New Curricula in Precision Agriculture Using GIS Technologies and Sensing Data

University of Oran1 Ahmed Ben Bella
Fac. Life/Nature Sciences / Fac. App/Exact Sciences

CUPAGIS

Prof. Smain Balaska, Prof. Yahia Lebbah
University Oran1, Algeria

Implemented Activities

- **WP1 (PREPARATION):** Courses review in the first 6M report; First draft of a new curricula in the 12M report; We got all of the local and regional agreements.
- **WP2 (DEVELOPMENT):** Finalizing the whole curricula in march 2020, in French; Discussion with our partners to set the list of equipment.
- **WP3 (QUALITY PLAN):** Internal quality plan in the 6M report; Trello software to manage internal quality assurance.
- **WP4 (DISSEMINATION):** Many dissemination activities done (seminar, radio station "EL BAHIA", facebook page); Develop a set documentation on PASENSO.
- **WP5 (MANAGEMENT):** continuously under development.

New Courses development process: Technology courses

- Technological tools for Precision Agriculture
- Introduction to Computer Science
- Statistics
- Programming and Algorithms
- Information systems and web/mobile programming
- Data analytics
- Bioinformatics
- Image Processing and Computer Vision
- GIS for Precision Agriculture
- Remote Sensing
- Sensor Systems for Precision Agriculture
- Advanced GIS Techniques for Precision Agriculture
- Global Navigation Satellite Systems
- Artificial intelligence, machine learning and big data

New Courses development process: Biology courses

- Plant Physiology
- Plant Biodiversity
- Ecology and Environment
- Physiology and Biochemistry of Symbiotic Fixation of Nitrogen
- Physiology of Plant Nutrition
- Water and water nutrition of plants
- Agricultural Irrigation Technology
- Vegetable Production
- Phytodiagnosis and Phytoprotection
- Fertilization
- Salty soils
- Agricultural Mechanization Technology

Curricula descriptions: updated courses

- Plant Physiology (semester 1)
- Plant Biodiversity (semester 1)
- Ecology and Environment (semester 1)
- Introduction to Computer Science (semester 1)
- Physiology and Biochemistry of Symbiotic Fixation of Nitrogen (semester 2)
- Physiology of Plant Nutrition (semester 2)
- Water and Water Nutrition of Plants (semester 2)
- Statistics (semester 2)
- Programming and algorithms (semester 2)
- Information systems and web/mobile programming (semester 2)
- Soil Pedology and Microbiology (semester 3)
- Plant Ecophysiology (semester 3)
- Data analytics (semester 3)
- Image Processing and Computer Vision (semester 3)
- Bioinformatics (semester 3)
- Vegetable Production (semester 3)

Curricula descriptions: new courses

- Technological tools for Precision Agriculture (semester 1)
- Agricultural Irrigation Technology (semester 3)
- Phytodiagnosis and Phytoprotection (semester 4)
- GIS for Precision Agriculture (semester 4)
- Remote Sensing (semester 4)
- Sensor Systems for Precision Agriculture (semester 4)
- Fertilization (semester 4)
- Salty soils (semester 5)
- Agricultural Mechanization Technology (semester 5)
- Advanced GIS Techniques for Precision Agriculture (semester 5)
- Global Navigation Satellite Systems (semester 5)
- Artificial intelligence, machine learning and big data (semester 5)

Teaching materials

- Remote sensing / Textbook / 15/12/2020
- In-situ sensing / Manual / 15/12/2020
- GIS / Manual / 15/12/2020
- Plant diversity / Audio-visual / 31/09/2020
- Plant growth and development / Audio-visual / 31/09/2020
- Controlled greenhouse / Manuals / 31/12/2020
- Plant disease fact sheets / Manual / 31/12/2020

Quality assurance of the new courses

QUALITY ASSURANCE – Courses		
Course №	Course title	Peer reviewers (Name, position, organization)
1	Image Processing and Computer Vision	Pr. Rachid Nourine, National Institute INTTIC, Algeria Dr. Naoui Moulkheir, University Oran1, Algeria
2	GIS for Precision Agriculture	Pr. Moulay Idriss Hassani, University Oran2, Algeria Pr. Rachid Nourine, National Institute INTTIC, Algeria
3	Remote Sensing	Pr. Moulay Idriss Hassani, University Oran2, Algeria Pr. Khalladi Mederbal, University Ibn Khaldoun, Tiaret, Algeria
4	Sensor Systems for Precision Agriculture	Pr. Khalladi Mederbal, University Ibn Khaldoun, Tiaret, Algeria
5	Advanced GIS Techniques for Precision Agriculture	Pr. Rachid Nourine, National Institute INTTIC, Algeria Pr. Souiah Sid Ahmed, University Oran2, Algeria
6	Global Navigation Satellite Systems	Pr. Moulay Idriss Hassani, University Oran2, Algeria Pr. Rachid Nourine, National Institute INTTIC, Algeria
7	Artificial intelligence, machine learning and big data	Pr. Samir Loudni, EMN, Nantes, France Dr. Nadjib Lazaar, University of Montpellier, France

