MASTER & MASTER OF SCIENCE PROGRAMMES IN "LAND AND WATER RESOURCES MANAGEMENT: IRRIGATED AGRICULTURE" ACADEMIC YEAR 2019 – 2020

OBJECTIVES

The Master of Science Programme in "Land and Water Resources Management: Irrigated agriculture" provides a two-year curriculum for graduates holding the title of agricultural or hydraulic engineers. The main objective of the Programme is to enhance the scientific knowledge and technological know-how of the candidates in water saving and land conservation issues especially in Mediterranean environments. The two-year programme is structured as follows: the 1st year is based on the completion of a series of specific one-week courses and the preparation of an irrigation project, whereas the 2nd year is dedicated to the development of applied research themes and experimental works.

The major topics are related to the following thematic areas:

- Water use efficiency and water productivity;
- On-farm irrigation systems performance;
- Large-scale irrigation systems performance and new technologies;
- Use of non-conventional water resources in agriculture;
- Integration and up-scaling of the above issues at the basin level;
- Sustainable use and management of Mediterranean soils;
- Economic aspects of Mediterranean agriculture.

Most of the above-said topics take into account the impact of climate variability.

A one-week Diploming Course is another opportunity offered to students: From a business idea to its project design: the enterprise culture in the innovation process management. Attending this module students will receive knowledge and basic skills to create, develop and communicate an innovative entrepreneurial idea, through a new and attractive method.

Access to the 2nd year is only guaranteed to students who have successfully completed the first year and have met all the prerequisites set by the Institute.

The 2nd year programme is based on the "problem solving" approach and research themes are derived from specific and relevant problems for which a practical technical solution is sought. In a rigorous scientific framework, works are targeted to innovatory solutions that are feasible in the integrated land and water system they are designed for. The Programme is carried out by MAIB staff in collaboration with national and international Institutions and Universities from Europe, Middle East, North Africa and the U.S.A.

ORGANIZATION

First Year: 66 ECTS

- Seven Teaching Units 56 ECTS
- Irrigation Project 10 ECTS

Diploma: Master of MAIB / Master Universitario di I Livello
Duration: 9 months

Second Year: 60 ECTS

- Preparatory research methodology 10 ECTS
- Supervised research work: Thesis and Defence 50 ECTS

Diploma: Master of Science
Duration: 12 months

ACCESS TO FURTHER STUDIES

Students who have been awarded the CIHEAM Master of Science Diploma have access to **PhD programmes**. CIHEAM Bari gives support to Doctoral studies in the framework of its collaboration with Italian and foreign Universities.

CANDIDATES' PROFILE

Courses are addressed to graduate students, researchers, managers of research centres or public administrations, professionals in the following **disciplines**: Agronomy/Agriculture engineering; Civil Engineering (Irrigation and Hydraulics); Agricultural Economics; Computer and Communications Engineering; Eco-system Management; Environmental and Water Resources Engineering; Irrigation; Plant Science/Horticulture; Hydrotechnic Engineering; Farm management; Soil Science/Geology

Required level:

- **Three years (180 ECTS) or Four years (240 ECTS) of university studies;**
- **Four years out of five of university studies (240 ECTS)**, upon agreement between the sending University and CIHEAM Bari;
- **Five years of university studies (300 ECTS)**;
- **Professionals** having a degree (3-4years) and at least **2 years** of experience in a field related to the Master Programme.

ADMISSION

Selection of students is based on:

1. Screening of documents sent online by candidates to support their application;
2. Online test to assess candidates' technical skills and abilities;
3. Online English test;
4. Skype interview.

Submission of applications through the Online procedure
Deadline: May 31, 2019

COSTS

Registration fee: 200.00€/year.
Tuition fee: 500.00€/month (travel, accommodation and insurance expenses not included).

BENEFICIARIES

Master and MSc programmes are open to candidates of any nationality.

SCHOLARSHIPS

CIHEAM BARI grants **full** or **partial scholarships** to candidates according to a ranking list. Priority is given to students coming from CIHEAM-Member countries and other Mediterranean, Balkan and Middle Eastern Countries.

