**Course SYLLABUS form**

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| **Basic data of the subject** |
| **Academic Unit:**  | **Faculty of Mathematics & Natural Sciences – Department of Chemistry** |
| **Course title:** | **Technological Processes** |
| **Level:** | **Bachelor (Bsc)** |
| **Course status:** | **Obligatory** |
| **Study year/Semester:** | **Third Year/Sixth Semester** |
| **Number of hours per week:** | **2 + 2** |
| **Credit value – ECTS:** | **6** |
| **Time / location:** |  |
| **Lecturer:** | **Prof. Asoc. Dr. Bardha Korça** |
| **Contact details:**  | **bardhakorca@gmail.com** |
| **Course description** | Throughout this course, the following topics will be covered: raw materials in the chemical industry. Technological schemes of the chemical technological processes. Materials of general importance. Hydraulic and non-hydraulic (air-based) adhesive materials. Black and colored metallurgy. Inorganic chemical technology. Acids. Alkalis. Artificial mineral fertilizers. Organic chemical industry and similar fields. Oil. Mechanical and chemical processing of wood. Sugar fabrication. Fermentation industry. Beer. |
| **Course objectives:** | During this course, the students will gain insights about the basics of processes for the chemical transformation of raw materials into production tools and goods for consumption, and will learn about the scientific basics of chemical production. Moreover, the students will get familiar with the essential characteristics of the chemical reactions which help the desired transformations (equilibrium and reaction speed; energetic changes), the tools where the transformations will take place, the process direction control in general so that it is conducted efficiently and safely. The students will broaden their horizons and upon finishing the course, they will be able to contribute to the economic development of the country; and will evaluate the negative aspects of these processes and the materials which result from these processes, which damage the environment. |
|  **Learning outcomes:** | **Upon finishing this course, the students will:*** Understand the wide and important application of chemistry in the industry, everyday life and subfields of economy;
* Describe the technological schemes of the chemical technological processes;
* Evaluate the properties of important materials for the everyday life;
* Analyze the characteristics of the chemical reactions from which various products are generated, as well as will study the equipment used during these procedures;
* Evaluate the role of metals and alloys in the industry and everyday life;
* Evaluate the role of acids and alkalis as raw materials in inorganic chemical technology;
* Evaluate the role of oil and its derivatives in the petrochemical industry;
* Analyze the importance of products used everyday and in the industry for human use, and their impact in polluting the environment.
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| **Contribution on student load (must correspond with learning outcomes)** |
| **Activity**  | **Hours** | **week** | **Total /hours**  |
| Lectures | 2 | 15 | 30 |
| Exercise theoretical/laboratory | 0+2 | 15 | 30 |
| Practice work | / | / | / |
| Contact with lecturer/consultations | 1 | 15 | 15 |
| Field exercises | 10 | 1 | 10 |
| Mid-terms, seminars | 1 | 5 | 5 |
| Homework | / | / | / |
| Individual time spent studying (at the library or home) | 3 | 10 | 30 |
| Final preparation for the exam | / | 15 | 15 |
| Time spent in evaluation (tests, quiz, final exam) | 1 | 10 | 10 |
| Projects, presentations, etc. | 1 | 5 | 5 |
| **Total** |  |  | **150** |
| **Teaching methods**  | Teaching methodology is based on: Lectures, exercises, seminars and debates. |
| **Evaluation methods** | First midterm evaluation*: 25%* Second midterm evaluation*: 25%* *Homework and seminars: 10%* *Regular attendance: 5%* *Final exam: 35%* *Total 100%* The final grade will be calculated as follows:51%- 60% = 6 61% -70% = 771% - 80% = 8 81% - 90% = 991%-100% =10 |
| **Literature:** |
| **Basic Literature:**  | Dr.XhevdetPula,Mr.LuljetaBeqiri,TeknologjiaKimike,Prishtinë1985. |
| **Additional Literature**  | Dr.DhimitërHaxhimihali,TeknologjiaKimikeIdheII, Tiranë1992. |

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| **Designed study plan - Lecture:**  |
| **Week** | **Lectures which will be held** |
| ***First week:*** | Objective of the chemical technology. Raw materials in the chemical industry. Technological schemes of technological chemical processes. |
| ***Second week:*** | Fuels. Heat regeneration. Gasification of solid fuels. Plants for the combustion of solid fuels. |
| ***Third week:*** | Hydraulic and non-hydraulic (air-based) adhesive materials. Limestone and gypsum. Cement. Ceramics. Porcelain. Tiles. Fire-resistant materials. |
| ***Fourth week:*** | Metallurgy. Methods for metal production. Wrought iron. Raw material. Wrought iron production in furnace. Steel. Ferronickel, raw material, production and usage. |
| ***Fifth week:*** | Copper. Methods of production. Properties and usage. Alloys of copper. Lead. Methods of production. |
| ***Sixth week:*** | Zinc. Methods of production. Properties. Usage. Aluminum. Raw material. Melted aluminum production from aluminum oxide. Aluminum usage. |
| ***Seventh week:*** | Inorganic chemical technology. Technical (industrial) gases. Acids. Sulfuric acid. Raw material. |
| ***Eighth week:*** | First midterm exam |
| ***Ninth week:*** | Nitric acid. Nitric acid production from ammonium. Hydrochloric acid. Hydrochloric acid production from hydrogen and chlorine. |
| ***Tenth week:*** | Alkalis. Sodium carbonate. Sodium hydroxide. Methods of production. Usage. |
| ***Eleventh week:*** | Mineral artificial fertilizers. Nitrogenous fertilizers. Phosphoric fertilizers. Potassium fertilizers. Mixed (complex) fertilizers. |
| ***Twelfth week:*** | Chemical organic industry and similar fields. Oil. Distillation. Oil derivatives. |
| ***Thirteenth week:*** | Mechanic and chemical wood processing. Technical cellulose. Paper production. |
| ***Fourteenth week:*** | Second midterm exam |
| ***Fifteenth week:*** | Sugar production. Starch. Starch production from potatoes and corn. Fermentation industry. Beer and wine. Soaps and detergents. |
| **Designed study plan – Lab exercise:**  |
| **Nr.** | **Lab exercises which will be held** |
| ***1.*** |  Water hardness determination |
| ***2.*** | Determination of acidic number |
| ***3.*** | Analysis of natural oils (determination of iodic number) |
| ***4.*** | Determination of saponification number |
| ***5.*** | Analysis of soaps and detergents (determination of water in soap) |
| ***6.*** | Analysis of liquid fuels. Determination of the flash point. |
| ***7.*** | Softening and hardening points |
| ***8.*** | Determination of oils through the extraction method according to Soxlet |
| ***9.*** | Determination of viscosity in lubricants according to Engler |
| ***10.*** | CO2 determination in construction materials |
| ***11.*** | Fuel distillation according to Engler |
| ***12.*** | Water softening with ionic exchangers |
| ***13*** | Sulfur determination in fuels |
| ***14*** | Second midterm exam |
| ***15*** | Analysis of synthetic and artificial fibers |

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| **Academic policies and rules of conduct:** |
| * Regular attendance of classes and exercises.
* Compliance with the rules set forth by the university
* Compliance with the lesson schedule and consultation hours.
* Respecting the laboratory and lesson specifics.
* Respecting the code and Statute of the University.
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