Federal State Autonomous Educational Institution for Higher Education
PEOPLES' FRIENDSHIP UNIVERSITY OF RUSSIA
RUDN University

Higher School of Management
educational division (faculty/institute/academy) as higher education programme developer

COURSE SYLLABUS

Engineering innovation
course title

Recommended by the Didactic Council for the Education Field of:

38.04.02 Management
field of studies / speciality code and title

The study of the discipline is conducted as part of the professional program of higher education.

Engineering Management
higher education programme profile/specialisation title

2025

1. COURSE GOAL(s)

The goal of mastering the *Engineering Management* discipline **is** to build the students' theoretical knowledge and skills of applying the process approach to enterprise management, as well as practical skills in business process modeling.

2. REQUIREMENTS FOR LEARNING OUTCOMES

Mastering the *Engineering Management* discipline envisages building the following competencies (parts of competencies) in students:

Table 2.1. The list of competencies acquired by students in the course of the discipline (outcomes of the discipline)

Competence Code	**Competence Descriptor**	**Competence Formation Indicators** (within this discipline)
GC-1	Ability to perform critical analysis of problematic situations based on the systemic approach and to develop a plan of action	GC-1.1 Analyzes the task and singles out its basic components GC-1.2 Defines and prioritizes the information needed to solve the task GC-1.3 Searches the information to solve the task by various types of queries GC-1.4 Offers solutions to the problem, analyzes the possible consequences of their use GC-1.5 Analyzes the ways of solving problems of worldview, moral and personal nature based on the use of fundamental philosophical ideas and categories in their historical development and socio-cultural context
GC-2	Ability to manage a project at all lifecycle stage.	GC-2.1 Specifies a problem, the solution of which is linked to the achievement of the project goal
PC-1	Capability to manage the efficiency of an investment project	PC-1.1 Defines the operations and their sequence to implement the investment project. PC-1.2 Evaluates operational, estimates human resources and determines the participants in the investment project PC-1.3 Plans the implementation stages of the investment project, ensures the quality and quality control of the investment project implementation PC-1.4 Can work in specialized computer programs for the preparation and implementation of an investment project PC-1.5 Can search the necessary information for the preparation and implementation of an investment project PC-1.6 Can identify and assess the degree (level) of an investment project risks and develop measures to manage them

3.COURSE IN HIGHER EDUCATION PROGRAMME STRUCTURE

The *Engineering Management* discipline is an elective block formed by students.

Within the higher education program students also take other disciplines and/or internships that contribute to the achievement of the expected learning outcomes as results of mastering the *Engineering Management* discipline.

Table 3.1. The list of the higher education program components that contribute to the achievement of the expected learning outcomes as the disciplines results.

Competence code	**Competence descriptor**	**Previous courses/modules***	**Subsequent courses/modules***
GC-1		Innovation Management	Business Process Management Cloud Technologies in Enterprise Management
GC-2,		Strategic Management in Industrial Companies	Fundamentals of Logistics and Supply Chain Management Enterprise Management Information System
PC-1		Innovation Management	Lean Manufacturing Data Mining and Decision Making

4. COURSE WORKLOAD AND ACADEMIC ACTIVITIES

The total workload of the discipline is 3 credits.

Table 4.1. Types of educational work according to the periods of mastering the higher education program for FULL-TIME students

Type of academic activities		**Total academic hours**	**Semesters/training modules**			
			1	**2**	**3**	**4**
Contact academic hours		*36*		*36*		
including:						
Lectures (LC)		18		18		
Lab work (LW)						
Seminars (workshops/tutorials) (S)		18		18		
Self-studies		*54*		*54*		
Evaluation and assessment (exam/passing/failing grade)		*18*		*18*		
Course workload	academic hours_	**432**		**108**		
	credits	**12**		**3**		

5. COURSE CONTENTS

Table 5.1. The content of the discipline (module) by type of academic work

No	Name of the Discipline Section	Content of the Section (topics)	Type of Educational Work

