Luiz de Queiroz College of Agriculture

Course Offerings

Degree codes:
11010 - Agriculture
11020 - Forestry
11040 - Licentiate Degree in Agriculture
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ID	Course Name	Professor	Course Content Summary	Total Course Hours	Semester	Degree code
CEN0001	Plant Tissue Culture	Adriana Pinheiro Martinelli Paulo Hercílio Viegas Rodrigues	History and basic concepts of the in vitro culture of plants; Use of in vitro culture for the propagation of commercial species and those of difficult propagation, in plant breeding and in studies of plant development.	60	2nd	11070 11020 11010
CEN0002	Food Preservation by Non-Conventional Methods	Julio Marcos Melges Walder Thiago de Araujo Mastrangelo	Knowledge of alternative methods of food preservation, in particular the use of food irradiation, ultraviolet light, high pressure, ultrasound, electrical pulses, use of ozone, cryoconcentration, microwaves, ohmic heating and radio frequency heating; Quality control of processed products.	60	2nd	11061
CEN0100	Introduction to Biological Sciences	Hudson Wallace Pereira de Carvalho Regina Teresa Rosim Monteiro	There will be invited at the very least 15 speakers from different fields of the Biological Sciences, giving preference to Professors that give lectures in the Biological Science program or to post-doctors that work in the Field.	15	1st	11070
CEN0107	Energy and Biosphere	Alex Vladimir Krusche Maria Victoria Ramos Ballester	Structure and functioning of Earth; Origin of solar radiation; Laws of radiation; Transformations of solar energy in the biosphere and global balance of radiation; Greenhouse effect; Mitigation actions; Sustainable management.	30	2nd	11080

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CEN0109	General Ecology	Plinio Barbosa de Camargo Marcelo Zacharias Moreira Luiz Antonio Martinelli	The scope of ecology; The ecosystem: concepts and structure; Study of the ecosystem; Global production and decomposition; Stability of ecosystems; Energy in ecological systems: concepts of productivity, food chains, trophic levels; Biogeochemical cycles; Population dynamics; Populations and communities; Limiting factors and the environment; Anthropogenic stress and toxic waste; Development and evolution of ecosystems; Human impacts on the biosphere.	75	1st	11070
CEN0119	Environmental Organic Chemistry	Valdemar Luiz Tornisielo	Concepts of organic chemistry and introduction to organic substances of environmental interest; Functions, nomenclature and properties of major organic compounds: alkanes, alkenes, alkynes, alcohols, ethers, alkyl halogens, sulfur compounds, amines, aldehydes, ketones, carboxylic acids, esters and aromatic compounds; Introduction to the main physical-chemical properties that affect the behavior of substances and organic pollutants in the environment.	60	1st	11070 11080 11020 11010
CEN0120	Principles of Biochemistry	Victor Alexandre Vitorello	The cell, macromolecules, water and solutes; Proteins: composition, structure and function; Enzymes: classification, kinetics and control; Other major biomolecules: carbohydrates, lipids, nucleotides and nucleic acids; Biomembranes: structure and transport; Bioenergetics and oxidative metabolism; Chemiosmotic theory; Photosynthesis; C-3 and C-4 pathways and environmental adaptation; metabolism of carbohydrates, lipids and nitrogen compounds; Molecular tools of interest to environmental management; Basic concepts and principles of toxicology.	30	2nd	11080

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CEN0140	Environmental Geoscience	Celia Regina Montes	The topics covered in the syllabus, which is directed towards the monitoring of the Earth system, conservation of mineral resources, energy, water and agricultural land and natural disaster reduction, will be presented with an emphasis to the welfare of society; Ultimately, the course aims at highlighting the role of geosciences in sustainable development of the planet.	90	1st	11070 11080
CEN0146	Biosphere and Global Changes	Maria Victoria Ramos Ballester Marisa de Cassia Piccolo	Origin, structure and functioning of the biosphere; Global cycles of the major elements; Human activities and changes in the global cycles of the major bio-elements; Ecosystem management and biogeochemical cycles.	30	2nd	11070 11080 11020 11010
CEN0148	Systems Ecology	Alex Vladimir Krusche	Conceptual evolution of systems ecology; General theory of systems and the concept of ecosystems; Fundamental principles: structure and functioning of the ecosystems; Flow of energy and matter in the ecosystems; The cycles of water, carbon, nitrogen, phosphorus and sulfur and their interactions; Diversity, stability and maturity of natural ecosystems and ecosystems under anthropic action; Major current environmental problems and management of natural resources.	90	1st	11050 11070 11080 11020 11010

