Bachelor in Crops and Livestock Engineering | Courses syllabus

1st curricular year

Agricultura e Zootecnia Gerais I / General Crops and animal production I (1º semestre / Fall semester)

Intended learning outcomes of the curricular unit (knowledge, skills and competences to be developed by the students):

1.Evaluate the importance of national agriculture, in the European and global context; 2.Know the interconnection between agriculture and the surrounding environment; 3.Establish appropriate rotations; 4.Evaluate the quality of the seeds and the most suitable method of sowing/planting; 5.Know the importance of animal science at national, European and global level and main indicators used in animal husbandry; 6.Know major livestock species and breeds: origin, distribution and main productive characteristics; 7.Realize the structural and functional interrelationships of plants and animals; 8.Identify animal species with different digestive and metabolic characteristics and nutritional requirements.

Syllabus:

1: Fundamentals of agriculture production: Importance of agriculture; Biodiversity and plant species; Agriculture in Portugal; Agriculture concepts and definitions; Main types of agriculture; Traditional/conventional versus modern systems; Crop classification; Seeds and seedling; Climate and agriculture; Soil and agriculture; Humic correctives; Fertilizers and fertilizations; Crop rotations; 2: Importance of animal production: National livestock production statistics and territorial distribution; Animal husbandry technical economic indicators; Livestock breeds characteristics; Food composition and their digestive and metabolic value; Classification and nutritional value of foods; Digestion and metabolism.

Bibliography:

Caldas, E. A agricultura portuguesa através dos tempos. Lisboa: INIC. 1991.
Diehl, R. Agricultura geral. Lisboa: Clássica Editora, Colecção Técnica Agrária. 1984.
Direção-Geral de Alimentação e Veterinária (DGAV). Raças Autóctones Portuguesas. 2013. ISBN: 978-972-99044-4-8.
Drogoul, C.; Gadoud, R.; Joseph, M. M.; Jussiau, R.; Lisberney, M. J.; Mangeol, B.; Monteméas, L.; Tarrit, A. Nutrition et alimentation des animaux d'elevage, volume I e II. Dijon: Educagri éditions. 2004.
Éliard, J. L. Manual geral de agricultura. Mem Martins: Publicações Europa-América, Colecção Euroagro. 1979.
Institut National de la Recherche Agronomique (INRA). Alimentation des Bovins, Ovins et Caprins. Paris: INRA éditions. 1988.
McDonald, P.; Edwads, R. A.; Greehalgh, J. F. D.; Morgan, C. A., Sinclair, L.A & Wilkinson, R.G. Animal Nutrition, 7ª Ed. Edimburgh: Prentice Hall. 2011.
Soltner, D. Les bases de la production végétale. Angers: Collection Sciences et Techniques Agricoles; Tome I, II et III. 1995.
Terrón, P. Fitotecnia: ingeniería de la producción vegetal. Madrid: Ed. Mundi-Prensa. 2002.
Villalobos, F.; Mateos, L.; Orgaz, F.; Ferreres, E. Fitotecnia: bases y tecnologías de la producción agrícola . Madrid: Ed. Mundi-Prensa. 2002.

Biologia I / Biology I (1º semestre / Fall semester)

Intended learning outcomes of the curricular unit (knowledge, skills and competences to be developed by the students):

Introduction to the diversity of living beings; cell structure and physiology, hereditability mechanisms, plant histology, systematics.

Syllabus:

1. Cytology and methods to study cells; 2. Systematics; 3. Eukaryotic and prokaryotic cells; 4. Hereditability and evolutions; 5. Histology and plant anatomy; 6. Major groups of microorganisms: viruses, bacteria, fungi, algae, protozoans.

Bibliography:

Azevedo, C, Sunkel, C. Biologia Celular e Molecular. 5ª ed., Lidel - Edições Técnicas, Lisboa, 629 p. 2012.
Junqueira, L.C., Carneiro, J. Histologia Básica. 11ª ed., Guanabara Koogan, Rio de Janeiro, 524p., 2008.
Madigan, M.T. Martinko, J.M., Bender, K., Buckley, D.P., Stahl, D.A. Brock Biology of Microorganisms. 13ª ed., Benjamin Cummings, Pearson, 2012.
Pelczar, M., Chan, E., Krieg, N. Microbiology: Concepts and Aplications. McGraw-Hill Book Company. Nova Iorque, 1993.
Raven, P.H., Evert, R.F., Eichhorn, S.E. Biologia Vegetal. 7a ed., Guanabara Koogan. Rio de Janeiro, 2007.
Sadava, D.E., Hillis, D.M., Heller, H.C., Berenbaum, M. Life: The Science of Biology. 10a ed., Publisher, W.H Freeman, Massachussets, 2014.

Língua Inglesa e Comunicação / English Language and Communication Skills (1º semestre / Fall semester)

Intended learning outcomes of the curricular unit (knowledge, skills and competences to be developed by the students):

Uses the English language in oral and written expression as well as in reading and listening comprehension; Conducts bibliographic research on specific topics; Recognizes the specifics of scientific-technical discourse; Develops the ability to communicate in an academic context.

Syllabus:

1) Review of general vocabulary and main grammatical structures of the English language. 2) Bibliographic research on specific topics: - Writing texts of varying levels of difficulty; 3) The concept of English for Specific Purposes: the language at the service of the subject it conveys: - The technical-scientific discourse: characteristics and application; -Types of scientific-technical texts: laboratory protocol, technical report, research paper, critical review, scientific poster, monograph, etc.; - Exercises in reading and analysis of various types of texts; 4. Communication practices in an academic context«: - The fundamentals of oral presentations; - Research: concept, types and procedures for locating and retrieving written and online information; - Structuring of reports and technical-scientific posters.

Bibliography:

Answers.com – Online Dictionary, Encyclopedia and much more. URL:http://www.answers.com_.
BASTOS, Lilia da Rocha [et al.] – Manual para a elaboração de projetos e relatórios de pesquisa, teses, dissertações e monografias. 4ª ed. rev. e ampl. Rio de Janeiro: Guanabara Koogan, 1995.
DUDLEY-EVANS, T.; ST. JOHN, M. - Developments in English for Specific Purposes. Cambridge: Cambridge University Press, 1998 [2011].
MURPHY, Raymond – English Grammar in Use. Cambridge: Cambridge University Press, 2004.
NP 405-1.1994, Informação e documentação - Referências bibliográficas: documentos impressos. Instituto Português da Qualidade (IPQ).
NP 405-3.2000, Informação e documentação – Referências bibliográficas: documentos não publicados. IPQ.
NP405.4.2002, Informação e documentação – Referências bibliográficas: documentos electrónicos. IPQ.
SINCLAIR, J. M. – Collins English Dictionary. Millennium Edition. Glasgow: Harper Collins, 1998.

