SYLLABUS [1]

1. Information about the program

1.1 Higher education institution	Politehnica University Timisoara
1.2 Faculty[2]/ Department [3]	Civil Engineering Faculty / Civil Constructions and Installations Department
1.3 Chair	—
1.4 Field of study (name/code[4])	Civil Engineering / 20
1.5 Study cycle	License
1.6 Study program (name/code/qualification)	Civil Engineering / 80 / Civil Engineer

2. Information about the discipline

2.1 Name of discipline/ formative category[5]			Electrical Engineering Fundamentals and Introduction in Thermodynamics / DF				
2.2 Coordinator (holder) of course activities			Assoc. Prof. PhD. Eng. GRECONICI Marian, Assoc. Prof. PhD. Eng. BRATA Silviana				
2.3 Coordinator (holder) of applied activities[6]			Assoc. Prof. PhD. Eng. GRECONICI Marian, Assoc. Prof. PhD. Eng. BRATA Silviana				
2.4 Year of study[7]	II	**2.5** Semester	3 I	**2.6** Type of evaluation	D	**2.7** Type of discipline[8]	DI I

3. Total estimated time – hours / semester: direct teaching activities (fully assisted or partly assisted) and individual training activities (unassisted) [9]

3.1 Number of fully assisted hours / week	3 of which:	**3.2** course	2	**3.3** seminar / laboratory / project	1
3.1* Total number of fully assisted hours / semester	42 of which:	**3.2*** course	28	**3.3*** seminar / laboratory / project	14
3.4 Number of hours partially assisted / week	0.2 of which:	**3.5** training	0.2	**3.6** hours for diploma project elaboration	0
3.4* Total number of hours partially assisted / semester	2.8 of which:	**3.5*** training	2.8	**3.6*** hours for diploma project elaboration	
3.7 Number of hours of unassisted activities / week	1,8 of which:	additional documentary hours in the library, on the specialized electronic platforms and on the field			0.5
		hours of individual study after manual, course support, bibliography and notes			1
		training seminars / laboratories, homework and papers, portfolios and essays			0.3
3.7* Number of hours of unassisted activities / semester	25,2 of which:	additional documentary hours in the library, on the specialized electronic platforms and on the field			7
		hours of individual study after manual, course support, bibliography and notes			14
		training seminars / laboratories, homework and papers, portfolios and essays			4,2
3.8 Total hours / week [10]	5				
3.8* Total hours /semester	70				
3.9 Number of credits	3				

4. **Prerequisites** (where applicable)

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[1] The form corresponds to the Discipline File promoted by OMECTS 5703 / 18.12.2011 and to the requirements of the ARACIS Specific Standards valid from 01.10.2017.

[2] The name of the faculty which manages the educational curriculum to which the discipline belongs

[3] The name of the department entrusted with the discipline, and to which the course coordinator/holder belongs.

[4] The code provided in HG no.140 / 16.03.2017 or similar HGs updated annually shall be entered.

[5] Discipline falls under the educational curriculum in one of the following formative disciplines: Basic Discipline (DF), Domain Discipline (DD), Specialist Discipline (DS) or Complementary Discipline (DC).

[6] Application activities refer to: seminar (S) / laboratory (L) / project (P) / practice/training (Pr).

[7] Year of studies in which the discipline is provided in the curriculum.

[8] Discipline may have one of the following regimes: imposed discipline (DI), optional discipline (DO) or optional discipline (Df).

[9] The number of hours in the headings 3.1 *, 3.2 *, ..., 3.8 * is obtained by multiplying by 14 (weeks) the number of hours in headings 3.1, 3.2, ..., 3.8. The information in sections 3.1, 3.4 and 3.7 is the verification keys used by ARACIS as: (3.1) + (3.4) ≥ 28 hours / wk. and (3.8) ≤ 40 hours / wk.

[10] The total number of hours / week is obtained by summing up the number of hours in points 3.1, 3.4 and 3.7.

