

TEMATICA și BIBLIOGRAFIA
pentru proba de evaluare a cunoștințelor fundamentale și de specialitate
din cadrul examenului de diplomă
pentru sesiunile iulie 2015, septembrie 2015 și februarie 2016

A. Fundamental knowledge

1. **Programming** - Describe a method that can be used to save different types of data for a class of students. Consider next values: first and second name (as array of char), CNP (13 chars) and grades for 10 disciplines (array of integers). Please write the C code used to allocate the memory, to read the values and to compute the grade average for each student and the average for the entire class.
2. **Systems theory** - Frequency response. Bode diagrams
3. **Electrical circuits theory** - Maximum active power transfer theorem
4. **Electrical equipments** - Heating of homogenous conductors into long-term thermal state
5. **Electrical and electronic measurements** - Measurements upon surface and volume resistivity. Principles, techniques, instrumentation.
6. **Electrical machines** - Rotating Magnetic Field Development
7. **Digital circuits** - Combinational logic circuits: digital comparators and adders
8. **Electromagnetic compatibility** - Measurements in the near field. Probes for E-field and H-field. Significance and applications.

B. Specialty knowledge

9. **Computer architecture** - Types of memories for PCs
10. **Applications of computers in process control** - Computer Control Systems, (basic concepts of computer controlled systems, discretization and choice of sampling frequency, discrete-time models, structure of digital controllers)
11. **Electrical drives** - Efficiency of electric drive systems (efficiency of motors gears, power converter, Sankey diagram)
12. **Sensors and transducers** - Sensors for thermal quantities (thermometers)
13. **High voltage technique** - The Behaviour of the Series Resonant Circuit in the Transient Regime
14. **Electrical energy utilization** - Electric lamps for street lighting (high pressure mercury lamps, high pressure sodium lamps, metal halide lamps)
15. **Industrial robots** - The 2DOF serial robot: kinematic and dynamic models
16. **Microcontrollers and PLC** - Describe structure and operation of the analog input and output modules of PLCs
17. **FACTS devices** - Thyristor Controlled Series Capacitor –TCSC
18. **Digital signal processing** - FIR Filters Design
19. **Data bases** - SQL Statements: Insert, Update, Delete
20. **Finite Element Method in electrical engineering** - Describe the main steps in performing Finite Element Analysis

References:

Course notes from each discipline listed above

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11. - V. Vodovozov, Electric drive system and operation, 2012, Venus Publishing.
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15. - John J. Craig, "Introduction to Robotics. Mechanics and Control". Third Edition. Pearson Prentice Hall, ISBN 0-13-123629-6, 2005.
- M. Poboroniuc, Controlul robotilor. Controlul miscarii umane prin stimulare electrica functionala, Edited by POLITEHNIUM Publishing House, Iasi , pp.261, 2004, ISBN 973-621-074-x.
16. - Hugh Jack, Automating Manufacturing Systems with PLCs, v.5.0, May 2007, http://www.pacontrol.com/download/plcbook5_0.pdf
17. - Hingorani N. G., Gyugyi L., Understanding FACTS. Concepts and technology of Flexible AC Transmission Systems. IEEE Press, New York, 2000.
18. - Delmar - Digital Signal Processing, Ed White, Prentice Hall, 2006
19. - http://www.w3schools.com/sql/sql_insert.asp
20. - David Hutton - Fundamentals of Finite Element Analysis; McGrawHill, 2004; Chapter 1

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