Thematic for the entrance exam (interview)

Master study program: **Advanced Electrical Systems (in English)**

Examination - part 1

The candidate will concisely present a personal research project (e.g. the diploma thesis) for maximum 5 minutes, with a focus on the following thematic areas:

1) Power factor correction in electrical installations;
2) Electrical measurements;
3) Induction machine – mechanical characteristics torque-speed, torque-slip;
4) Three-phase two-level PWM inverters;
5) D.C.-D.C. PWM converters;
6) Low voltage switching equipment;
7) Low voltage protection equipment;
8) Power calculation in AC circuits;
9) Renewable energy sources;
10) Sensors;

Recommended minimal bibliography:

[1] Schneider Electric, Electrical Installation Guide, Chapters: L (power factor correction); H (LV switchgear); Online: https://www.se.com/ww/en/download/document/EIGED306001EN/

[2] J.G. Webster, The Measurement, instrumentation, and sensors : handbook, CRC Press, 1999, Chapters: 37 (Voltage measurement); 38 (Current measurement); 39 (Power Measurement).

[3] Stephen J. Chapman, Electric Machinery Fundamentals - Fourth Edition, Chapter 7.5 (Induction Motor Torque-Speed Characteristics);

[4] M.H. Rashid, Power electronics handbook, Elsevier, 2011, Chapters: 13 (DC/DC converters); 15.3 (Three-phase voltage source inverters);

[5] N. Riedel, Electric Circuits – 8th edition, Pearson Education, 2008, Chapter 10 (Sinusoidal Steady-state power calculations);

[6] G.B. Masters, Renewable and efficient electric power systems, Wiley-Interscience, 2004, Chapters: 4.5 (Micro-Hydropower Systems); 6.2-6.6 (Wind Power - basics); 8.3-8.6 (Photovoltaic power - basics) .

[7] J.S. Wilson, Sensor Technology Handbook, Elsevier, 2005, Chapters: 1 (Sensor Fundamentals); 4 (Sensor Signal Conditioning).

Examination - part 2

Brief presentation of the professional development plan of the candidate

The candidate will prepare a 5-minute presentation, considering the following:

- the current skills, technical interests and strengths;
- the selected study track for the master programme, providing a motivation for his option;
- the topic for the dissertation thesis that would fit best his technical interests;
- the targeted profession and provide a brief explanation of how this master programme will contribute to move his career forward.
- the current research interest and whether he would consider following a PhD programme after graduating the master programme, which would make him eligible for a potential academic career.

Recommended bibliography:

[1] https://www.accessmasterstour.com/articles/view/make-your-career-plan-in-graduate-school

[2] https://www.indeed.com/career-advice/career-development/professional-development-plan

[3] https://capd.mit.edu/resources/make-a-career-plan/