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CEN0150	River Basin Hydrogeochemistry	Helder de Oliveira	The cycle of life and its relations to global climate fluctuations; The use of water basins as the unit of study in hydrogeochemistry; Mechanical and chemical erosion: modeling and transport; Alterations in rocks in relation to hydrochemical characterization of rivers; Atmospheric inputs and environmental pollution; The use of isotopic tracers in environmental problems.	60	1st	11070 11080
CEN0167	Biodiversity and Conservation: A Molecular Approach	Tsai Siu Mui	Introduction, principles and terminology in biodiversity and conservation; Biochemical and molecular analysis of genetic diversity: information obtained from molecular polymorphism with or without adaptive effects; Community studies using biomarkers and molecular tools; Sustainable use of biodiversity: technological use of biodiversity; Conservation of biological and genetic resources by means of biotechnology; Use of bioinformatics in the analysis of genetic diversity and evolution; Sustainable use of biodiversity: ethical and legal aspects.	90	1st	11070 11020 11010
CEN0190	GIS Principles and Application in Environmental Studies	Alex Vladimir Krusche Maria Victoria Ramos Ballester	Use of geographic information systems for environmental analysis and natural resource management; Effects of spatial and temporal scales in structural factors and ecosystem modifying agents; Analysis and interpretation of the spatial patterns of the structural factors and ecosystem modifying agents; Quantitative methods of analysis of the structural factors, use and ground cover; Spatial and temporal effects of changes in soil use and cover on ecosystem structure and functioning; Integrated analysis of ecosystems by geoprocessing techniques; Georeferenced data bank design and implementation for environmental planning.	75	2nd	11080

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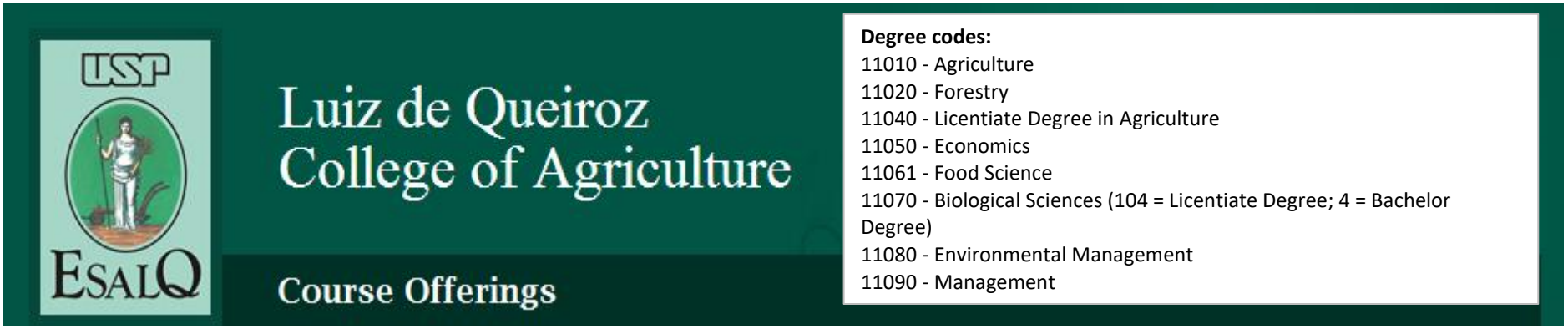
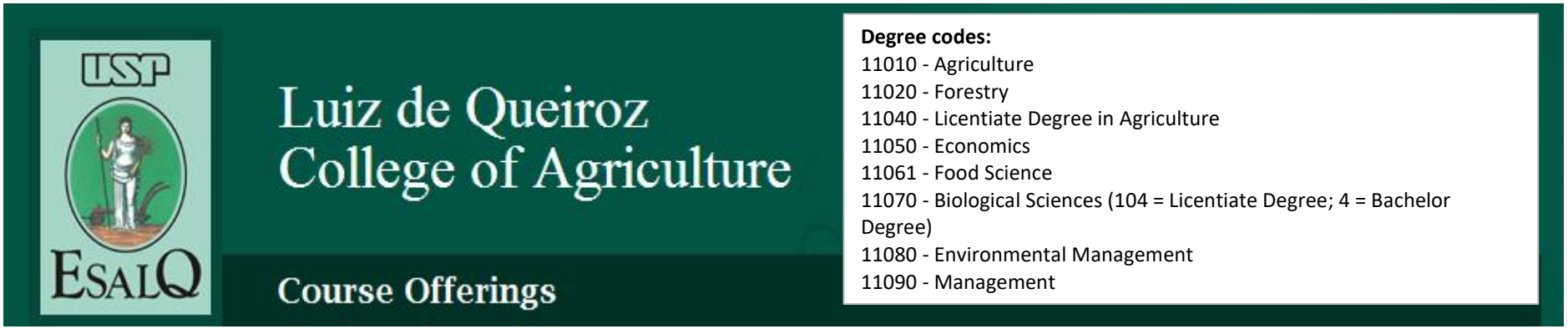
CEN0212	Pollution of Terrestrial, Aquatic and Atmospheric Ecosystems	Plinio Barbosa de Camargo	The constitution of terrestrial and aquatic ecosystems and interactions between these two compartments; The physical and chemical properties of water; Geochemical and hydrological cycles; The main uses of water and soil; The major pollutants that occur and how they enter the ecosystems; Criteria and parameters for water and soil quality; Procedures for water and soil sampling; Qualitative and quantitative forms of liquid, solid and gaseous pollution; Colloids in aquatic systems, soil and atmosphere; The occurrence of inorganic and organic chemical species: production and distribution in the environment and point and dispersed sources of pollution; Considerations of sustainable development and its implications with water and air pollution and types of remediation.	90	2nd	11070 11080
CEN0225	Stable Isotopes in Biology	Helder de Oliveira Hudson Wallace Pereira de Carvalho	Stable isotopes since the origin of the Universe and Earth's formation; Concepts, definitions and differences between isotopes; History and evolution of techniques and measurements of stable isotopes; Methods and measurements of isotopes; Principle and operation of mass spectrometers; Applications of stable isotopes in different areas of biology and environment.	30	2nd	11070
CEN0257	Agricultural and Ecological Systems Modeling	Fábio Ricardo Marin Quirijn de Jong van Lier	Computer programming basics; Modeling: concepts and definitions; Model types and modeling tools; Case study of physical and biological processes modeling within agro-ecosystems; Model assessment.	105	1st	11080 11070 11020 11010



