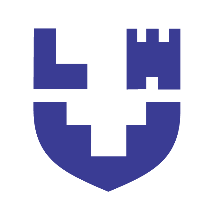
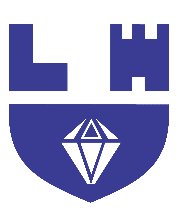
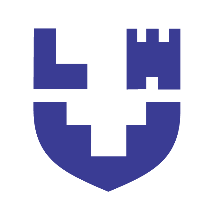
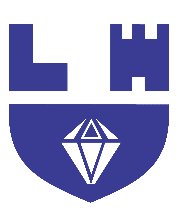
Faculty of Customs, Materials and Technologies - **Lutsk National Technical University**

**Proposal of the subjects for Erasmus+ student**



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| --- | --- | --- |
| UDERGRADUATE STUDY | | ECTS |
| **Alternative fuels** | **Valentyna Tkachuk**  Dr., Professor | 5 |
| **Textile science** | **Olena Pakholiuk**  PhD., associate professor | **5** |
| **Sustainable development for engineers** | **Mykola Melnychuk**  PhD., associate professor | **5** |
| **Food technology** | **Ihor Dudariev**  Dr, Professor | **5** |
| **Innovative surface treatment technologies** | **Natalia Imbirovych**  PhD., associate professor | **5** |
| **Travel & tourism industry** | **Yuliia Dashchuk**  PhD., associate professor | **5** |
| **Research methods and SMART Technologies** | **Mykola Riabchykov**  Dr., Professor | **5** |
| Management of international projects | **Larysa Savosh,**  PhD., associate professor | **5** |
| Cad-graphics and design of machines | **Viktor Sychuk**  PhD., associate professor | **5** |



[Faculty of Customs, Materials and Technologies](https://lutsk-ntu.com.ua/en/faculty-customs-materials-and-technologies)**- Lutsk National Technical University**

WINTER SEMESTER

ALTERNATIVE FUELS

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| **Course disposition** | The course consists of lectures, literature assignment, testing; educational discussion; solving practical problems and discussing situational tasks; performing tasks submitted for independent study. |
| **Department** | Department of Customs, Materials and Technologies |
| **ECTS credits** | 5 |
| **Learning outcomes** | Apply legislation and regulatory framework in the field of production and consumption of alternative fuels; evaluate the consumer properties of these products. |
| **Course description** | The academic discipline provides specialists with a complex of professional knowledge on the basic concepts and categories of commodity science of fuel and lubricants and form the ability and skills to assess the quality of goods in accordance with regulatory requirements, analyse the results of foreign and domestic scientific research on the development and implementation of alternative motor fuels.  Special (subject) competencies: the ability to select and use appropriate methods, tools for studying the quality indicators of motor fuels, apply innovative approaches in the production of alternative motor fuels; determine and evaluate the characteristics of alternative fuels. |
| **Literature** | 1. Aksenov A. F., Seregin E. P., Yanovskii L. S, Modern Paradigm and Prospects of Chemmotology Development. and S. V. Boichenko. Chemistry and Technology of Fuels and Oils. № 4 (578). 2013. Р. 13–20.  2. Tkachuk V.V., Peredrii О.І. Commodity science. Plastic masses, fuel, and lubricants: textbook Lutsk: Lutsk NTU. 2017. 216 p.  3. Bratychak М.М., Babiak L.V. Motor fuels from alternative raw materials: Textbook. Lviv. 2017. 144 p.  4. Topilnytskyi P.І. Physical, chemical and operational properties of commercial petroleum products. Lviv.1015. 248 p.  5. Tkachuk V., Rechun O., Melnic. Iu. Study of operational properties of motor biofuels. Mechanization in agriculture & converving of the resources (International scientific journal). Issue 2, 2019. Bulgaria. P. 70-71.  6. Tkachuk V., Rechun O., Merezhko N., Bozhydarnik T., Karavaiev  T. Assessment of the quality of alternative fuels for gasoline engines. Lecture Notes in Mechanical Engineering. 2020. P. 871-881. DOI.ORG/10.1007/978-3-030-22365-6\_46/  7. Merezhko N., Tkachuk V., Rechun О., Zagoruiko V., Priadko  O. Infrared spectroscopy of gasolines with addition of ethanol. Advanced Manufacturing Processes, 2020. P. 442-450.  8. Merezhko N., Tkachuk V., Rechun О., Zolotariova O., Romanchuk V. Influence of high-octane bioadditives on physical and chemical properties of low-octane gasoline. Lecture Notes in Mechanical Engineering, 2020. P. 367-376.  9. Yakovlieva A., Boichenko S. (2020) Energy Efficient Renewable Feedstock for Alternative Motor Fuels Production: Solutions for Ukraine. In: Systems, Decision and Control in Energy I. Studies in Systems, Decision and Control, vol 298. Springer, Cham.  10. Lapuerta, M., Canoira, L. The suitability of Fatty Acid Methyl Esters (FAME) as blending agents in Jet A-1. Biofuels for Aviation. Feedstoc. Technol. Imp. Р.47 – 84. 2016. |
| **Examination** | Exam |
| **Examiner / Teacher** | Valentyna Tkachuk, Dr., Professor |

