**Syllabus**

| Discipline’s code | Discipline’s title |  | | | Number of ECTS | SWST  Self-work of student with teacher in hours | SWST  Self-work of student without teacher in hours |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Lect. | Pract. | Lab. |  |  |  |
| - | Commercialization of innovative products, start-up initiatives for future engineers | 14 | 4 | - | 2 (60 hours) | 4 | 38 |

| Academic presentation of the course | **Aim of course:**  To acquaint with the concept and policy of innovation, to provide the knowledge and skills to discover the connection between innovation and research and development, and to apply in the development of innovation and understand the basics of innovation, their importance in the context of engineering sciences and intellectual property synthesis for the student.  **As a result of studying the discipline, students should be able to:**  1. Will have the knowledge of the characteristics of innovation as an object of intellectual property;  2. Will be able to select appropriate research methods and adapt and apply them based on the elements of the research process structure, will be able to offer innovative solutions for the development of start-ups;  3. Will be able to distinguish and analyze the stages of the innovation development process;  4. Will be able to understand the significance of project management and business interfaces;  5. Understand the importance of engineering & technological solutions and economic consequences and be able to analyze and evaluate them. |
| --- | --- |
| Prerequisites | Knowledge of the characteristics of economically attractive products. Cost-benefit analysis for development of the new product. Knowledge about the development, application and improvement of general engineering technologies, design of a new and / or existing product in the field of specialized engineering, project preparation for the development and/or implementation of an object in its intended field.  Disciplines in the field of engineering - fundamental sciences: mathematics, parts of physics (mechanics, electronics, hydraulics); economy.  *Primary:*  Sustainable environment;  Environmental pollution prevention;  Methodology of Environmental Research;  Environmental projects;  Management and operation of environmental systems.  *Secondary:*  Technological creativity and scientific knowledge;  Economic substantiation of engineering solutions;  Fundamentals of Innovation Management;  Advanced Technology Physics;  Innovation Strategy and Tactics;  The latest construction technologies;  Design of Innovative Products. |
| Post requisites | It will be useful for modules in the areas of technological development, research and innovation and business engineering. This module will provide an opportunity to gain knowledge about the path from the formation of a new idea to the creation of a start-up for specialized engineering study modules. Management and/or industrial engineering where an already developed innovation will be implemented, manufactured and/or marketed, commercialized and/or licensed.  *Primary:*  Scientific Research and Innovation;  Innovative environmental technologies;  Cleaner production;  Ecological design.  *Secondary:*  Optimization Methods;  Innovative scientific solutions;  Production process improvement and innovation;  Production modeling and industrial production systems;  Commercial Market Research in the Context of Design;  New Product Development Process;  Experimental design of a design object;  Product (product) identity and presentation;  Optimization Theory and Methods in Engineering;  Project preparation and management;  Production planning and organization;  Industrial Marketing and Human Resource Management;  Quality Management and Optimization;  Business projects. |
| Information resources | **Literature:**  Adams R, Transfield D, Denyer D. 2011. A taxonomy of innovation: Configurations of attributes in healthcare innovations. *Int J Innov Manag*. 15(2):359-392. doi:10.1142/S1363919611003192  Badiru A, Lamont G. Managing Innovation Projects. In: ; 2021:179-216. doi:10.1201/9781003022008-8  Chen X, Liu Z, Zhu Q. Performance evaluation of China’s high-tech innovation process: Analysis based on the innovation value chain. *Technovation*. Published online 1 March 2018. doi:10.1016/j.technovation.2018.02.009  Collis J, Hussey R. *Business Research: A Practical Guide for Undergraduate and Postgraduate Students*.; 2014.  G. A, Yilmaz C. Innovative Capability, Innovation Strategy and Market Orientation: An Empirical Analysis in Turkish Software Industry. In: ; 2019:139-181. doi:10.1142/9781786346520\_0007  Garcia R, Calantone R. A Critical Look at Technological Innovation Typology and Innovativeness Terminology: A Literature Review. *J Prod Innov Manag*. 2002;19:110-132. doi:10.1111/1540-5885.1920110  Henry P. Why Some Startups Succeed (and Why Most Fail).  Hirschman E. Innovativeness, Novelty Seeking, and Consumer Creativity. *J Consum Res*. 1980;7:283-295. doi:10.1086/208816  Junarsin E. Managing Discontinuous Innovation. 2021;5.  Lerman C. Patent Strategies of Technology Startups: An Empirical Study. *SSRN Electron J*. Published online 1 January 2015. doi:10.2139/ssrn.2610433  Liu Z, Chen X, Chu J, Zhu Q. Industrial development environment and innovation efficiency of high-tech industry: analysis based on the framework of innovation systems. *Technol Anal Strateg Manag*. Published online 7 June 2017:1-13. doi:10.1080/09537325.2017.1337092  Livingston J. *Founders at Work: Stories of Startups’ Early Days*.; 2008. doi:10.1007/978-1-4302-1077-1  MacArthur M, Naylor LA, Hansom JD, Burrows MT. 2020. Ecological enhancement of coastal engineering structures: Passive enhancement techniques. Sci Total Environ. 740:139981. doi:https://doi.org/10.1016/j.scitotenv.2020.139981  Mosey S, Clare J, Woodcock D. Innovation decision making in British manufacturing SMEs. *Integr Manuf Syst*. 2002;13:176-184. doi:10.1108/09576060210416625  Nafula K. Effect of innovation on firm competitiveness: a study of small and medium enterprises in the manufacturing sector in Nairobi city country, Kenya. Published online 2017.  Nasrollahzadeh A. 2010. Caspian Sea and its Ecological Challenges. Casp J Env Sci. 8.  O’Shaughnessy KA, Hawkins SJ, Evans AJ, et al. 2020. Design catalogue for eco-engineering of coastal artificial structures: a multifunctional approach for stakeholders and end-users. Urban Ecosyst. 23(2):431-443. doi:10.1007/s11252-019-00924-z  Quintane E, Casselman R, Reiche B, Nylund P. Innovation as a Knowledge-Based Outcome. *J Knowl Manag*. 2011;15. doi:10.1108/13673271111179299  Sharma R. Role of Start-up Activities during Firm Formation and Development: Review Paper. *J Entrep Manag*. 2014;3(3):46-55.  Swann GMP. The Economics of Innovation: An Introduction. *Econ Innov An Introd*. Published online 1 January 2009.  Zeinolabedin Y, Yahyapour M, Shirzad Z. 2009. Geopolitics and Environmental Issues in the Caspian Sea. Casp J Env Sci. 7.  Zemlickienė V, Maditinos D. Marketing Strategy Formulation for Innovative Product Development Process. *Verslas Teor ir Prakt*. 2012;13:365-374. doi:10.3846/btp.2012.38  **Internet-resources:**  Startup Lithuania database. https://www.startuplithuania.com/  StartupDefinition. https://startupdefinition.com/ |

