EQUINE SCIENCES

Year 1

Curriculum Units	Semester	Contact Hours	ECTS	Type	Obs
Mathematics and Statistics	I		6	C	
Biochemistry	I		3	C	
Animal Anatomy	I		6	C	
Special Animal Husbandry	I		6	C	
General Agriculture	I		3	C	
Horse Riding I	I		6	C	
Animal Physiology	II		6	C	
English	II		3	C	
Animal Cytology and Histology	II		6	C	
Bio-Physics	II		6	C	
Equine Genetics and Reproduction	II		6	C	

C – Compulsory; PC – Personal Choice

Curriculum Units available to foreign students according to conditions described

Curriculum Unit	Mathematics and Statistics
Contents	The course seeks to support mathematics as a tool of analysis, understanding and developing solutions in other courses enabling the student to: (i) use statistical methods to summarize data and perform exploratory data analysis, (ii) understand the conditions underlying the applicability, validity and limitations of the theoretical models used for statistical analysis, (iii) analyze the results obtained, (iv) distinguish between cause-effect relationships and statistical associations between variables, (v) to acquire basic research skills and critical reading of technical and scientific documentation, (vi) be able to import, store, process, analyze and present data using the spreadsheet as a universal tool.

Curriculum Unit	Biochemistry
Contents	Students acquire knowledge on key biological molecules, their genesis, function, interrelation and in particular its importance for the maintenance of life living beings. Knowledge of the phenomena of regulation, including enzymatic and non-enzymatic will also be acquired.

Curriculum Unit	Animal Anatomy

Contents	Animal anatomy (theory) is aimed at providing scientific techniques and methodologies for the correct identification of anatomical structures and systems. Also, it provides basic knowledge about the constitution comparative anatomy of domestic animals. Animal anatomy (practice) is intended to teach students the anatomical bases of the major domestic animals for the implementation of procedures within the veterinary nursing and the study of animal physiology and pathology.

Curriculum Unit	**Special Animal Husbandry**
Contents	**Objectives** The course aims to provide the necessary theoretical and practical knowledge to the students about the identification, exploration potential and shape of different livestock species of higher national interest. **Syllabus** **I - Introduction to Animal Production Systems** Edaphoclimatic framework to production systems Resources and conditioning factors of animal production systems Classification of production systems and organic production Major livestock production Livestock production in numbers, and head-count and productions in Portugal and the European Union Concepts of indigenous breed versus industrial breed Husbandry in Animal Production Indexes of analysis Registration and identification of animals Welfare and animal behaviour Applied reproduction Facilities and equipment **II - Cattle Production Systems** Milk aptitude Bovines Breeds and indexes Reproductive and Food Husbandry Lactation Curve Meat Bovines Indigenous and exotic breeds Production systems Reproductive and Food Husbandry **III - Sheep and Goats Production Systems** Milk Aptitude Sheep Indigenous and exotic breeds Reproductive and Food Husbandry Lactation curve Meat Sheep Indigenous and exotic breeds Reproductive and Food Husbandry Milk Aptitude Goats

	Indigenous and exotic breeds Reproductive and Food Husbandry Lactation curve Meat Goats Indigenous and exotic breeds Reproductive and Food Husbandry **IV - Swine Production Systems** Indigenous and exotic breeds Production Systems Reproductive and Food Husbandry **V - Production of Poultry and Rabbits** Breeds and production systems Production of broilers Egg Production Reproductive and Food Husbandry Alternative Poultry (other poultry production) Reproductive and Food Husbandry in rabbit meat production systems **VI - Equine Production** Indigenous and exotic breeds Key indicators (reproductive and productive) Equine Nutrition and Food
Methodologies and Evaluation	Theoretical and practical classes. Tutorials Classes to support the preparation of bibliographic research, answering questions , monitoring field work. **Assessment alternatives** Alternative 1: Continuous assessment 2 interim tests and group work on topic proposed by the teacher 1st test - 40% (minimum score 8 points) + 40% 2nd test + 20% work assignment Alternativ22: Final Exam Written test covering all the content of the course - 100%

