



Empowering Science in
Agriculture for Excellence

MASTER'S DEGREE

Fertilizer Science & Technology

Science & Technology Cluster

Accredited by the Ministry of Higher Education, Scientific Research and Innovation.

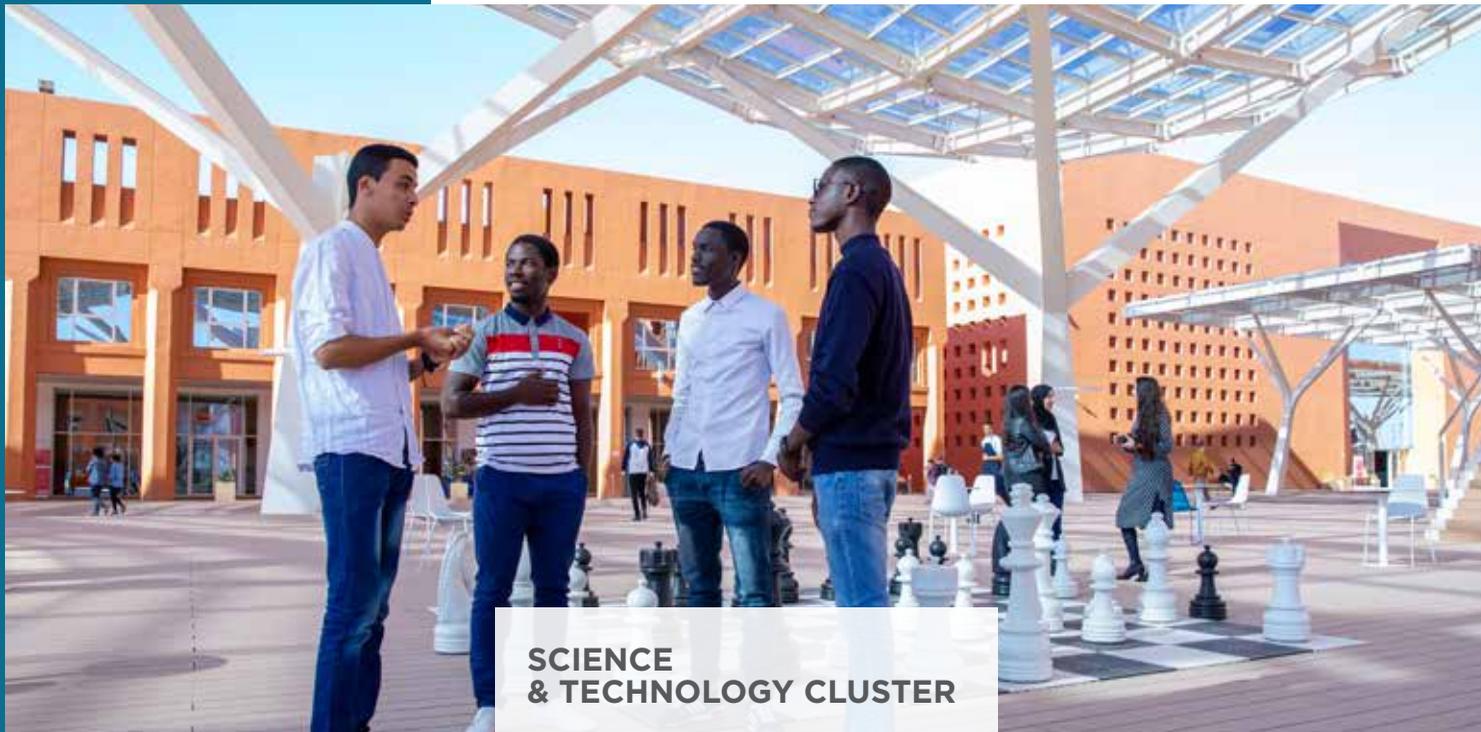
ABOUT MOHAMMED VI POLYTECHNIC UNIVERSITY

Mohammed VI Polytechnic University is an institution oriented towards applied research and innovation, which aims to be among the world-renowned universities in these fields.

The University is committed to an education system based on the highest international standards in crucial fields such as science and technology, humanities, economics and social sciences for the sustainable economic development of Morocco and the African continent.

This allows Mohammed VI Polytechnic University to consolidate Morocco's avant-garde position in these fields through the implementation of a unique partnership approach and the strengthening of its academic and executive education programs in relevant skills, for the future of Africa.

