



Master of Science Programme in "Land and Water Resources Management: Irrigated Agriculture"

Academic Year 2017 – 2018

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 candidates in water saving and land conservation issues especially in Mediterranean environments. The two-year programme is structured as follows: the first year is based on the completion of a series of specific one-week courses and the preparation of an irrigation project, whereas the second 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**. By 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 second year is only guaranteed to students who have successfully completed the first year and have met all the prerequisites set by the Institute.

The second-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: 64 ECTS

- ❖ Seven Teaching Units **54 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.

ADMISSION

Selection of students is based on the evaluation of application documents.

Required level: At least 4 years of undergraduate studies in the fields of Agricultural Sciences, Agricultural engineering and related courses or an academic level that qualifies applicants to undertake postgraduate level studies in their home country or a minimum of 240 ECTS or its equivalent in the home country.

Submission of applications to: didattica@iamb.it

Deadline: May 31, 2017

Registration fees: 230.00€/year.

Tuition fees: 500.00€/month (travel, accommodation and insurance expenses not included).

BENEFICIARIES

MSc programmes are open to candidates of any nationality. In particular, courses are addressed to: graduate students, researchers, managers of research centres or public administrations, professionals in agriculture-related fields.

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 form: www.iamb.ciheam.org



First-year Programme Master/Master Universitario di I livello October 2017 – June 2018

Unit I: Introductory Courses

Information and Communication Technologies (ICTS). Criteria for bibliographic research on specific topics in the country of origin; English language; Application of geographic information systems in land and water resources management; Pedology and soil survey investigation.

Unit II: Water and Land Resources Management

Soil physics: water and solute movement; 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 surface irrigation systems; Design, operation, maintenance and performance evaluation of trickle irrigation systems; Design, operation, maintenance and performance evaluation of sprinkler 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; Cost Recovery; Participatory irrigation management (PIM) and transfer (IMT) in a monitoring & evaluation perspective; 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

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:

- ❖ Water use efficiency and water productivity
- ❖ Deficit irrigation and supplemental irrigation
- ❖ Crop water requirements and irrigation scheduling
- ❖ Soil-plant-atmosphere relationships and crop growth modelling
- ❖ Saline irrigation practice and management
- ❖ Treated sewage water and its use in agriculture
- ❖ Climate variability and changes and their impacts on agriculture
- ❖ Land evaluation and Agro-ecological characterization
- ❖ Performance assessment of CIS: operational analysis and rehabilitation
- ❖ Management and design of CIS and optimization of on-farm/CIS interaction
- ❖ Water energy consumption: irrigation water supply and pumping station regulation
- ❖ Water resources management: reservoir operation and groundwater exploitation