



START-UP MANAGEMENT (30-4)

Curriculum summary (Syllabus)

1. Details of the academic discipline

Higher education level	Second (master's)
Branch of knowledge	14 Electrical engineering; 18 Production and technologies
Specialty	141 "Electric power engineering, electrical engineering and electromechanics"; 184 "Mining"
Educational program	Systems of supplying consumers with electric energy; Energy management and energy-efficient technologies; Engineering of intelligent electrotechnical and mechatronic complexes; Engineering of automated electrotechnical complexes
Status	Mandatory
Form of education	Full-time education
Year of training, semester	5th year, autumn semester
ECTS workload	3 credits/90 hours (lectures: 18 hours, practical: 36 hours, SS: 36 hours)
Semester control/control measures	Credit, modular test
Class schedule	According to the timetable: http://rozklad.kpi.ua/Schedules/
Teaching language	English
Tutors	Lecturer/practical classes: Julia Yereshko associate professor of the Department of Economic Cybernetics, Doctor of Economic Sciences, Associate Professor, contact details: e-mail: julia.jereshko@gmail.com Telegram: +380679106326
Links	https://campus.kpi.ua https://classroom.google.com/c/NTQ4NDA0OTk0NjMy?cjc=7mww7vm

2. Academic discipline programme

1. Course description, goals, objectives, and learning outcomes

The discipline "Start-up Management" studies the theoretical and practical foundations of modern economic, motivational, legal means, methods and forms of startups' management in order to build a successful business model.

"Start-up management" as a course combines both specialized and interdisciplinary knowledge. Each start-up project, built on an individual innovative idea, is unique and requires the involvement of professionals in various engineering areas of training, so current course will be useful for all technical areas that form a powerful innovative and scientific potential. Special knowledge reflects the specifics of the industry to which the enterprises belong. The study of this discipline is based on the concepts and notions of management theory, innovation management, and intellectual property. This determines the relevance of the training course "Start-up management" in the cycle of mandatory disciplines for master's training in the field of electrical engineering and mining.

The subject of the discipline "Start-up Management" is a system of theoretical knowledge and applied abilities and skills in the creation and managing the start-up projects.

The goal of the course is to form a knowledge system and master a set of practical skills related to managing the development, support, development of a start-up project, its marketing, organizational planning, and financial justification by using modern innovation management tools, project management, business analytics, and business modelling.

The course is aimed at forming the following competencies in students:

GC1 – Ability to search, process and analyse information from various sources..

GC2 – Ability to use information and communication technologies.

GC3 – Ability to apply knowledge in practical situations.

GC6 – Ability to learn and master modern knowledge.

GC7 – Ability to identify and assess risks.

PC6 – Ability to manage projects and evaluate their results.

PC7 – The ability to develop plans and projects to ensure the achievement of a specific goal, taking into account all aspects of the problem being solved, including production, operation, maintenance and disposal of equipment of electric power, electrotechnical and electromechanical complexes.

PC09 – Ability to use software for computer modelling, automated design, automated production and automated development or construction of elements of electrical power, electrotechnical and electromechanical systems.

PC10 – Ability to demonstrate awareness of intellectual property and contract issues in electricity, electrical engineering and electromechanics.

The goals of the course are realized through the achievement of the following program learning outcomes:

PLO02 – Outline a plan of measures to increase the reliability, safety of operation and prolong the resource of electric power, electrotechnical and electromechanical equipment and relevant complexes and systems.

PLO08 – Take into account the legal and economic aspects of scientific research and innovative activities.

PLO15 – Take into account modern trends in the development of physics and technology of renewable energy sources when designing renewable energy facilities using the energy of the Sun, wind, water, low-potential energy sources, geothermal energy, the energy of bioresources and the potential of cogeneration and energy conservation.

2. Prerequisites and post-requisites of the discipline

Prerequisites: The discipline requires basic knowledge of economics and production organization.

