transport, housing, husbandry, handling, procedures and humane killing); Explain and give examples of welfare assessment protocols. 11.17. Describe possible conflicts between Refinement and Reduction (e.g.in the case of re-use) and the factors that need to be considered to resolve this conflict
Lunch Break			
13.30-18.15	**Project work and Coffee** (GA, 165') ID, PL, AZ	*11. Design of procedures and projects (level 2) [Function B]*	• Group work on student projects.

Saturday October 5, 2019

Sunday October 6, 2019

free days

Day 6 – Monday October 7, 2019

[L, 270 min – GA 150 min]

Time	Title	Module	Learning Outcomes
9.00-9.30	**Legislation and guidelines that impact on the welfare and use of animals - local arrangements relating to project licence management** (L, 30') A Zacharioudaki	*11. Design of procedures and projects (level 2) [Function B]*	11.2. List the key purposes of other relevant EU and international legislation and associated guidelines that impact on the welfare and use of animals. This includes Directive 2010/63/EU and legislation/guidelines relating to: veterinary care, animal health, animal welfare, genetic modification of animals, animal transport, quarantine, Health & Safety, wildlife and conservation. 11.18. Define the requirements for, and controls on, re-homing of animals; identify any relevant re-homing guidelines 11.19. Explain the need to be aware of local arrangements relating to project licence management, e.g. procedures for ordering animals, accommodation standards, disposal of animals, safe working practices and security, and the actions to take in the event of unexpected problems arising with any of these
09.30-10.00	**Legal responsibilities of those designing procedures and projects** (L, 30') A Zacharioudaki	*11. Design of procedures and projects (level 2) [Function B]* *23. Advanced animal husbandry, care and enrichment practices*	11.1. Describe in detail the main components of the national legislation regulating the scientific use of animals; in particular, explain the legal responsibilities of those designing procedures and projects (Function B staff) and those of other persons with statutory responsibilities under the national legislation (e.g. the person responsible for compliance, veterinarian, animal care staff, training officers). 23.28. Summarise the key aspects of the legislation protecting laboratory animals. 23.29. Discuss how the legislation controls the use of animals for scientific purposes.
10.00-10.45	**Zoonoses** (L, 45') M Foa	4. Animal care, health and management – species specific (theory)	4.13. List potential human health hazards associated with contact with laboratory animals (including allergy, injury, infection, zoonosis) and how these can be prevented.
Coffee Break			
11.15-12.00	**Health monitoring** (L, 45') M Foa	4. Animal care, health and management – species specific (theory) 23. Advanced animal husbandry, care and enrichment practices	4.5. Describe how the animal facility is organized to maintain an appropriate health status for the animals and the scientific procedures. 4.9. List potential disease risks in the animal facility, including specific predisposing factors which may be relevant. Name methods available for maintaining appropriate health status (including use of barriers, different containment levels use of sentinels as relevant to the species). 4.11. Describe how genetically altered animals can be used for scientific research and the importance of monitoring such animals very carefully. (iv) Identify potential disease risks in the animal facility 23.10. Describe a health-screening programme suitable for the animals in their care. 23.11. Discuss potential sources of disease in the animal facility. 23.12. Recognize examples of laboratory animal parasites. 23.13. Describe the life cycle of some common laboratory animal disease organisms. (v) Evaluate methods for minimizing the risks from potential disease organisms 23.14. Explain methods for minimizing the risk from disease organisms. 23.15. Apply suitable disease control methods under specified conditions.
12.00-13.30	**Project work** (GA, 90') ID, PL, AZ	11. Design of procedures and projects (level 2)	Group work on student project.
Lunch Break			

14.30-15.00	**Statistics and experimental design – Part 1** (L, 30') T Sergentanis	*11. Design of procedures and projects (level 2) [Function B]*	• Interpret experimental results
15.00-15.45	**Statistics and experimental design – part 2** (L, PBL, 45') T Sergentanis	*10 & 11. Design of procedures and projects [Function B]*	10.5. Describe the variables affecting significance, including the meaning of statistical power and "p-values". 10.8. Explain how to access expert help in the design of an experiment and the interpretation of experimental results.
Coffee Break			
16.15-17.00	**Formal ways of determining sample size** (L, PBL, 45') T Sergentanis	*10 & 11. Design of procedures and projects [Function B]*	10.5. Describe the variables affecting significance, including the meaning of statistical power and "p-values". 10.6. Identify formal ways of determining of sample size (power analysis or the resource equation method). 10.8. Explain how to access expert help in the design of an experiment and the interpretation of experimental results. 11.6. Describe situations when pilot experiments may be necessary.
17.00-18.00	**Project work** (GA, 60') ID, PL, AZ	11. Design of procedures and projects (level 2)	Group work on student project.

