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ERASMUS+

HIGHER EDUCATION CAPACITY BUILDING

Erasmus+ Project

New curricula in Precision Agriculture using GIS technologies and sensing data

(CUPAGIS)

COURSES/PROGRAMM DESCRIPTION

Name of the program: Engineer in Precision Agriculture

University: Ecole Nationale Supérieure Agronomique

(ENSA, Algiers)

Program title:	*Computer Programming 1.*	**University:**	*Ecole Nationale Supérieure Agronomique*
Degree:	*Engineer (-Master)*	**Standard period of study:**	*Semester 1*
Web link of the university:	*https://www.ensa.dz/*		
Web link of the program:	*https://www.ensa.dz/category/cupagis/*		
Credit points (ECTS):	*5*	**Teaching language:**	*english/french*
Contact (email):			

Program Description:

E*ducate the students on computer science, algorithm, programming languages (C/C++ and Python).*

Objectives:

Through this course, the student learns about the internals of computers, how computers work, programming concepts, essentials of programming languages, and basic operations of the programming environment for cpp and python . At the end the student will be able to write a program to solve problems.

Prerequisites:

- *Mathematic*
- *English.*

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Program title:	*Mathematics of Machine Learning.*	**University:**	*Ecole Nationale Supérieure Agronomique*
Degree:	*Engineer (-Master)*	**Standard period of study:**	*Semester 1*
Web link of the university:	*https://www.ensa.dz/*		
Web link of the program:	*https://www.ensa.dz/category/cupagis/*		
Credit points (ECTS):	*4*	**Teaching language:**	*English/French*
Contact (email):			

Program Description:

The course is an introduction to the field of linear algebra and the relationship it has with the field of machine learning. The student will study the key structures for preserving and manipulating data in linear algebra in vectors, matrices and tensors. He will also study a series of methods to decompose a matrix into its constituent elements in order to make numerical operations more efficient and more stable.

Objectives:

To acquire or reactivate the essential baggage for the study of Machine Learning algorithms.

To be able to manipulate vectors, Matrices, tensors, EigenValues and EigenVectors.

Prerequisites:

General Mathematics

Program title:	*Soil Properties*	**University:**	*Ecole Nationale Supérieure Agronomique*
Degree:	*Engineer (-Master)*	**Standard period of study:**	*Semester 1*
Web link of the university:	*https://www.ensa.dz/*		
Web link of the program:	*https://www.ensa.dz/category/cupagis/*		
Credit points (ECTS):	*4*	**Teaching language:**	*English/French*
Contact (email):			

Program Description:

This course presents basic concepts of all aspects of soil science including; composition and genesis; physical, chemical, and biological properties. Discussion topics includes: soil genesis, soil forming processes, soil classification and basic soil functions, organic and mineral constituents, soil water system, mechanical properties and bioavailability of nutrients for plant.

Objectives:

- *Competence in the terminology, concepts, and methodologies used in soil science*
- *The skills required to make field observations and interpretations of soils for various uses*

Prerequisites:

Soil Science

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Program title:	*Cropping system*	**University:**	*Ecole Nationale Supérieure Agronomique*
Degree:	*Engineer (-Master)*	**Standard period of study:**	*Semester 1*
Web link of the university:	*https://www.ensa.dz/*		
Web link of the program:	*https://www.ensa.dz/category/cupagis/*		
Credit points (ECTS):	*3*	**Teaching language:**	*English/French*
Contact (email):			

Program Description:

Concept of crop system

The main plant productions

Cereals, Forage crops, The vegetable crops, Perennial crops, Oil-protein crops

Objectives:

- *to model a culture system according to the environment*
- *manage a technical practice on crops*
- *reason a culture and predict yields*
- *maintain crops*
- *harvest in the good time by using best technics*

Prerequisites:

- *Plant biology*
- *Plant physiology*
- *The basics of plant production.*

Program title:	*Applied Electronics*	**University:**	*Ecole Nationale Supérieure Agronomique*
Degree:	*Engineer (-Master)*	**Standard period of study:**	*Semester 1*
Web link of the university:	*https://www.ensa.dz/*		
Web link of the program:	*https://www.ensa.dz/category/cupagis/*		
Credit points (ECTS):	*2*	**Teaching language:**	*English/French*
Contact (email):			

Program Description:

This course covers some aspects of analogue and digital electronics. It is presented in the form of chapters which take up the basic concepts of electronics:

(1) Electric current, law and application, (2) electronic passive and active components (3) the electronic analogue and digital circuits.