Métodos numéricos e programação / Numerical Methods and Programming (1º semestre / Spring semester)

Intended learning outcomes of the curricular unit (knowledge, skills and competences to be developed by the students):

1. Knows the concepts of both matrix and determinant and their applications for solving linear systems; 2. Uses numerical analysis techniques, to find zeros of functions, uses polynomial interpolation and numerical integration; 3. Uses structured programming and object-oriented languages; 4. Uses the main office software tools.

Syllabus:

1.1. Matrices; 1.2. Determinants; 1.3. Linear systems. 2.1. Zeros of functions; 2.2. Polynomial interpolation; 2.3. Numerical integration. 3.1. Programming functions; 3.2. Programming procedures. 4.1. Word processing; 4.2. Spreadsheet; 4.3 Other information technology.

Bibliography:

Magalhães, Luís T. - Álgebra Linear como Introdução à Matemática Aplicada. Texto Editora, 1996.
Ruggiero, M.; Lopes, Vera Lúcia - Cálculo Numérico Aspectos Teóricos e Computacionais. McGraw-Hill, 1988.
Strang, Gilbert - Linear Algebra and its Applications. Harcourt Brace Jovanovich, Inc., 1988.

Química e Bioquímica I / Chemistry and Biochemistry I (1º semestre / Fall semester)

Intended learning outcomes of the curricular unit (knowledge, skills and competences to be developed by the students):

To know: the properties of the solutions; laws of the Chemical Equilibrium considering the different types of equilibrium: acid base, oxidation-reduction, poorly soluble salts and complexation; structure of the main classes of organic compounds; the nomenclature of the main classes of organic compounds; the physical properties of the organic compounds; the main functional groups of the organic biomolecules

Syllabus:

Interaction forces between molecules and sites of action. Properties of the solutions. Chemical Equilibrium: acid-base, oxidation-reduction, poorly soluble salts and complexation. Structure, nomenclature and physical properties of the organic compounds. Functional groups of the organic biomolecules

Bybliography:

Atkins, P. W; Beran, J.A. - General Chemistry, Sci. Am. Books, 1992
Allinger, N.L.; Stevens, C.L. - Organic Chemistry, Worth Publishers, Inc. 1998
Stryer, L. - Biochemistry, The Molecular Basis of Cell Structure and Function, Worth Publishers, 1979
Vidal, M.M.; Filipe O.; Costa, M.C. - Química no laboratório, 100Luz, 2ª Edição, 2010

Geologia e Climatologia / Geology and Climatology (1º semestre / Fall semester)

Intended learning outcomes of the curricular unit (knowledge, skills and competences to be developed by the students):

Competency 1 - a) Knowing the internal structure of the Earth, the phenomena associated with it and the implications for plate tectonics, earthquakes, and in the type of volcanoes; b) Know the major types of rocks, their genesis, composition and aspects related to weathering; c) Identify the different types of relief and orogenesis. Competency 2 - a) Realize variation of incident solar radiation throughout the year and according to latitude, the radiation balance and energy balance of the surface; b) Know the ways of measuring climatic elements, the ratio of the average values of climatic elements and extremes with climate factors that gave rise to the various climates at a globally scale; c) Prepare the soil water balance using methods of Thornthwaite and Matter.

Syllabus:

Geologic process- internal geodynamic processes, theory of continental drift, plate tectonics; volcanism; external geodynamics; Geomorphology - rock types, genesis and composition. Variation of incident solar radiation throughout the year and according to latitude; Radiation balance and energy balance of the surface; Measurement of climatic elements; Interaction of climate with average and extreme elements of the weather factors that gave rise; The second soil water balance methodology Thornthwaite and Matter. Climates worldwide.

Bibliography:

CARVALHO, A.. M. G.1996. Morfogénese e Sedimentogénese, Universidade Aberta, Lisboa. CARVALHO, A. M. G. 1997. Petrogénese e Orogénese, Universidade Aberta, Lisboa. CARVALHO, A. M. G. 2008. Geologia Sedimentar. Editora Âncora, 2ª Edição.

CARVALHO, A. M. G. 2008. Introdução ao Estudo dos Minerais. Editora Âncora, 2ª Edição, 2008.

COSTA, J. B. 1985. Estudo e Classificação das Rochas por Exame Macroscópico, Fundação Calouste Gulbenkian, (6ªed.), Lisboa. CUNHA, L.V. 1982. As secas. Comisão Nacional do Ambiente, Lisboa.

FEIO, M. 1991. Clima e Agricultura. Ministério da Agricultura, Pescas e Alimentação. Lisboa. MONTGOMERY, C. W. 1997. Environmental Geology, McGraw Hill.

NUNES, M.E e FERREIRA, A. 2003. Elementos de Apoio à Disciplina de Climatologia. ESAC. PEIXOTO, J.P. 1981. A Radiação Solar e o Ambiente. Comisão Nacional do Ambiente, Lisboa. RETALLACK, J.B. 1996. Meteorologia. Instituto Nacional de Meteorologia e Geofísica, Lisboa.

Agricultura e Zootecnia Gerais II / General Crops and animal production II (2º semestre / Spring semester)

Intended learning outcomes of the curricular unit (knowledge, skills and competences to be developed by the students):

Identify nutritional needs of animal species with different digestive and metabolic characteristics; Know food systems and valuation methods; Use adequate methods to formulate diets; Know the main cultural techniques used in agriculture, from land preparation to harvesting; Recognize the advantages and disadvantages of the use of the main management crop techniques in real situations.

Syllabus:

1: Animal feeding: Energy value of foods and its use by the animal; Nutritional needs; Feed classification; Energy and protein valorization of feed; Ration formulation. 2: Machinery and farm equipment; Adaptation of land for agriculture and soil tillage according to purpose; Technologies for soil management and tillage.

