UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Scienze Agrarie, Alimentari e Forestali
ACADEMIC YEAR	2017/2018
MASTER'S DEGREE (MSC)	AGRICULTURAL SCIENCES AND TECHNOLOGIES
SUBJECT	MACHINES AND EQUIPMENT FOR AGRICULTURE
TYPE OF EDUCATIONAL ACTIVITY	C
AMBIT	21005-Attività formative affini o integrative
CODE	12638
SCIENTIFIC SECTOR(S)	AGR/09
HEAD PROFESSOR(S)	COMPARETTI ANTONIO Professore Associato Univ. di PALERMO
OTHER PROFESSOR(S)	
CREDITS	6
INDIVIDUAL STUDY (Hrs)	90
COURSE ACTIVITY (Hrs)	60
PROPAEDEUTICAL SUBJECTS	
MUTUALIZATION	
YEAR	2
TERM (SEMESTER)	2° semester
ATTENDANCE	Not mandatory
EVALUATION	Out of 30
TEACHER OFFICE HOURS	**COMPARETTI ANTONIO** Wednesday 11:00 13:00 Dipartimento Scienze Agrarie, Alimentari e Forestali, Edificio 4, Ingresso L, Ufficio n. 137

PREREQUISITES	Vectorial and scalar quantities. Concepts of mass, force, torque, work, energy and power.
LEARNING OUTCOMES	Knowledge and understanding capacity Knowledge and understanding of the technical and working characteristics of machines and plants for agriculture, as well as their use methods. Acquisition of the basic technical and scientific knowledge about machines and plants for agriculture, as well as the technical and economic criteria for selecting different types of those offered by the market. Knowledge and capacity of using the language specific of machines and plants for agriculture. Capacity of applying knowledge and understanding Capacity of applying the acquired knowledge to the identification of the optimal solutions for environmentally sustainable and effective interventions in precision agriculture. Capacity of indipendently selecting the machines and plants for agriculture and activities of technical support in this sector. Opinion autonomy To obtain the capacity of finding data and identifying survey methods, in order to define solutions to the technical problems of precision agriculture. To obtain the capacity of critically assessing the issues and results of the planned interventions. To identify the problems and the related solutions aimed at reducing the used amounts of crop inputs and, therefore, the environmental impact and crop production costs, in order to improve the environmental sustainability and efficiency, respectively, in agricultural farms. To be able to assess the problems of selection and the costs for buying machines and plants for agriculture, as well as their management costs, reliability and working safety. Communication skills Capacity of converting the technical and scientific language of the student in a didactic speech and, then, communicating with technicians of the same and different background, as well as describing the technical and working characteristics of machines and plants for agriculture and their use methods, in order to improve their efficiency and working capacity. To effectively communicate the theories and choices of the student to a not specialist audience, by transmitting the importance of the proposed choices. Capacity of converting the choices of the student in project papers. Capacity of explaining the types, characteristics, main parts, working, performance and management of machines and plants for agriculture, as well as their basic principles of evaluation and selection, also to an inexpert audience. Learning capacity Capacity of updating through the participation to technical and scientific seminars and/or the reading of scientific papers specific of this subject. Capacity of attending in-depth courses and specialised seminars, by using the knowledge obtained within the subject. Capacity of understanding the machines and plants for agriculture, as well as the newly acquired techniques and methods, developed in research fields.
ASSESSMENT METHODS	The exam candidate will have to answer to four oral questions, in agreement with the suggested references, about all the parts of the course contents: 1) exercise on basic physical quantities and practical aspects of measurements; 2) machines or energy supply for the activation of machines and plants or systems, techniques, services, sensors, methods and software for the implementation of precision agriculture; 3) types and criteria for selecting electric engines or pumps; 4) machines and plants of dairy industry or mills and pasta factories or breweries or oil mills or Citrus industry. The final test is aimed at assessing if the student has knowledge and understanding of the topics, as well as has obtained interpretative competence and opinion autonomy of real cases. The threshold of pass mark will be achieved when the student shows at least general knowledge and understanding of the topics and minimum practical competences (basic physical quantities and practical aspects of measurements, machines, plants for food processing), as far as the solution of real issues. He will have to show also explanatory and arguing capacities, in order to allow the transmission of his knowledge to the examiner. Below this threshold the exam result will be fail. Instead, the more the exam candidate succeeds in interacting with the examiner, by using his explanatory and arguing capacities, as well as the more his knowledge and practical capacities are concerned in detail with the subject of test, the more the assessment will be positive. The assessment is carried out according to a scale ranging from 18 to 30 with honours.
EDUCATIONAL OBJECTIVES	The education objectives of the subject are : - basic technical and scientific knowledge about the machines and plants for agriculture, as well as the technical and economic criteria for selecting different types of those offered by the market; - competences about the types, characteristics, main parts, working,

	performance and management of machines and plants for agriculture, as well as their basic principles of evaluation and selection.
TEACHING METHODS	Lectures, exercises and technical visits.
SUGGESTED BIBLIOGRAPHY	Materiale didattico fornito dal docente sotto forma di presentazioni di MS PowerPoint, pubblicazioni e dispense. MS PowerPoint presentations, papers and lecture notes given by the teacher.

SYLLABUS

Hrs	Frontal teaching
1	Introduction to the course.
2	Basic physical quantities and practical aspects of measurements.
2	References to mechanics and basic thermodynamics.
6	Machines.
3	Energy supply for the activation of machines and plants.
10	Systems, techniques, services, sensors, methods and software for the implementation of precision agriculture.
3	Issues about the selection of machines and plants for food processing.
1	Reliability, working safety and layouts of plants for food processing.
4	Types and criteria for selecting electric engines.
3	Types and criteria for selecting pumps.
2	Machines and plants of dairy industry.
2	Machines of mills and pasta factories.
2	Machines of breweries.
1	Machines of oil mills.
1	Machines of Citrus industry.
2	Plants for producing biogas and digestate from food industry by-products.

Hrs	Practice
3	Basic physical quantities and practical aspects of measurements.
1	References to mechanics and basic thermodynamics.
1	Low cost hand-held GPS mobile receiver.

Hrs	Others
4	Machines and plants of dairy industry (technical visits).
2	Machines of mills and pasta factories (technical visits).
2	Machines of breweries (technical visits).
2	Machines of Citrus industry (technical visits).