*Recommended template: “Course Description, Syllabus, Course Requirements”*

# course syllabus and course requirements academic year 2023/2024 semester 1st

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| Course title | Engineering physics 1. |
| **Course Code** | **IVB290ANVM** |
| **Hours/Week: le/pr/lab**  | **2/2/0** |
| **Credits** | **6** |
| **Degree Programme** | **Electrical engineering BSc** |
| **Study Mode**  | **full-time** |
| **Requirements** | **Exam** |
| **Teaching Period** | **Autumn** |
| **Prerequisites** | **-** |
| **Department(s)****Course Director** | **Department of Automation****Hegedüs József** |
| **Teaching Staff** | **Kovács Attila** |
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# course description

The course is based on the lectures and practices giving examples and calculation exercises to help understanding the subject.

# syllabus

## **goals and objectives**

Electric circuit theory and electromagnetic theory are the fundamental principles upon, which many branches of engineering are built. Therefore, the basic electric circuit theory is not only the one of the most important courses for students learning information technology, electrical engineering but always an excellent starting point for the beginnings in all kind of engineering education.

Circuit theory is also valuable for students specializing in other branches of the physical sciences because circuits are good model for the study of energy systems in general, and because the applied mathematics, physics, and topology involved.

In different branches of engineering, we are often interested in communicating or transferring energy from one point to another. To do this an interconnection of electrical devices is required. The interconnection is referred as an electric circuit and each component of the circuit is known as an element.

This course is the short collection of the fundamental principles is given helping to understand the basics of practical electricity i.e. the basics of electric circuits.

## **course content**

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|  | TOPICS |
| LECTURE/PRACTICE | 1. Basic mathematical and physical principles, concepts and definitions. The properties and behaviors of the electrostatic field. Common formulas and applications.
2. Fundamental laws (aka Maxwell-equations) of electrodynamics. Phenomena and applications in nonstationary fields.
3. Circuit analysis. Calculations in common DC and AC circuits. Understanding the principles of simplification methods in circuits. Complex quantities and their meaning.
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### **DETAILED SYLLABUS AND COURSE SCHEDULE**

### *academic holidays included*

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| LECTURE  |
| week | **Topic** | **Compulsory reading; page number****(from … to …)** | **Required tasks (assignments, tests, etc.)** | **Completion date, due date** |
| 1. | SyllabusMathematical intro (vectors, calculus) |  | - | - |
| 2. | Definitions (charge, field, potential, voltage)Laws (Coulomb’s law, Gauss’ law)  |  | - | - |
| 3. | Capacitors (types, symbols)FormulasTheory of operationCircuits |  | - | - |
| 4. | Definitions (current, resistance, circuit, DC, AC)Ohm’s lawCharacteristics of capacitors |  | - | - |
| 5. | Circuits (series, paralel)Effects (heat, magnetic)Oersted-experiment |  | - | - |
| 6. |  |  | - | - |
| 7. | Definitions (magnets, electromagnets – solenoid)ForcesMagnetic fluxAmpere’s law, Biot-Savart law |  | - | - |
| 8. | Faraday’s lawElectromagnetic inductionMaxwell’s equations |  | - | - |
| 9. | Advanced DC circuits |  |  |  |
| 10. | Characteristics, AC circuits |  | - | - |
| 11. | Kirchhoff’s circuit laws |  | - | - |
| 12. | Applications of Complex Numbers in AC circuits |  | - | - |
| 13. | RLC circuit |  | - | - |

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| PRACTICE, LABORATORY PRACTICE |
| week | **Topic** | **Compulsory reading; page number****(from … to …)** | **Required tasks (assignments, tests, etc.)** | **Completion date, due date** |
| 1. | SyllabusMathematical intro (vectors, calculus) |  | - | - |
| 2. | Definitions (charge, field, potential, voltage)Laws (Coulomb’s law, Gauss’ law)  |  | - | - |
| 3. | Capacitors (types, symbols)FormulasTheory of operationCircuits |  | - | - |
| 4. | Definitions (current, resistance, circuit, DC, AC)Ohm’s lawCharacteristics of capacitors |  | - | - |
| 5. | Circuits (series, paralel)Effects (heat, magnetic)Oersted-experiment |  | - | - |
| 6. | Definitions (magnets, electromagnets – solenoid)ForcesMagnetic fluxAmpere’s law, Biot-Savart law |  | - | - |
| 7. | 1st WE |  | - | - |
| 8. | Faraday’s lawElectromagnetic inductionMaxwell’s equations |  | - | - |
| 9. | Advanced DC circuits |  | - | - |
| 10. | Characteristics, AC circuits |  | - | - |
| 11. | Kirchhoff’s circuit laws |  | - | - |
| 12. | Applications of Complex Numbers in AC circuits |  | - | - |
| 13. | 2nd WE |  | - | - |

## **assessment and evaluation**

*(Neptun: Instruction/Subjects/Subject Details/Syllabus/Examination and Evaluation System)*

##### **Attendance**

*In accordance with the Code of Studies and Examinations of the University of Pécs, Article 45 (2) and Annex 9. (Article 3) a student may be refused a grade or qualification in the given full-time course if the number of class absences exceeds 30% of the contact hours stipulated in the course description.*

***Method for monitoring attendance*** *(e.g.: attendance sheet / online test/ register, etc.)*

Attendance sheet.

##### **assessment**

Course-unit with final examination

**Mid-term assessments, performance evaluation and their weighting as a pre-requisite for taking the final exam**

(The samples in the table to be deleted.)

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| --- | --- | --- |
| Type | Assessment | Weighting as a proportion of the pre-requisite for taking the exam |
| 1. *Test 1*
 | *50 points* | *40 %* |
| 1. *Test 2*
 | *50 points* | *40 %* |

**Requirements for the end-of-semester signature**

(Eg.: mid-term assessment of 40%)

mid-term assessment of 40% and attendance

**Re-takes for the end-of-semester signature** (PTE TVSz 50§(2))

*The specific regulations for grade betterment and re-take must be read and applied according to the general Code of Studies and Examinations. E.g.: all the tests and the records to be submitted can be repeated/improved each at least once every semester, and the tests and home assignments can be repeated/improved at least once in the first two weeks of the examination period.*

…

***Type of examination*** *(written, oral): WRITTEN*

***The exam is successful if the result is minimum 40 %.*** *(The minimum cannot exceed 40%.)*

**Calculation of the grade** (TVSz 47§ (3))

The mid-term performance accounts for  ***50***  %, the performance at the exam accounts for  ***50***  % in the calculation of the final grade.

**Calculation of the final grade based on aggregate performance in percentage.**

|  |  |
| --- | --- |
| **Course grade** | **Performance in %** |
| excellent (5) | 85 % … |
| good (4) | 70 % ... 85 % |
| satisfactory (3) | 55 % ... 70 % |
| pass (2) | 40 % ... 55 % |
| fail (1) | below 40 %  |

The lower limit given at each grade belongs to that grade.

## **Specified literature**

*In order of relevance. (In Neptun ES: Instruction/Subject/Subject details/Syllabus/Literature)*

##### **compulsory reading and availability**

* TEAMS ppts
* Dr. Gyurcsek – Dr. Elmer: Theories in Electric Circuits, GlobeEdit, 2016, ISBN:978-3-330-71341-3
* Dr. Gyurcsek: Electrical Circuits – Exercises, FEIT, University of Pécs, 2019 ISBN:978-963-429-385-9

##### **recommended literature and availability**

* Ch. Alexander, M. Sadiku: Fundamentals of Electric Circuits, 6th Ed., McGraw Hill NY 2016, ISBN: 978-0078028229