Curriculum Unit	**General Agriculture**
Contents	Concepts in Agriculture. (2) The climate of Portugal: basic concepts of weather; climatological characterization of the national territory. (3) The soils of Portugal: basic concepts of pedology; Soil characterization of Portugal; notions of fertility and fertilization. (4) Plant Biology: Understanding the morphology and plant taxonomy; main agricultural species used in animal feeding; plant physiology (transpiration, photosynthesis, growth and development); environmental effects on crop production; fertilization of crops. (5) systems of animal production. Role of the animal in the agricultural environment. (6) Agriculture and the environment. Development of sustainable production systems and ways of working to combat pollution sources generated in the agricultural process. Preservation of ecosystems.

Methodologies and Evaluation	Theoretical-practical classes in which concepts are introduced and the basics of the topics explained with the desired level of detail, and practical classes in which theoretical concepts are applied and demonstrated. The practical assessment will be based on completion of a short test, a monograph on a topic in class and a herbarium on the plant species under study. The theoretical evaluation will be based on completion of a written examination.

Curriculum Unit	**Horse Riding I**
Contents	The objective of the course is to teach students basic tasks such as cleaning the horse, its hygiene and health, food and drink; use the various materials and ingredients of the cleaning and maintenance of equipment and harnesses; use various systems to guide the work of horses and freedom; use safety rules and during the riding lessons, and during the working; Develop guiding principles for placement in the saddle; make use of the hands, legs and body weight, to conduct and control the movement of the horse, including figures run riding school and make transitions; use the aids so that the horse work "calm", "rhythmic" and "flexible"; reruns of education level "Primary" successfully; run an obstacle course simple and isolated; drive a horse and working abroad, making use of changes in the slopes to gymnastic horse and develop some of the characteristics of "working horse well."

Curriculum Unit	**Animal Physiology**
Contents	The aim is to teach scientific and technical methodologies for the correct identification and understanding of the interrelationships of the structures and physiological systems.

Curriculum Unit	**English**
Contents	This English course is aimed at students whose current level of English is less than B2 on the Common European Framework of Reference for Languages. The course revises 4 basic English structures so that the students can distinguish between and use tenses that express Present, Past and Future time concepts in all language skills: listening, reading, writing and speaking. In addition lexis that reflects their future potential employment possibilities is introduced and practised, for example names of domestic and wild animals, basic animal anatomy, basic clinical equipment.
Methodologies and Evaluation	Given the very practical nature of language acquisition, there is a 70% attendance requirement for this course. Evaluation is as follows: Written Test; 70%, Classroom Participation and Demonstration of Oral Abilities; 20%, Individual Written Work (done out of the classroom); 10%. Worker students for whom there is no attendance requirement will have to take an oral test to replace the classroom participation grade.

	This course is available to foreign students and is completely conducted in English. Foreign students are expected to follow classes and participate in all activities assigned.

Curriculum Unit	**Animal Cytology and Histology**
Contents	Cellular diversity. Microscopes, microscopic techniques and other study forms of the cell. Cells and its structures. Main techniques used in the animals' tissues study. The animal tissues: epithelial, connective, muscle and nervous. Study of the histology and histophysiology of the main systems of domestic animals body: circulatory system, skin and mammary gland, digestive system (gastro gastrointestinal tract; liver, gallbladder and pancreas); respiratory system; urinary system; endocrine organs and male and female reproductive systems.
Methodologies and Evaluation	Students are assessed in partial (just theoretical) or a final examination that includes a laboratory work (identify of histological sections) and a theoretical test. The final mark is the result of the weighted average of the laboratory mark (25%) and theoretical test (75%)

Curriculum Unit	**Biophysics**
Contents	The course focus on basic training in physics related to agricultural sciences, providing the theoretical knowledge background and their application for the various courses in the study plan. Also, it aims at demonstrating the applicability and the role of the physical description and quantification of natural phenomena related to life sciences and engineering.