1.	Section 1. Innovation and Innovative Activity. Subject 1. The Concept and Essence of Innovation.	Innovative economy development. The importance and role of innovation for the enterprise and the national economy. Fundamentals of J. Schumpeter's theory of innovation. N.D. Kondratieff's long waves of economic activity. The concepts and logic of the change of technological patterns by S. Glazyev. Characteristics of the 6th Technological Order. The concept of innovation, signs of innovative products (novelty, demand compliance, profitability). Classification of innovations: product, process, marketing and organizational innovations. Their main features and characteristics.	Lecture, self study
2.	Subject 2. Innovative Work and Innovative Activity of a Company.	The conceptual apparatus of innovation-related activities (innovation marketing, innovation management, innovative product development). The innovation process, the life cycle stages of the innovation process. Methodological foundations of the survey of processes and results of innovative activity (Frascati Family manuals, Oslo Manual). Innovative activity, its goals and distinctive features. Assessment of innovation costs in accordance with the classification of innovative activities recommended by the Oslo Manual. Innovation activity, indicators for innovation activity assessment. Diffusion of innovations.	Lecture, self study
3.	Subject 3. Innovation Models: Continuous and Substitute.	Continuous and substitute innovations by Clayton Christensen. Disruptive innovation theory; theory of resources, procedures and values; theory of value chain development. The main modern substitute technologies: the human genome, nanotechnology, wireless technologies. Factors that foster innovations (globalization, competent customers in individual markets, a diversity and change of technologies, shorter product life cycles.	Lecture, self study
4.	Section 2. Innovation and Commercialization Process Stages. Subject 4. Innovation and Commercialization Process Main Stages.	General characteristics and sequence of the innovation and commercialization process stages. The creative process of creating an idea. Engineering approach to creative problem solving, TIPS. Identification of opportunities, their sources (industry research, search for patent literature, customer feedback, research of university opportunities, research of government sources, search for new opportunities in existing technologies, etc.) Assessment of technological capabilities. Evaluation of innovation in terms of market opportunities: compliance with the goals, objectives and mission of the company; advantages for potential buyers; distribution potential; assessment of risks associated with development.	Lecture, self study

5.	Subject 5. Business Concept Development. Innovation Commercialization Opportunities Analysis.	Commercialization, its essence and necessity. Business concept, its main elements. Feasibility analysis: industry analysis, technical feasibility analysis, market analysis, analysis of alternative distribution channels, financial plan.	Lecture, self study
6.	Subject 6. Innovative Product Development.	The process of new product development. Phases of new product development: discovery; technology evaluation, concept research, preliminary financial analysis; prototype development; design and development of a series of products, internal testing; limited market testing and the business plan drafting based on its results; complete launch of the product on the market. Criteria for the success of product development and the reasons of the product's failure on the market. The role of partnership in the success of an innovative product.	Lecture, self study
7.	Subject 7. Innovation Marketing	High-tech markets, features of high-tech marketing. Technological and competitive uncertainty, know-how effects. The main approaches to the commercialization of innovation. Features of consumer research, demand forecasting and price formation. High-tech products promotion.	Lecture, self study
8.	Section 3. Intellectual Property. Subject 8. Intellectual Property as the Basis of an Innovative Product.	The concept of intellectual property. Copyright. Patents, their types. Licensing of intellectual property, licensing strategies. The Law "On Inventions in the USSR", 1991. The fourth part of the Civil Code "Rights to the results of intellectual activity and means of individualization", 2008.	Lecture, self study
9.	Section 4. Innovative Project. Subject 9. Innovation Project Management.	The concept of a project and project activity. The project life cycle. Innovative project and features of its implementation.	Lecture, self study

6. CLASSROOM EQUIPMENT AND TECHNOLOGY SUPPORT REQUIREMENTS

Table 6.1. Equipment and technological support of the discipline

Classroom Type	**Equipment of the Classroom**	**Specialized Educational/Laboratory Equipment, Software and Materials for the Discipline** (if necessary)
Lecture Hall	An auditorium for conducting lecture-type classes, equipped with a set of specialized furniture; a board (screen) and technical means of multimedia presentations.	21 workplaces: system unit P4 C2D/3160 MHz MB/ 320 GB/DVD±RW/ LCD monitor 19"+ 1 projector