Post-requisites: The discipline will be useful for completing a master's thesis

3. Content of the academic discipline

Topic 1. The essence and features of start-up projects.

Topic 2. Development of a start-up business idea

Topic 3. Formation of a start-up project team.

Topic 4. Business modelling of a start-up

Topic 5. Marketing planning of a start-up

Topic 6. Investment and financial support of a start-up.

Topic 7. Presentation of start-up projects

4. Educational materials and resources

Core literature

1. Dunn, P., & Cheatham, L. (1993). Fundamentals of small business financial management for start up, survival, growth, and changing economic circumstances. *Managerial Finance*.
2. Davila, A., & Foster, G. (2007). Management control systems in early-stage startup companies. *The accounting review*, 82(4), 907-937.
3. Davila, A., Foster, G., & Jia, N. (2010). Building sustainable high-growth startup companies: Management systems as an accelerator. *California Management Review*, 52(3), 79-105.
4. Blank, S., & Dorf, B. (2020). *The startup owner's manual: The step-by-step guide for building a great company*. John Wiley & Sons.
5. Masters, B., & Thiel, P. (2014). *Zero to one: notes on start ups, or how to build the future*. Random House.
6. Catlin, K., & Matthews, J. B. (2001). *Leading at the Speed of Growth: Journey from Entrepreneur to CEO*. Wiley.

Additional literature

1. Gritzo, L. (2017). *Radical Candor: Be a Kick-Ass Boss Without Losing Your Humanity*.
2. Horowitz, B. (2014). *The hard thing about hard things: building a business when there are no easy answers*. Harper Collins.
3. Livingston, J. (2008). *Founders at work: Stories of startups' early days*. Apress.
4. Reis, E. (2011). *The lean startup*. New York: Crown Business, 27, 2016-2020.
5. Kornblum, R. (2016). *Never too Late to Startup*. Lioncrest.

Useful links

1. Osterwalder business model canvas. URL: <https://www.intemarketing.org/marketing-information/marketing-models/osterwalders-business-model-canvas>
2. Kickstarter: URL: <https://kickstarter.com>
3. RocketHub: URL: <https://rockethub.com>
4. TechUkraine: URL: <https://techukraine.org>
5. Pitch templates: URL: <https://pitchdeckexamples.com>

3. Educational content

5. Methods of mastering the educational discipline (educational component)

The following teaching methods are used to master the discipline:

methods of organization and implementation of educational and cognitive activities – lectures, practical classes, independent work, working with educational and methodological literature, information resources;

methods of controlling the effectiveness of educational and cognitive activities – survey, testing, assessment of case execution, assessment of creative and educational and research tasks, modular control work; performance of educational tasks;

general teaching methods – method of problem and problem-search presentation, explanatory-illustrative, heuristic, reproductive, interactive, research, reproducible method when performing modular test;

special teaching methods – case method, creative tasks, teamwork;

methods of creating interest and motivating educational and cognitive activities – presentations, performance of an educational and research task, analytical report, discussion, methods of creating ideas, methods of solving creative tasks.

Mastering the educational component involves appropriate teaching and assessment methods that will ensure the achievement of program learning outcomes.

Correspondence of program results, teaching methods and assessment forms

<i>PLO</i>	<i>Teaching methods</i>	<i>Assessment forms</i>
1	2	3
PLO 02, PLO 08, PLO 15	<p><i>methods of organization and implementation of educational and cognitive activities</i> – lectures, practical classes, independent work, working with educational and methodological literature, information resources;</p> <p><i>methods of controlling the effectiveness of educational and cognitive activities</i> – survey, testing, assessment of case execution, assessment of creative and educational and research tasks, modular control work; performance of educational tasks;</p> <p>general teaching methods – method of problem and problem-search presentation, explanatory-illustrative, heuristic, reproductive, interactive, research, reproducible method when performing modular test;</p> <p><i>special teaching methods</i> – case method, creative tasks, teamwork;</p> <p><i>methods of creating interest and motivating educational and cognitive activities</i> – presentations, performance of an educational and research task, analytical report, discussion, methods of creating ideas, methods of solving creative tasks.</p>	<p>A rating evaluation system, which provides for the accumulation of points for: answers during the survey, execution of cases, creative and educational and research tasks on the development of a start-up project, execution of educational tasks, modular control work.</p> <p>Calendar control: first and second certification.</p> <p>Final control - credit.</p>

Note: PLO is a programme learning outcome

The curriculum includes 18 hours of lectures and 36 hours of practical classes, modular control.