Bibliography:

Briosa, F. Glossário ilustrado de mecanização agrícola. 3ª ed. 1989.

Diehl, R. Agricultura geral. Lisboa: Clássica Editora, Colecção Técnica Agrária. 1984.

Drogoul, C.; Gadoud, R.; Joseph, M. M.; Jussiau, R.; Lisberney, M. J.; Mangeol, B.; Monteméas, L.; Tarrit, A. Nutrition et alimentation des animaux d'elevage, volume I e II. Dijon: Educagri éditions. 2004.

Éliard, J. L. Manual geral de agricultura. Mem Martins: Publicações Europa-América, Colecção Euroagro. 1979.

Institut National de la Recherche Agronomique (INRA). Alimentation des animaux monogastriques: porc, lapin, volailles, 2ª Ed. Paris: INRA éditions. 1989.

Institut National de la Recherche Agronomique (INRA). Alimentation des Bovins, Ovins et Caprins. Paris: INRA éditions. 1988.

Institut National de la Recherche Agronomique (INRA). Alimentation des bovins, ovins et caprins: besoins des animaux - valeur des aliments. Versailles: Éditions Quae. 2007.

McDonald, P.; Edwads, R. A.; Greehalgh, J. F. D.; Morgan, C. A., Sinclair, L.A & Wilkinson, R.G. Animal Nutrition, 7ª Ed. Edimburgh: Prentice Hall. 2011.

Perriot, B. Pulvérisation en grandes cultures, les clés de la réussite. ARVALIS-Institut du végétal. Décembre 2013

Soltner, D. Les bases de la production végétale. Angers: Collection Sciences et Techniques Agricoles; Tome I, II et III. 1995.

Terrón, P. Fitotecnia: ingeniería de la producción vegetal. Madrid: Ed. Mundi-Prensa. 2002.

Villalobos, F.; Mateos, L.; Orgaz, F.; Ferreres, E. Fitotecnia: bases y tecnologías de la producción agrícola . Madrid: Ed. Mundi-Prensa. 2002.

Biologia II / Biology II (2º semestre / Spring semester)

Intended learning outcomes of the curricular unit (knowledge, skills and competences to be developed by the students):

1. Identification of microorganisms; microbial diversity; 2. Identification of plants; plant diversity; main characteristics of the major taxonomic groups.

Syllabus:

Bases of microbial taxonomy and systematics; general methods in microbiology; methods for microbial identification; microbial nutrition and growth; applied microbiology. Introduction to botany; evolution from green algae to evolved Magnoliophyta. Adaptations of terrestrial plants. Plant systematics: botanical characterization of the main families with agricultural interest. External plant morphology.

Bibliography:

FERREIRA W.F.C.; Sousa J.C.F.; Lima N. Microbiologia. ed. Lidel, Lisboa. 622 pp. ISBN: 978-972-757-515-2. 2010.
FRANCO J.A.; Afonso M.L.R. Nova Flora de Portugal (Continente e Açores). Escolar Editora. Lisboa. Portugal. 1971-2003.
IZCO J. et al. Botânica. 2ª Edição McGraw-Hill- Interamericana de España. S.AU. 1998.
LIDON F.J.C.; Gomes H.P., Abrantes A.C.S. Anatomia e morfologia externa das plantas superiores. Lidel. Lisboa. 2001.
PELCZAR M., Chan E.; Krieg N. Microbiology: Concepts and Aplications. McGraw-Hill Book Company. New York. 1993.
RAVEN, et al. Biology of Plants. 6.nd Edition. W.H. Freeman and Company. Nova Iorque. 1999.

Inglês Técnico e Comunicação /Technical English and Communication skills (2º semestre / Spring semester)

Intended learning outcomes of the curricular unit (knowledge, skills and competences to be developed by the students):

1) Applies the syntax and rhetoric of scientific discourse in the production of technical written and oral texts: Prepares thematic glossaries; Uses technical vocabulary. 2) Masters the lexicon of specific terminologies: Develops techniques for characterization, classification and definition; - Writes abstracts and summaries. 3) Uses advanced techniques of communication to produce technical-scientific works in audiovisual media: Designs and prepares technical-scientific papers and reports using quotes; Masters oral presentations. 4) Collects, selects, analyzes and produces information: Applies techniques of written and oral communication for the world of work (curriculum, application and presentation letters, etc.).

Syllabus:

1) The technical-scientific discourse: characteristics and application: - Types of scientific-technical texts: laboratory protocol, technical report, research paper, critical review, scientific poster, monograph, etc..; - Reading and listening comprehension of texts in the field of Organic Farming; - Elaboration of thematic glossaries. 2) Expansion of the lexicon of specific terminologies: - Discursive features and linguistic patterns present in these types of texts: descriptions, definitions, classifications, comparisons, instructions, etc.; - Review of academic vocabulary for these operations. 3) Specialized written and oral production in the context of Food Science and Technology: - Using advanced techniques of communication. 4) Practice collection, selection, analysis and production of information: - Development of curriculum, application and presentation letters, and procedures for the job interview.

Bibliography:

Answers.com – Online Dictionary, Encyclopedia and much more. Disponível em WWW:URL:http://www.answers.com
BASTOS, Lilia da Rocha [et al.] – Manual para a elaboração de projetos e relatórios de pesquisa, teses, dissertações e monografias. 4ª ed. rev. e ampl. Rio de Janeiro: Guanabara Koogan, 1995.
DUDLEY-EVANS, T.; ST. JOHN, M. - Developments in English for Specific Purposes. Cambridge: Cambridge University Press, 1998 [2011].
MURPHY, Raymond – English Grammar in Use. Cambridge: Cambridge University Press, 2004.
NP 405-1.1994, Informação e documentação - Referências bibliográficas: documentos impressos. Instituto Português da Qualidade.
NP 405-3.2000, Informação e documentação – Referências bibliográficas: documentos não publicados. IPQ.
NP405.4.2002, Informação e documentação – Referências bibliográficas: documentos electrónicos. IPQ.
SINCLAIR, J. M. – Collins English Dictionary. Millennium Edition. Glasgow: Harper Collins, 1998.