TEXTILE SCIENCE

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| **Course disposition** | The course consists of lectures, literary tasks, performance of tasks submitted for independent study. |
| **Department** | Department of Customs, Materials and Technologies |
| **ECTS credits** | 5 |
| **Learning outcomes** | To use appropriate terminology used in textile application  To learn and understand textile terminology  To understand the sources, properties of textile fibers, characteristics of various types of yarns, woven fabrics  To familiarize the weaving process involved to produce woven fabrics |
| **Course description** | The objective of this course is to understand the textile raw material like fibers, fiber source and properties. The conversion of fiber into yarn and yarn spinning process as well as conversion of yarn into varies fabric developments like woven, knit and other forms of fabrics. At the end of the course the students will be able to understand integration of fiber, yarn and various forms of fabrics and integrate their properties, characteristics, performances and behavior according to various end uses of apparel and home furnishing products |
| **Literature** | 1. Commodity of non-food products: a textbook / L.G. Voinash, L.I. Baidakova, M.M. Dianich and others. - К.: «Ukooposvita», 2004. - P. 2. - 532 p.  2. Commodity of non-food products: important and fur products / L.I. Baidakova - K .: Higher School, 2007. - 183 p.  3. Voloshina S.V. Course of lectures on the subject of commodity science (non-food products). Part Commodity of clothing and perfume and cosmetics. – 2017.  4. Baidakova L.I. Commodity science. Non-food products: footwear and fur products: a textbook for students. University / L.I. Baidakova. - К.: High school, 2007. - 183 р.  5. Halyk I.S. Commodity of knitted products: a textbook / I.S. Galik, B.D. Semak; MES of Ukraine. - Lviv: Magnolia-2019, 2011.  6. Pugachevsky GF Commodity science of non-food products. Textile Commodity: a textbook for students. University / G.F. Pugachevsky, B.D. Semak. - К.: 1999. - 595 p.  7. Commodity science of non-food products. Part 1: Textile footwear and haberdashery: Workshop: Textbook. way. / G.F. Pugachevsky, N.P. Tikhonova, N.K. Zimina. - К.:, 2003. - 324 p. |
| **Examination** | Exam |
| **Examiner / Teacher** | Olena Pakholiuk, PhD., associate professor |

