Denumirea disciplinei	BASIS OF ELECTROTEHNICS / BAZELE ELECTROTEHNICII II
Domeniul de studiu	Inginerie Electronică şi Telecomunicaţii - Licenţă
Specializarea	Electronică Aplicată, Tehnologii şi Sisteme de Telecomunicaţii
Codul disciplinei	51381807
Titularul disciplinei	Prof.dr.ing. Vasile TOPA
Colaboratori	As.drd. ing. Claudia RACASAN
Catedra	Electrotehnica
Facultatea	Inginerie Electrica

Sem	Tipul disciplinei Disc.Fundamentala, Disc.Ing.din Dom, Disc. de Spec, Disc Optionala, Disc.Facultativa	Curs [ore/ sapt]	Aplicaţii [ore/sapt]			Curs [ore/ sem]	Aplicaţii [ore/sem]			Studiul Individual [ore/ sem]	Practica	TOTAL	Puncte credit	Forma de verificare
			S	L	P		S	L	P					
III	**Disciplina fundamentala**	**2**	**2**	**-**	**-**	**28**	**28**	**-**	**-**	**64**	**-**	**120**	**4**	**Examen**

Cerinţe prealabile

Cunoştinţe de analiza matematică: derivate, integrale simple, duble si triple, ecuatii de tip Laplace/Poisson, functii de variabilă complexa, analiza vectoriala, matematici speciale.

A. Conţinutul Cursului (Titlul cursurilor)

Curs - 1 Electrostatics. Electric field in vacuum. Electric charges. Coulomb's Law and definition of the electric force and electric field intensity.
Curs - 2 The electric field for discrete and continuous distributions. Gauss Law. Applications.
Curs - 3 Electric potential. Potential due to discrete and continuous distribution of charges. Laplace and Poisson equations in electrostatics field.
Curs - 4 Electric field in conductors. Dielectric materials and polarization. Electric field in dielectric materials.
Curs - 5 Laws of electrostatics. Boundary conditions in electrostatics. Capacitance. Electrostatic field energy and forces.
Curs - 6 Electrokinetic fields. Electric current definition. Convection electrical current. Ohm's law. Charges conservation law.
Curs - 7 Resistance. Analogy between the electrostatic field and electrokinetic field. Power density and Joule's law.
Curs - 8 Magnetostatics fields. Magnetic forces. Biot-Savart-Laplace's formula. Ampere's law.
Curs - 9 Magnetic flux. Laws of magnetostatics. Boundary conditions in magnetostatics.
Curs - 10 Vector magnetic potential. Laplace and Poisson equations in magnetic field.
Curs - 11 Flux linkage. Self and mutual inductances. Magnetostatic field energy and forces.
Curs - 12 Electromagnetic field. Faraday's law. Applications.
Curs - 13 Maxwell's equations. Electromagnetic waves.
Curs - 14 Transmission lines (TL). Distributed parameters. The first and second order equations of the TL. Steady-state TL equations. Derivation of power equations. Equivalent TL. Heaviside conditions.

B. Conţinutul Aplicaţiilor (Lista lucrarilor de laborator, teme de seminar, continutul proiectului de an)

Seminar - 1 Elements of vector analysis. Electrostatic field computation using the direct method.
Seminar - 2 Electrostatic field computation by Gauss's law.
Seminar - 3 Electric potential computation. Laplace & Poisson equations.
Seminar - 4 Electric field computation in dielectric materials. Boundary conditions.
Seminar - 5 Electric energy and force computation.
Seminar - 6 Electrokinetic field computation. Applications of Ohm's law.
Seminar - 7 Earths/grounding's system computation.
Seminar - 8 Magnetic field computation using Biot-Savart-Laplace method and Ampere's law.
Seminar - 9 Magnetic field computation. Boundary conditions. Magnetic energy and force computation.
Seminar - 10 Vector magnetic potential computation. Laplace and Poisson equations in magnetic field.
Seminar - 11 Inductance and magnetic circuits computation.

Seminar - 12 EMF computation.
Seminar - 13 Solution of electromagnetic waves for partially conducting media.
Seminar - 14 Evaluation of the distributed parameters. Steady-state TL equations.

C. Tematica studiului individual (Tematica studiilor bibliografice, materiale de sinteza, proiecte, aplicatii, etc)

7 seturi de probleme

Structura pregătirii individuale	Studiu materiale curs	Studiu materiale tutoriale	Rezolvări teme	Pregătire aplicații	Timp alocat examinărilor	Total ore pregătire individuală
Nr. ore	24	10	20	7	3	64

Bibliografie

1. Vasile ȚOPA, Radu CIUPA, *Basic of Electrotehnics*, Editura Casa Cărții de Ştiință, Cluj, in curs de aparitie.
2. N.O SADIKU, *Elements of Electromagnetics*, Oxford University Press 3rd, 2000.
3. Remus RADULET, *Bazele electrotehnicii,* Probleme II, EDP Bucuresti, 1982.
4. J.A.EDMINISTER, *Schaum's Interactive Electromagnetics*, McGraw Hill, Inc. 2005.
5. Folii de curs - http://www.et.utcluj.ro/~vtopa

Competente Dobindite:

Cunostinte teoretice - Programa analitică

- provide students with an introduction to electromagnetism;
- introduce the principles and applications of electromagnetism;
- understand and apply the laws governing electric and magnetic behaviour;
- aware of some of the applications of electromagnetic behaviour;
- solve basic lectrostatic, magnetostatic and electromagnetic problems.

Abilităţi dobândite: (Ce stie sa faca)

- understand electrostatic, magnetostatic, and electromagnetic fields and their interaction with matter;
- able to compute the electromagnetic local (E, D, B, H) and global (R, L, C) quantities;
- able to apply knowledge of mathematics, science, and engineering. Students use concepts from physics and calculus in the analysis of electromagnetic problems;
- able to identify, formulate and solve engineering problems.

Modul de examinare şi atribuire a notei	
Modul de examinare	■ Se dau teste la curs, se notează activitatea la seminar şi se dă un test final; ■ Testul final (scris) este compus din: întrebări teoretice, întrebări tip grilă şi rezolvări de probleme (3 ore).
Componentele notei	Un total de 100 de puncte (pentru nota 10) se distribuie astfel: ■ Prezenta la curs (AC = 10 p) ■ Teste la curs (C = 15 p): 3 teste ■ Activitate la seminar (S = 15 p): 3 teste ■ Examinare finală (E = 60 p).
Formula de calcul a notei	N = (AC + C + S + E)/10, cu condiția: E > 30

Responsabil de disciplina,

Prof. dr. ing. Vasile TOPA