Calendar-thematic plan and structural-logical construction of course study

Week of training	Titles of sections, topics	Distribution of hours		Description of classes
		L.	P.	
1	2	3	4	5
1–2	Topic 1. <i>The essence and features of start-up projects.</i>	2	4	<p>L. Historical prerequisites for the emergence of start-ups. The essence of the concepts "management" and "start-up". Differences between a start-up company and a traditional enterprise. 4. The best stories of creating start-ups.</p> <p>P 1. Survey on the topic <i>Essence and features of start-up projects.</i></p> <p>P 2. Educational task for teamwork: determining whether projects belong to startups</p>
3–4	Topic 2. <i>Development of a start-up business idea</i>	2	4	<p>L. Start-up business idea and product idea. Development of a minimum viable product. Testing the viability of a start-up idea. Verification of minimum viable product.</p> <p>P 1. Group task: formulation and implementation start-up project ideas</p> <p>P 2. Training of practical skills: formation and development of a minimally viable innovative product</p>

5–7	Topic 3. <i>Formation of a start-up project team.</i>	4	6	<p>L. 1. Formation of the start-up project team. Team and group. Stages of team development. Models of effective team formation.</p> <p>L. 2. Stages of team development. Types of commands. Team efficiency curve. Team roles. Team building</p> <p>P 1. Business game - "Formation of an effective team".</p> <p>P 2. Team building training - Rivalry and cooperation in team building</p> <p>P. 3. Training of practical skills: formation and scaling of a start-up team, distribution of start-up shares among participants.</p>
8–10	Topic 4. <i>Business modelling of a start-up.</i>	4	6	<p>L. The essence, types and features of the business model of start-ups. Business model - Canvas template. Building a business model based on the Lean Canvas template. Configurations of business model templates.</p> <p>P 1. Creative task - The process of transforming a business idea into a business model</p> <p>P 2. P 3. Practical skills training: Building a Business Model Canvas by O. Osterwalder and I. Piñet for your own business idea</p>
11–13	Topic 5. <i>Marketing planning of a start-up.</i>	2	6	<p>L. Peculiarities of start-up marketing. Methods of evaluating the start-up market. Interaction with start-up consumers. Advertising and promotion of the product of the start-up project. Marketing strategy and marketing plan of a start-up project</p> <p>P 1. Situational task "Describe the field of competition high-tech start-up project"</p> <p>P 2. Group assignment based on cases "Marketing promotion and formation of the online reputation of start-ups in energy sector"</p> <p>P 3. Training of practical skills: Marketing analysis of a start-up project for the implementation of one's own business idea</p>
14-15	Topic 7. <i>Investment and financial support of a start-up.</i>	2	4	<p>L. Sources for start-up investment. Assessment of investment attractiveness and value of start-ups. Cooperation of start-ups with investors. Investor participation in a start-up project and its exit</p> <p>P. 1. Exercise for individual performance: drawing up an investment proposal</p> <p>P 2. Business game "Choosing and justifying sources of funding for a startup project"</p>
16-17	Topic 8. <i>Presentation of start-up projects.</i>	2	4	<p>L. The structure of the startup project presentation. Startup project presentation form</p> <p>P. 1. P.2 Training of practical skills: presentation of the developed startup project</p>
18	Modular test		2	Includes theoretical and test tasks

	Total	18	36	
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Note: L - lectures, P - practical classes, T - teaching methods, C - control measure, PLO - program learning outcomes, GC - general competences, PC - professional competences.