CEN0260	Instrumental Methods of Chemical Analysis	Fábio Rodrigo Piovenzani Rocha Francisco Jose Krug Hudson Wallace Pereira de Carvalho	Principles of methods for the pre-treatment of food samples for the determination of essential and toxic elements. Principles, instrumentation and application of methods for chemical analysis of food by spectroscopies of molecular and atomic absorption and atomic, atomic emission and coupled plasma mass; flow injection analysis, gas and liquid chromatographies.	60	2nd	11061
CEN0310	Paleobiology	Luiz Carlos Ruiz Pessenda	Basic concepts in sediment geology and paleontology; Evolution of fauna, flora and mankind; Analytical methods and isotopic techniques in paleoenvironmental studies (vegetation and climate) in the quaternary; Applications in several locations of Brazil.	120	1st	11070
CEN0333	Diagnostic Analysis of Genetically Modified Organisms (GMOs)	Tsai Siu Mui Adriana Pinheiro Martinelli	Concepts of genetically modified or transgenic organisms; Detection and quantitative analysis of transgenic organisms: DNA extraction and purification, immunoenzymatic method (ELISA), methods of analysis based on nucleic acids (PCR and real time PCR); The Biosafety Law, Labeling Decree, Cartagena Protocol, international legislation; Concepts in Metrology: Reference material and controls; Risk analysis for the introduction of transgenic organisms into the environment and in human and animal diets; Laboratory activities: DNA extraction; Qualitative PCR; real time PCR; Exercises in risk analysis.	120	1st	11061 11070 11010
CEN0350	Radioisotopes and Biological Effects of Radiation on Animals	Adibe Luiz Abdalla Helder Louvandini	Concepts of radiation; interaction of radiation with matter; mode of action of radiation at the level of molecules, cells, tissues and organisms; chronic and acute effects; radioprotectors and radiosensitizers.	45	1st	11070