Located in the town of Benguerir, near Marrakech, and situated in the heart of Mohammed VI Green City, Mohammed VI Polytechnic University intends to combine local roots and a national, continental and international influence.



SCIENCE & TECHNOLOGY CLUSTER

The Science & Technology Cluster is dedicated to “hard” sciences, new technologies and their impacts on society. It groups together several programs around the following disciplinary fields: Industrial Management, Geology and Sustainable Exploitation of Mineral Resources, Materials Science, Energy and Nanoengineering, AgroBioSciences, Chemical and Biochemical Sciences, Green Process Engineering, Applied Mathematics, Communication and Computer Science, Sustainable Urban and Territorial Planning, Medical Applications Interface and Renewable energies.

The Cluster offers degrees in Engineering, (academic and professional) Undergraduate degrees, Master's and Ph.D. degrees, as well as executive training programs.

The Science & Technology Cluster puts experimentation at the heart of its programs (learning-by-doing approach). In a unique approach to train professors, doctoral students, graduate and undergraduate students, the various entities of the cluster have “living labs”, working and training platforms, (mining facilities, experimental farms, factories, cities, etc.) open to the scientific community, researchers and students to put their learnings to practice.



*You are most
welcome to join us*

ESAFE SCHOOL OF AGRICULTURE, FERTILIZATION AND ENVIRONMENTAL SCIENCES

ESAFE is the school of Agriculture at Mohammed VI Polytechnic University aiming to become a leader in the sector of education and research in Africa. ESAFE trains agricultural experts to contribute to food security by advancing research, improving fertilizers and plant products, and through sustainable water and soil management.

ESAFE programs address relevant topics, including fertilizers, the environment and crop productivity. These Master's programs are accredited by the Ministry of National Education, Vocational Training, Higher Education and Scientific Research.



MASTER FERTILIZER SCIENCE & TECHNOLOGY

OBJECTIVES

The objectives of the master program in Fertilizer Science and Technology are to prepare graduates possessing a broad knowledge of fertilizer and soil fertility to become experts advising African farmers or experts in the fertilizer industry by developing fertilizers of the future. The program is designed to provide the most comprehensive training possible in this field.

CAREER OUTLOOK

The graduates of this master will have several career options in several areas such as:

- Process engineering related to fertilizer manufacturing;
- Innovation in the field of fertilizers;
- Soil fertility management;
- Fertilizer formulation and recommendation;
- Phosphate and other fertilizers value chain
- Restoring fertility of degraded soils;
- Nutrient management in the soil and nutrients deficiency diagnosis;
- Logistics and communication in relation to the valorization, marketing and rationalization of fertilizers;
- Environmental impact studies.

They may also pursue research work as part of a PhD or create their own startups.

WHO SHOULD APPLY



This Master's program is open to students who have a bachelor's or engineer's degree in science with high level of English proficiency, or equivalent.

CORE COMPETENCIES

At the end of the training, students will be able to:

- Recommend appropriate fertilizers to farmers.
- Evaluate and correct soil fertility to maximize crop productivity.
- Develop diagnostic and communication tools to rationalize and promote fertilizers.
- Act on the entire value chain of the phosphate fertilizer industry.
- Develop new fertilizer products.
- Evaluate the physical and chemical characteristics / quality of fertilizers.
- Develop standards of interpretation of soil and plant analyses.
- Set up laboratories for analysis related to soil fertility and fertilizers.
- Design and manage environmental studies projects.
- Design, monitor and evaluate research in the areas of fertilizer and soil fertility management
- Produce soil fertility maps using GIS and practice precision farming.
- Manage projects related to fertilizers and soil fertility.
- Identify and implement actions related to sustainable development (social equity, environment and economic efficiency).



Faculty Director

Pr. Abdallah Oukarroum is a plant physiologist with a strong research interest in the functional plasticity of plants under stress. According to a Scientific paper recently published by Stanford University, he was ranked as one of the 2% top scientists in the world in 2021.

At the University of Quebec in Montreal in Canada, Abdallah Oukarroum has been interested in understanding the inhibitory effects and bioaccumulation of metals and metallic nanoparticles at the membrane and cellular levels on aquatic plants.

Currently, at University Mohammed VI Polytechnic (UM6P) in Morocco, Abdallah Oukarroum's research group focuses on the elucidation of the biochemical-physiological mechanisms underlying adaptation and acclimation responses of plants to environmental stress.

Pr Oukarroum also occupies the position of director of the School of Agriculture, Fertilization & Environmental Sciences (ESAFE-UM6P).