Classroom Type	Equipment of the Classroom	Specialized Educational/Laboratory Equipment, Software and Materials for the Discipline (if necessary)
Colloquium	A classroom for conducting colloquium-type classes, group and individual consultations, ongoing monitoring and midterm assessment, equipped with a set of specialized furniture and multimedia presentation equipment.	21 workplace: Celeron system unit/2600 MHz/1280 MB/ 40 GB/DVD ROM/ LCD monitor 17"+ 1 projector + WiFi access point
Computer Class	A computer classroom for conducting classes, group and individual consultations, continuous control and midterm assessment, equipped with personal computers (___ pcs.), a blackboard (screen) and multimedia presentation technical means.	21 workplace: Celeron system unit/2600 MHz/1280 MB/ 40 GB/DVD ROM/ LCD monitor 17"+ 1 projector + WiFi access point
Autonomous Work of Students	A classroom for autonomous work of students (can be used for seminars and consultations), equipped with a set of specialized furniture and computers with access to EIEE.	21 workplace: Celeron system unit/2600 MHz/1280 MB/ 40 GB/DVD ROM/ LCD monitor 17"+ 1 projector + WiFi access point

7. RESOURCES RECOMMENDED FOR COURSE STUDY

a) Microsoft Teams software, university telecommunication training and information system of RUDN

10. Infrastructure support necessary for the discipline:

a) Main Readings:

1. Barancheev, V. P. Upravlenie innovatsiami [Innovation management]: textbook for universities / V. P. Barancheev, N. P. Maslennikova, V. M. Mishin. — 3rd ed., reprint. and add. — Moscow : Yurayt Publishing House, 2025. — 747 p.

2. Spiridonova, E. A. Upravlenie innovatsiami [Innovation management]: textbook and workshop for universities / E. A. Spiridonova. — Moscow : Yurayt Publishing House, 2025. — 298 p. — (Higher education). — ISBN 978-5-534-06608-1. — Text : electronic // Yurayt Educational Platform [website]. — URL: https://urait.ru/bcode/516365.

b) Additional Readings:_

3. Innovatsionnaya economika [Innovative economics]: a textbook for universities / E. Y. Sidorova [et al.] ; under the general editorship of E. Y. Sidorova. — Moscow : Yurayt Publishing House, 2023. — 334 p. — (Higher education). — ISBN 978-5-534-15480-1. — Text : electronic // Yurayt Educational Platform [website]. — URL: https://urait.ru/bcode/520355

4. Allen K. Bringing New Technology to Market / K.R. Allen: trans. from English – M.: BINOM. Laboratoria znanii, 2012

5. Antonets V.A. Innovatsionny biznes. Formirovanie modelei kommertsializatsii perspektivnyh razrabotok [Innovative business. Formation of commercialization models of promising developments] / V.A. Antonets, N.V. Nechaeva, K.A. Khomkin, V.V. Shvedova. –M.: Publishing house "Delo" RANEPA, 2013

6. Altshuller G.S. to Find an idea. Introduction to TRIZ - theory of inventive problem solving.– M.: Alpina Publisher, 2011

1. Electronic libraries (EL) of RUDN University and other institutions, to which university students have access on the basis of concluded agreements

- RUDN Electronic Library System (RUDN ELS) http://lib.rudn.ru/MegaPro/Web
- EL "University Library Online" http://www.biblioclub.ru
- EL "Yurayt" http://www.biblio-online.ru
- EL "Student Consultant" www.studentlibrary.ru
- EL "Lan" http://e.lanbook.com/

Databases and search engines:
- electronic foundation of legal and normative-technical documentation http://docs.cntd.ru/
- Yandex search engine https://www.yandex.ru/
- Google search engine https://www.google.ru/
- SCOPUS abstract database http://www.elsevierscience.ru/products/scopus/

BiblioRossika An electronic library for students, professors and researchers. http://www.bibliorossica.com/individuals.html?ln=ru

The following training toolkit for the student's autonomous work is envisaged as part of mastering the discipline/module:*

1. A course of lectures on the *Engineering Management* discipline.
2. Laboratory workshop on the *Engineering Management* discipline (if laboratory work is available): not available.
3. Methodological guidelines for drafting and formatting the course paper/project on the *Engineering Management* discipline (if there are ones).