Day 7 – Tuesday October 8, 2019

[L, 45 min - GA, 345 min]

Time	Title	Module	Learning Outcomes
09.00-12.45	**Project work and Coffee** (225')	11. Design of procedures and projects (level 2)	Group work on student project.
12.45-13.30	**Dissemination of study results. ARRIVE guidelines** (L, 45') T Xanthos	*11. Design of procedures and projects (level 2) [Function B]*	11.9. Explain the importance of dissemination of the study results irrespective of the outcome and describe the key issues to be reported when using live animals in research e.g. ARRIVE guidelines.
Lunch Break			
14.30-16.00	**Written Examination** (90') ID, PL, AZ	Examination for theoretical modules	60 multiple choice questions
16.00-18.00	**Project presentations and Coffee**		15 min project presentation followed by 10 min discussion/questions for each student project.

Day 8 – Wednesday October 9, 2018 [W 60', P 310']

Module 3.2 Basic and appropriate biology – species specific (skills)

LO 3.2.1. Be able to approach, handle/pick up and restrain an animal and return it to its cage/pen in a calm, confident and empathetic manner such that the animal is not distressed or caused harm.

Module 8. Minimally invasive procedures without anaesthesia – species specific (skills)

LO 8.1. Select and explain the best methods for common procedures (such as blood sampling and application of substances) including route/volume/ frequency as appropriate.

LO 8.2. Demonstrate that s/he can handle and restrain the animal in the best position for the technique.

LO 8.3. Perform minor techniques under supervision, in a manner that does not inflict unnecessary pain, suffering, distress or lasting harm.

Time	Title	Learning Outcomes
09.00-09.30	**Rat workshop** (W, 30') E Balafas (L), PL, EB, PA, AZ (dummy P)	➢ Presentation of "Rat Techniques" to be practiced today (15 min) ➢ Rat dummy restraint (15 min)
09.30-10.00	**Injections workshop** (W, 30') E Balafas (L), PL, EB, PA, AZ (dummy P)	Short presentation followed by practice: ➢ Preparation of workspace ➢ Handling sharps ➢ Handling needles (practice holding, aspirating, injecting) ➢ Rat dummy injections
	Coffee Break	
10.00-12.10	**Rat Handling** (P, 130') PL, EB, PA, AZ	➢ Rat transfer (10 min) ➢ Rat acclimatization (10 min) ➢ Rat restraint (90 min) ➢ Rat restrainer use (20 min)
	Lunch Break	
13.00-16.00	**Rat Procedures** (P, 180') PL, EB, PA, AZ	➢ Rat positioning for injections (10 min) ➢ Rat s.c. injection (30 min) ➢ Rat i.p injection (30 min) ➢ Rat oral gavage (30 min) ➢ Rat i.m. injection (20 min) ➢ Rat i.v. injection & blood collection (40 min) ➢ Free practice under supervision (20 min)
	Coffee Break	
16.30-17.30	**Assessment in groups** (or break) (60')	

Day 9 – Thursday October 10, 2018 [W 30', P 260']

Module 3.2 Basic and appropriate biology – species specific (skills)

LO 3.2.1. Be able to approach, handle/pick up and restrain an animal and return it to its cage/pen in a calm, confident and empathetic manner such that the animal is not distressed or caused harm.

Module 8. Minimally invasive procedures without anaesthesia – species specific (skills)

LO 8.1. Select and explain the best methods for common procedures (such as blood sampling and application of substances) including route/volume/ frequency as appropriate.

LO 8.2. Demonstrate that s/he can handle and restrain the animal in the best position for the technique.

LO 8.3. Perform minor techniques under supervision, in a manner that does not inflict unnecessary pain, suffering, distress or lasting harm.