Curriculum Unit	**Equine Genetics and Reproduction**
Contents	1. The brood mare and oestrus 1.1. Anatomy and physiology of the reproductive tract of the mare 1.2. Phases of oestrus and oestrus abnormalities 1.3. Hormonal manipulation of oestrus 2. The stallion 2.1. Anatomy and physiology of the reproductive tract of the stallion 2.2. Stallion management for maximizing reproductive efficiency 3. Applied aspects of reproductive management 3.1. Detection of estrus 3.2. Diagnosis of pregnancy 3.3. Determination of semen quality 3.4. Assisted reproduction techniques: artificial insemination and transfer of embryos 4. Management of pregnancy and childbirth, and management of the foal 4.1. Caring for the pregnant mare 4.2. Childbirth: stages and care 4.3. Parameters of the normal newborn 4.4. Weaning

	5. Fundamentals of population genetics 5.1. Gene and genotypic frequencies, modes of action of genes 5.2. Hardy-Weinberg Law 6. Single genes in animal breeding 6.1. Genetics of coat colour in horses 7. Endogamy 7.1. Introduction 7.2. Inbreeding at the individual level 7.3. Inbreeding level of a population 7.4. Inbreeding, selection and maintenance of genetic variability 7.5. Applications of molecular genetics: control of paternity and filiations 8. Exogamy 8.1. Concept of heterosis 8.2. Main types of crossover 8.3. Creation in purebred and cross 9. Genetic parameters 9.1. Concept of heritability 9.2. Concept of correlation 10. Improvement programe 10.1. Index selection 10.2. Selection schemes 10.3. Structure of a breeding program
Methodologies and Evaluation	ASSESSMENT SCHEME: a) Continuous assessment: two interim tests at the end of each chapter and development and presenting a paper on the theme proposed by or agreed with the teacher and students. • Calculation of the final grade: (0.4 x Note the 1st test) + (0.4 x Note the 1st test) + (0.2 x Note the work) • Warning! The minimum score required for any of the components rating is 9.5. b) Final exam (final match score obtained in the examination).

Year 2

Curriculum Units	Semester	Contact Hours	ECTS	Type	Obs
Equine Clinical Pathology	I		6	C	
History and Theory of Horse Riding	I		3	C	
Horse Riding II	I		6	C	
Nutrition and Food	I		6	C	
Behavior and Welfare of Equines	I		6	C	
Economy and Taxation	I		6	C	
Pastures and Forages	II		6	C	
Horse Care Techniques and Horse Shoeing	II		6	C	
Business Management	II		6	C	
Horse Infrastructures Design	II		6	C	
Elective I - Hippotherapy	II		3	PC	
Elective I - Drawing and Graphic Representation	II		3	PC	

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Curriculum Units available to foreign students according to conditions described

Curriculum Unit	Equine Clinical Pathology
Contents	Basics of hygiene and prophylaxis; diseases and their causes; defense reactions of the body; hygiene concept and factors affecting hygiene; concepts and measures of health prophylaxis. Evaluation of general condition and physiological constants; temperature; heart rate/pulse; respiratory rate; abdominal noises; hydration status; capillary time repletion; mucosal colouring; other indicators of the general condition of the horse. Methods of restraint in horses; general rules; some methods of restraint. Wounds; bleeding control; evaluation of the wound; healing mechanism; factors affecting healing; how to cope with a wound; keloids. Application of bandages; general rules; different types of bandages. Administering medications; dosage; oral administration; administration by injection; topical administration to the eye. Contents of First Aid Kit; contents of the first aid kit. Problems of foals; retention of meconium and failures in the transfer of passive immunity; combined immunodeficiency (CID); neonatal isoerythrolysis; gastro-duodenal ulcers; diarrhea; Rhodococcus equi infection; infection/sepsis/pneumonia; "joint disease" or septic polyarthritis; poor neonatal adaptation syndrome and premature foals; persistence of the urachus and ruptured bladder; congenital deformities of members. Infectious diseases; equine influenza; rhinopneumonitis /viral abortion; equine infectious anemia; African horse sickness; Tetanus; Gurma; contagious equine metritis; vaccination schedules for horses. Horse parasitic diseases; major horse parasites; prophylaxis of parasitic diseases. Colic; colic definition; causes; clinical signs; assistance to suspect colic and performance of the veterinarian; prognosis; preventive management. Other common changes in horses; laminitis; navicular bone pathology; exercise myopathies; chronic obstructive pulmonary disease; exercise-induced pulmonary hemorrhage.

