UNIVERSITATEA DE ŞTIINŢE AGRICOLE ŞI MEDICINĂ VETERINARĂ CLUJ-NAPOCA
Calea Mănăştur 3-5, 400372, Cluj-Napoca
Tel: 0264-596.384, Fax: 0264-593.792
www.usamvcluj.ro

No._____of_____ **USAMV form -** CN-0702020216 **(discipline code)**

SUBJECTIVE OUTLINE

1. Information on the programme

1.1 Higher education institution	University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca
1.2. Faculty	Food Science and Technology
1.3. Department	Food Science
1.4. Field of study	Food Engineering
1.5. Education level	Bachelor
1.6.Specialization/Study programme	**CEPA**
1.7. Form of education	Full time

2. Discipline data

2.1. Name of the discipline	ELEMENTS OF ELECTRICAL ENGINEERING							
2.2. Course coordonator				Lect. eng. PhD. Adriana-Pula DAVID				
2.3. Seminar/laboratory/project leader				Lect. eng. PhD. Adriana-Pula DAVID				
2.4. Year of study	**II**	**2.5. Semester**	**IV**	**2.6. Evoluation type**	**Summative**	**2.7. Discipline status**	**Content[2]** / **Compulsoriness**	**DD** / **D)**

3. Total estimated time (hours per semester of teaching activities)

3.1. Hours per week – full time programme	2	**out of which: 3.2. lecture**	2	**3.3. seminar/ laboratory/ project**	1
3.4.Total number of hours in the curriculum	28	**out of which: 3.5. lecture**	14	**3.6.seminar/laboratory**	14
Distribution of the time allotted					**hours**
3.4.1. Study based on books, textbooks, bibliography and notes					23
3.4.2. Additional documentation in the library, electronic platforms and field experiences					12
3.4.3. Preparing seminars/ laboratories/ projects, subjects, reports, portfolios and essays					10
3.4.4. Tutorials					4
3.4.5. Examinations					18
3.4.6. Other activities					
3.7. Total hours of individual study	31				
3.8. Total hours per semester	90				
3.9. Number of credits[4]	3				

4. Precondiţii (acolo unde este cazul)

4.1. curriculum-related	Mathematics, Biophysics
4.2. skills-related	The student must have knowledge about physical states and phenomena

5. Conditions (if applicable)

5.1. for the course	Classroom equipped with projection system; internet connection The course is interactive, being supported with the help of the video projector through ppt and video presentations. Students can ask questions about the content of the presentation. The university discipline requires the observance of the start and end time of the course. No other activities are tolerated during the lecture, mobile phones should be closed.
5.2. for the seminar/ laboratory/ project	Laboratory equipment: sectioned devices, operating devices, electrician's kit, assemblies, multimeters, models At the practical works it is mandatory to consult the guide of practical works / documentation sheets, each student will carry out an individual activity with the laboratory materials provided. Academic discipline is required throughout the development of practical work

In the case of online teaching, the teaching methods are adapted to the conditions and online platforms used

6. Cumulated specific competences

Professional competences	C1.1. Describe and use the concepts, theories and methods underlying the use of electricity in the food industry C1.3.Apply the basic principles and methods of Electrical Engineering and Applied Electronics in the food industry to solve engineering and technological problems 2-3. To apply the specific principles and methods for solving the technological problems that appear in food processing
Transversal competences	CT2 Aplicarea tehnicilor de interrelationare in cadrul unei echipe; amplificarea si cizelarea capacitatilor empatice de comunicare interpersonala si de asumare a unor atributii specifice in desfasurarea activitatii de grup in vederea tratarii/ rezolvarii de conflicte individuale/ de grup, precum si gestionarea optima a timpului atat in cadrul activitatilor individuale cat si a celor in grup.