8. ASSESSMENT TOOLKIT AND GRADING SYSTEM* FOR EVALUATION OF STUDENTS' COMPETENCES LEVEL UPON COURSE COMPLETION

The assessment materials and the grading system* to evaluate the graduate's level of competences (part of competences) formation as the results of the *Engineering Management* discipline are specified in the Appendix to course syllabus.

DEVELOPERS:

Associate Professor of the Applied Economics Department		V.A. Ermakov
Position, educational department	Signature	Name, surname

HEAD OF EDUCATIONAL DEPARTMENT:

Deputy Head of the Applied Economics Department		A.A. Ostrovskaya
Name of the educational department	Signature	Name, surname

Program Manager

Deputy Head of the Applied Economics Department _____ A.A. Ostrovskaya
position, name of the department signature Name, surname

Annex

Methodological guidelines for students on mastering the discipline (module)

The implementation of the course provides interactive lectures, practical classes (colloquiums) using multimedia equipment, preparation of autonomous creative projects and their subsequent presentations, testing, group discussions on the subject of the course, modern knowledge control technologies.

While studying the discipline, the student must attend a course of lectures, participate in the number of colloquiums provided by the course syllabus, study autonomously some topics of the course and confirm their knowledge during control activities.

The student's work in lectures consists in clarifying the basics of the discipline, briefly taking notes of the material, and clarifying issues that cause difficulties. The lecture notes are the basic educational material along with the textbooks recommended in the main list of readings.

The teaching of the main part of the lecture material involves usage of multimedia tools that facilitate the comprehension and consolidation of the material. Presentations are available for download from the RUDN website and can be freely used by students for educational purposes.

The student must master all the topics provided for by the educational and thematic plan of the discipline. Individual topics and training issues must be mastered autonomously. The student studies the recommended literature, briefly outlines the material, and clarifies the most difficult questions that require clarification during consultations. The same should be done with sections of the course that were skipped due to various circumstances.

For an in-depth study of the issue, the student should study the literature from the additional readings list and specialized websites. It is also recommended that students communicate in professional community forums.

Students study educational, scientific literature and periodicals on an autonomous basis. They have the opportunity to discuss what they have read with the teachers of the discipline during scheduled consultations, with other students at colloquiums, as well as at lectures, asking the professor questions.

The control of autonomous work is carried out by the professor in charge. Depending on the teaching methodology, the following forms of continuous assessment can be used: a short oral or written survey before the start of classes, tests, control papers, written homework, essays, etc.

The assessment toolkit for the midterm assessment of students in the discipline (module) *(developed and issued in accordance with the requirements of the " Regulations for the Formation of Assessment Toolkit (FOS"), approved by the Rector's order No. 420 dated 05.05.2016)*.

Discipline: Creating an innovative product

The code of the controlled competence or its part	Controlled Discipline Section	Controlled Discipline Topic	Assessment Toolkit (form of control of mastering the professional program)													Subjects Scores	Section Scores
			Classroom work							Autonomous work							
			Survey	Test	Colloquium	Control Paper	LW performance	Class work	Cases	Homework	Report	Graphic and calculation	Course Paper / project	Report/presentation	Exam/Test		
GC-1, PC-3	Section 1. Innovation and Innovative Activity.	Subject 1. The Concept and Essence of Innovation.	1							4						5	14
		Subject 2. Innovative Work and Innovative Activity of a Company.	1						3	2						6	
		Subject 3. Innovation Models: Continuous and Substitute.	1							2						3	
GC-1, PC-3	Section 2. Innovation and Commercialization Process Stages.	Subject 4. Innovation and Commercialization Process Main Stages.	1							4						5	24
		Subject 5. Business Concept Development. Innovation	1						6	2						9	

		Commercialization Opportunities Analysis.																
		Subject 6. Innovative Product Development.	1							2						3		
		Subject 7. Innovation Marketing	1							6						7		
GC-1, PC-3	Section 3. Intellectual Property.	Subject 8. Intellectual Property as the Basis of an Innovative Product.	1							4						5	5	
GC-1, PC-3	Section 4. Innovative project.	Subject 9. Innovation Project Management.	1						3							4	4	
		Report									8						8	
		Milestone certification				15											15	
		Final certification													30		30	
		TOTAL	9			15			12	26	8				30		100	