Curriculum Unit	History and Theory of Horse Riding
Contents	

Curriculum Unit	Horse Riding II
Contents	The objective of the course is to continue to develop the guiding principles of placement in the saddle - "balance", "flexibility," "strength" and "at ease"; to teach the horse to run the arena figures and transitions; teach the horse to work in initiating side: "transfer to the leg."; to work in the canter "straighten out the gallop" (front shoulder); Run the reruns of Education "Preliminary" / "Elementary" successfully; run an obstacle course of small simple and isolated; perform simple compounds obstacles; drive a horse and working abroad, making use of changes in the slopes to exercise the horse and develop some of the characteristics of "working horse well."; and incorporate small fixed obstacles in the field.

Curriculum Unit	Nutrition and Food
Contents	Basic concepts of animal nutrition. Nutrients: water, carbohydrates, lipids and proteins. Food analysis: Weende method and method of Van Soest. Basic concepts in ruminant feed Vitamins: general characteristics, functions, sources, deficiency and toxicity vitamin. Classification of food for livestock species. Practical exercise on digestion in ruminants. Minerals: main macro minerals and trace elements, functions, sources, deficiency symptoms and toxicity. Digestive tract of ruminants and non-ruminants: physiological aspects of anatomy. Feeding beef cattle: step mother and step son and dairy cattle: nutrition of dairy calves. Energy metabolism: key pathways, metabolic profile of the major organs, hormonal control of metabolism, metabolism in prolonged fasting. Classroom practice in nutrition-infected animal (ruminant), preventive and therapeutic strategies: overfeeding and malnutrition, nutritional monitoring, forms of power to the sick animal. Definition of digestive coefficient. Determination of digestibility in vivo and in vitro. Factors affecting digestibility. Ruminant feed: key concepts to consider. Allocation of energy from food (gross energy, digestible energy, metabolizable energy, clean energy maintenance and clean energy production). Energy use by animals: for maintenance and production. Energy recovery systems. Assessment of body condition in horses, cattle, goats and sheep. Voluntary intake: intake regulation in the short and long-term mechanisms that control the intake in monogastric and ruminant physiological factors that affect intake. Basics of small ruminants' diet. Feeding lambs, fattening under intensive and extensive. Feeding lambs replacement. Power players: pregnancy, lactation. Power for the production of sheep wool. Feeding goats. Protein food in monogastric and ruminant animals. Concept of crude protein, digestible crude protein, true protein, biological value of protein and recovery of the protein based on amino acid composition. Basics of pigs' diet. Swine feeding on mountain-system. Lecture-feeding in dogs and cats. Royal Canin. Basics of food poisoning. Monensin poisoning. Aflotoxicose.

	Nutrition in hospitalized animals (small animals). Definition of malnutrition. Definition of assisted nutrition. Enteral and parenteral nutrition. Diet therapy in small animals. Concept of food, nutrition, health and nutrition. Main diets used in small animals
Methodologies and Evaluation	Lectures. Practical classes Assessment scheme (general arrangement and student work) Regular students are required to attend 75% of practical classes, and to get a grade of 75% of the experiments proposed and a positive grade on written evaluation. Working or military students are only exempted from the requirement to attend at least 75% of practical classes. They shall, however, perform practical work individually and at home, in order to obtain a pass. The written assessment test consists of a theoretical and a practical test, which both contribute 50% towards the final grade.