6. Self-study

The curriculum provides 36 hours of self-studying. Each student is expected to be prepared for classes. Homework will also consist of a weekly assignment to hand in one article on the class topic, included with a short personal reflection or summary. The assignments will be further explained in class. Please refer to the Course Outline for the classes and topics that will be discussed. Additionally, one of the requirements of the course is that students take an assessment of the assigned reading before it is covered in class.

Following is assigned to self-study:

1-2	2	<i>Topic 1. Preparation for a survey in a classroom session: life cycle of a start-up, features of a start-up project. Processing and understanding of information from lectures</i>
3-4	2	<i>Topic 2. Preparing a creative task: minimally viable innovative product. Processing and understanding of information from lectures</i>
5-7	2	<i>Topic 3. Preparing a creative task: formation and scaling of the start-up team. Processing and understanding of information from lectures</i>
8-10	2	<i>Topic 4. Preparing a creative task: construction of the Business Model Canvas based on ones by O. Osterwalder and I. Piñet. Processing and understanding of information from lectures</i>
11-13	4	<i>Topic 5. Preparing a research task: analysis of the market, consumers and competitors of a start-up, SWOT analysis of a start-up, formation of a promotion strategy, preparation of a marketing budget. Processing and understanding of information from lectures</i>
14-15	4	<i>Topic 6. Preparing a research task: development of a business plan for a start-up project. Processing and understanding of information from lectures</i>
16-17	4	<i>Topic 7. Preparing a creative task which is to be presented in a classroom session: presentation of the developed start-up project. Processing and understanding of information from lectures</i>
18	4	<i>Preparation for the modular test</i>
	6	<i>Preparation for the credit</i>

Policy and Control

7. Course policy

- **Attendance** at lectures is not evaluated but is desirable, as the study material is presented in an accessible form and there is an opportunity to discuss discussion issues and clarify unclear points. For applicants for higher education who want to demonstrate excellent learning outcomes, active work in lectures is essential. However, it is not necessary to work off the missed lectures.
- **Active student participation in seminars is mandatory.** The student's rating will be largely formed based on the results of his work in seminars. Each missed seminar (regardless of the reasons for skipping) lowers the final rating in the discipline. If you miss a seminar, you must study the topics and complete all the tasks. The control of knowledge (understanding) by the student of the missed subjects (performance of tasks) will take place during communication with the teacher according to the schedule of consultations available on a site of department of psychology and pedagogics. The student who completes the relevant tasks (answer the questions) will receive the appropriate points for the rating depending on the quality of the answers (task completion).
- Compliance with set **deadlines** is mandatory. Any work submitted after the deadline is not credited or reassigned. At the same time, if the control measures are missed for good reasons (illness or other important life circumstances), the student is given an additional opportunity to compile them.
- Any work with **existing plagiarism and violation of academic integrity** is not credited or reassigned. The policy and principles of academic integrity are defined in Section 3 of the National

Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute" Code of Honour. Details: <https://kpi.ua/code>.

- **Penalty points for the discipline are not provided.**
- Students can be awarded **incentive points** for the following types of scientific and research work (even in the absence of such points, the student has the opportunity to gain the maximum rating):
 - conducting research work within the subject of the course, the results of which are presented in the form of a published (recommended for publication) scientific article, essay, etc. (weight score - up to 10);
 - conducting research work within the subject of the course, the results of which are presented in the form of published (recommended for publication) abstracts at a scientific / scientific-practical conference (weight score - up to 10);
 - participation in competitions of scientific works corresponding to the subject of the discipline (weight score - up to 10).
- **Norms of ethical behaviour** of students and employees are defined in section 2 of the National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute" Code of Honour