LANGUAGE OF INSTRUCTION: English

For further information and application procedure: www.iamb.ciheam.org

FIRST-YEAR PROGRAMME
MASTER/MASTER UNIVERSITARIO DI I LIVELLO
SEPTEMBER 2019 – JUNE 2020

Unit I: Introductory Courses
Introduction to the general principles of thematic areas of great interest for agriculture that can be shared between the 3 Master's courses: biodiversity, climate change and high technology for agriculture

Unit II: Land and Water Resources Management
Pedology and soil survey investigation; Application of geographic information systems in land and water resources management & remote sensing; Soil physics: water and solute movements; Surface Water Hydrology management; Groundwater hydraulics and pollution in agricultural settings; Soil erosion and desertification: monitoring, modelling and mitigation technologies; Water harvesting techniques.

Unit III: Irrigation Management: Soil-Water-Plant-Atmosphere Continuum
Agrometeorology and Seminar on Climate Change; Crop response to water and water use efficiency; Crop water requirements and practical irrigation scheduling; Crop growth modelling: Eco-physiological and Engineering aspects; Seminar on Agricultural aspects of irrigation methods.

Unit IV: Irrigation Management at Farm Level
Design, operation, maintenance and performance evaluation of sprinkler irrigation systems; Design, operation, maintenance and performance evaluation of trickle irrigation systems; Design, operation, maintenance and performance evaluation of surface irrigation systems.

Unit V: Irrigation Management at Distribution Systems Level
Design, operation, maintenance and performance evaluation of large scale open channel distribution systems; Design, operation, maintenance and performance evaluation of large scale pressurized irrigation systems; Seminar on Determining soil hydraulic properties by field-measured infiltration rates; Water management optimization; Seminar on Water resources management: the FAO approach.

Unit VI: Use of Non-Conventional Water Resources: Technical and Environmental Issues
Salinity control in relation to irrigation; Drainage and drainage systems design and management; Use of low quality waters: environmental and technical aspects; Seminar on Wastewater reuse in irrigation farming; Seminar on Non-conventional water use; Urban wastewater treatment for agricultural reuse.

Unit VII: Irrigation Management: Institutional, Economic and Environmental Aspects
Principles of farm economics; Optimal water allocation in irrigation sector; Cost/Benefit Analysis; Participatory irrigation management (PIM) and transfer (IMT) in a monitoring & evaluation perspective; Cost Recovery; International economics and the role of agriculture in economic development; Seminar on Geopolitics of water in the Mediterranean and Middle East

Case study - Irrigation Project Design
Collection and analysis of climatic, soil and crop data. Determination of crop water requirements and gross irrigation requirements. Choice of the optimal cropping pattern based on different simulation scenarios (limited water availability, use of saline water, etc.) and economic criteria. Determination of specific continuous discharge. Hydraulic design of a large scale distribution network. Cost/Benefit analysis. Environmental Impact Assessment Applications.
Synthesis, conclusions and reporting.

SECOND-YEAR PROGRAMME
MASTER OF SCIENCE
NOVEMBER 2019 – OCTOBER 2020

Preparatory research methodology
- Scientific English. Bibliographic research. Scientific writing (common to all students)
- Safe laboratory practices/ Modelling approaches and Statistical analysis/Laboratory and field methodologies (according to the thesis subject

Supervised Research work: Thesis and Defence
Topics generally available for Master of Science theses are:
- Nexus Energy - Hydraulic Performance, based on Management of Large-Scale Pressurized Irrigation Systems
- Modernization techniques of pressurized irrigation system and related technical and socio-economic impacts
- Combination of new sensor technologies, satellite navigation and positioning technology to manage irrigation and fertilisation, and to face climate change impacts on agriculture
- Crop and soil-water modelling
- Eco-Efficiency analysis of irrigation
- Impact of treated wastewater use on the cropping pattern, irrigation management and irrigation systems performance
- Agro-hydrological modelling and modern techniques to estimate soil hydraulic parameters
- Land evaluation, agro-ecological characterization and action to reduce soil erosion losses
- Characterization, modelling and participatory simulations of water use and development strategies at the level of rural households and rural territories
- Economic policies and tools for an effective implementation of Water Demand Management in agriculture.