Curriculum Unit	**Behavior and Welfare of Equines**
Contents	

Curriculum Unit	**Economy and Taxation**
Contents	Commercial Legislation; types of commercial societies; from the constitution to the start a commercial society. Taxation; Personal Income Tax (IRS); Business Income Tax (IRC); Value Added Tax (VAT). Index and developments; price indices and inflation rates; nominal and real variables; nominal and real growth rates. Markets and prices; demand and supply of products; the demand curve; the supply curve; movement of the curve and moving along the curve; individual and aggregate demand and supply; price formation; assumptions of perfect competition; the invisible hand and market equilibrium, the role of the state in the economy; public goods; externalities; the functions of the state in the economy. Producer Theory; factors of production; the production function with one or more factors of production; production, marginal productivity and average productivity; the cost function and marginal costs; optimal conditions and optimal production; deduction of the supply curve from the cost curve; scale economies.

Curriculum Unit	**Pastures and Forages**
Contents	The course is intended to teach students the biological, physiological and cultural aspects of pastures and forages. It is intended that students acquire knowledge about the main species of grasses and legumes, annuals and perennials as well as its role as a cover to protect against erosion, and CO2 sequestration as part of agro-forestry-pastoral. Reference is made to the relationships between growth, development stage and nutritional value of plants, and the approach to grazing systems and pasture-animal relations and animal-soil.

Curriculum Unit	**Horse Care Techniques and Horse Shoeing**

Contents	Theme 1: Anatomy and physiology of the hoof. Theme 2: Preliminary remarks and preparation of the hull. Theme 3: Choice, preparation and placement of the horseshoe. Theme 4: Overview of the balance of forces in member Topic 5: Issues related to the hull: Problems hoof growth, problems of mud and white line problems the beads; frog Problems, Problems of the sole. Theme 6: angular and flexural deformities. Theme 7: laminitis. Theme 8: Diseases of the navicular bone and third phalanx. Theme 8: Lameness in horses. Theme 9: Identification of horses. Theme 10: Transport of horses. Animal welfare. Practical class: examination of lameness. SEMINAR 1: TOPIC TO BE CONFIRMED. GROUP PAPERS SEMINAR 2: Equine Identification and lameness in horses. Presentation of papers, "journal club", other relevant subjects, seminar, etc. Clarification of doubts,
Methodologies and Evaluation	THEORETICAL CLASSES PRACTICAL CLASSES (obligatory presence in field trips): 1. Quality control of farriery: normal vs. farriery; orthopedic farriery; 2. Locomotor problems: observation of lameness; examination of lameness equine. 3. Equine Identification: Practical lessons for monitoring the quality of farriery. SEMINARS <u>Assessment system</u>: = 70% Average final individual assessment test + 20% group work (oral + written work) + 10% Journal Club. The students who obtain a grade lower than 9.5 in the individual test will have the opportunity to repeat the exam. Regardless of the type of student the non-participation in practical components will lead to non-admission to the exam, that is, these students are not admitted will be considered as absent or lacking evaluation data. Attendance at practical classes is compulsory, regardless of student's status, the lack of a practical component involves conducting an oral examination, individually, on the subjects taught in practical classes.

Curriculum Unit	**Business Management**
Contents	
Methodologies and Evaluation	

Curriculum Unit	Horse Infrastructures Design
Contents	
Methodologies and Evaluation	

Curriculum Unit	Elective I - Hippotherapy
Contents	
Methodologies and Evaluation	

Curriculum Unit	Elective I – Drawing and Graphic Representation
Contents	
Methodologies and Evaluation	

Year 3

Curriculum Units	Semester	Contact Hours	ECTS	Type	Obs
Horse riding III	**I**		**6**		
Entrepreneurship	**I**		**3**		
Sporting Coach Training	**I**		**6**		
Exercise Physiology and Biomechanics	**I**		**6**		
Organizing Equestrian Events	**I**		**6**		
Elective II - Physiotherapy and Osteopathy for Equines	**I**		**3**		
Elective II - Marketing and Communication Techniques	**I**		**3**		
Elective II - Research Methodologies	**I**		**3**		
Internship	**II**		**30**		