Análise Matemática / Mathematical analysis (2º semestre / Spring semester)

Intended learning outcomes of the curricular unit (knowledge, skills and competences to be developed by the students):

1. Masters the basic concepts of differential and integral calculus and its applications; 2. Identifies and solves 1st order differential equations; 3. Knows the concepts of both matrix and determinant and their applications for solving linear systems

Syllabus:

1.1. derivatives; 1.2. antiderivative; 1.3. definite integrals; 1.4. areas and volumes by applying definite integrals; 1.5. improper integrals; 2.1. differential equations of separable variables; 2.2. linear differential equations; 2.3. Bernoulli differential equations.

Bybliography:

Foulis, D.; Munem, M.- O Cálculo. Guanabara Dois, S.A.:Volume I, Cop. 1978.
Leithold - O Cálculo Com Geometria Analítica. Dinalivro, 1994.
Ross, S. - Differential Equations. McGraw-Hill, 1984.
Saraiva, M.A; Silva, M. - Primitivação. Edições ASA, 1995.
Swokowsski, E. W.; - Cálculo com Geometria Analítica. McGraw-Hill, 1983.

Química e Bioquímica II / Chemistry and Biochemistry II (2º semestre / Spring semester)

Intended learning outcomes of the curricular unit (knowledge, skills and competences to be developed by the students):

The student knows the reactivity of the main functional groups of the organic compounds; Knows the structure of the main classes of natural compounds; - Understands the metabolism of carbohydrates, lipids and proteins; Understands the mechanism of the catalytic activity of the enzymes

Syllabus:

Reactions of the main classes of organic compounds. Structure and properties of the main classes of natural compounds. Biological functions of carbohydrates, lipids and proteins. Metabolism of carbohydrates, lipids and proteins. General structure of enzymes and their action mechanism.

Bibliography:

Lehninger - Principles of Biochemistry, Worth Publishers inc, 1987
Morison, R.; Boyd, R. - Química Orgânica, Fundação Calouste Gulbenkian, 1998
Metzler, D. E. - Biochemistry: The Chemical Reactions of Living Cells, Academic Press, 1977

Solos / Soils (2º semestre / Spring semester)

Intended learning outcomes of the curricular unit (knowledge, skills and competences to be developed by the students):

a) Identify the factors and general processes responsible for the formation and differentiation of the soil, b) Identify the components and properties of natural soils or subject to crop production; c) Understand the degradative processes of soil and practices that contribute to the conservation and improvement of soil quality; d) To know the dynamics of mineral elements in soil-plant-atmosphere system, physical chemical and biological fertility of soils.

Syllabus:

1) Factors and soil formation processes; Horizons diagnosis; Main types of soils. 2) Mineral and organic constituents from the ground; Mineralogy soil; Organic matter. 3) Soil properties and their relationship to the constitution. 4) Water the soil: content, retention and movements in saturated and unsaturated soil; Water availability for plants. 5) Types of erosion, wind and water; Factors and processes; Methods to combat erosion and soil conservation practices; Universal soil loss equation. 6) Effects of the constitution and soil properties in plant growth and development. Factors and laws of plant growth. Biogeochemical cycle and balance of plant nutrients. 7) Soil fertility, plant nutrition and soil suitable for the production.

Bibliography:

AGASSI, M. 1996. Soil erosion, conservation and rehabilitation. Marcel Dekker Inc
BRADY, N.C.; WEIL, R.R. 2002. The Nature and Properties of Soils. 13ªEd. Mac Millan Pearson Education Inc. New Jersey
CARDOSO, J. C., BESSA, M. T., MARADO M. B. 1973. Carta de Solos de Portugal (1:1 000 000). Agronomia Lusitana 33 : 481 – 602
COSTA, J. B. 2004. Caracterização e Constituição do Solo. 7ªEd, F.C.G., Lisboa
GARDINER, D. T., MILLER, R. W. 2004. Soils in our Environment. Ed. Pearson. New Jersey
ISSS/ISRIC/FAO 2006. World Reference Base for Soil Resources. World Soil Resources Reports 103, FAO. Roma
MADRP 1999. Manual Básico de Práticas Agrícolas: Conservação do Solo e da Água. INGA Ed.,1999
MENGEL, K., KIRKBY, E., KOSEGARTEN, H. AND APPEL T. 2001. Principles of Plant Nutrition. 5th Ed. International Potash Institute, Berna. Kluwer Academic
Publishers, Netherlands
SANTOS, J.Q. 2002. Fertilização – Fundamentos da Utilização dos Adubos e Correctivos. 3ª Ed. Publicações Europa América.

2nd curricular year

Economia e Sociologia / Economy and Sociology (1º semestre / Fall semester)

Intended learning outcomes of the curricular unit (knowledge, skills and competences to be developed by the students):

To understand the networks of relationships among economic actors; To understand the mechanisms of price formation in a market economy; To analyze the evolution of Portuguese society according to various perspectives; To apply methods and techniques of social science research;.

Syllabus:

1. Economy: 1.1. Economic circuits and the relations between the different actors; 1.2. Indicators of productivity and corporate profitability; 1.3. State functions and regulatory bodies; 1.4. The effects of macroeconomic and sectoral policies on the economic and social fabric. 1.5. The concepts of opportunity cost, the willingness to pay and to receive; 1.6. The concepts of supply and demand; 1.7. Determinants of supply and demand and the effect on market changes in its structure; 1.8. The values of the elasticities of demand and supply; 2. Sociology: 2.1. Indicators of demographic, social and economic characterization; 2.2. Causes and consequences of major social transformations that occurred in Portugal in recent decades; 2.3. The economic and social change in specific territories or sectors; 2.4. The main procedures of data collection used in the social sciences.

Bibliography:

ANDRADE, J.– Introdução à Economia. Lisboa: Minerva, 1998.
FRANK, R. e BERNANKE, B. – Princípios de Economia. Lisboa: Mc Graw Hill, 2003. MOREIRA, C. - Planeamento e Estratégias da Investigação Social: Lisboa: ISCSP, 1994
SAMUELSON, P. e NORDHAUS, W. – Economia. 16 ª ed. Lisboa: Mc Graw Hill, 1999.
SILVA, A.S. e PINTO, J.M. - Metodologia das Ciências Sociais. Porto: Edições Afrontamento, 1986.