CEN0364	Radioisotopes in Entomology	Thiago de Araújo Mastrangelo Valter Arthur	Concepts of ionizing radiation, use of ionizing radiation on insects, post-harvest insect pest control, quarantine of export products, the sterile insect technique, breeding, sterilization and release of insects, labeling of insects with radiotracers for bio-ecological studies.	60	2nd	11070
CEN0365	Cell Ultra Structure	Neusa de Lima Nogueira	Introduction to basic and practical concepts of light and transmission and scanning electron microscopy; Preparation of biological samples for examination by light and electron microscopy and analysis; Photographic techniques; Interpretation of photomicrographs.	30	2nd	11070
CEN0395	Introduction to Plant Mineral Nutrition	Cassio Hamilton Abreu Junior José Lavres Junior	The mineral elements; Direct and indirect criteria of essentiality; Uptake, transport and redistribution of elements in plants; Macronutrients: nitrogen, phosphorus, potassium, calcium, magnesium and sulfur; Micronutrients: boron, chlorine, copper, iron, manganese, molybdenum, nickel and zinc; Beneficial elements: cobalt, selenium, silicon and sodium; Toxic elements: aluminum, arsenic, bromine, cadmium, lead, chromium and fluoride; Genomics, Proteomics, Ionomics, Molecular Biology and Plant Nutrition; Evaluation of the nutritional status of plants.	90	1st	11070

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CEN0407	Nuclear and Correlated Techniques in Agricultural Productivity Studies	Adibe Luiz Abdalla Helder Louvandini	1. Introduction to the use of nuclear techniques in studies of animal productivity; Properties of stable isotopes, radionuclides and radiation; Atomic model and radioactivity; Nuclear disintegrations; 2. Alpha and beta particles, X-rays and γ-rays; Radiation energy; Law of radioactive decay; Interaction of radiation with matter; 3. Detection of radioisotopes and measurements of stable isotopes; Basic considerations and units; Radiation protection; Control of contamination; Disposal of radioactive waste; 4. Methods of application of radioactive and stable tracers in animal studies; Planning and execution of experiments with tracers; Isotopic dilution technique; Concept of specific activity and half-life; biological half-life; 5. Application of nuclear techniques in studies of water balance; Determination of body composition of animals; 6. Application of radioisotopes in studies of mineral nutrition; Bioavailability in ruminants; Absorption studies in fish; 7. Application of tracers in studies of microbial synthesis; Radioactive tracers in in vitro studies of microbial synthesis in ruminants; Stable tracers in in vivo studies of microbial synthesis in ruminants; 8. Use of radiation in Animal Science; Use of γ-rays to attenuate infective larvae; Use of γ-rays in the treatment of fibrous waste as feed for ruminants; Use of X-ray fluorescence in studies of passage rates of nutrients; 9. Use of radioactive tracers for determination of hormones by radioimmunoanalysis, aimed at monitoring the reproductive functions of females.	45	2nd	11070