C – Compulsory; PC – Personal Choice

Curriculum Units available to foreign students according to conditions described

Curriculum Unit	Horse riding III
Contents	
Methodologies and Evaluation	

Curriculum Unit	Entrepreneurship
Contents	1. Entrepreneurship 1.1 – What is entrepreneurship 1.2 – The entrepreneur profile 1.3 – How to measure entrepreneurship 2. Innovation 2.1 – What is innovation 2.2 – Somme innovation models 2.3 – How to measure innovation 2.4 – The relationship between innovation and entrepreneurship 3. From the idea to a business 3.1 – Basic notions of mathematical finance 3.2 – Basic notions of accounting * Main financial statements * Analysis of financial statements 3.3 – Investment project * Investment planning * Financial planning * Provisional budgets * Descriptive information of a project 3.4 – Evaluation of investment projects
Methodologies and Evaluation	

Curriculum Unit	Sporting Coach Training

Contents	
Methodologies and Evaluation	

Curriculum Unit	**Exercise Physiology and Biomechanics**
Contents	A Energy for the year 1.1 Routes of synthesis of ATP 1.2Top of lactic acid ("anaerobic threshold") 1.3Interplay between metabolic pathways 1.4Energy substrates 2 The muscle contraction and muscle 2.1Muscle fiber composition 2.2Mechanism of muscle contraction 2.3Types of muscle contraction 2.4Types of muscle fibers 2.5Muscle fatigue 3 Thermoregulation 3.1Thermodynamic Mechanisms 3.2Factors affecting thermoregulation 3.3 Systems of heat dissipation by the body of the horse 3.4Cooling after exercise 3.5Heat stroke, exhaustion and anhidrosis. 4 Fluid and electrolyte balance 4.1Dehydration 4.2Signs of dehydration 4.3Electrolyte imbalance 5 Cardio-vascular system and blood 5.1Anatomo-physiology and functions during exercise 5.2Effects of exercise on the cardiovascular system 5.3Effects of training on the cardio-vascular 6 Respiratory System 6.1Anatomo-physiology and mechanics of gas exchange 6.2 Effects of exercise on the respiratory system, locomotor-respiratory coupling 6.3 Effects of training on the respiratory system 7 Endocrine response to exercise 7.1 Effects of exercise 7.2 Recovery after exercise 7.3 Effects of training 8 Introduction to equine biomechanics 9 Principles of training 10. Monitoring
Methodologies and Evaluation	ASSESSMENT SCHEME

	a) Final inspection of all matter b) Reading and analysis of scientific articles Final Grade = 0.9 * Score of the theory test + 0.1 * Participation in reading and literature review The minimum score in any of the components is 9.5.

Curriculum Unit	**Organizing Equestrian Events**
Contents	
Methodologies and Evaluation	

Curriculum Unit	**Elective II - Physiotherapy and Osteopathy for Equines**
Contents	
Methodologies and Evaluation	

Curriculum Unit	**Elective II - Marketing and Communication Techniques**
Contents	
Methodologies and Evaluation	

Curriculum Unit	**Elective II - Research Methodologies**
Contents	
Methodologies and Evaluation	

Curriculum Unit	**Internship**
Contents	The Internship is essentially practical in nature and the undergraduate students are integrated into normal life of the organization / company / institution. The internship takes place in the 6th semester of the Curriculum and extends throughout the duration defined in the curriculum. In exceptional cases, the student can complete his internship in a different period if approved by the Course Director. The internship will be held in organizations, institutions or companies either public or private. Organizations, institutions or companies where the internship will occur will be defined by the School Board based on a proposal from the Course Director. Organizations, institutions or companies will be contacted

	in advance by the School Board or its representatives and a protocol will be signed for this purpose. Students can take the initiative to contact the organizations, institutions or companies where they wish to be placed. The organizations, institutions or companies to contact should operate in areas of activity consistent with the profile of the Curriculum or have departments or services similar in nature.
Methodologies and Evaluation	Each student or group of students will be supervised by a teacher at school (supervisor), under a proposal of the Course director. The organization, institution or company where the work placement takes place shall appoint a person responsible for its monitoring (advisor). The elements taken into account for assessment are as follows: internship plan; regular progress reports; quality assessment form for completion by the advisor; technical evaluation of the training venue; internship final report.