Engenharia Rural I / Rural Engineering (1º semestre / Fall semester)

Intended learning outcomes of the curricular unit (knowledge, skills and competences to be developed by the students):

Understand how farm machinery works; Evaluate engines and agricultural equipment for specific uses; Determine the working capacity of the tractor and equipment; Select the most appropriate set to mechanize within the standards of quality and environment protection. Know the general rules about agricultural facilities; Identify the key factors about location, orientation and implementation of agricultural facilities; Perform lighting, environmental conditioning calculations and budgeting; Know the different materials and building techniques; Elaborate agricultural facilities plans; Draw up an agricultural facility project using AutoCAD software.

Syllabus:

1. Study of the engines used in agriculture; 2. Study of the principal agricultural equipment; 3. General rules of agricultural facilities; 4. Lighting, ventilation and environmental conditioning design.

Bibliography:

ATARES, P. V. A., BLANCA, A. L. – Tractores e motores agricolas. Ediciones MundiPrensa, Madrid, 429 pp. 1993.
BRIOSA, F. – Glossário ilustrado de mecanização agrícola. Galucho, Sintra, 391 pp. 1984.
CAÑHAVATE, J. O. Las maquinas agricolas y su aplicación. Ediciones MundiPrensa, Madrid, 467 pp. 1993.
CARBÓ, C. B. – Alojamientos e instalaciones. Madrid, MundiPrensa, 1998.
PALMER, R. W. – Dairy Modernization. New York, Thomson Delmar Learning, 2005.
PAREJO, E. S., CARBÓ, C. B., RUBIO, I. O. – Bases para el diseno de alojamientos e instalaciones ganaderas. Barcelona, Associació d`Enginyers Agrònoms de Catalunya, 1988.
SANTOS, F. Equipamentos Rurais. Equipamentos de sementeira, plantação e fertilização. Universidade de Trás-os-Montes e Alto Douro, Vila Real, 44 pp. 1996.
SANTOS, F. Equipamentos Rurais. Equipamentos para a recolha de cereais praganosos. Universidade de Trás-os-Montes e Alto Douro, Vila Real, 18 pp. 1996

Horticultura / Horticulture (1º semestre / Fall semester)

Intended learning outcomes of the curricular unit (knowledge, skills and competences to be developed by the students):

1. Understand the concept and the importance of Vegetable crops; 2. Identify the main families and vegetable species and understand their cultural requirements; 3. To plan, install and maintain a vegetable garden; 4. To have a relevant knowledge of vegetable crops technology; 5. Run vegetable crops tasks.

Syllabus:

1. Vegetable crops concept and its importance; 2. Planning and Installing a vegetable crop garden; rules and principles to establish: crop rotations, consociations catch crops and scheduling; 3.Vegetble crops technology, knowledge and cultural operations: seeding, transplanting, watering, weeding and thinning; 4.Special Care operations in vegetable crops: grafting, pruning, topping, tutoring, bleaching and shading; 5.Horticultural technology knowledge with respect to: greenhouses, tunnels, nurseries and substrates; 6.The "greenhouse effect" and the "temperature inversion"; methods, techniques, systems and materials used in "forcing, semiforcing and land cover"; 7 Environmental conditioning and disinfection of the soil; 8.Requirements and cultural operations of the main families of vegetable crops species and identification of seeds.

Bibliography:

ALMEIDA, D. (2006). Manual de Culturas Hortícolas, Vol. I. Editorial Presença. Lisboa
ALMEIDA, D. (2006). Manual de Culturas Hortícolas, Vol. II. Editorial Presença. Lisboa
BUNT,A.C. (1988).Media and Mixes for Container Grown Plants. Unwin Hyman Ltd, London, G.B
G.P.A.A. (2006).Anuário Hortofrutícola. Ministério da Agricultura, do desenvolvimento Rural e das Pescas, Lisboa
HANAN, Joe J. (1998).Greenhouses: Advanced Tecnology for protected horticulture. CRC Press LLC, Florida, U.S.A.
JANICK, J. (1977).Horticultural Science. W.H. Freeman and Company. Fouth Edition. New York.
MAROTO, J.V. (1990).Elementos de Horticultura General. Ediciones MundiPrensa. Madrid
RUBATZKY, V.;YAMAGUCHI, Mas (1983) Word Vegetables.Principles, Production and nutritive Values. Chapman & Hall;Internatinal Thomson Publishing. New Work
SEMEDO,C.M. Bugalho (1988).A Intensificação da Produção Hortícola O meio ambiente, a preparação de plantas e a protecção das culturas.4ª ed.,Publicações Europa América.

Pastagens e forragens / Pastures and forages (1º semestre / Fall semester)

Intended learning outcomes of the curricular unit (knowledge, skills and competences to be developed by the students):

1. Relate specific definitions for pasture and forage with its production, reclamation and use in feed for herbivorous animals; 2. Select from among the major grassland species and forage, the most suitable options for creation of mixes, depending on soil and climatic characteristics, operating conditions and production objectives; 3. Plan to set more suitable for the establishment of pastures and forage crops technical procedures; 4. Integrate the positive aspects arising from the use of pastures and forages in herbivores feeding farm animals, with particular emphasis on the economic, environmental and animal welfare issues.

Syllabus:

I - 1. Definitions and specific designations; 2. Levels of production and quality of grassland and forage crops; 3. Advantages and limitations of the use of pastures and forages in feeding herbivores; 4. Complementarity between pastures, fodder and other foods. II - 1. Physiological adaptation of grassland and forage species to the Mediterranean climate; 2. Contribution of the main families of species for feeding herbivores; 3. Agronomic and physiological characteristics of the main species; 4. Selection of species / subspecies for mixtures / grassland and forage consociations; III - 1. Choice of "improvement" and "roll back" pasture; 2. Specifics of the implementation of grassland and forage crops; 3. Cultural practices to perform for the installation of pastures and forages; 4. Programs for installation of pastures and forages in different soil and climatic situations, objectives and working conditions.

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Proteção Vegetal / Plant Protection (1º semestre / Fall semester)

Intended learning outcomes of the curricular unit (knowledge, skills and competences to be developed by the students):

Provide students with the necessary elements to understand the importance of Plant Protection on Agricultural Production. In this framework it will be introduced the basics of Plant Protection and knowledge about epidemiology and resistance of plants to enemies. The different groups of enemies and the measures available to prevent or minimize the damage caused by them, without affecting natural resources, will be also introduced. The students should acquire knowledge enabling them to develop the following skills: 1. To know the basics of Plant Protection and Plant Pathology and the effects caused by enemies and their importance; 2. To identify the main enemies; 3. To know the means available to prevent or minimize the damage and the rules to use pesticides.

