



UNIVERSITATEA DIN ORADEA

Facultatea de Inginerie Electrică și Tehnologia Informației

**Topics and references for the contest
for ASSOCIATE PROFESSOR, position 10,
Department of Electrical Engineering,
academic year 2023-2024**

Disciplines: **Fundamentals of electrical engineering I / Electrotechnics I**
The numerical modeling of the electromagnetic field
Equipments for heating, ventilation and air conditioning
Electromechanical systems II

TOPICS FOR THE DIDACTIC LECTURE

I. Fundamentals of electrical engineering I / Electrotechnics I

1. Characteristic features of the electromagnetism.
2. The general laws of electromagnetism.
3. Material laws of the electromagnetic field.
4. Linear electrical circuits in steady state. Transfiguration theorems.
5. Analysis of linear electrical circuits in steady state.
6. Non-linear electric circuits in steady state.
7. Analysis of non-linear electrical circuits in steady state.
8. Alternative sinusoidal features.
9. RLC circuits in continuous sinusoidal mode.
10. Analysis of linear electrical circuits in permanent sinusoidal regime.

References

1. Leuca T., Carmen Otilia Molnar, Arion M. N. – Elemente de bazele electrotehnicii. Aplicații utilizând tehnici informatice. Ed. Universității din Oradea, 2014
2. Cazacu E, Petrescu L, Petrescu M. C., - Bazele electrotehnicii. Elemente de teoria circuitelor electrice, Ed. Matrixrom, 2021
3. Dumitriu, L., Iordache, M. - Teoria circuitelor electrice 1, 2, Ed. ALL EDUCATIONAL S.A., Bucuresti, 1998, 2000.
4. Leuca, T. – Elemente de teoria câmpului electromagnetic. Aplicații utilizând tehnici informatice, Ed. Universității din Oradea, 2002.
5. Dumitriu L, - Bazele electrotehnicii., Ed. Matrixrom, 2008
6. Șora, C. - Bazele electrotehnicii, Ed. Didactică și Pedagogică, București, 1982.



II. The numerical modeling of the electromagnetic field

1. The macroscopic features of the electromagnetic field.
2. Mathematical formulation of the electromagnetic field problems.
3. Numerical analysis of the quasistationary electromagnetic field by the $(\mathbf{A}\text{-}\mathbf{V}, \mathbf{A})$ method.
4. Numerical analysis of the quasistationary electromagnetic field by the $(\mathbf{A}\text{-}\mathbf{V}, \phi)$ method,
5. Numerical analysis of the quasistationary electromagnetic field by the $(\mathbf{T}\text{-}\psi, \phi)$ method.
6. Numerical modeling by the boundary element method. Fundamental concepts.
7. Numerical modeling by the finite element method. Fundamental concepts..
8. Numerical modeling in environments with nonlinear magnetization characteristics
9. Treatment of magnetic nonlinearity by the polarization method
10. Treatment of magnetic nonlinearity by the iterative Newton method

References

1. Hăntîla F.I., Bandici L., Leuca T. - Tehnici informatice utilizate în ingineria electrică, Ed. Universității din Oradea, 2011
2. Maghiar T., Leuca T., Hăntîlă F.I. – Analiza numerică a câmpului electromagnetic în probleme de curenți turbionari, Ed. Universității din Oradea, 2001
3. Ioan D., - Metoda Elementului finit pentru modelare electromagnetică, București, 2012
4. Răcășa, C., Răcășan A.N., Țopa V, Munteanu C., - Modelarea numerică a câmpului electromagnetic, Ed. Casa Cărții de Știință, 2007
5. Tomescu A. Tomescu I.B.L, Tomescu F.M.G., - Modelarea numerică a câmpului electromagnetic. Preliminarii câmpuri statice și staționare, Ed. Matrixrom.
6. Andrei H. L., C. Fluerașu, Virjoghe E., Fluerașu C., Enescu D., Popovici D., Husu, Andrei P. C., Predusca G., Diaconu E., - Metode numerice, modelări și simulări în ingineria electrică, Ed. ICPE 2011

III. Equipments for heating, ventilation and air conditioning

1. Heating equipment with infrared radiation for indoor premises.
2. Electrical systems for centralized space heating.
3. Internal combustion systems for central heating.
4. Equipment and systems for residential ventilation
5. Installations and equipment for industrial ventilation.
6. Production of air conditioning. Refrigeration installations for the production of air conditioning
7. Air conditioning installations for residential buildings. Automatic adjustment of installations.
8. Industrial installations for air conditioning. Automatic adjustment of installations.
9. Dimensioning of air conditioning installations.
10. Installation, maintenance and diagnosis of air conditioning installations.



References

1. Iordache V., - Instalatii interioare de incalzire cu agent termic apa calda, Ed. Matrixrom, Bucuresti,
2. Cosman I., - Instalații de încălzire, Ed. MAST, 2014
3. Duță Gh., Colda I, Stoienescu P – Instalații de ventilare și climatizare. Ed. ARTECNO, București, 2002
4. Damian A., Vartires A. - Instalatii de ventilare si climatizare - partea I, Ed. Matrixrom, Bucuresti, 2013.
5. Miller M.R., - Air Conditioning and Refrigeration, McGraw Hill Education, 2006
6. McDowalls R. - Fundamentals of HVAC Systems, Elsevier Science, 2007

IV. Electromechanical systems II

1. Industrial local ventilation systems by suction.
2. Industrial blowing local ventilation systems
3. Emergency ventilation systems.
4. Systems and industrial installations for air treatment.
5. Refrigerating installations for air conditioning. Component elements. Operating principle.
6. Industrial air conditioning systems. Constructive solutions.
7. The elements for automatic regulation of the flow of thermal agent or air within the ventilation and air conditioning installations.
8. Automatic regulation of ventilation installations.
9. Automatic regulation of air conditioning installations.
10. Maintenance and repair of industrial air conditioning systems

References

1. Damian A., Vartires A. - Instalatii de ventilare si climatizare - partea I, Ed. Matrixrom, Bucuresti, 2013.
2. Duță Gh., Colda I, Stoienescu P – Instalații de ventilare și climatizare. Ed. ARTECNO, București, 2002
3. Nagy Stefan – Utilaj electromecanic industrial Ed. Universitatii din Oradea, 2013
4. Hera – Instalații frigorifice Vol III, Editura Matrixrom
5. Monger S. C. - HVAC Systems: Operation, Maintenance and Optimization, Ed. Pretice Hall 1992
6. Miller M.R., - Air Conditioning and Refrigeration, Ed. McGraw Hill Education, 2006

Head of Department,

