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ФИО: Ястребов Олег Александрович  
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**Federal State Autonomous Educational Institution of Higher Education  
Peoples' Friendship University of Russia named after Patrice Lumumba**

**RUDN University  
Engineering Academy**

## **ANNOTATIONS OF DISCIPLINES (MODULES) OF THE EP**

**The study of disciplines is carried out as part of of the basic professional educational program of higher education (EP HE) « Innovation Management»,  
27.04.05 Innovation**

***Disciplines (modules) are studied as part of the curriculum hire educational program  
"Innovation Management" 27.04.05 «Innovation»***

<b>Subject</b>	<b>Foreign language in the professional activity of the master</b>
<b>Credits (hr.)*</b>	<b>6 3E (216 час.)</b>
<b>Synopsis</b>	
<b>Chapters:</b>	<b>Short content:</b>
<p>1. Institute of Science and Technology. Specialized culture. Reports. Articles. Patents. Business letter.</p> <p>2. Prepared / unprepared speech. Reputable scientists in the field of engineering. Discussion. Argumentation. Message. Scientific and technical concepts in technical engineering sciences.</p> <p>3. The logic of scientific presentation. Referencing the text. The main idea and the author's attitude. Abstract Overview. Business conversation and negotiation skills development.</p>	<p>1. The specifics of the functioning of the Institute of Science and Technology in foreign-speaking countries and in Russia. Rules and norms of communication in professional scientific and technical sphere. Formation of the ability to understand oral presentations / long speeches in a foreign language on engineering topics. Written foreign language general scientific / highly specialized articles in the field of engineering. Foreign language patents in the field of engineering. Structure and types of business letters.</p> <p>2. Unprepared conversation on general scientific / highly specialized topics in the field of engineering. Well-known scientists in the field of science and technology. The main directions of development of science in the field of engineering. Discussions on general scientific/highly specialized issues. Expressing one's own position and logical argumentation in a foreign language. Report on general scientific topics in a foreign language. Scientific and technical concepts in a foreign language and Russian text in the field of engineering.</p> <p>3. Composition, pragmatic attitude of a foreign language scientific text. Key segments of text. Getting an information as a result. Abstract Review. The main idea of the text. Author's relation to the topic of the text. Summarizing a foreign-language text in the field Engineering. Ability to determine your attitude to the content. Presentation of development achievements in the field of engineering (review). Professional/scientific/ conversation of a production nature.</p>

<b>Subject</b>	<b>Design of automated control systems</b>
<b>Credits (hr.)*</b>	<b>4 3E (144 час.)</b>
<b>Synopsis</b>	
<b>Chapters:</b>	<b>Short content:</b>
Tools and technologies for integrated automation of the design stage of control systems (CS)	<p><i>Topic 1. Problems of design, computer-aided control systems.</i> The subject and objectives of the discipline. Formulation of the problem of designing the automation of the control system. A systematic approach to the design of the control system. Structural, block-hierarchical, characteristic equations, object-oriented approaches in the formulation of the problem of computer-aided design of the control system. Structuring the design process of the control system. Problems of computer-aided design and control systems.</p> <p><i>Topic 2. Functions of CAE/CAD/CAM systems. Composition of integrated CAD systems.</i> Integrated CAE/CAD/CAM systems. Functions of CAM (ERP systems). Functions of SCADA systems. The fundamental principle of management: feedback. Tools and control systems for complex automation.</p>
Models and methods of CS analysis in the automation of the design stage	<p><i>Topic 3. Model representation of tools and control systems (CS).</i> Model representation of control systems and control elements as design objects. Formulation of the problem of analysis of the control system as an object with distributed parameters. Formal methods for obtaining models of control systems. Mathematical representation of the control system.</p>

	<p><i>Topic 4. Computer-aided design methods: methods of CS analysis.</i> Performance evaluation. Methods for the analysis of CS in the time domain. Methods of analysis of technical systems in CAD. Features of the mathematical description of the control system in computer-aided design. Methods of analysis in the frequency domain, their main characteristics. The main statistical characteristics of the output parameters of the control system. Evaluation of the accuracy of the statistical test method.</p>
Methods for the synthesis of control systems and verification of design solutions in the automation of the design stage	<p><i>Topic 5. Methods of computer-aided design: methods of synthesis of control systems.</i> Quadratic assignment model. Methods and algorithms of technical optimization of tools and control systems, their main characteristics. Methods of artificial intelligence as a means of automating the tasks of structural synthesis of control systems. Adaptive Genetic Algorithms as Algorithms for Solving Problems of Synthesis of SU Devices.</p> <p><i>Topic 6. Automation of design of control systems.</i> Automation of design in the framework of complex automation of the design stage of the control system. Levels and tasks of design and technological design of control systems. Mathematical models of control elements in design automation.</p> <p><i>Topic 7. Automation of control system tests.</i> CS test methods: based on semi-natural modeling; physically real equipment of the control system. Test algorithms. Methods and algorithms for processing test results.</p>

