UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Scienze della Terra e del Mare
ACADEMIC YEAR	2018/2019
MASTER'S DEGREE (MSC)	ANALYSIS AND ENVIRONMENTAL MANAGEMENT
SUBJECT	LANDSCAPE ECOLOGY
TYPE OF EDUCATIONAL ACTIVITY	C
AMBIT	21017-Attività formative affini o integrative
CODE	11718
SCIENTIFIC SECTOR(S)	BIO/03
HEAD PROFESSOR(S)	ILARDI VINCENZO Professore Associato Univ. di PALERMO
OTHER PROFESSOR(S)	
CREDITS	6
INDIVIDUAL STUDY (Hrs)	94
COURSE ACTIVITY (Hrs)	56
PROPAEDEUTICAL SUBJECTS	
MUTUALIZATION	
YEAR	1
TERM (SEMESTER)	1° semester
ATTENDANCE	Not mandatory
EVALUATION	Out of 30
TEACHER OFFICE HOURS	**ILARDI VINCENZO** Monday 09:30 13:30 Studio del docente, previo appuntamento telefonico. Tuesday 09:30 13:30 Studio del docente, previo appuntamento telefonico. Wednesday 09:30 13:30 Studio del docente, previo appuntamento telefonico. Thursday 09:30 13:30 Studio del docente, previo appuntamento telefonico. Friday 09:30 13:30 Studio del docente, previo appuntamento telefonico.

DOCENTE: Prof. VINCENZO ILARDI

PREREQUISITES	Basic knowledge of general and systematic botany.
LEARNING OUTCOMES	Knowledge and understanding ability Ability to read and interpret the landscape. Acquisition of techniques and cognitive tools necessary for monitoring, analysis, evaluation, planning and management of land resources at landscape scale. Ability to arrange the most appropriate actions for attenuating or removing the factors of environmental criticality. Acquisition of techniques for sampling and mapping the plant landscape. Acquisition of techniques for sampling and analysing the flora. Acquisition of techniques for sampling and analysing the vegetation with synchronic and diachronic methods. Capability to identify vegetation models to be proposed in actions of environmental recovery and restoration. Ability to apply knowledge and understanding. Ability to analyse, describe and elaborate technical documents (reports and maps) functional to study, design, planning and management of terrestrial ecosystems. Acquisition of cognitive tools necessary for the active participation in design and realisation interventions of restoration of plant topsoil in accordance with the criteria of environmental botany and landscape ecology. Making judgements Acquisition of evaluation and choice ability, in full autonomy, of the most appropriate techniques and procedures to be used in the field of applications of environmental botany and landscape ecology. Ability to join inter- and transdisciplinary study and working groups. Awareness in the partial or overall assessment of a project and its implications in the application of scientific principles acquired in environmental botany and landscape ecology. Ability to interaction and integration within inter- and transdisciplinary working groups in the field of the urban development management and planning. Communication skills Acquisition of disciplinary specialized terminology necessary for the interpretation and the correct presentation, also in public, of data and planning proposals in the field of environmental botany and landscape ecology. Ability to support and promote all those activities that pertain the management and planning of natural resources related to terrestrial ecosystems. Learning ability Ability to access and consultation of specialized scientific production, fundamental for the urban development management and planning compatible with the conservation of the natural resources. Acquisition of cognitive tools able to allow the participation in postgraduate university and advanced courses, conferences and specialized seminars in the areas of applied environmental botany and landscape ecology.
ASSESSMENT METHODS	Oral exam on the topics covered in the classroom or verified during field trips.
EDUCATIONAL OBJECTIVES	The course aims to direct the student to the issues of planning and management of terrestrial ecosystems, in accordance with the principles of applied environmental botany and landscape ecology. The course aims, in fact, to provide, through the techniques of sampling and interpretation of the plant biological component, the essential cognitive tools for a correct reading of the structure and function of terrestrial ecosystems. Moreover, another main objective is the transfer of knowledge and techniques required to: - identify ecological successions and potential evolutionary stages; - extrapolate vegetation models to be applied in environmental recovery, restoration and rehabilitation; - assess, through the use of appropriate biological indicators of flora and plant communities, the human impacts; - provide specific contributions to the planning and management of terrestrial ecosystems, consistent with the needs of conservation of biological resources in Mediterranean environment, with particular reference to the Sicilian territory.
TEACHING METHODS	Frontal lessons (5 EC) integrated with excursions (1 EC) and projection of original images, relating to the environments and the topics covered.
SUGGESTED BIBLIOGRAPHY	Pignatti S., 1994 – Ecologia del paesaggio. UTET. Pignatti S. (ed.), 2000 – Ecologia vegetale. UTET. Ubaldi D., 2003 – Flora, Fitocenosi e Ambiente. Elementi di Geobotanica e Fitosociologia. CLUEB Lomolino M.V., Riddle B.R., Whittaker R.J. Biogeography. Biological Diversity across Space and Time. FifthEdition.Sinauer Associates, Inc.Publishers. Sunderland, Massachusetts.USA

SYLLABUS

Hrs	Frontal teaching
2	Introduction to the study of flora and vegetation. Definitions and principles of landscape ecology.