Quality assurance of the new courses

QUALITY ASSURANCE – Courses		
Course №	Course title	Peer reviewers (Name, position, organization)
8	Plant Physiology	Pr Djabeur Abderrezak Teacher researcher University of Science and Technology of Oran Pr Mekhaldi Abdelkader Teacher researcher University of Mostaganem
9	Plant Biodiversity	Pr Mekhaldi Abdelkader Teacher researcher University of Mostaganem Pr Benhassaini Hachemi Teacher researcher University of Sidi Bel Abbès
10	Ecology and Environment	Pr Benabadji Noury Teacher researcher University of Tlemcen Pr Merzouk Abdessemed Teacher researcher University of tlemcen
11	Physiology and Biochemistry of Symbiotic Fixation of Nitrogen	Pr Bennaceur Malika Teacher researcher University of Oran 1 Pr Mekhaldi Abdelkader Teacher researcher University of Mostaganem
12	Physiology of Plant Nutrition	Pr Benhassaini Hachemi Teacher researcher university of sidi bel abbès
13	Water and water nutrition of plants	Pr Tsaki Hassini Teacher researcher University of Oran 1
14	Agricultural Irrigation Technology	Pr Benkhelifa Mohamed Teacher researcher University of Mostaganem
15	Vegetable Production	Pr Hassani Abdelkrim Teacher researcher University of Tiaret
16	Phytodiagnosis and Phytoprotection	Dr Yahiaoui Dalila Researcher National Institute for Plant Protection- Algeria Pr Mami Anes Teacher researcher University of Science and Technology of Oran
17	Fertilization	Pr Reguieg Hocine Teacher researcher University of Mostaganem
18	Salty soils	Pr Reguieg Hocine Teacher researcher University of Mostaganem
19	Agricultural Mechanization Technology	Pr Benkhelifa Mohamed Teacher researcher University of Mostaganem

Impact and sustainability

- Three events since November 2019:
    - University seminar (25/11/2019)
    - Mass media Algerian Public Television (19/12/2019)
    - Poster in a conference on "smart farming" (28/01/2020)
- Dissemination materials:
    - Brochure, Press book, Leaflet
- Dissemination of the information about the project in mass media:
    - We maintain a facebook page

    https://www.facebook.com/Cupagis-Oran1-University-454383688459311

    - Two broadcasts at Radio station "EL BAHIA"/Oran

Dissemination events from November 2019

- Poster in the conference
  «Smart Farming au service d'une agriculture intelligente»
  28 and 29 January 2020
- One broadcast at Radio station "EL BAHIA"/Oran
  19 December 2019

- *We have planned to organize a seminar on "Remote sensing and GIS for precision agriculture", but COVID confinement prevented this event.*

Non academic partners

List of non-academic partners and organizations:

1) DSA Oran - Direction des services agricoles de la wilaya d'Oran (Agricultural Services Management of the District of Oran)
2) SAKORA - Enterprise specialized in agricultural development in Algeria
3) UDES – Unité de développement des équipements solaires (Solar equipment development unit)
4) La conservation des forêts de la wilaya d'Oran (Conservation of the forests of Oran)
5) ITGC - Institut des Grandes Cultures d'Oran (Institute of Field Crops of Oran)
6) IHFR - Institut hydrométéorologique de la formation et la recherche (Hydrometeorological Institute of Training and Research)
7) CFPA Misserghine - Oran - Centre de formation professionnelle agricole (Agricultural Training Center)
8) CFPA Hassi-Bounif - Oran - Centre de formation professionnelle agricole (Agricultural Training Center)
9) ITCM Hassi-Bounif - Oran - Institut technique des cultures maraîchères (Technical Institute of Vegetable Crops)
10) Chambre d'Agriculture d'Oran (Oran Agriculture Center)
11) DSA Ain-Témouchent (Agricultural Services Management of the District of Ain-Témouchent)
12) INPV - Institut national de la protectin des végétaux - Station régionale de la protection des végétaux (National Plant Protection Institute - Regional Plant Protection Station) of Misserghin (Oran)
13) ITGC - Institut des grandes cultures de Sidi Bel Abbès (Institute of Field Crops of Sidi Bel Abbes)
14) INRA de Sidi Bel Abbès - Institut national de la recherche agronomique (National Institute of Agronomic Research)
15) SRPV - Services Régionaux de la Protection des Végétaux (Regional Plant Protection Services)
16) I.T.M.A.S - L'institut de technologie moyen agricole spécialisée de Ain Temouchent (The institute of specialized agricultural middle technology)
17) CDTA - Centre de développement des technologies avancées (Center for Advanced Technology Development)
18) CNA - Chambre National d'Agriculture (National Agricultural Center) Oran
19) INCT - Institut National de Cartographie & de Télédétection (National Institute of Cartography & Remote Sensing)
20) ASAL - Agence Spatiale Algérienne (Algerian Space Agency) - Oran
21) CRAAG - Centre de Recherche en Astronomie, Astrophysique et Géophysique (Research Center in Astronomy, Astrophysics and Geophysics) - Oran

Planned dissemination events

We are planning to organize a seminar on
"Remote sensing and GIS for precision agriculture"
provided that COVID confinement will be canceled.

University enterprise agreements

We have signed an agreement with DSA (Agricultural Services Management of the District of Oran) which is at the core of our proposal of new bachelor curricula in precision agriculture:

https://cupagis.eu/images/downloads/documents/cupplus/Agreement%20DSA.pdf

Thank you for you attention!

Prof. Smain Balaska, Prof. Yahia Lebbah
University Oran1, Algeria
ylebbah@gmail.com
sbalaska@yahoo.com

Co-funded by the
Erasmus+ Programme
of the European Union