7. Discipline objectives (based on the cumulated specific competences)

7.1. General objective	To acquire knowledge regarding technical systems and methods of using electrical devices in the food industry.
7.2. Specific objectives	Knowledge of the general notions regarding the principles underlying the production of electricity, basic principles in the operation of electric machines, methods of automation of processes in the food industry Study of the effects of electricity use and the effects of electricity on food quality

8. Content

8.1.COURS	**Teaching method**	**Observation**
Electrostatic: electric charge, electric dipole, Coulomb's law, capacitors Electrokinetics: electric current, Ohm's law, resistors, thermal effect of electric current, gaivan elements, electric current in semiconductors, vacuum, gas and electrolytes Kirchhoff's theorems	Lecture; explication; problem solving; case study; conversation	1 Lecture 1 Lecture

Introduction to semiconductors: atom structure; semiconductors, conductors and insulators; semiconductor conduction; n-type and p-type semiconductors; pn junction; polarization of the pn junction; the current-voltage characteristics of the pn junction. Diode; Practical applications of diodes: monoalternating rectifiers. Alternating double recovery; Power supplies; voltage converters. Transistors. Transistor structure, operating principle, characteristics and parameters, collector current characteristics. The function of amplifying and switching the transistor Applications of electricity and semiconductor devices in the food industry		1 Lecture 1Lecture 1 Lecture 1 Lecture 1 Lecture

8.2. PRACTICAL WORK **Namber of hours – 14**		
General rules of protection against electric shock and the measurement of the electrical resistance of the body	Study constructive functional	1 laboratory work
Study of circuit devices: potentiometric resistors, semiconductors, capacitors and galvanic éléments	Case Study	1 laboratory work
Semiconductor. Semiconductor devices.		1 laboratory work
Thyristor testing		1 laboratory work
Construction and operation of electric motors		1 laboratory work
Reading electrical diagrams		1 laboratory work
Colloquium		1 laboratory work

Compulsory bibliography:

1. Costin Ștefănescu Nicolae Cupcea - ELECTRONICĂ APLICATĂ –Bucuresti, 2000
2. *Livia Naghiu, şi colab.,(2001)Utilizarea energiei electrice în industria laimentară, Ed. RisoPrint*
3. *LIVIA NAGHIU, ILIE SUĂRĂŞAN, (2011), Electrotehnică aplicată în industria alimentară, Ed. RisoPrint*

Optional bibliography:

1. *P. Cristea, M. Preda, F. Manea* (2008)- Bazele electronicii, Editura Matrixrom, Bucuresti.
2. *N. Bogoevici, (1979) Electrotehnică şi măsurări electrice, Editura Ditactică şi Pedagogică, Bucureşti*

9. Corroborating the discipline content with the expectations of the epistemic community representatives, of the professional associations and of the relevant employers in the corresponding field

• Knowledge by students of all important aspects presented in the practical works, project and course;
• Mastering good craftsmanship and fully understanding the importance of knowing this discipline,
• Achieving the teaching objective with interdisciplinary implications, ie understanding and placing Electrotechnics and electronics applied in the food industry and other related disciplines in the practical aspects of the chosen profession,
• Involvement of students in the activity and discussions as numerous as possible on the theoretical and pre-practical aspects presented

10. Evaluation

Type of activity	10.1. Evaluation criteria	10.2. Evaluation type	10.3. Percentage of the final grade
10.4. Course	Logical, correct and coherent application of the acquired notions	Written exam (Evaluation of the answers given to the subjects on the exam ticket)	70%

10.5. Seminar/Laboratory	Ability to perform analyzes and interpret the results obtained.	Final oral colloquium (Test of practical evaluation of the acquired professional competences)	30%
10.6. Standard minim de performanță			
• Description of a specific process, including the argumentation of the methods, techniques, procedures and apparatus or equipment and installations used. • Elaboration of a team solution for the most efficient use of electrical devices and the effects of use			

1 Cycle of studies - choose one of the three options: Bachelor/Master/Ph.D.
2 Discipline regim (content) – for the license level one of the variants is chosen / DF (fundamental discipline), DD (discipline in the field), DS (specilalized discipline), DC (complementary discipline)
3 Regime of the discipline (compulsory) – choose on of the variants – DI (compulsory discipline) DO (optional discipline) DFac (optional discipline)
4 One credit is equivalent to 25-30 hourse of study (teaching activities and individual study)

Filled in on
06.09.2021

Course coordinator
Lect. PhD. eng. Adriana-Paula DAVID

Laboratory work/seminar coordinator
Lect. PhD. eng. Adriana-Paula DAVID

Subject coordinator

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Approved by the
Department on
22.09.2021

Head of the Department
Prof. PhD. Ramona SUHAROSCHI

Approved by the Faculty
Council on
28.09.2021

Dean
Prof. PhD. Elena MUDURA