Objectives:

- *Manipulate electronic assembly simulation software*
- *Mounting a basics electronic circuit*
- *Be able to identify electronic components in the circuits.*

Prerequisites:

- *The basics of mathematics*
- *The basics of physics*

Program title:	*Solution Design*	**University:**	*Ecole Nationale Supérieure Agronomique*
Degree:	*Engineer (-Master)*	**Standard period of study:**	*Semester 1*
Web link of the university:	*https://www.ensa.dz/*		
Web link of the program:	*https://www.ensa.dz/category/cupagis/*		
Credit points (ECTS):	*4*	**Teaching language:**	*English/French*
Contact (email):			

Program Description:

This course is a thinking toolbox that gives students a hierarchical and systematic overview of a problem. Thus to know how to design good solutions as Problem Solving for Engineers in general application and specific application in precision agriculture ecosystems.

Allows understanding the meaning of a problem in a precision agriculture environment. How to deploy and implement one of a problem solving approach (TRIZ, creative solving problem…).

Objectives:

By the end of this course students will possess a Knowledge and Capacity to design a solution for precision agriculture application.

Prerequisites:

No prior knowledge.

Program title:	*Computer Vision*	**University:**	*Ecole Nationale Supérieure Agronomique*
Degree:	*Engineer (-Master)*	**Standard period of study:**	*Semester 1*
Web link of the university:	*https://www.ensa.dz/*		
Web link of the program:	*https://www.ensa.dz/category/cupagis/*		
Credit points (ECTS):	*5*	**Teaching language:**	*English/French*
Contact (email):			

Program Description:

- *The student will learn theoretical and practical aspects of computer vision with a specific application in precision agriculture context.*
- *They will learn themes about image and image acquisition systems, processing and analysis.*
- *Featuring, Segmentation, Shallow-based handcraft imaging, deep learning imaging.*

Objectives:

Knowledge and ability to utilize or develop a precision agriculture solution.

Prerequisites:

Mathematics, Python, OpenCV, machine learning,

Program title:	*Power and Energy in Agriculture*	**University:**	*Ecole Nationale Supérieure Agronomique*
Degree:	*Engineer (-Master)*	**Standard period of study:**	*Semester 1*
Web link of the university:	*https://www.ensa.dz/*		
Web link of the program:	*https://www.ensa.dz/category/cupagis/*		
Credit points (ECTS):	*1*	**Teaching language:**	*English/French*
Contact (email):			

Program Description:

- *Electric current and powers*
- *Electric energy storage in Precision Agriculture*
- *Electric motors in agriculture and precision Agriculture*
- *Renewable Energy in Agriculture*

Objectives:

- *Identify the electrical energy needs of a farm, a plant or animal production building, as well as the equipment related to precision farming.*
- *Manipulate different energy sources and understand their characteristics.*
- *Be able to understand and maintain a renewable energy installation.*

Prerequisites:

- *The basics of physics*
- *The basics of electricity/electronic*

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Program title:	*Introduction to Precision Agriculture*	**University:**	*Ecole Nationale Supérieure Agronomique*
Degree:	*Engineer (-Master)*	**Standard period of study:**	*Semester 1*
Web link of the university:	*https://www.ensa.dz/*		
Web link of the program:	*https://www.ensa.dz/category/cupagis/*		
Credit points (ECTS):	*1*	**Teaching language:**	*English/French*
Contact (email):			

Program Description:

This course covers information and technologies that are used for precision farming and their applications. In this course we would like to:

- *Identify and understand the key terminology associated with various precision agriculture topics*
- *Describe what precision agriculture is and why it is needed,*
- *Explain principles and applications of the Global Navigation Satellite System (GNSS),*
- *Describe what yield monitoring system is,*
- *Identify current remote sensing technologies,*

Objectives:

- *Identify how precision agriculture can be used to improve the management efficiencies of a specific farm operation,*
- *Understand the ability of precision agriculture to provide value to a farm*

Prerequisites:

- *Agronomic basis*
- *Principles and applications of technologies supporting precision agriculture*

Program title:	*English 1*	**University:**	*Ecole Nationale Supérieure Agronomique*
Degree:	*Engineer (-Master)*	**Standard period of study:**	*Semester 1*
Web link of the university:	*https://www.ensa.dz/*		
Web link of the program:	*https://www.ensa.dz/category/cupagis/*		
Credit points (ECTS):	*1*	**Teaching language:**	*English*
Contact (email):			

Program Description:

This course will take place entirely face-to-face. It will include group activities, collaborative work and a range of activities aimed at developing comprehension activities and production activities.

The students will have an understanding of the foundations of morphology and syntax as applied. They will have an appreciation of the difference between categories and functions, constituency, a number of grammatical categories, main and subordinate clauses, voice, the notions of word, morpheme, affix and root, derivation, inflection and compounding.

Objectives:

to train students to read, write and speak in English. The course introduces students to the meaning and structure of English words and to structural and functional properties of English sentences. Skills must be able to assimilate a conference in English and also be able to present an idea during a work session.

Prerequisites:

The basics of English grammar and basic vocabulary

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Program title:	*Computer Programming 2*	**University:**	*Ecole Nationale Supérieure Agronomique*
Degree:	*Engineer (-Master)*	**Standard period of study:**	*Semester 2*
Web link of the university:	*https://www.ensa.dz/*		
Web link of the program:	*https://www.ensa.dz/category/cupagis/*		
Credit points (ECTS):	*6*	**Teaching language:**	*English*
Contact (email):			

Program Description:

- *Package for scientific computing in Python 3.*
- *Data and computation in Python 3*
- *Image processing in Python 3*
- *Machine learning in Python 3*
- *OpenCV*

Objectives:

Become able to write a program in python and or in Cpp to solve problems in computer vision and machine learning.

Prerequisites:

- *Mathematic*
- *C/C++*
- *Python*
- *Machine learning*
- *English.*

Program title:	*Data analysis and decision making*	**University:**	*Ecole Nationale Supérieure Agronomique*
Degree:	*Engineer (-Master)*	**Standard period of study:**	*Semester 2*
Web link of the university:	*https://www.ensa.dz/*		
Web link of the program:	*https://www.ensa.dz/category/cupagis/*		
Credit points (ECTS):	*4*	**Teaching language:**	*English/French*
Contact (email):			

Program Description:

- *Exploratory data analysis*
- *Probability and decision-making under uncertainty*
- *Statistical inference*
- *Regression analysis and time series*
- *Optimisation, simulation and modeling*

Objectives:

- *Understand the data and have a clear concept of the decision-making process.*
- *Discover basic methods of data analysis, as well as their deployments for building effective decision support systems.*
- *Select the most appropriate statistical data analysis methods.*
- *Apply the skills acquired through agricultural case studies.*

Prerequisites:

Mathematics

Program title:	*Farm Machinery and Agro-equipment*	**University:**	*Ecole Nationale Supérieure Agronomique*
Degree:	*Engineer (-Master)*	**Standard period of study:**	*Semester 2*
Web link of the university:	*https://www.ensa.dz/*		
Web link of the program:	*https://www.ensa.dz/category/cupagis/*		
Credit points (ECTS):	*2*	**Teaching language:**	*English/French*
Contact (email):			

Program Description:

- *Farm Mechanization*
- *Tillage Equipment*
- *Sowing and planting machines*
- *Harvesting / post-harvest*

Objectives:

- *Adapt farm machines and equipments for precision agriculture*
- *Recognize machines and equipment used in farm*

Prerequisites:

- *The basics of physics*
- *The basics of mathematics*

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Program title:	*Geographic Information System (GIS)*	**University:**	*Ecole Nationale Supérieure Agronomique*
Degree:	*Engineer (-Master)*	**Standard period of study:**	*Semester 2*
Web link of the university:	*https://www.ensa.dz/*		
Web link of the program:	*https://www.ensa.dz/category/cupagis/*		
Credit points (ECTS):	*4*	**Teaching language:**	*English/French*
Contact (email):			

Program Description:

This course provides an overview of the theory and application of geographic information systems (GIS). It is intended to expose students to free and open source GIS desktop applications (primarily QGIS). This course is organized in two parts presenting the theoretical and practical foundations of the geographic information system. The student will quickly acquire the basic knowledge required to create spatial databases and produce high-quality maps and cartographic representations.

Objectives:

- *Understand the basic principles of modern spatial data and structures.*
- *Will understand the importance of scale, projection, and coordinate systems in GIS*
- *Will understand vector and raster data structures and the appropriate use of each of these data structures*
- *Will understand the basics of data capture, storage, analysis, and output in a GIS.*
- *Discuss the value and applications of GIS in the field of agriculture.*

Prerequisites:

- *Very good practice of basic IT tools (Windows and office tools)*
- *Basic computer skills.*

Program title:	*Introduction to Machine Design 1*	**University:**	*Ecole Nationale Supérieure Agronomique*
Degree:	*Engineer (-Master)*	**Standard period of study:**	*Semester 2*
Web link of the university:	*https://www.ensa.dz/*		
Web link of the program:	*https://www.ensa.dz/category/cupagis/*		
Credit points (ECTS):	*2*	**Teaching language:**	*English/French*
Contact (email):			

Program Description:

- *General concepts of mechanical engineering technology.*
- *Basics of the mechanical design methodology.*
- *CAD and prototyping.*

Objectives:

- *Easily draw and model parts*
- *Simulate with software the operation of a mechanism*
- *Create prototypes (3D printing, etc.)*

Prerequisites:

- *Use of computer*
- *Mathematic*

Program title:	*Sensors and Measurements*	**University:**	*Ecole Nationale Supérieure Agronomique*
Degree:	*Engineer (-Master)*	**Standard period of study:**	*Semester 2*
Web link of the university:	*https://www.ensa.dz/*		
Web link of the program:	*https://www.ensa.dz/category/cupagis/*		
Credit points (ECTS):	*5*	**Teaching language:**	*English/French*
Contact (email):			

Program Description:

- *Introduce a concept of measurement, what is sensors, transducers, and actuators.*
- *Introduces the concepts of measurand, true value, measured value, error, and measurement uncertainty.*
- *Locate different types of sensors and Transducers used in real life applications and paraphrase their importance.*
- *Explain working principles of Actuators.*
- *Understanding of Sensor Interfacing with embedded systems.*

Objectives:

Be able to use any type of measuring device and to know how to identify the parameters and characteristics of measurement.

Recognize all types of sensors, transducers, actuators and know where and how to use them.

Prerequisites:

- *The basics of electricity*
- *The basics of electronic*
- The basics of physics

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Program title:	*Machine Learning*	**University:**	*Ecole Nationale Supérieure Agronomique*
Degree:	*Engineer (-Master)*	**Standard period of study:**	*Semester 2*
Web link of the university:	*https://www.ensa.dz/*		
Web link of the program:	*https://www.ensa.dz/category/cupagis/*		
Credit points (ECTS):	*4*	**Teaching language:**	*English/French*
Contact (email):			

Program Description:

This module provides a more practical approach by explaining the concepts of machine learning algorithms and describing the areas of application for each algorithm, using simple practical examples to demonstrate each algorithm and showing how different issues related to these algorithms are applied. At the end, the student will be able to apply the appropriate algorithms to solve problems.

Objectives:

Apply Models of Machine Learning algorithms in precision agriculture.