Time	Title	Learning Outcomes
09.00-09.30	**Mouse workshop** (W, 30') V Ntafis (L) EB, PA, AZ, VN (dummy P)	➢ Presentation of "Mouse Techniques" to be practiced today (15 min) ➢ Mouse dummy restraint (15 min)
09.30-09.40	**Cage handling** (P, 10') EB, PA, AZ, VN	➢ Transfer, open/close cage, enrichment (10min)
09.40-11.10	**Mouse Handling** (P, 90') EB, PA, AZ, VN	➢ Mouse transfer (10 min) ➢ Mouse manual restraint (60 min) ➢ Mouse restrainer use (20 min)
	Coffee Break	
11.30-13.10	**Mouse Procedures (part 1)** (P, 100') EB, PA, AZ, VN	➢ Mouse positioning for injections (10 min) ➢ Mouse s.c. injection (30 min) ➢ Mouse i.p. injection (30 min) ➢ Mouse oral gavage (30 min)
	Lunch Break	
14.00-15.00	**Mouse Procedures (part 2)** (P, 60') EB, PA, AZ, VN	➢ Mouse i.v. injection & blood collection (40 min) ➢ Free practice under supervision (20 min)
	Coffee Break	
15.30-16.30	**Assessment in groups** (or break) (60')	

Day 10 - Friday October 11, 2018 [W 60', P 180']

[P, Modules 6.2, 8, 20, 22]

Module 6.2: Humane methods of killing (skills)

6.2.1. Proficiently and humanely carry out euthanasia using appropriate techniques on relevant species of laboratory animals

6.2.2. Demonstrate how death is confirmed and how cadavers should be processed or otherwise disposed of

Modules 20 & 21: Anesthesia

Time	Title	Learning Outcomes
09.00-09.30	**Anesthesia workshop** (W, 30') P Lelovas	➢ Select appropriate anesthetic protocol ➢ Calculate doses for injectable anesthesia ➢ Mouse & rat intubation demonstration (video)
09.30-10.00	**Blood collection workshop** (W, 30') A Zacharioudaki	➢ preparation of workspace ➢ calculating blood withdrawal volumes ➢ selection of blood collection site
	Coffee break	
10.30-12.00	**Mouse anesthesia, terminal blood collection euthanasia and necropsy.** (P, 90') PL, EB, PA, AZ, VN, ZIK	Mice (1 mouse/participant): ➢ Anaesthesia (ketamine+dexmedetomidine i.p. - 30 min) ➢ Blood collection under anaesthesia (cardiac puncture - 30 min) ➢ Euthanasia (Cervical dislocation - 15 min) ➢ Necropsy and Anatomy Demonstration (15 min) **Note:** Assessment takes place during session.
	Lunch break	
13.00-14.30	**Rat anesthesia, intubation, terminal blood collection, euthanasia and necropsy** (P, 90') PL, EB, PA, AZ, VN, ZIK	Rats (1 rat/group): ➢ Anaesthesia (ketamine+dexmedetomidine i.m. - 30min) ➢ Intubation (30 min – 1 attempt/student) ➢ Blood collection under anaesthesia (demonstration - caudal vena cava - 5 min) ➢ Euthanasia (demonstration - pentobarbital overdose - 5 min) ➢ Necropsy and Anatomy (demonstration - 20 min) **Note:** Assessment takes place during session.
	Farewell	

Abbreviations:
L – lecture
PBL – problem based learning
GA – group activity
P – practical training
W – workshop/dry lab

Instructors:
PA - Pavlos Alexakos
EB - Evangelos Balafas
ID – Ismene Dontas
MK - Michalis Katsimpoulas
PL - Pavlos Lelovas
ZIK - Zacharias Kakazanis
AZ - Argyro Zacharioudaki

Attendance options

Functions	Curriculum	Hour allocation	
Functions ABCD **[Full Course, requires relevant degree]**	**Modules: 1-11, 20-23, Animal Models** **Project Work** **Practical training (mice, rats)**	theory	32.5
		practical (live animals)	12.5
		practical (workshops)	2.5
		suturing	1
		project work	14
Functions ACD Plus **[Course without Function B Modules, does not require a degree]**	**Modules 1-8, 20-23, Animal Models** **Practical training (mice, rats)** **Project Work optional (state during enrollment)**	theory	24.75
		practical (live animals)	12.5
		practical (workshops)	2.5
		suturing	1
		project work	optional