8. Monitoring and grading policy (rating evaluation system)

At the first class the students are acquainted with the grading policy which is based on Regulations on the system of assessment of learning outcomes https://document.kpi.ua/files/2020_1-273.pdf The student's rating in the course consists of points (100 max) that they receive for:

- participation in classes (survey, participation in the discussion based on the results of case studies);
- educational tasks (individual and team work);
- practical tasks (educational, research and creative tasks);
- modular test

Current control:

- *Answers in practical classes (survey)* (max 15 points).
Calculation per one answer in a practical session (3 max):

5 points	Active participation, complete answers during the survey
4 points	The answer to the question is not fully explained, but the main aspects are revealed
3 points	Answer with significant inaccuracies that require clarification
0 points	No answer

educational tasks (individual and team work) (max 35 points).

Calculation per one task (7 tasks):

5 points	The task was performed qualitatively, the results are substantiated and proven
4 points	The task is completed with certain inaccuracies or does not contain justifications
3 points	Task not completed

practical tasks (educational, research and creative tasks):

6 points	Impeccably executed task, all its components are justified
5 points	There are certain shortcomings in the performance of the task, which do not significantly affect its result
4 points	The task is partially completed or contains shortcomings that significantly affect its result
0 points	Task not completed

- **Calendar control:** is held twice a semester.
 - 8th week Certification condition: current rating of at least 25 points.
 - 15th week Certification condition: current rating of at least 42 points. A modular control work has been completed.

Modular test (MT): (max 20 points)

MT (2 parts– max 10 points each) includes: 1) tests (10 tests, 1 point each); 2) theoretical question (10 points):

10 points	1) the test tasks were completed correctly; 2) the theoretical question is fully covered
9 points	1) test tasks were completed with 1 error; 2) the answer to the question is not fully stated, but the main aspects are disclosed
8-7 points	1) not all test tasks were completed correctly; 2) the answer to the question contains significant inaccuracies
6 points	1) a significant number of errors were made when performing test tasks; 2) in the logic of covering the theoretical question, there is a lack of understanding of its essence, the answer is based on assumptions
0 points	Tasks were not completed or were completed incorrectly

● **Semester control (credit)** (max 100 points).

Completion of all educational tasks (case studies, exercises, and practical skills training) is a condition for admission to the *credit*.

The student receives *credit* without additional tests, if the sum of points scored is not less than 60. A student who received more than 60 points in the semester, but wants to improve his result, can take part in a final test. In this case, the final result consists of the points obtained on the final test.

Applicants who have fulfilled all the conditions for admission to the test and have a rating of less than 60 points take the final test. The final result consists of the points obtained on the final test.

The final test is carried out in the last scheduled class.

The final test is valued at 100 points. The task of two parts: theoretical questions (4 questions); tests (40):

<i>Theoretical questions</i>	
5 points	The answer to the question is stated correctly, comprehensively, without an error and logically
4 points	The answer to the question is presented without an error, not completely enough, but with the application of acquired theoretical knowledge
3 points	The answer to the question is not fully explained, but the main aspects are revealed
0 points	No answer
<i>Tests</i>	
2 points	The answer is correct
0 points	The answer is not correct

Correspondence of rating points to grades on the university scale:

<i>Points</i>	<i>Grade</i>
100-95	Excellent
94-85	Very good
84-75	Fine
74-65	Satisfactorily
64-60	Enough
Less, than 60	Unsatisfactorily
Conditions not met	Not allowed

9. Additional information

- It is possible to include certificates of completion of remote or online courses on the relevant subject in the rating of the applicant (as an offer: "Y Combinator Startup School" Prometheus).
- The teaching could be executed in a distance form under appropriate conditions according to the university's orders.

Syllabus:

Is Developed by: Sc.D., Associate Professor, Julia Yereshko

Approved by the Department of Economic Cybernetics (protocol No. 18 dated June 28, 2023)

Agreed by Methodical Commission of the Faculty of Electrical Power Engineering and Automation (protocol No.9 dated June 22, 2023)