CURRICULUM

SEMESTER 1

- **M1** : Fundamentals of fertilizer
- **M2** : Fertilizers in the African context
- **M3** : Experimental design and statistics
- **M4** : Production economics
- **M5** : Industry seminars and tours
- **M6** : Geographic Information System (GIS)

SEMESTER 2

- **M7** : Phosphorus production and processing
- **M8** : Nitrogen production and processing
- **M9** : Potassium production and processing
- **M10** : Economic Analysis of Fertilizer Value Chains
- **M11** : Technology transfer to end users
- **M12** : English for communication

SEMESTER 3

- **M13** : Soil - plant relationships
- **M14** : Nutrient management
- **M15** : Environmental issues related to fertilizers
- **M16** : Fertilizer Application Methods
- **M17** : Communication issues in the fertilizer industry
- **M18** : Prior-graduation project: Preparation to the research activity in the internship

SEMESTER 4

At the end of the second year, the student will do a 6-month internship to immerse in the working environment and discover research. The objective is to put into practice the acquired knowledge and skills, both practical and theoretical. The internship is also an opportunity to develop a research topic.

LEARNING BY FARMING PROGRAM

Students manage a piece of land at the Experimental Farm for the whole period of the program.

Partnership:



PROGRAM HIGHLIGHTS

Students of this master's program will benefit from the teachings of qualified academic administration, composed of both renowned academics and practitioners known for their expertise and their sharp vision of the economic and industrial world.

- The teaching model is based on an innovative approach focused on experimentation (learning by doing). The University's sites are equipped with "Living Labs", dedicated to applied research. These laboratories are real-scale work and training platforms (mining facilities, experimental farms, factories, towns, etc.) open to the scientific community as well as to the students.
- Our innovation aspect of the pedagogical approaches within this master's program is based on learning by farming concept.
- The training includes courses in "Flipped Class" as mode of digital education that encourage learning autonomy.
- Beyond technical skills, students will also acquire transversal skills in "Soft Skills" (communication, teamwork and English) and "Business Skills" (innovation, entrepreneurship, project management, etc.) allowing them to interact effectively with their future career environments.



CAMPUS ADVANTAGES

Designed by architects Ricardo Bofill and Elie Mouyal, on a 17-hectare site, the campus provides you with modern infrastructure equipped at the highest international standards, fully adapted to the needs of Teaching and Research.

Our students benefit from a living environment which is conducive to learning and fosters community life and personal development through its secure residences, an athletic complex including 5000m2 of outdoor spaces, a library of 13,000 titles, catering areas and designated places to relax promoting exchanges.

The University also boasts a wellness center as the health and well-being of our students, faculty and staff is of paramount importance. Students' associative projects, whether they concern entrepreneurship, civic engagement, cultural activities, etc, are encouraged and supported by the University. Thus, over time, your experience here enriches both professionally and personally.



Qualifications

This course is open to students holding a bachelor's or engineer's degree in science

- Level of training required: Bac+3, L3 scientists
- Specialty/Major required: life sciences, environment or equivalent

Application requirements*

- Application letter
- Curriculum vitae
- Two passport photos
- School marks / transcripts
- Copy of diplomas or certificates of achievement
- Photocopy of C.N.I / passport
- Two letters of recommendation

**Original documents and / or certified copies will be required at the time of final registration.*



Duration
2 years



Seats
25 participants



Training venue
Mohammed VI
Polytechnic
University



Language
English (Full
Time Master's
degree program)

Admissions calendar

Would you like to join us?

We invite you to sign up online via the link my.um6p.ma by completing the requested information or by contacting us at: admission@um6p.ma.

If you are shortlisted, you will be invited to a written competitive examination followed by an oral interview in keeping with the following schedule:

- **31st of May** : Application deadline
- **June - July** : Written examination and oral interview
- **End of July - August** : Admission results and receipt of scholarship application files
- **September - Early October** : Start of term.

Selection procedure

- Examination of application file
- Written test
- Oral Test

Scholarships

In line with its civic commitment, UM6P supports the students through an attractive system of academic scholarships and financial aid grants.

Tuition and fees

- Registration fee : 5.000 Dhs
- Tuition costs : 75.000 Dhs / year

FOR MORE INFORMATION

Pr. Abdallah OUKARROUM

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Admission : admission@um6p.ma

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جامعة محمد السادس
متعددة التخصصات التقنية
MOHAMMED VI POLYTECHNIC UNIVERSITY
UNIVERSITÉ MOHAMMED VI POLYTECHNIQUE