4.1 Curriculum	Vector algebra and vector analysis, Basic computer user, Physics • Introduction in Computer Programming, Physics 1 •
4.2 Competencies	Learning the fundamentals of curriculum prerequisites • Mathematics skills, computer basic knowledge, Physics principles • Documentation in Romanian and English technical language

5. Conditions (where applicable)

5.1 of the course	• Classroom of medium capacity, Support Materials: laptop, projector, projection screen, white (or black board
5.2 to conduct practical activities	• Classroom of medium capacity, Support Materials: laptop, projector, projection screen, whiteboard.

6. Specific competencies acquired through this discipline

Specific competencies	Acquire knowledge about electromagnetic phenomena and methods for solving problems in the domain of electromagnetics. Learning the fundamental energy notions in building physics and installations.
Professional competencies ascribed to the specific competencies	• Design of structural elements in civil engineering, specific to graduated study programme • Complying to quality and sustainability requirements, specific to civil engineering constructions.
Transversal competencies ascribed to the specific competencies	• Application of efficient and responsible work strategy (implying punctuality, seriously and personal responsibility) based on the principles, rules and values of professional ethics; • Application of efficient team work techniques on miscellaneous hierarchical tiers; • -Documentation in Romanian and English technical language, in view of professional and personal development, via continuous learning and efficient adaptation to the new technical specifications.

7. Objectives of the discipline (based on the grid of specific competencies acquired - pct.6)

7.1 The general objective of the discipline	Presentation of the fundamental scientific principles from the field of electric and electronic engineering, based on the laws of electromagnetics according to Maxwell-Hertz theory. To establish an understanding of fundamental concepts in thermodynamics, to provide students a basis for the courses Building Physics and Building Services. •
7.2 Specific objectives	• The development of skills and aptitudes of the students in order to have a correct understanding of electromagnetic phenomena and ability to handle some methods for solving problems in the domain of electromagnetics. An engineering approach of problems and the development of the capacity for measurements and results interpretation

	• To teach use of thermodynamics in design of building elements, with complying to quality and sustainability requirements specific to civil engineering constructions • Efficient use of sources of information and communication resources, training assisted (Internet portals, specialized software applications, databases, online courses, etc.) both in Romanian and in a foreign language .

8. Content [11]

8.1 Course	Number of hours	Teaching methods [12]
1. The physical foundations of electrical engineering: fundamental electrical quantities; electric field; magnetic field; electric power and energy; passive circuit elements- resistance, capacitance, inductance; active independent sources	6	classic presentation and questions for a test of understanding Lecturing, conversation, explication, demonstration
2. Circuit analysis – Resistive networks (DC Steady state; The Ohms law; the Kirchhoff's law; the power conservation theorem;	4	
3.Sinusoidal steady-state circuit analysis: general definitions, rms value; RLC series circuit; power in AC circuits	4	
4. Thermodynamic processes in buildings: The First Law of Thermodynamics. The Second Law of Thermodynamics; Thermodynamic agents. Thermodynamic cycles. Carnot cycle. Heat engine/pump cycle.	4	
5. Psychrometrics: Moist air; Psychrometric chart; Psychrometric processes for buildings	4	
6. Heat and mass transfer in buildings: Conduction: Steady one-dimensional heat conduction in plane and cylindrical walls; Thermal insulation of walls; Transient heat conduction; Finite difference method; Periodically thermal conduction; Convection; Thermal Radiation	4	
7. Thermal comfort and health: Thermal balance of the body; Perception of thermal comfort	2	

[11] It details all the didactic activities foreseen in the curriculum (lectures and seminar themes, the list of laboratory works, the content of the stages of project preparation, the theme of each practice stage). The titles of the laboratory work carried out on the stands shall be accompanied by the notation "(*)".
[12] Presentation of the teaching methods will include the use of new technologies (e-mail, personalized web page, electronic resources etc.).