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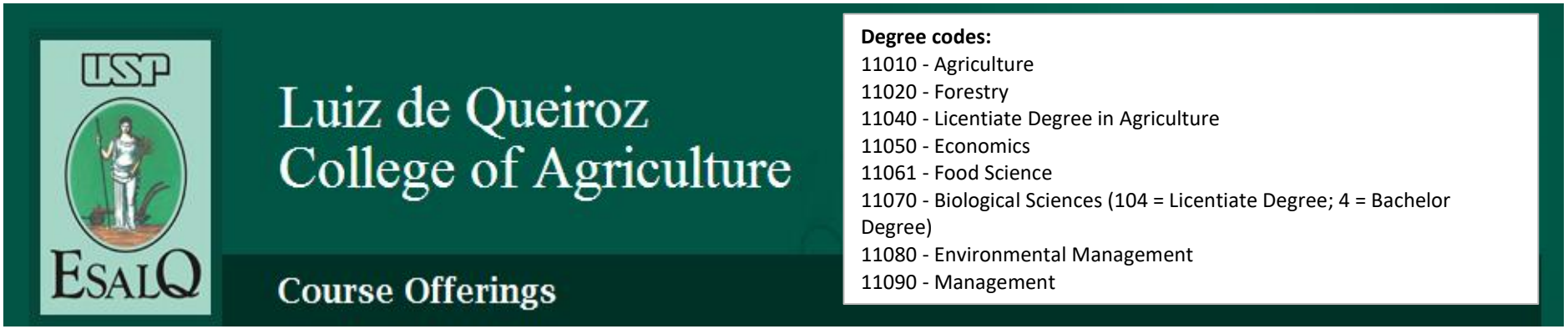
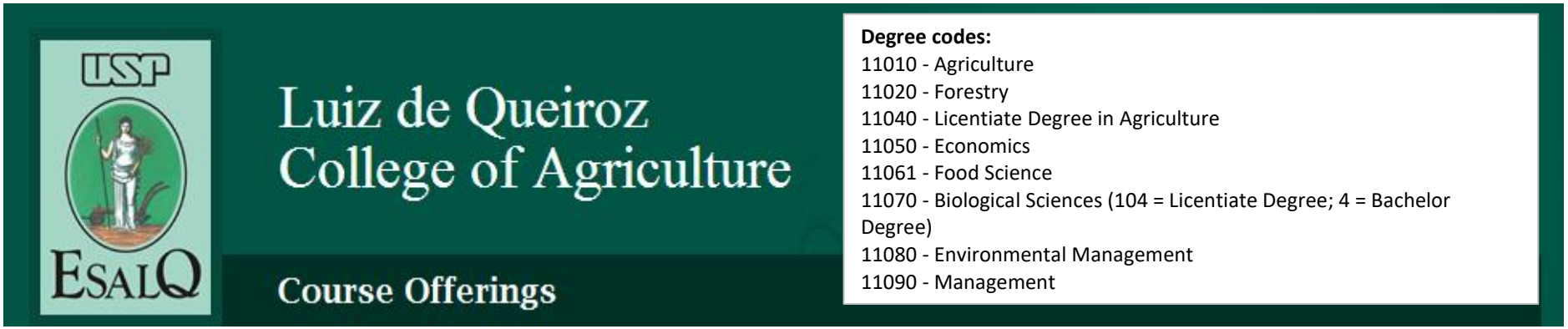
CEN0408	Isotopic Ecology	Marcelo Zacharias Moreira Plinio Barbosa de Camargo	Use of stable isotopes as natural tracers of carbon, nitrogen and water in their biogeochemical cycles and their interactions in ecological, environmental and agricultural ecosystem studies. Climatic variations associated with carbon and nitrogen emissions to the atmosphere through the burning of fossil fuels, burning of vegetation and fertilizer nitrogen use on a large scale, have potentially contributed to change the biogeochemical cycle of these natural elements; The responses of terrestrial and aquatic ecosystems to these changes have been the subject of intense debate; Therefore, the objectives of this course are: (1) Disseminate the knowledge of isotopic methods and their applications; (2) Address the cycles of carbon, nitrogen and water in different compartments of terrestrial and aquatic ecosystems under an isotopic and ecological perspective; (3) Based on isotopic studies, address how possible adaptations and modifications of ecosystems are responding to the new scenario brought about by the so-called "global changes".	60	2nd	11070 11080
CEN0409	Soil and Plant Analysis	Takashi Muraoka	Nutrients in plants and soil; Analysis of nutrients in plants and soil samples for the purpose of diagnosing nutritional deficiencies.	60	1st	11070 11080 11020 11010



CEN0413	Pesticides: Environmental Interactions	Valdemar Luiz Tornisielo	Definitions and history of pesticide use by humans; The use of pesticides in the environment; Interactions in the soil-plant-water system; Ecosystem and food contamination by pesticides; Principles of ecotoxicology; Sampling methods; Methods for the analysis of pesticides.	90	2nd	11070 11080
CEN0414	Tissue Biology and Animal Protection	Adibe Luiz Abdalla Helder Louvandini Tsai Siu Mui	Introduction to histology and basic techniques in cell, organ and tissue histology; The blood, its observable elements and the plasma; Bases of the immune system: natural mechanisms of resistance, biology and physiology of an immune response; vaccine and serum production; immunopathology and common methods in clinical analysis and biological diagnosis.	90	1st	11070
CEN0460	Integrated Environmental Analysis in Drainage Basins	Luiz Antonio Martinelli	Current environmental problems are extremely complex and require multidisciplinary approaches; Rivers are natural integrators of processes occurring in their watersheds; Therefore, it is very rational and convenient to adopt watersheds as a unit of study; This course aims at enabling students to have a critical and integrated view of environmental problems that occur in watersheds; This view will be developed throughout the course through concrete examples which have been experienced by the course teachers over several years of study of the Piracicaba River and Amazon River watersheds and, more recently, in other medium sized watersheds of the State of São Paulo.	60	2nd	11080



CEN0470	Chemical Waste Management	Jose Albertino Bendassolli	The course focuses on the correct management of chemical waste produced in education and research laboratories and in industries, from its generation to its disposal or appropriate treatment; To achieve these goals, the following topics will be addressed: Basic concepts in chemistry; basic concepts in safety; introduction and concepts of management programs; identification of industrial and laboratory waste; minimizing the generation of waste; management of recyclable waste; basic concepts involved in the treatment and disposal of hazardous waste; waste transport; authorization for final disposal and evaluation of suppliers.	90	2nd	11061 11080
CEN0628	Landscape Ecology	Alex Vladimir Krusche Maria Victoria Ramos Ballester	Introduction and definitions of landscape ecology; Definitions, principles and terminology in landscape ecology; Scales and hierarchy in landscapes; Pattern forming agents; Data related to landscapes and quantitative analysis; Quantification of landscape patterns; Pattern dynamics; Processes, patterns and applications in landscape ecology.	90	1st	11070 11080