SUSTAINABLE DEVELOPMENT FOR ENGINEERS

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| **Course disposition** | The course consists of lectures, literature assignment, project assignment and written examination. |
| **Department** | Department of Customs, Materials and Technologies |
| **ECTS credits** | 5 |
| **Learning outcomes** | -Knowledge of world trends in toward of sustainable development of humankind and the role of engineers in certain ways of developing sustainable technologies;  -Ability to perform calculations of index indicators of sustainable development;  -Ability to use the main set of indicators of sustainable development;  -Apply modern methods of determining environmental, economic and social security of human;  -Apply methods of eco-audit and LSA-analysis during technology design;  -Ability to use strategic planning methods for the development and implementation of technical products and technologies;  -Formed a comprehensive, objective and creative approach to discussing the most acute and complex problems of sustainable development. |
| **Course description** | In most industrialized countries, the engineer is envisaged as a bright individual inventing or designing new products, processes or public works at his1 drawing board. However, his inventiveness might just be channeled too much towards developing clever technology, and too little towards societal needs. Scientifically trained engineers must focus on questions of sustainability and how social and environmental issues impact on technology. This course to give the engineering student insight into the challenge that sustainable development poses to the engineering profession, the contribution of engineering to sustainable development, and the barriers and pitfalls to beware. The engagement of engineers in sustainable development is good for sustainable development, and good for the engineer who wants to broaden his perspective.  ***Course content***: Influence of world consumption and production systems on natural systems. Technology is the culprits or the saviors. Methods of measuring sustainability. Sustainable development and companies. Design and sustainable development. Innovation processes and strategic planning. Technologies for sustainable development. |
| **Literature** | 1. Carl Mulder. Sustainable development for engineers. - Netherlands; Greenleaf, .2011.-288p. 2. B. Allenby and S. Rajan, The Theory and Practice of Sustainable Engineering, Upper Saddle River, NJ: Prentice Hall, 2012. 3. Sustainable development: ecological and economic optimization of territorial production systems: Textbook / NV Karaeva, RV Korpan, T.A. Kotsko and others. / Зазаг. ed. І.В. Nedina. –Sumy: VTD “University Book”, 2008. –384 p 4. Socio-economic potential of sustainable development: a textbook for students. of universities / L.G. Melnik (scientific editor), L. Hans (scientific editor). –Sumy: ITD "Univ. Knjiga", 2007. –1120 p. 5. Course of engineering ecology. Ed. Mazura II .M .: Higher. shk., 1999. .447 s. |
| **Examination** | Individual reflection based on group assignments and written examination Grade - A, B, C, D, E, FX, F |
| **Examiner / Teacher** | Mykola Melnychuk, PhD., associate professor |

FOOD TECHNOLOGY

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| **Course disposition** | The course consists of lectures, literary tasks, performance of tasks submitted for independent study. |
| **Department** | Department of Technologies and Equipment of Processing Industries |
| **ECTS credits** | 5 |
| **Learning outcomes** | The purpose of teaching the course “Food technology” is to study the basic properties of raw materials and finished food products, as well as food production technologies.  After successfully completing this course, a student will have competence in food producing. Also student will be able to apply the principles of food science and food technology to produce safe and quality food products. |
| **Course description** | Lecture topics: Importance of food science and technology. Characteristics of the food industry. Constituents of foods: properties and significance. Nutritive aspects of food constituents. Rheology of processed foods. Quality factors in foods. Food deterioration. Heat preservation and processing. Cold preservation and processing. Food dehydration and concentration. Irradiation, microwave, and ohmic processing of foods. Fermentation and other uses of microorganisms. Milk and milk products. Meat, poultry, and eggs. Seafoods. Fats, oils, and related products. Cereal, grains, legumes, and oilseeds. Vegetables and fruits. Beverages. Confectionery and chocolate products. Dairy product technology. Bakery technology. Minimally processed (fresh-cut) fruits and vegetables: production, quality, and safety. Nonalcoholic and alcoholic beverages. Chocolate manufacturing. Fat and oil processing technology. Meat and meat products: processing, quality, and safety. Poultry manufacturing technologies. Seafood technology. Snack foods. Functional foods. Flavor production. Principles of food packaging. Food processing and the environment. Food safety, risks, and hazards. |
| **Literature** | 1.Advances in food science and technology. (2013). Editor(s): Visakh P. M., Sabu Thomas, Laura B. Iturriaga, Pablo Daniel Ribotta. Scrivener Publishing LLC. https://doi.org/ 10.1002/97811186590832. Handbood of food processing. Food safety, quality, and manufacturing processes. (2016).Editor(s): Theodoros Varzakas, Constantina Tzia.Taylor & Francis Group, LLC.3.Roopan, S. Mohana, & Madhumitha, G. (2018). Bioorganic phase in natural food: an overview*. Importance of Food Science and Technology - Way to Future*. (Chapter 2), 11–23*.*https://doi.org/10.1007/978-3-319-74210-6\_24.Stewart, G.F., Amerine, M.A. (2012). Introduction to food science and technology. Second edn. Academic press INC, Cambridge, M.A.5.Heldman, D.R., & Singh, R.P. (1981). Food process engineering. Springer Science+Business Media B.V. https://doi.org/10.1007/978-94-010-9337-8 6. Potter, N.N., & Hotchkiss, J.H. (1998). Food science. 5th ed. Springer Science+Business Media New York.  7. Heldman, D.R., & Hartel, R. (1998). Principles of food processing. New York: Chapman & Hall. |
| **Examination** | Exam |
| **Examiner / Teacher** | Igor Dudarev, Dr., Professor |

