

## SUBJECT DETAILS AND SYLLABUS

### 2019/2020. 2. SEMESTER

<b>Subject name</b>	Electrical Power Conversion 1
<b>Subject code</b>	IVB465MNVM
<b>Classes per week (L/P/Lab)</b>	3-1-1
<b>Number of Credits</b>	4
<b>Program</b>	Basic Program of Electrical Engineering (BSc/K)
<b>Division</b>	Full time training
<b>Requirement type</b>	Exam
<b>Semester</b>	4 (Spring)
<b>Prerequisites</b>	-
<b>Organization name</b>	Department of Electric Networks
<b>Name of the responsible lecturer</b>	Zoltán Kvasznicza PhD

## GOAL OF INSTRUCTION

### Course aims:

Main aim of this course is to make the students familiar with the working principle, operational properties, selection and operation conditions of electrical machines applied in the engineering practice along with the fundamentals of electric drives.

## SUBJECT CONTENT

*Brief Syllabus:*

*Course program:*

Students learn the structure and operation of direct-current machines, transformers, synchronous and asynchronous machines, operational features, selection and operating conditions of electric machines applied in the practice and the fundamentals of electric drives.

Students become familiar with the theoretical structure and operation of transformers, synchronous and asynchronous machines.

*Schedule:*

*Theory:*

1. General informations. Importance of electrical power conversion. Theoretical structure and working principle of single-phase transformers.
2. Equivalent circuit and operating conditions of single-phase transformers.
3. Working principle and arts of connection of three-phase transformers.
4. Parallel operation, loads and losses of three-phase transformers.
5. Structure, cooling modes of transformers. Special transformers.
6. Alternating current coils. Theoretical structure and operation of synchronous machines.
7. Equivalent circuit and vector diagrams of synchronous machines.
8. operating conditions of synchronous machines. Their connection to the network, current load diagram.
9. Synchronous motors.
10. Working principle, structure and equivalent circuit of asynchronous machines.
11. Vector diagrams and current working diagram of asynchronous machines.
12. Starting modes of slide ring and squirrel cage motors. Asynchronous motors using skin effect.
13. Braking and speed regulation modes of slip ring and squirrel cage motors.
14. Working principle and structure of single-phase asynchronous motors.

*Practice:*

Practical lessons extend the theoretical material aiming the intensification of the knowledge of the students with:

- solving numerical examples;
- mounting electric machines;
- performing measurements made by a lecturer or by the students.

## EXAMINATION AND EVALUATION SYSTEM

### *Attendance:*

Attendance of 67% of the theory lecture and 100% of the laboratory practice is obligatory. In case of excused absences extra lab practices have to be performed.

*Signature / Precondition of midterm grade:* Successful performance of all practices.

*Exam:* written exam,

### *Grading:*

The score is evaluated taking into account the results won during the semester and at the exam with 50% each; minimum result has to be 50% at the exam separately.

### *Retake:*

*Signature:* Can be retaken during the 15. week of the semester and during the first two weeks of the exam period in reasonable cases.

*Exam:* According to the Study Exam Regulation.

### Grading scale:

Numeric Grade:	5	4	3	2	1
Evaluation in points:	89%-100%	77%-88%	66%-76%	55%-65%	0-54%

## LITERATURE

1. Stephen J. Chapman: Electric Machinery Fundamentals
2. Mihail Antchev: Technologies for Electrical Power Conversion, Efficiency, and Distribution: Methods and Processes;
3. James L. Kirtley: Electric Power Principles: Sources, Conversion, Distribution and Use;
4. William Shepherd, Li Zhang: Power Converter Circuits.

# SCHEDULE

		STUDY PERIOD, STUDY WEEKS															EXAM PERIOD				
2019/2020. II. SEMESTER		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	1.	2.	3.	4.	5.
Lecture number		1	2	3	4	5	6	7	8	9		10	11	12	13	14			Signature, midterm grade can not be retaken		
Practice number			1	2	3	4	5	6	7	8		9	10	11	12						
Midterm test								Test								Test					
Homework	Publishing																				
	Submission																				
Protocols	Terms of submission																				
Others	E.g.reports																				
	Etc.																				
Signature / midterm grade given																a /fj					
Expected date of exams																					

2020. ....

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Responsible lecturer