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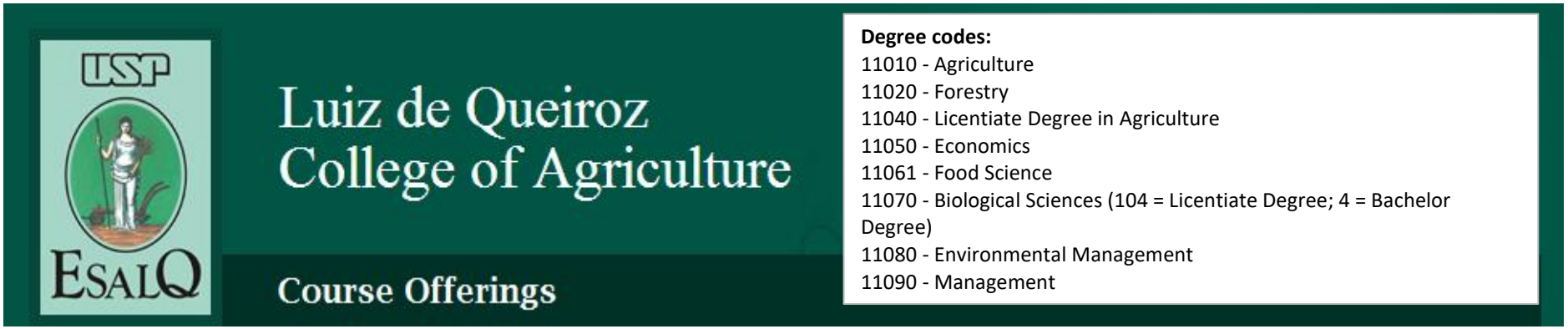
CEN0640	Supervised Internship in Advanced Techniques in Agriculture I	Adriana Pinheiro Martinelli	During the Supervised Internship, students will be guided by researchers of the Center for Nuclear Energy in Agriculture (CENA / USP) and will be involved in activities in one of the following areas of their choice: Plant tissue culture; Light and electron microscopy; Biological effects of radiation; Plant mineral nutrition; Fate and monitoring of pesticides in the environment; Molecular biology of plants; In vivo and in vitro induction of mutations in plant breeding; Biochemical techniques for the study of plant proteins; Microbial ecology; Soil organic matter; Multi-isotopic analytical techniques in soil-plant processes; 15N techniques in studies of transformations of nitrogen in agroecosystems; The activities are aimed at introducing students to the techniques used in scientific research in the laboratories and will be conducted at CENA/USP.	105	1st/2nd	11020 11010
CEN0650	Supervised Internship in Advanced Techniques in Agriculture II	Adriana Pinheiro Martinelli	During the Supervised Internship, students will be guided by researchers of the Center for Nuclear Energy in Agriculture (CENA / USP) and will have the opportunity to improve and apply their knowledge in one of the following areas of their choice: Plant tissue culture; Electron microscopy; Nuclear and correlated techniques in studies of agricultural productivity; Nuclear techniques to study the behavior of pesticides in the soil-water-plant system; Use of chromatographic techniques for monitoring of pesticides in agroecosystems; Plant nutrition (Hydroponics); Plant Molecular Biology; In vivo and in vitro induction of mutations in plant breeding; Plant proteins: characterization and applications in plant breeding; Food quality and certification; Soil organic matter; Multi-isotopic analytical techniques in soil-plant process; 15N techniques in studies of transformations of nitrogen in agroecosystems.	105	1st/2nd	11020 11010



CEN0672	Ecology and Management of Vertebrates	Luciano Martins Verdade	Populations, species and evolution; Adaptation; Behavioral Ecology I: mating systems; Behavioral Ecology II: parental care; Behavioral Ecology III: dispersion patterns; Behavioral Ecology III: habitat use; Behavioral ecology IV: diet; Diseases of wild animals; Experimental approach in applied ecology; Biological conservation; Management of detrimental species; Sustainable use; Monitoring.	105	2nd	11070 11080 11020 11010