Bibliography [13]

1. W.H.Hayt,J.A.Buck,Engineering Electromagnetics,McGraw-Hill,2001

2. D.D.Irimia,C.Blaj,Campuri si unde electromagnetice,Editura Politehnica,Timisoara,2014

3. D.D.Irimia,C.Blaj, Circuite electrice, Editura Politehnica, Timisoara, 2013

4. Brata Silviana, Ostafe Petru – Termotehnica, Editura Politehnica Timisoara, 2013

5. Brata Silviana, Dobosi Ioan Silviu, Pescari Simaon -Alexandru, Maduta Carmen, Bistran Ioan – Certificarea performnatei energetice a cladirilor, Editura Politehnica Timisoara, 2015

6. ASHRAE Handbook - Fundamentals, American Society of Heating, Refrigerating and Air Conditioning Eng., New York, 2017

7. Jan F. Kreider, Ari Rabl – Heating and Cooling of Buildings, Mc Graw-Hill, Inc., 1994

8. Nellis, G., Klein S. – Heat Transfer, Cambridge University Press, 2009

9. SR EN ISO 7730 - Ergonomics of the thermal environment - Analytical determination and interpretation of thermal comfort using calculation of the PMV and PPD indices and local thermal comfort criteria

10. HEAT3 4.0 – Computational program for 3D transient heat transmission

8.2 Applied activities [14]	Number of hours	Teaching methods
SEMINAR Electric Flux and Gauss's Law; Capacitance and Resistors; Calculation of Electric dc circuits; Faraday's Law; Magnetic Circuits	7	About 30 proposed problems (in advance, by intranet). Solving 3-4 problems per seminar explication, example, experiment, simulation
Determination of the moist air state in a room Non-contact temperature measurements. Thermal imaging	1 2	
Temperature distribution in building elements	1	
Computer simulation of three-dimensional heat transfer – program HEAT3	1	
Comfort indices	2	explication, example, experiment, simulation

Bibliography [15] The same as for course

9. Corroboration of the content of the discipline with the expectations of the main representatives of the epistemic community, professional associations and employers in the field afferent to the program

Updating the course each year. Basic understanding of Maxwell's Hertz theory assures a long-time capability of adaptation to the newest technological discoveries. Main knowledge of Electromagnetics principles is indispensables for all engineering activity, using electric and magnetic instruments, tools and devices

- Completing the discipline content in accordance with didactic books, with theoretical and practical elements of professional associations textbooks, norms, standards.

10. Evaluation

[13] At least one title must belong to the discipline team and at least one title should refer to a reference work for discipline, national and international circulation, existing in the UPT library.
[14] Types of application activities are those specified in footnote 5. If the discipline contains several types of applicative activities then they are sequentially in the lines of the table below. The type of activity will be in a distinct line as: "Seminar:", "Laboratory:", "Project:" and / or "Practice/training".
[15] At least one title must belong to the discipline team.

Type of activity	**10.1** Evaluation criteria [16]	**10.2** Evaluation methods	**10.3** Share of the final grade
10.4 Course	9 questions; 3 short theory, 6 problems, with gradual dificulty - Understanding of concepts taught in every introductory theme and linked the notions - The correct approach to applications - Dexterity computing. Ensure recognition of the progressive accumulation	Written distributed evaluation lasting 1 hour Grade 10 is given for obtaining 95% of the maximum score in each subject (application) and minimum grade 9 course activity. The final grade is apparent considering share notes on paper with k1 = 0.5, respectively activity during semester, with k2 = 0.5.	50%
10.5 Applied activities	**S:** Capability of solving problems	1 test The attendance is monitored	50%
	L:		
	P[17]**:**		
	Pr:		
10.6 Minimum performance standard (minimum amount of knowledge necessary to pass the discipline and the way in which this knowledge is verified [18])			
• For grade 5, both, theory and problems should be solved at least 50% •			

Date of completion September 17th, 2019	**Course coordinator (signature)** ……	**Coordinator of applied activities (signature)** ……
Head of Department (signature) ……	**Date of approval in the Faculty Council** [19]	**Dean (signature)** ……

[16] Syllabus must contain the procedure for assessing the discipline, specifying the criteria, methods and forms of assessment, as well as specifying the weightings assigned to them in the final grade. The evaluation criteria shall be formulated separately for each activity foreseen in the curriculum (course, seminar, laboratory, project). They will also refer to the forms of verification (homework, papers, etc.)

[17] In the case where the project is not a distinct discipline, this section also specifies how the outcome of the project evaluation makes the admission of the student conditional on the final assessment within the discipline.

[18] It will not explain how the promotion mark is awarded.

[19] The endorsement is preceded by the discussion of the board's view of the study program on the discipline record.