Calendar (schedule) the implementation of the course content**:**

| Week / date | Topic title (lectures, practical classes, Independent work of students, IWS) | Number of hours | Maximum score |
| --- | --- | --- | --- |
| 1 | 2 | 3 | 4 |
| 1 | Lecture 1. Concept and classification of innovation, key concepts of innovation | 2 | 5 |
| 2 | Lecture 2. The concept of a start-up, its development models, funding opportunities and tools. Funding as an economic driver of innovation | 2 | 5 |
| 3 | Lecture 3. Concept and peculiarities of innovation implementation system, analysis of innovation implementation models and aspects of main stages | 2 | 5 |
| Practical class 1. How start “To make an innovation and to prepare a patent”. Real example and practice for preparation.  Homework: student makes algorithm from personal chosen idea to innovation: principal design, short description (Patent type), possible application and foundation, future development | 2 | 15 |
| 4 | Self-work of student with teacher 1: SWST:  Consulting for the course and homework content | 2 | 0 |
| 5 | Lecture 4. Analysis of factors which stimulate innovation. Innovation and internationalization as a promising area of research. Innovation System Management and Maintenance. The role of science and technology parks | 2 | 5 |
| 6 | Lecture 5. A study of start-up development based on a real example. Methodology. Change of idea during start-up development, selection of funding sources. Start-up Problems and Success Factors and Case Study | 2 | 5 |
| 7 | Lecture 6. Engineering technologies of Coastal Ecosystems. Climate change adaptation innovations. | 2 | 5 |
| 8 | Lecture 7. Ecosystem problems in the Caspian region. Ecological enhancement of coastal engineering structures | 2 | 5 |
| 9 | Self-work of student with teacher 2: SWST:  Consulting for the full course content | 2 | 0 |
| 10 | Self-study without teacher 1:  Analysis of the information during the lectures;  Preparation and Submission of Homework | 14 | 15 |
| 11 | Practical class 2. Conclusions and discussion about Practical class 1 and Homework results | 2 | 15 |
| 12 | Self-study without teacher 2:  Analysis of the information during the lectures;  Preparation for Exam | 24 | 20 |