SYLLABUS

Hrs	Frontal teaching
3	Climate-plant relationships, habit of plants, eco-morphological convergence and parallelism, growth forms and life forms, Raunkiaer's life forms, biological spectrum. Geographic range of species, dispersion strategies, size and shape of geographic ranges, types of geographic ranges, endemic species and species with wide distribution, chorological types and spectrum, floristic kingdoms and regions.
2	Geographical distribution of temperature and rainfall, bioclimatic indices (Rivas-Martínez), bioclimatic types. Bioclimatology and bioclimatic classification of Sicily according to Rivas-Martínez.
2	The floristic research. Ecological factors and behaviour of the species. Adaptation to climatic, edaphic and mechanical factors. Strategies of pollination and dispersal.
3	The large plant formations (vegetation of cold, temperate and warm zones). Mediterranean vegetation: ecophysiological aspects, vegetation structures, biodiversity, adversity.
3	Habitat and ecological valence, indicator species. Occupation of space and relationships between plants, physiognomic communities and elementary populations, plant communities. Methods for vegetation sampling. The phytosociological method. Classification of the vegetation, the plant association and the other syntaxonomic units. The phytosociological nomenclature. The phytosociological relevé and the syntaxonomic attribution.
3	Autoecological, synecological and distribution characters of species and systematic groups characterising mostly the plant landscapes of Sicily. Fagaceae woodlands (genera Fagus, Castanea and Quercus). Roles and functions of the shrublands. Rosaceae (genera Rosa, Crataegus, Pyrus, Malus, Prunus and Sorbus), and / or Leguminosae shrublands (genera Genista, Spartium, Adenocarpus, Calicotome, Teline and Cytisus).
3	Roles and functions of the grasslands. Grasslands dominated by hemicryptophytes and grasslands dominated by therophytes. The most represented taxonomic groups in Mediterranean environment. Gramineae (Ampelodesmos, Hyparrhenia, Stipa, Brachypodium, etc.), Leguminosae (Trifolium, Medicago, Vicia, etc.). The species of Mediterranean maquis, wetlands and coastal environment.
3	Dynamism of vegetation, successions and vegetation series. The competition for resources, population dynamics and vegetation succession. The vegetation series. Regressive series and progressive series. Edaphic series and climatophilous series. The diachronic study of the vegetation: the permanent squares. Actual vegetation, potential vegetation and climacic vegetation.
2	The levels of phytosociological study: classical, serial and catenal phytosociology. The landscape as a mosaic, the patch-corridor-matrix pattern. Concept and effects of spatial and temporal scale in landscape ecology. Fragmentation of the plant landscape.
2	Origin and persistence of the patches, effects of the shape and size of the patches on biodiversity and biomass production. Optimal size and minimal area of the patch. Structural and functional characteristics of the ecotones. Structures and functions of the ecological corridors. Ecological characteristics of the matrix. Matrixpatch relationships. Emergent properties of the landscapes.
2	Integrated or landscape phytosociology. Vegetation mosaics, tesseras, sigmeta, geosigmeta and microgeosigmeta.
2	The cartographic representation of vegetation and plant landscape (actual vegetation map, potential vegetation map, land use map, naturalness degree map, vegetation series map, landscape ecological map), functional in planning and management of the territory. Remote sensing and information systems for the environment.
6	Preservation of landscapes, conservation of biodiversity. Connections between human activities and plant landscape. Analysis and problems of the Sicilian landscape. The plant landscape of the soils on the "Gessoso-Solfifera" Formation. The vegetation of the circum-Sicilian islands. The plant landscape of the Palermo and Trapani Mountains. The plant landscape of the Sicani and Madonie Mountains. The plant landscape of the Nebrodi and Peloritani Mountains. The plant landscape of the Etna Mount and the Hyblean plateau.
2	Role of plants in soil conservation. Indigenous species, vegetation patterns and functional groups useful for the protection of soil and the environmental recovery, restoration and conservation. Intervention techniques on a naturalistic base. Native species and non-native species. Invasive species. Strategies for conservation of plant biodiversity.