INNOVATIVE SURFACE TREATMENT TECHNOLOGIES

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| **Course disposition** | The course consists of lectures, literary tasks, performance of tasks submitted for independent study. |
| **Department** | Department of Customs, Materials and Technologies |
| **ECTS credits** | 5 ECTS |
| **Learning outcomes** | Obtaining theoretical and practical training on the main technological processes and methods of impact on the surface layer of metal, as well as acquaintance with the processes occurring in the implementation of surface treatment and restoration of products.  The study of the discipline will allow you to choose the most optimal technological processes, taking into account the savings of metal, energy and labor resources. |
| **Course description** | The discipline is a source of theoretical knowledge about methods of surface hardening of materials in the implementation of real technologies. Theoretical information, comparative tables and schemes of separate methods of surface hardening of materials are considered. The problem of wear of products and methods of their restoration is studied. Changes of the main characteristics of metal after application of surface treatment by methods of plastic deformation are given. |
| **Literature** | 1. Methods of local surface treatment and restoration of products [Textbook for students of technical specialties] / N.Yu. Imbirovich, VI Schwabyuk, M.D. Klapkiv, VM Moved. - Lutsk: RVV LNTU, 2013. - 245 p. 2. Technology of construction materials: Textbook / MA Sologub, IO Rozhnetsky, OINekoz, etc .; For the order. MA Sologuba. - 2nd ed., Revised. and add.- K .: Higher school., 2002. - 374 p. 3. Technology of construction materials: Textbook / MA Sologub, IO Rozhnetsky, OINekoz, etc .; For the order. MA Sologuba. - 2nd ed., Revised. and add.- K .: Higher school., 2002. - 374 p. 4. Kharyakov A.V. Peculiarities of structure formation of coatings applied by plasma-powder method // Bulletin of Kharkiv State Technical University of Agriculture, Vip. No. 47 Technical service of the agro-industrial complex, equipment and technologies for the agricultural machinery industry. - Kharkiv. - 2006. - P.230-238. 5. Walsh, F.C., Low, C.T.J., Wood, R.J.K., Stevens, K.T., Archer, J., Poeton, A.R. & Ryder A.: Plasma electrolytic oxidation (PEO) for production of anodised coatings on lightweight metal (Al, Mg, Ti) alloys, Transactions of the IMF, 87:3, 122-135, (2009). DOI: 10.1179/174591908X372482 6. Povstianoi, O.Y., Rud, V.D., Imbirovych, N.Y. et al. Optimization of the Properties of Multilayer Porous Permeable Materials. Mater Sci 56, 530–535 (2021). 7. Special coatings in mechanical engineering: textbook. way. / AG Fesenko, MM Ubizky, OV Kulik, DI Shevchuk. - D: RVV DNU, 2009 - 92 p. |
| **Examination** | Exam |
| **Examiner / Teacher** | Natalia Imbirovych, PhD., associate professor |