Prerequisites:

-Mathematic of Machine learning

-Python and/or Cpp

Program title:	*Soil-Plant-Atmosphere Continuum (SPAC)*	**University:**	*Ecole Nationale Supérieure Agronomique*
Degree:	*Engineer (-Master)*	**Standard period of study:**	*Semester 2*
Web link of the university:	*https://www.ensa.dz/*		
Web link of the program:	*https://www.ensa.dz/category/cupagis/*		
Credit points (ECTS):	*1*	**Teaching language:**	*English/French*
Contact (email):			

Program Description:

- *Soil-Plant-Atmosphere-continuum (SPAC)*
- *Measurement of water transfers in unsaturated environments*
- *Calculation of the consumption of a crop (ETR) by the in situ water balance method*
- *The agronomic efficiency of water*

Objectives:

At the end of the course, the student will be able to:

- *Know that all soil, plant and climate data are variables, the content of this module is to quantify the flux levels at all times in the SPAC.*
- *Uunderstand Water movement through the SPAC as driven by the passive movement of water generated by an energy gradient. The energy gradient is created by a difference in water potential from high potential in the soil, to a gradually lower potential in the plant and the atmosphere.*

Prerequisites:

- *Soil and plant knowledge*
- *Water fluxes Possess*

Program title:	*Economics of Innovation and Project Management*	**University:**	*Ecole Nationale Supérieure Agronomique*
Degree:	*Engineer (-Master)*	**Standard period of study:**	*Semester 2*
Web link of the university:	*https://www.ensa.dz/*		
Web link of the program:	*https://www.ensa.dz/category/cupagis/*		
Credit points (ECTS):	*1*	**Teaching language:**	*English/French*
Contact (email):			

Program Description:

- *Sustainable development*
- *Productive potential of agriculture and technological change and innovations*
- *Methodologies for economic analyzes*
- *Project monitoring*
- *Economic evaluation*

Objectives:

-At the end of this course, students will improve their knowledge of the theoretical and practical aspects of innovation economics applied to agricultural production systems with particular attention to technological change and precision agriculture.

-They will learn to use their acquired fundamental skills and knowledge to implement and ensure the dissemination and use of precision agriculture technologies in farm-scale investment projects and segments of agricultural value chains.

Prerequisites:

No prior knowledge.

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Program title:	*English 2*	**University:**	*Ecole Nationale Supérieure Agronomique*
Degree:	*Engineer (-Master)*	**Standard period of study:**	*Semester 2*
Web link of the university:	*https://www.ensa.dz/*		
Web link of the program:	*https://www.ensa.dz/category/cupagis/*		
Credit points (ECTS):	*1*	**Teaching language:**	*English/French*
Contact (email):			

Program Description:

This module, as a follow up to module English 1, allows students to revise and develop basic grammatical and syntactic structures, while doing reading comprehension exercises, listening to oral and written expression exercises and the systematic study and practice of basic and technical vocabulary related to the targeted level of proficiency. This will also help students to express themselves clearly in writing and/or orally using precise and adapted vocabulary, and also to structure their thinking, give their opinion and argue.

Objectives:

- Collecting and transmitting information, in an English context

- Explain and comment (in writing and orally) on documents falling within the scope of its activities

- Negotiate, argue and defend opinions

- Structuring one's thoughts and expressing oneself in writing and orally using professional vocabulary adapted to the different interlocutors

Prerequisites:

English 1

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Program title:	*Tractor and Automotive Engines*	**University:**	*Ecole Nationale Supérieure Agronomique*
Degree:	*Engineer (-Master)*	**Standard period of study:**	*Semester 3*
Web link of the university:	*https://www.ensa.dz/*		
Web link of the program:	*https://www.ensa.dz/category/cupagis/*		
Credit points (ECTS):	*4*	**Teaching language:**	*English/French*
Contact (email):			

Program Description:

- *Tractor components*
- *Traction theory*
- *Equations of traction*
- *Tire and soil interaction*
- *Tractor guidance*

Objectives:

- *Predict the pulling force*
- *Predict energy consumption*
- *Predict the tractor performance during field operations*

Prerequisites:

- *The basics of physics*
- *The basics of mathematics*

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Program title:	*Crop Models*	**University:**	*Ecole Nationale Supérieure Agronomique*
Degree:	*Engineer (-Master)*	**Standard period of study:**	*Semester 3*
Web link of the university:	*https://www.ensa.dz/*		
Web link of the program:	*https://www.ensa.dz/category/cupagis/*		
Credit points (ECTS):	*2*	**Teaching language:**	*English/French*
Contact (email):			

Program Description:

The goal of this course is to familiarize students with a comprehensive computer model for the simulation of process-based crop growth and yield, soil and plant water, nutrients and their application to real world problems.

This course will also introduce students to the idea of models as used in crop and soil research. The emphasis will be on applying simple models and the methods for evaluating their effectiveness.

Objectives:

- *Get hands on practice on Crop Simulation Model AquaCrop.*
- *To assess dynamics of crop growth and yield under various production options.*

Prerequisites:

Background in soil, water and crop or plant sciences

Be familiar with personal computers and the Windows operating environment.

Program title:	*Remote Sensing (RS)*	**University:**	*Ecole Nationale Supérieure Agronomique*
Degree:	*Engineer (-Master)*	**Standard period of study:**	*Semester 3*
Web link of the university:	*https://www.ensa.dz/*		
Web link of the program:	*https://www.ensa.dz/category/cupagis/*		
Credit points (ECTS):	*4*	**Teaching language:**	*English/French*
Contact (email):			

Program Description:

- *Concepts and foundations of remote sensing*
- *Platform and Sensor system*
- *Earth Resource Satellites Operating in the Optical Spectrum*
- *Image Processing and Analysis*
- *Remote Sensing Applications*

Objectives:

The primary objective of this course is to provide students with the conceptual foundations and the technical skills to apply remote sensing for problem solving in agriculture and environmental domains. Develop some practical, hands-on skills for processing, analysis, display, and discussion of remote sensing data.

Prerequisites:

Good working knowledge of the principles and elements of GIS.

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Program title:	*Smart Irrigation*	**University:**	*Ecole Nationale Supérieure Agronomique*
Degree:	*Engineer (-Master)*	**Standard period of study:**	*Semester 3*
Web link of the university:	*https://www.ensa.dz/*		
Web link of the program:	*https://www.ensa.dz/category/cupagis/*		
Credit points (ECTS):	*4*	**Teaching language:**	*English/French*
Contact (email):			

Program Description:

- *Definition, purpose, and history of irrigation*
- *Irrigation methods*
- *Smart Irrigation Technology*

Objectives:

- *Continuously monitoring the status of soil through sensors and provide signal for taking necessary action*
- *To observe parameters for better yield.*

Prerequisites:

Knowledge of hydraulics, Water Resources Engineering and agronomy

Program title:	*Introduction to Machine Design 2*	**University:**	*Ecole Nationale Supérieure Agronomique*
Degree:	*Engineer (-Master)*	**Standard period of study:**	*Semester 3*
Web link of the university:	*https://www.ensa.dz/*		
Web link of the program:	*https://www.ensa.dz/category/cupagis/*		
Credit points (ECTS):	*4*	**Teaching language:**	*English/French*
Contact (email):			

Program Description:

- *Stress, Strain and Stiffness*
- *Machine components and parts*
- *Structure of a mechanism*

Objectives:

- *To identify, after a small analysis, the operating principle of an agricultural machine*
- *Recognize the different sensitive points of a machine (wear, high stress, etc.)*

Prerequisites:

- *Basics in Physics*
- *Basics in Mathematics*
- *CAD software*
- *Mechanical basics*
- *Machine parts, technical drawing and material sciences*

Program title:	*Control and Embedded System*	**University:**	*Ecole Nationale Supérieure Agronomique*
Degree:	*Engineer (-Master)*	**Standard period of study:**	*Semester 3*
Web link of the university:	*https://www.ensa.dz/*		
Web link of the program:	*https://www.ensa.dz/category/cupagis/*		
Credit points (ECTS):	*4*	**Teaching language:**	*English/French*
Contact (email):			

Program Description:

- *Boolean algebra*
- *Combinational logic*
- *Sequential logic*
- *Programmable logic*
- *Programmable cards*

Objectives:

Understand how a programmable card works, and be able to program it.