<b>Subject</b>	<b>Methodology of scientific research</b>
<b>Subject</b>	<b>2 3E (72 h.)</b>
<b>Synopsis</b>	
<b>Chapters:</b>	<b>Short content:</b>
Scientific research and its specifics	Specificity of the object and subject of research. Subject of research. Rational, objective, true in science. Rationality and rationalism. Classical and non-classical concepts of truth in science. Characteristics of scientific research: objectivity, reproducibility, evidence, accuracy. Explanation, understanding, interpretation. Nature and types of explanation. Major research programs: naturalistic and anti-naturalistic research program. The criteria of scientific character are empirical verifiability, verifiability, falsifiability, the presence of a paradigm, the development of a specialized language. Methodological research strategy as a holistic system of interpretation of principles, concepts, key definitions and justification of hypotheses. Problem field and problem situation. Theoretical and methodological prerequisites and research program, formulation of its goals and objectives. Logical system and composition of scientific research. Types of compositions. Compositional errors.
Conceptual development of the problem	Review, relevant, abstract information. Scheme and sequence of scientific research. Research theses as an explication of the topic. Methods of scientific research and their specificity in economic science. Methods of scientific research, their specificity and classification. Empirical and theoretical methods. Methodology of scientific research: general philosophical, general scientific, specific branches of science. General philosophical methodology as a system of general principles, conditions, guidelines in research activities. General logical methods: analysis, synthesis, induction, deduction, abstraction, idealization, analogy, generalization, etc. Methods used in economic research: modeling, methods of literature analysis, method of selection of facts, statistical-probabilistic method, etc. Specificity of observation, experiment, measurement in economic science.

The concept and its role in scientific research.	Logical analysis of concepts. The scope of the concept. Operations with volumes of concepts. Conceptual and terminological situations in scientific research and their resolution. Selection of defined concepts in scientific research. Selection of basic and auxiliary concepts. Definition of the concept, the choice of the type of definition used in scientific research. Informativeness, scientific adequacy and cognitive simplicity of definition. Typical mistakes in the definition of concepts. Division of the concept as the basis of the structure of scientific research. Division and classification of concepts.
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<b>Subject</b>	<b>Big Data Mining</b>
<b>Credits (hr.)*</b>	<b>6 3E (216 h)</b>
<b>Synopsis</b>	
<b>Chapters:</b>	<b>Short content:</b>
<p>Introduction to the Mathematical Foundations of Blockchain Distributed Database Technology.</p> <p>The concept of a distributed information processing system.</p> <p>The main mechanisms of distributed object technologies.</p> <p>The main models of distributed object technologies</p> <p>Internet Technologies</p> <p>Component model technology.</p> <p>Types of distributed applications.</p> <p>Application integration issues.</p>	<p>Types and properties of distributed systems. Information systems software architecture. Managing the interaction of heterogeneous applications (middleware).</p> <p>The concept of a remote procedure (RPC model). Transactional monitors. Transaction confirmation algorithms. Remote access to object methods (RMI model). Object brokers (CORBA specification). Messaging-based communication (MOM model). Message queues and transactional queues. Point-to-point interaction model.</p> <p>The concept of a network service (Web Service). Service and application integration. The core components of network services. Protocols and standardization. Problems publishing data and finding network services. Coordination of network services. Composite network services.</p> <p>Fundamentals of component software systems. COM and COM+, EJB for high-level programming languages.</p> <p>Cloud thechnology. Definition of cloud computing. Multi-layered cloud application architecture. Components of cloud applications. Advantages and disadvantages of cloud computing. Classification of clouds. The most common cloud platforms. GRID-technologies. GRID architecture. GRID Standards. Parametric GRID Performance Models.</p> <p>Comparison of GRID and Cloud Computing. Agent-based systems. The concept of a software agent. Multi-agent systems. Security in mobile agent systems.</p> <p>End-to-end application integration (EAI). Message brokers. Publish/subscribe model. Worker Management Systems thread (WorkflowMS). Application Servers.</p>

<b>Subject</b>	<b>Information Technologies in Mathematical Modeling</b>
<b>Credits (hr.)*</b>	<b>3 3E (108 h.)</b>
<b>Synopsis</b>	
<b>Chapters:</b>	<b>Short content:</b>
<p>Basic concepts of simulation modeling.</p>	<p>General characteristics of the problem of modeling systems. Principles of a systematic approach to modeling. Classification of system models. Basic concepts of the theory of systems modeling. Features of system development and modeling: the principle of a systems approach; general characteristics of the problem;</p>

