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| **B-III – Charakteristika studijního předmětu** |
| **Název studijního předmětu** | Electrotechnology |
| **Typ předmětu** | Compulsory elective | **doporučený ročník / semestr** | 1 / L |
| **Rozsah studijního předmětu** | 28p + 28c | **hod.**  |  | **kreditů** | 5 |
| **Prerekvizity, korekvizity, ekvivalence** |  |
| **Způsob ověření studijních výsledků** | Exam | **Forma výuky** | Lecturers and labs |
| **Forma způsobu ověření stud. výsledků**  |  |
| **Další požadavky na studenta** | Basic electrotechnics and physics (electromagnetism) knowledge |
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| **Garant předmětu** | Ing. Miroslav Novák, Ph.D. |
| **Zapojení garanta do výuky předmětu** | Lecturer |
| **Vyučující** | Ing. Miroslav Novák, Ph.D., Ing. Martin Diblík, Ph.D., |
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| **Stručná anotace předmětu** |  |
| The course focuses on the properties, production and processing of materials used in electrical engineering. It aims to explain the contexts of physics and material science in relation to each other. The main topics of lectures are:1. Mass structure, molecules and bonds between atoms, electron energy and band model, properties of electrotechnical materials
2. Physical properties of conductors, electrical resistance, dependence of electrical resistance on temperature, superconductivity, cryo-conductivity
3. Thermoelectric properties, thermal coefficient of linear extensibility, specific thermal conductivity
4. Physical properties of insulators, intrinsic resistivity and surface resistivity, insulator permitivity, dielectric loss factors, electrical strength, mechanical properties, heat resistance, tensile and compressive strength, hardness, viscosity, wettability and water absorption
5. Physical properties of semiconductors
6. Wire and cables materials, requirements for wires, basic properties and distribution of used materials, copper and its alloys
7. Aluminum and its alloys, other electrolytic metals used, bimetals, electrotechnical carbon,
8. Solders, fuse materials
9. Materials for contacts – currentless and current switching, circuit variables during switch on and off - contact requirements.
10. Materials for resistors, types and manufacture of resistors
11. Insulators and dielectrics, properties and distribution, inorganic insulators
12. Organic insulators, types and production of capacitors
13. Magnetic materials, diamagnetic, paramagnetic and ferromagnetic substances, magnetostriction
14. Magnetically soft materials for magnetic circuits of machines, permanent magnets

Practical exercises will be focused on the measurement of properties of substances and principles of design of electrotechnical parts. |
| **Studijní literatura a studijní pomůcky** |  |
| COLCLASER, Roy A. a Sherra DIEHL-NAGLE. Materials and Devices for Electrical Engineers and Physicists. New York: McGraw-Hill, 1985. [KVKLI]SLADE, Paul G. Electrical contacts: principles and applications. New York: CRC Press/Taylor & Francis, 1999. ISBN 978-0-8247-1934-0. [KVKLI]CULLITY, B. D. a C. D. GRAHAM. Introduction to magnetic materials. 2nd ed. Hoboken, N.J.: IEEE/Wiley, c2009. ISBN 978-0-471-47741-9. [KVKLI] |