Syllabus:

Basic Concepts in Plant Protection and Plant Pathology and effects caused by harmful organisms: Enemies of crops, losses and its importance; Plant Pathology. Plant diseases and their development. Resistance. Diagnosis. 2 Identification of the enemies, factors of spread and importance: Mycology, Bacteriology, Virology and Nematology. Morphology, reproduction and classification. Biological cycle and diagnosis. Important species; Agricultural Entomology and Acarology. Economic importance. Morphology, physiology, reproduction and classification. Orders with agronomic interest. Biological cycle of species of greatest importance; Herbology. Definition of weed. Losses and benefits. Classification. Important species. 2. Control measures: Indirect: Legislature, Genetics, Cultural, Mechanical and Natural Limitation; Direct: Physical, Mechanical, Thermal, Biological and Biotechnical. Phytopharmacology. Toxicology, Legislation and Sustainable Use of Pesticides

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Unidade Biológica Animal / Animal Biological Unit (1º semestre / Fall semester)

Intended learning outcomes of the curricular unit (knowledge, skills and competences to be developed by the students):

1. Know the outside of the animal, its general musculoskeletal organization, and the angulation of its shortcomings, the anatomical structure of the animal's basin and its links to the labor process; 2. Know the anatomy and physiology of different organ systems, with particular emphasis on the reproductive functions and lactopoietcs alongside their livestock applications; 3. Know the defense mechanisms in animals and the principles of immunization and the Ethiopathogenesis in an epidemiological and animal health context approach with some pathologies.

Syllabus:

1: The exterior of the animal and its skeletal organization; ossification and calcium metabolism; joints; angulation and its shortcomings; basin and the birthing process; muscle physiology and some muscles. 2: Anatomical physiology of cardiorespiratory systems, circulatory, immune, digestive and genitourinary; lactopoietcs and reproductive function and husbandry applications; 3: pathogens; immune system and immunization; Ethiopathogenesis in an epidemiological context, animal health and public health; some conditions (metabolic, infectious and parasitic).

Bibliography:

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Atividades Profissionalizantes / Professional Activities (2º semestre / Spring semester)

Intended learning outcomes of the curricular unit (knowledge, skills and competences to be developed by the students):

Perform basic techniques related to agricultural and livestock production, as part of practical activities in agriculture, livestock farm, in experimental fields or laboratories.

Syllabus:

The syllabus is defined according to the objectives and competencies to be acquired by students. The various points presented in the syllabus will be developed during the activities of animal husbandry or farm tasks associated with it

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Culturas Arvenses I / Arable Crops I (2º semestre / Spring semester)

Intended learning outcomes of the curricular unit (knowledge, skills and competences to be developed by the students):

1. Assess the importance of arable crops for spring-summer in Portugal and around the world; 2. Know the major arable crops grown in spring-summer; 3. Assess individuals and current situations of arable crops in spring-summer season; 4. Conduct field crops in the spring and summer in a perspective of sustainable development.

Syllabus:

1: Main sites of production of arable crops in spring-summer in Portugal and abroad; Cultivated areas yields and incomes; Obstacles at national and international level; Crop Identification at different stages of their growth cycle; Growing cycle and crop cycle: application to the studied cultures; Main requirements of crops and cultivation techniques. 2: Characterization of important situations of arable crops in spring-summer; Critical appreciation of cultural options followed; Quantitative and qualitative evaluation of the final production of arable crops on spring-summer; Sustainable strategies to obtain a given final product; Prospects for the future, in a viewpoint of sustainable development; Impacts of strategies.

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Engenharia Rural II / Rural Engineering II (2º semestre / Spring semester)

Intended learning outcomes of the curricular unit (knowledge, skills and competences to be developed by the students):

1. Know the objectives of irrigation and drainage and the role of water in crop production and its relationship to the environment; 2. Know the basics of irrigation and drainage, referenced to water resources, soil, climate, water requirements of crops and hydraulic installations; 3. Know the irrigation methods, selection criteria and calculation procedures of facilities at the field level; 4. Know the systems and drainage techniques and the respective criteria of design and maintenance.

Syllabus:

1. Introduction to irrigation and drainage: concepts and objectives; classification of methods of irrigation and drainage types; irrigation projects and irrigation schemes; issues and legislation. 2. Basis of irrigation and drainage: water resources; soil water and usable capacity, infiltration; topography and use of topographic maps; crop evapotranspiration, the soil water balance method, need for watering; hydraulic elements, Bernoulli's theorem, flows under pressure and permanent channel and hydraulic pumps. 3. Methods of irrigation: performance indicators; Surface irrigation features and modernization; Sprinkler irrigation installation types and characteristics, calculation of fixed installations; Microirrigation installation types and characteristics, and fertigation, calculation facilities. 4. Drainage: benefits of drainage, irrigation-drainage relationship, soil characteristics; surface drainage; underground drainage.

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Fruticultura e Viticultura I / Fruticulture and Viticulture I (2º semestre / Spring semester)

Intended learning outcomes of the curricular unit (knowledge, skills and competences to be developed by the students):

1. Recognizes the importance of fruit production and viticulture in a national and global level; 2.Relates the structures of plants and their functions with growth , development and cultural practices of spring summer; 3. Recognizes the factors affecting the production and quality of the crop and harvest; 4.Introduces students to the problems of crop protection according to the criteria of protection and integrated production.

Syllabus:

1.1 Interest of fruit in the diet and the importance of the wine culture of the peoples; 1.2 Economic importance of Fruit production and Viticulture in the national economy and the global economy; 1.3 Potential bottlenecks of this sector; 1.4 National fruit and wine growing regions. 2.1 Main fruit and grape vines varieties 2.2 Different organs of woody plants; 2.3

Vegetative and reproductive cycles; 2.4 Phenology of fruit trees and vine; 2.5.Problem of flowering and fruit set. 3.1 Cultural and physiological implications of interventions in green on the yield and quality; 3.2 Different growth stages of the fruit and berry; 3.3 Methods of determining the time of harvest; 3.4 Philosophy and concepts of Integrated Production and Protection; 3.5 Main pests and methodologies of estimation of risk in major crops (fruit trees, vineyard and olive).

