SYLLABUS[1]

1. Information about the program

1.1 Higher education institution	Politehnica University Timisoara
1.2 Faculty[2] / Department[3]	Faculty of Electronics and Telecommunications/Fundamentals of Physics for Engineers
1.3 Chair	—
1.4 Field of study (name/code[4])	Electronic engineering and telecommunications/100
1.5 Study cycle	License
1.6 Study program (name/code)/Qualification	

2. Information about the discipline

2.1 Name of discipline			Engineering Electromagnetics				
2.2 Coordinator (holder) of course activities			Constantin BLAJ				
2.3 Coordinator (holder) of applied activities [5]			Marian GRECONICI				
2.4 Year of study[6]	2	**2.5** Semester	3	**2.6** Type of evaluation	D	**2.7** Type of discipline	mandatory

3. Total estimated time (hours / semester of didactic activities)

3.1 No. of hrs. / week	4 , of which:	**3.2** course	2	**3.3** seminar/laboratory/ project/training	2
3.4 Total no. of hrs. in the education curricula	56 , of which:	**3.5** course	28	**3.6** applied activities	28
3.7 Distribution of time for individual activities related to the discipline					hrs.
Study using a manual, course materials, bibliography and lecture notes					7
Additional documentation in the library, on specialized electronic platforms and on the field					7
Preparation for seminars / laboratories, homeworks, assignments, portfolios, and essays					10
Tutoring					7
Examinations					4
Other activities					
Total hrs. of individual activities					35

3.8 Total hrs. / semester[7]	91
3.9 No. of credits	4

4. Prerequisites (where applicable)

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1 The form corresponds to the Syllabus promoted by OMECTS 5703/18.12.2011 (Annex3).

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 Fill in the code provided in GD no. 493/17.07.2013.

5 The applied activities refer to: seminar (S) / laboratory (L) / project (P) / practice/training (Pr).

6 The year of study to which the discipline is provided in the curriculum.

7 It is obtained by summing up the number of hrs. from 3.4 and 3.7.

4.1 Curriculum	• Vector algebra and vector analysis, Basic computer user, Physics
4.2 Competencies	• Mathematics skills, computer basic knowledge ,Physics principles

5. **Conditions** (where applicable)

5.1 of the course	• Big (enough) room, with both projector and white (or black) board
5.2 to conduct practical activities	• Lab with devices for experiments, 1 computer for one student, if the group is reasonable

6. **Specific competencies acquired**

Professional competencies[8]	• Using the fundamental principles concerning with electronic devices, electronic circuits and systems, electronic instrumentation and technology
Transversal competencies	• Analiza metodica a problemelor intalnite in activitate,identificand elementele pentru care exista solutii consacrate,asigurand astfel indeplinirea sarcinilor profesionale

7. **Objectives of the discipline** (based on the grid of specific competencies acquired)

7.1 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
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 the 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

8. **Content**

8.1 Course	No. of hours	Teaching methods
1. Electrostatic Field. Coulomb's Law and Electric Field Intensity; Electric Flux Density and Gauss's Law	2	Slide show presentation
2. Energy and Electric Potential Energy of an Electrostatic System; Potential Difference and Electric Potential; Energy Density in Electrostatic Field.	2	Classical presentation on white (black) board
3. Conductors, Dielectrics, Capacitance Current and Current Density; Continuity of Current; Metallic Conductors; Conductor Properties in Electrostatic Field, Boundary Conditions; Semiconductors; Resistors; Joule's Law; Nature of Dielectric Materials; Capacitance	6	Questions for a test of understanding

8 The professional competencies and the transversal competencies will be treated according to the Methodology of OMECTS 5703/18.12.2011. The competencies listed in the National Register of Qualifications in Higher Education [Registrul Naţional al Calificărilor din Învăţământul Superior RNCIS] (http://www.rncis.ro/portal/page?_pageid=117,70218&_dad=portal&_schema=PORTAL) will be used for the field of study from 1.4 and the program of study from 1.6 of this form, involving the discipline.

4.The Steady Magnetic Field Biot Savart Law and Ampere's Circuital Law, Magnetic Flux and Magnetic Flux Density;Magnetization and Permeability;Magnetic Circuits;Inductances;Potential energy and Forces in Magnetic Field;Numeric Computation of Magnetic Field	6	idem
5.Time-Varying Fields and Maxwell's Equations Faraday's Law; Displacement Current; Maxwell's Equations in Point Form and Integral Form; Retarded Potentials	6	idem
6. Electromagnetic Waves; Uniform Plane Waves; Poynting Vector; Wave Propagation in Dispersive Media; Skin Effect	4	idem
7.Transmission Lines Transmission Line Equations; Transmission Line Parameters; Some transmission Lines Examples: Loss Less and Distortion Less Lines	2	

Bibliography[9] 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.Fleish A student's Guide to Maxwell's Equations, www.cambridge.org/978052177619

4. R.Bansal, Fundamentals of Engineering Electromagnetics, Taylor & Francis Group, 2006

8.2 Applied activities[10]	No. of hours	Teaching methods
SEMINAR Electric Flux and Gauss's Law;Calculation of Electric Field and Capacitance; Massive Resistors and current Distribution;Faraday's Law; Ampere's Circuital Law for tTime Varying Fields;Magnetic Circuits; Electromagnetic Waves; Transmission Lines, Parameter Calculation	14	About 10 proposed problems (in advance, by intranet). Solving 3-4 problems; 3 tests based on problems
LABORTORY Numeric Modelization of Electric Field; Experimental determination of the Distribution of an Electric Field; Numeric Modelization of Magnetic Field; Experiment and Modelization of Magnetic Circuits; Faraday's Law, Modelization and Experiment;Forces and Energy in Magnetic Field, Magnetic Levitation	14	Home works personalizad on student by different Group and small group number, as well as, with the ranking number in the small group, experiments and individual computer work

[9] At least one title must belong to the department staff teaching the discipline, and at least 3 titles must refer to national and international works relevant for the discipline, and which can be found in the Politehnica University Library.

[10] The types of applied activities are those specified in footnote 5. If the discipline contains several types of applied activities, then these will be written consecutively in the lines of the table below. The type of activity will be written in a distinct line, as „Seminar:", „Laboratory:", „Project:" and/or „Practice/Training:".

Bibliography [11] The same as for course + 5.Lessons, Problems and Laboratory, 2014, ftp:??ENG.ELMG@intranet.etc.upt.ro		

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 are indispensables for other courses (electronic engineering courses)

10. Evaluation

Type of activity	**10.1** Evaluation criteria	**10.2** Evaluation methods	**10.3** Share of the final grade
10.4 Course	9 questions; 3 short theory, 6 problems, with gradual dificulty	Writen examinarion	66%
10.5 Applied activities	**S:** Capability of solving problems	3 tests	12%
	L: 5 home works, 6 essays	Marks on home works and final oral examination	22
	P:		
	Pr:		
10.6 Minimum performance standard (minimum amount of knowledge necessary to pass the discipline and the way in which this knowledge is verified)			
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Date of completion

02.02.2015

Course coordinator

(signature)

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Coordinator of applied activities

(signature)

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Head of Department

Date of approval in the Faculty Council[12]

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[11] At least one title must belong to the staff teaching the discipline.
[12] Avizarea este precedată de discutarea punctului de vedere al board-ului de care aparţine programul de studiu cu privire la fişa disciplinei.

(signature) **(signature)**

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