**TRAVEL & TOURISM INDUSTRY**

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| --- | --- |
| **Course disposition** | class |
| **Department** | Department of Tourism, Hotel and Restaurant Business |
| **ECTS credits** | 5 ECTS |
| **Course description** | The purpose of teaching the course “Travel & tourism industry” is preparing highly qualified specialist with knowledge and skills of the nature and characteristics of travel and tourism.  After successfully completing this course, a student should be able to:  describe the functioning of the tourism and travel industry; understand the role of the different actors of the tourism and travel industry; promote a mutual and cultural understanding; describe tourism fluxes and indentify main tourism generating countries; describe the role of the government and the private sector in sustaining tourism development. |
| **Lecture topic** | Introduction to travel and tourism. The structure and organization of the travel and tourism industry. Technology of preparation of a trip. Tourism culture and society. Travel technology. Tourism policy and planning. Specialization in travel and tourism. Tourism and hospitality trends. |
| **Literature** | 1. Richard Sharpley (2012). Travel and Tourism. SAGE Publications Ltd. 2. Gooroochurn, N., & Sugiyarto, G. (2005). Competitiveness indicators in the travel and tourism industry. Tourism Economics, 11(1), 25–43. 3. Hall, C. M. (2008). Tourism planning: Policies, processes and relationships. Harlow: Pearson Education. 4. Dennis E. Deuschl (2012). Travel and tourism public relations. SAGE, 273. 5. Hall, C. M., & Page, S. J. (2014). The geography of tourism and recreation: Environment, place and space. New York: Routledge. 6. Holden, A. (2016). Environment and tourism (3rd ed.). London: Routledge |
| **Examination** | Exam |
| **Examiner / Teacher** | Yuliia Dashchuk, PhD., associate professor |

RESEARCH METHODS AND SMART TECHNOLOGIES

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| **Course disposition** | class |
| **Department** | Department of Light industry |
| **ECTS credits** | 5 ECTS |
| **Course description** | The purpose of teaching the course "Research methods and smart technologies" is to train specialists able for independent solution of problems that are characterized by uncertainty of conditions and requirements, taking into account the latest achievements in the field of smart technologies.  The main competencies after completing the course include knowledge of the main research methods and modern smart technologies, the ability to apply the main methods and technologies in specific situations, communication in the search for new methods and technologies, independent formation of judgments in the direction of processing obtained results and introducing new technologies.  In addition, the student should be able to: solve engineering and technological problems; with the use computer, nano and smart technologies. |
| **Lecture topic** | Principles of scientific research. Analysis and synthesis. Deduction and induction. Mathematical research methods. Development of theoretical models. Application of modern digital technologies. Methods and equipment for experimental research. Experiment planning. Processing of experiment results. Smart technologies and smart textiles. Electronic labels and transponders. Smart clothes with the possibility of energy saving. Magnetic nanotextile. |
| **Literature** | 1. Miguel Centellas. (2016) *Research Methods Handbook*. University of Mississippi 2. Shanti Bhushan Mishra, Shashi Alok. (2019) *Handbook of Research Methodology*. Dwarka, New Delhi. 3. Tilak Dias. (2015) *Electronic Textiles. Smart Fabrics and Wearable Technology*. Cambridge, Elsevier Ltd. 4. Rebeccah Pailes-Friedman (2016) *Smart textiles for designers. inventing the future of fabric*s. London, Laurence King Publishing. 5. Nazire D. Yilmaz. (2019) *Smart Textiles. Wearable Nanotechnology*. Hoboken, Scrivener Publishing. 6. Mykola Riabchykov, Alexandr Alexandrov, Roman Trishch, Anastasiia Nikulina, Natalia Korolyova (2022) *Prospects for the Development of Smart Clothing with the Use of Textile Materals with Magnetic Properties.* Tekstilec, 2022, Vol. 65(1), 36–43 |
| **Examination** | Exam |
| **Examiner / Teacher** | Mykola Riabchykov  Dr., Professor |