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Torres, L. (Co.) – Manual de Protecção Integrada do Olival Viseu. João Azevedo Ed. 2007.

Produção de Monogástricos I / Monogastric Production I (2º semestre / Spring semester)

Intended learning outcomes of the curricular unit (knowledge, skills and competences to be developed by the students):

1. To know the production process, management, overall performance and systems in poultry production. 2. To know the production process and the constraints in rabbits for meat production. 3. Understand the processes and operations for the animal feed.

Syllabus:

1: Avian species and productive objectives. Activity of reproduction, incubation and meat production; activities of rearing of pullets and commercial egg production. Technical and economic evaluation in breeders, meat production and egg production. Maintenance of health and biosecurity. Slaughterhouse, slaughter of birds and meat quality. 2: Breeds of rabbits and their productive objectives. The activities for production of meat: selection, breeders and production. Sanitary control. Technical and economic indices. Slaughterhouses, slaughtering and meat quality. 3: the compound feeding stuffs industry (ACA) in Portugal, to the Community market and global phase. Characterization of the main raw materials used in the ACA. Presentation of the different sectors of the ACA and factory planning.

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Produção de Ruminantes I / Ruminant Production I (2º semestre / Spring semester)

Intended learning outcomes of the curricular unit (knowledge, skills and competences to be developed by the students):

1. Relate the physiology of grassland species with management to adopt grazing dryland and irrigated; 2. Understand the principles involved in processing of forage in hay, silage and other forms of conservation; 3. Prepare work programs for the conservation of fodder in different forms; 4. Identify the various stakeholders, potential and existing constraints in the production process of beef cattle; 5. Know the different methods of evaluation of beef cattle, with a view to their use as breeding stock; 6. To consider different production systems beef cattle, from different feeding conditions and the particular objectives of the actors in the production process.

Syllabus:

I USE OF PASTURES AND FORAGES. Grazing systems and operations management of pastures. Conservation of forages: hay, silage, hay, silage and dehydration. Mechanisms involved in drying Importance of the intrinsic characteristics of forages in the activities of fermentative microorganisms. Influence of technology in the conservation process. Machinery and equipment type of operative chain. Quantitative and qualitative losses. Design of silos. II BEEF CATTLE PRODUCTION. Major breeds of beef cattle. Types of farms and agents involved in the production chain of beef. National and global market. Weight and differential growth. Earliness, meat quality and production costs. Evaluation and

phenotypic enhancement. Systematic exploration of relevant records in cattle. Planning of the annual reproductive and feeding management towards the rationalization of production systems.

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3rd curricular year

Culturas Arvenses II / Arable Crops II (1º semestre / Fall semester)

Intended learning outcomes of the curricular unit (knowledge, skills and competences to be developed by the students):

1. Assess the importance of arable crops for autumn-winter in Portugal and around the world; 2. Know the major arable crops grown in autumn-winter; 3. Assess individuals and current situations of arable crops in autumn-winter season; 4. Conduct field crops in the autumn and winter in a perspective of sustainable development.

Syllabus:

1: Main sites of production of arable crops in autumn-winter in Portugal and abroad; Cultivated areas yields and incomes; Obstacles at national and international level; Crop Identification at different stages of their growth cycle; Growing cycle and crop cycle: application to the studied cultures; Main requirements of crops and their cultivation techniques. 2: Characterization of important situations of arable crops in autumn-winter; Critical appreciation of cultural options followed; Quantitative and qualitative evaluation of the final production of arable crops on autumn-winter; Sustainable strategies to obtain a given final product; Prospects for the future, in a viewpoint of sustainable development; Impacts of chosen strategies.

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Floricultura e Jardinagem / OrganicFloriculture and Gardening (1º semestre / Fall semester)

Intended learning outcomes of the curricular unit (knowledge, skills and competences to be developed by the students):

Provide students a comprehensive information on the various activities such as the production and the use of cut flowers, potted plants, production and use of garden plants and parks or plants with scenic interest.

Syllabus:

1. Economic and social importance of ornamental plants 2. (1) Cut flowers; (2) Potted plants; (3) Creation and maintenance of herbal gardens; (4) Types of Garden; (5) Planting and maintenance of ornamental and sport turfs. 3. Execution of practical work in the field (crop plant material, pruning shrubs), laboratory (seed and plant propagation), nursery (planting and acclimatization of obtained plantlets).

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Fruticultura e viticultura II / Fruticulture and viticulture II (1º semestre / Fall semester)

Intended learning outcomes of the curricular unit (knowledge, skills and competences to be developed by the students):

1. Projecting the installation of an orchard and a vineyard; 2. know the ways of obtaining plant material; 3. Know the different cultural techniques used in vineyards and orchards in autumn-winter; 4. Explain the importance of proper use of drive systems in fruit trees and vines in production.

Syllabus:

1): 1 Key factors to consider when installing an orchard and a vineyard; 2 The method of soil preparation according to its characteristics; 3 Compasses, planting density and arrangement in different situations; 4 Techniques for planting; 2): 1 Methods for obtaining plant material; 2 Main rootstocks of different fruit and vine; 3 Different techniques of grafting; 4 Choose the best symbiont in every situation; 5 Importance of using quality propagation material. 3): 1 Concepts, principles, theories, and terminology of pruning, tying down and training systems; 2 Effect of pruning operations on the physiology of trees and vines; 3 Limitations soil and climate in the choice of drive systems, 4 Different techniques of pruning and tying down; 5 Choice of driving, pruning and tying down systems in fruit and / or vineyard.

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Gestão Empresarial e Empreendedorismo / Enterprise Management and Entrepreneurship (1º semestre / Fall semester)

Intended learning outcomes of the curricular unit (knowledge, skills and competences to be developed by the students):

Mastering the business concepts and principles for their management; Distinguishing legal and economic forms of companies and links the concepts of human behavior and the types of structures; it identifies and it applies the principles of stocks management. It knows the production planning systems. Diagnose the financial situation of a company and proposes measures to overcome possible weaknesses identified. Know the marketing techniques to advertise and promote their products and their activity. Possess technical and analytical skills for identifying and developing new business with visibility and growth potential. To master the theoretical tools and analytical methodology that allows investigating the problems of entrepreneurship in its multiple facets. Understand the fundamentals of the Business Plan and the moral values of the business

Syllabus:

Companies. Organizational Structures. Organizational Behaviour. Management of Material Resources: basic variables of management and stock control - the ABC system and economic order quantity "Wilson lot-sized formula". Method undiscounted and discounted in quantity. Management production: choice of production process, production planning. Method PERT / CPM and philosophy "just-in-time". Management of Financial Resources: financial function and financial analysis, document-based financial analysis, methods and techniques of analysis - the method of ratios, equilibrium analysis of financial profitability. Commercial Management: Strategic Marketing, Marketing Mix and the importance of market research. Entrepreneurship: ideas and business opportunities, funding sources, procedures for business creation, business plan and criteria for evaluating investments. Ethics and Ethics in Enterprise.

