UNIVERSITÀ DEGLI STUDI DI BARI ALDO MORO

CORSO DI LAUREA IN TECNICHE PER L'AGRICOLTURA SOSTENIBILE (Classe L-P02)

Fundamental of General information	
Academic subject	Applied thermodynamics, energetics and heat transfer (Integrated couse of System in Agri-food Industry)
Degree course	Sustainable Agriculture
Academic year	I year
European Credit Transfer and Accumulation System (ECTS)	3 ECTS
SSD	AGR/09
Language	Italian
Academic calendar	II semester
Attendance	Recommended attendance

Professor / Lecturer	
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Department and adress	Dipartimento di Scienze agro-alimentari e territoriali (DISAAT) – First floor – Room n. 23
Virtual headquarters	Codice Teams: 2rolaf7
Tutoring (time and day)	By appointment set by e-mail

Syllabus	
Learning objectives	The course provides the basis for the knowledge of applied thermodynamics, energetics and heat transfer for agri-food thermical plant operation
Course prerequisites	Knowledge of: Physics and Calculus
Contents	Basis of physics. Heat exchanges in the food industry, deepening radiation transmission. Mass and energy exchanges in drying food: - Hygrometry; - Thermohygrometric applications on sausage and cheese factory; - Balance of matter and energy in drying plants
Books and bibliography	Lecture Notes and tables distributed during the course.
Additional materials	Supplementary Supplements (periodically updated) are enclosed with a bibliography in which specific publications and other texts are recalled to deepen each topic.

Work schedule			
Hours			
Total	Lecture	Hands on (laboratory, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
75	16	14	45
CFU/ETCS			
3	2	1	

Teaching strategy	
	Blended learning: the topics of the course will be treated with the help of Power Point presentations and practical exercises.

Expected learning outcomes	
Knowledge and understanding on	• Mastery in the design, management and logistics of mass and energy exchanges in the food industry; • Knowledge of the issues related to the environmental impact of mass and energy exchanges.
Applying knowledge and understanding on	• Ability to carry out basic design and application of the design solutions; • Ability in defining layouts for mass and energy exchange in food processes, also based on the possibilities of energy recovery and the need to minimize the environmental impact.
Soft skills	• *Making informed judgements and choices* ○ Ability to correctly carry out the research for mechanical and plant solutions that are correct to change the characteristics and quality of foodstuffs; ○ Ability to correctly guide the choice of suitable technical solutions to monitor mass and energy exchanges in food processes; ○ Ability to evaluate technical and plant choices related to the environmental sustainability of primary productions; • *Communicating knowledge and understanding* ○ Ability to establish a professional dialogue with other professionals and operators in the industry, concerning to the definition of mass and energy flows, the layouts definition, and the testing of the studied plants; • *Capacities to continue learning* ○ Ability to develop and update knowledge of mass and energy exchanges in food processes.

Assessment and feedback	
Methods of assessment	As per Didactic Regulations of the TAS Degree Course and in the study plan (Annex A), an exemption test is required for students enrolled in the year in which the course is held. The exemption is carried out by conducting an oral test on the topics covered in class up to the date of administration of the exemption. The outcome of this test contributes to the evaluation of the final exam, which takes place on the remaining parts of the program not included in the exemption test, and is valid for one academic year. For students who do not take the exemption, the exam consists of an oral test on topics covered both during class hours and during exercises carried out in the laboratory. As detailed in Annex A of the Degree Course Academic Regulations, both the evaluation of the learners who take the exemption and the final exam and that relating to the oral exam in a single solution take place by expressing a mark out of thirty.

	Non-Italian students may be examined in English language, according to the aforesaid procedures.

Evaluation criteria	• *Knowledge and understanding*
	  ○ Description of mass and energy exchanges in plants studied during the course;
	  ○ Determination of operation, components, and working of the energy processes studied during the course;
	  ○ Description of operation of thermodynamic systems studied during the course;
	  ○ Description of layouts studied during the course.
	• *Applying knowledge and understanding*
	  ○ Making of mass and energy balances using the methods used in theoretical-practical lessons and exercises;
	  ○ Definition of criteria for choice of thermodynamic systems and layouts according to examples presented as case studies.
	• *Making informed judgements and choices*
	  ○ Proposals of changes in the thermodynamic systems based on the quantitative, qualitative and ecological requirements of the processes studied.
	• *Communicating knowledge and understanding*
	  ○ Ability to develop relationships and professional collaborations.
	• *Capacities to continue learning*
	  ○ Ability to extend the acquired knowledge to untreated mass and heat exchanges food processes.

Criteria for assessment and attribution of the final mark	The expected learning outcomes, in terms of knowledge and skills, are listed in Annex A of the Didactic Regulations of the Course Study (expressed through the European Degree Descriptors)

Additional information	