Know how to use programmable cards to find a solution to a problem in precision farming.

Prerequisites:

- *Base of set theory*
- *Cpp programing language*
- *Python programing language*
- *Base of Electricity*
- *Base of Electronic*

Program title:	*Machine Learning in precision agriculture*	**University:**	*Ecole Nationale Supérieure Agronomique*
Degree:	*Engineer (-Master)*	**Standard period of study:**	*Semester 3*
Web link of the university:	*https://www.ensa.dz/*		
Web link of the program:	*https://www.ensa.dz/category/cupagis/*		
Credit points (ECTS):	*4*	**Teaching language:**	*English/French*
Contact (email):			

Program Description:

- *Soil management (Models and algorithms)*
- *Water Management (Models and algorithms)*
- *Crop management (Models and algorithms)*

Objectives:

- *Write application uses models and algorithms of ML for PA*
- *Resolve problems of PA using ML*

Prerequisites:

- *Basic Mathematics and Calculus*
- *Mathematics of Machine Learning 1*
- *Machine learning*
- *Algorithms*
- *Python and/or Cpp*
- *OpenCV*

Program title:	*UAV's and agriculture*	**University:**	*Ecole Nationale Supérieure Agronomique*
Degree:	*Engineer (-Master)*	**Standard period of study:**	*Semester 3*
Web link of the university:	*https://www.ensa.dz/*		
Web link of the program:	*https://www.ensa.dz/category/cupagis/*		
Credit points (ECTS):	*1*	**Teaching language:**	*English/French*
Contact (email):			

Program Description:

- *Drone concepts, terminology and vocabulary;*
- *The steps for drone design;*
- *The process for drone fabrication;*
- *The technology to transmit and receive data;*
- *Safety and Regulations*

Objectives:

Understand and identify business opportunities with the use of drone technology;

Describe the process for drone fabrication;

Identify examples of related real-world applications of drones;

Prerequisites:

Bases of physic

Program title:	*Scientific writing and Communication*	**University:**	*Ecole Nationale Supérieure Agronomique*
Degree:	*Engineer (-Master)*	**Standard period of study:**	*Semester 3*
Web link of the university:	*https://www.ensa.dz/*		
Web link of the program:	*https://www.ensa.dz/category/cupagis/*		
Credit points (ECTS):	*1*	**Teaching language:**	*English/French*
Contact (email):			

Program Description:

- *The global goal of this course is to learn how research is being done, and to put that knowledge into practice.*
- *Develop a research orientation among the scholars and to acquaint them with fundamentals of research methods.*

Objectives:

- *To build of scientific project;*
- *Perform literature reviews and reference relevant scientific literature*
- *To develop of tools for managing literature review and scientific project ;*
- *To evaluate of various designs*
- *Writing Research Report*

Prerequisites:

none

Program title:	*Entrepreneurship*	**University:**	*Ecole Nationale Supérieure Agronomique*
Degree:	*Engineer (-Master)*	**Standard period of study:**	*Semester 3*
Web link of the university:	*https://www.ensa.dz/*		
Web link of the program:	*https://www.ensa.dz/category/cupagis/*		
Credit points (ECTS):	*2*	**Teaching language:**	*English/French*
Contact (email):			

Program Description:

- *The students will learn theoretical and practical aspects of entrepreneurship with a specific application in precision agriculture context.*
- *They will learn how to use their skills and fundamental knowledge to simulate business or to build one.*

Objectives:

-Tray a Business plan and managing a project under company

-Knowledge and capacity to use or to develop an entrepreneurial posture.

Prerequisites:

Do not need