**MANAGEMENT OF INTERNATIONAL PROJECTS**

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| **Course disposition** | Class |
| **Department** | International Economic Relations |
| **ECTS credits** | 5 ECTS |
| **Course description** | The purpose of the course “Management of International Projects” is to prepare qualified specialists with the knowledge on the use of modern project approaches to solving problems of management processes at different levels, focus on achieving results with minimal time and money, and mastering project management methodology as a progressive management tool.  The student will be able to carry out substantiation and selection of international projects; build a team in an international project and manage it; draw up a schedule of project activities and monitor its implementation; identify possible project risks and develop measures to reduce them; manage conflicts in international projects. |
| **Lecture topic** | Project Management in Organizations. Strategic Management and Project Selection. The Project Manager. Managing Conflicts and Negotiation. Project in the Organizational Structure. Project Activity and Risk Planning. Budgeting Estimating Costs and Risks. Scheduling. Resource Allocation. Monitoring and Information Systems. Project Control. |
| **Literature** | 1. Kerzner, H. (2017). Project Management: A Systems Approach to Planning, Scheduling, and Controlling (12th Ed). Wiley.  2. Kerzner, H. (2017). Project Management: Case Studies (5th Ed). Wiley.  3. Meredith, J. & Mantel, S. (2017). Project Management: A Managerial Approach (10th Ed). Wiley.  4. PMI Standards Committee (2017). A Guide to the Project Management Body of Knowledge (6th Ed). Project Management Institute: Upper Darby, U. S. A |
| **Examination** | Exam |
| **Examiner / Teacher** | Larysa Savosh, PhD., associate professor |

**CAD-GRAPHICS AND DESIGN OF MACHINES**

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| **Course disposition** | class |
| **Department** | Applied mechanics and mechatronics |
| **ECTS credits** | 5 ECTS |
| **Course description** | The purpose of teaching the course “CAD-graphics and design of machines” is preparing highly qualified specialist with knowledge and skills in using CAD/CAM/CAE software designing machine building parts and assemblies.  As a result of completion of the discipline "CAD-graphics and design of machines" students will be able to: design in CAD software products (AutoCAD, SolidWorks, PowerShape) parts and components from them in three-dimensional space; form drawings of designed products (AutoCAD, SolidWorks); conduct "virtual" tests of the developed models of parts and mechanisms (SolidWorks Simulation); eliminate possible shortcomings of the developed designs, at the stage of computer modeling, and not after the already made and tested prototype (SolidWorks Simulation); develop technology of manufacturing of the designed parts and mechanisms (FeatureCAM, Mach3, LinuxCNC); get acquainted with the work of modern equipment in the field of engineering design, namely with lathes, milling and laser machines equipped CNC systems, 3D printer and 3D scanner, electronic digital microscope. |
| **Lecture topic** | Basic information and development of CAD systems. Methods and principles of designing elements in CAD systems. CAE systems for virtual testing of designed products. CAM systems for creating manufacturing technologies. Equipment with numerical program control. Additive technologies and 3D scanning. Software that controls automated equipment. |
| **Literature** | 1. A.A. Alyamovsky. Engineering calculations in SolidWorks – M.: DMK Press, 2010. – 464 p.  2. Programming and adjustment of CNC equipment [Text]: Methodical instructions for practical classes for applicants of the first (bachelor's) level of higher education educational-professional program "Applied Mechanics" field of knowledge 13 Mechanical Engineering specialty 131 Applied mechanics of full-time and part-time forms of education / V.A. Sychuk. - Lutsk: Lutsk NTU, 2020. - 32 p.  3. CAD cutting tools, equipment and technological processes [Text]: Methodical instructions for practical classes for students majoring in 131 "Applied Mechanics" full-time and part-time forms of education / style. V.A. Sychuk. - Lutsk: Lutsk NTU, 2017. - 28 p  4. Help information in SolidWorks, AutoCAD, PowerShape, FeatureCAM, Mach3, Linux CNC EMC2. |
| **Examination** | Exam |
| **Examiner / Teacher** | Viktor Sychuk, PhD., associate professor |