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Produção de monogástricos II / Monogastric production II (1º semestre / Fall semester)

Intended learning outcomes of the curricular unit (knowledge, skills and competences to be developed by the students):

Know the: 1) breeds of pigs and its main characteristics; 2) production systems and the production cycle; 3) appropriate techniques and processes of daily management in the field of breeding and selection for improvement so as to obtain greater profitability in the farm; 4) management techniques in a pig farm; 5) housing needs of pigs and the treatment of effluent – environmental impact; 6) feed management in different stages of production; 7) factors affecting the welfare of pigs, hygiene and animal health and biosecurity plan; 8) equine breeds and its main characteristics; 9) horse breeding techniques; 10) the equine reproduction management; 11) nutrition management of horses: 12) the hygiene and health of the horses 13) riding and training horses..

Syllabus:

1) Production of Pigs: 1) Origin and evolution of the pigs and breeds reared in different production systems; 2) Housing of pigs Intensive, intensive outdoor and extensive; 3) Reproductive Management and Feeding and the necessary records. 4) Rearing of newborn piglets and fattening of piglets; 5) Animal Health and diseases affecting pigs; 6) Biosecurity on a pig farm. 2) Production of Horses: 1) origin and evolution of equines, the different breeds and their uses; 2) Housing; 3) Equine Reproduction equine reproductive management techniques; 4) Semen technology; 5) Equine Nutritional Management; 6) Hygiene and Animal health; 7) horse riding and horse training.

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Produção de ruminantes II / Ruminant production II (1º semestre / Fall semester)

Intended learning outcomes of the curricular unit (knowledge, skills and competences to be developed by the students):

1. Know the situation and determinants for the efficient and qualitative production in dairy systems; 2. Know all the routine procedures of conducting a farm of sheep and / or goats, productive skills and their differences, the importance of the sector in the regional economy and the constraints on its development.

Syllabus:

1 Dairy Cattle: a) major political, legal and structural constraints;. b) the main factors affecting the quality of milk from their synthesis until arrival at the dairy industry; c) operation of the production system in a particular way with regard to feeding, housing, milking, animal health, reproduction and breeding; d) Replacement; the creating and rearing of heifers. 2 Small Ruminants: a) domestic breeds of sheep and goats and their skills;. b) physiological mechanisms involved in food, nutrition, reproduction, lactation and growth and pathology of the species; c) standards of general husbandry, feeding, breeding and health, to each species; d) characteristics of the production of milk, meat and wool in each species and their economic importance; e) biometric systems and related structures involved; f) production systems and regional differences, constraints and objectives to be pursued.

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Enquadramento da produção agrícola / Framework of agricultural production (2º semestre / Spring semester)

Intended learning outcomes of the curricular unit (knowledge, skills and competences to be developed by the students):

1. Understand the importance of a business plan and the role of the entrepreneur; 2. Evaluate the current status of a agricultural and livestock company, previously chosen; 3. Develop a proposed business plan for the company; 4. Know the main types of agriculture practiced; 5. Understand the concepts and the terminology adopted in systems theory; 6. Know how to use the concept of efficiency of agricultural systems; 7. Characterize regional and national agricultural systems of particular interest.

Syllabus:

1 Project business plan for an agricultural company: Needs and problems of the organization of agricultural labor; Functions of the farmer; Characterization of soil and climate, socioeconomic and potential of the farming; Major productions and techniques implemented; Choke points to production and solutions for their resolution; 2 Agriculture systems: Main types of farming systems and environment in which they operate; Bottlenecks to national agricultural production; Concepts used in systems theory; Relationship between systems and models; Efficient functioning of farming systems; Graphical representations / diagrammatic systems using appropriate symbology; Characterize in detail a system of agriculture.

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Bem estar animal e segurança alimentar / Animal welfare and food safety (2º semestre / Spring semester)

Intended learning outcomes of the curricular unit (knowledge, skills and competences to be developed by the students):

The European Union laid down general rules for the protection of animals kept for farming purposes, applicable to animals reared for the production of foodstuffs and other agricultural purposes. The legislation focuses on three main areas: the breeding, transportation and slaughter, having as primary objective to avoid useless suffering to animals. However, before the existence of specific legislation, was already well known the relationship between animal welfare in their place of creation until they are slaughtered, product quality and food safety. Livestock production is an important part of the feeding system of the human being. This being their main source of protein, and it is essential to meet the welfare needs of these animals. This course will allow the student to gain an overview of the most relevant aspects of the ideal conditions for the wellbeing of the animal on a farm, during transport and at slaughter in order to obtain the desired food safety.

Syllabus:

A) Animal welfare on the farm: 1) INTRODUCTION TO ANIMAL WELFARE and FOOD SAFETY – the concepts of Animal welfare and its connection to safe food. 2) ANIMAL WELFARE ON THE FARM – Normal and abnormal Behaviors, impact of housing, food and environment on the animal's welfare and the quality of food. 3) AQUATIC ANIMAL WELFARE – Welfare of fish bred in aquaculture. B) Animal welfare during transport and slaughter: 1) INTRODUCTION TO CONCEPTS OF HACCP applied to Slaughterhouses 2) ANIMAL WELFARE DURING TRANSPORT and SLAUGHTER - Cattle, Pigs and Poultry Legislation on Meat quality – Factors that influence 3) WELFARE OF FISH at HARVEST and SLAUGHTER – Legislation Factors that influence. 4) IMPORTANCE of ANTE and POST MORTEM INSPECTION to ensure the quality of the food. 5) ANIMAL DISEASES that can affect human health through food Zoonotic Diseases Brucellosis, Yersina, Listeriosis etc.. Fish Parasites.

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