Methodology of mathematical modeling	classification of types of system modeling; Provision and efficiency of machine modeling.
Simulation models of queuing systems	The role of modeling in the analysis of economic objects. The concept of an object model. Classification of models. Static and economic models.
Simulation of stochastic processes	Mathematical and simulation models. Simulation modeling on a computer. The concept of a service device and service requests in the system. The object of the economy as a queuing system. Purpose of simulation models of queuing systems.
Model Management and Simulation Results	Random characteristics of queuing systems. Selection of the distribution law of a random characteristic. Uniform, normal, exponential, and beta laws. The effect of random processes on queue latency. Pollachek-Khinchin formula
Mathematical schemes of system modeling	Node management commands. Parameters of transactions. Node state settings. Sensors of pseudorandom variables. The results of the model.
Mathematical schemes of simulation modeling	The transition from a meaningful description of the system to a mathematical scheme. Mathematical schemes of general form.
Mathematical approaches in simulation modeling	Typical mathematical schemes. Continuously-deterministic models (D-schemes). Discrete-deterministic models (F-schemes). Discrete-stochastic models (P-schemes). Continuous-stochastic models (Q-schemes). Network models (N-circuits). Combined models (A-schemes).
Formalization of the process моделирования	Construction of conceptual models and their implementation. Algorithmization of models and their machine implementation. Obtaining and analyzing simulation results.
Formalization and algorithmization of the processes of functioning of systems	The main approaches to building models; continuously-deterministic models; discrete-deterministic models; discrete-stochastic models; continuous-stochastic models; network models; combined models.
Modeling the business process of a manufacturing company	Methodology for the development and machine implementation of models; construction of conceptual models and their formalization; algorithmization of models and their machine generation; obtaining and interpreting simulation results.
Synthesis of mathematical models of optimal control systems	Structural diagram of the business process. The relationship between order flows and financial resource flows. Its display on the diagram of the simulation model. Payment modeling. Simulate transactions from the same source account to different target accounts. Modeling of a bank loan. Forecast of the company's performance indicators. Simulation of parallel and spawned processes
Statistical modeling of computer systems	The problem of choosing the structure of a mathematical model. Linear models. Analytical design of optimal regulators (ACOR). Numerical methods for the synthesis of control systems. Selection of parameters of the mathematical model. Regression analysis. Least squares method. Recurrent methods.
Simulation tools	General characteristics of the method; machine generation of pseudorandom sequences; checking and improving the quality of random sequences; modeling of stochastic effects.
Simulation software.	Systematization and comparative analysis of simulation languages; system simulation application packages; system modeling databases; Hybrid simulation systems.

Evolutionary modeling	<p>Features of the choice of simulation software. Classification of simulation software Opportunities when using simulation programs. Random number generators. Generation of random variables.</p> <p>The main attributes of evolutionary modeling. Genetic algorithms. Evolutionary algorithms. Population algorithms. Genetic programming. Method of grammatical evolution. Analytical programming. Network Operator.</p>
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<b>Subject</b>	<b>Numerical methods for solving problems of mathematical modeling</b>
<b>Credits (hr.)*</b>	<b>5 3E (180 h)</b>
<b>Synopsis</b>	
<b>Chapters:</b>	<b>Short content:</b>
Methods for minimizing the functions of a single variable	Statement of the problem. The classic method. Bisection method. The method of the golden section. The method of broken. Coating method. Convex functions of a single variable. Tangent method
Classical theory of the extremum of functions of many variables.	Statement of the problem. Weierstrass theorem. The classical method of solving problems at an unconditional extremum. Conditional extremum problems. Necessary conditions of the first order. Second-order prerequisites. Sufficient extremum conditions.
Methods for minimizing the functions of many variables.	Gradient method. Gradient projection method. Conditional gradient method. Method of possible directions. Proximal method. Linearization method. Quadratic programming. The method of conjugate directions. Newton's method. Continuous methods with a variable metric. Method of coordinate descent. Coverage method in multidimensional problems. Method of modified Lagrange functions. The method of penalty functions. Proof of the necessary conditions of the extremum of the first and second orders using penalty functions. Method of barrier functions. Method of loaded functions. Random search method.
Dynamic programming.	Bellman's scheme. Synthesis problem for discrete systems. Scheme of Moiseev's. Synthesis problem for systems with continuous time. Sufficient optimality conditions.
Pontryagin's maximum principle.	Formulation of the problem of optimal control. Formulation of the maximum principle. Proof of the maximum principle. The maximum principle for optimal control problems with phase constraints. Relationship between the maximum principle and the classical calculus of variations.
Application of the maximum principle to the problems of optimizing the trajectories of spacecraft flights.	Reduction of the optimization problem to the boundary value problem of the maximum principle. Shooting method for numerical solution of the boundary value problem of the maximum principle. Modifications of Newton's method: Isaev-Sonin modification, Fedorenko normalization. Runge-Kutta method for solving Cauchy problems. Study of the problems of minimizing the flight time and the mass of fuel consumed.
Methods for minimizing the functions of a single variable	Statement of the problem. The classic method. Bisection method. The method of the golden section. The method of broken. Coating method. Convex functions of a single variable. Tangent method
Classical theory of the extremum of functions of many variables.	Statement of the problem. Weierstrass theorem. The classical method of solving problems at an unconditional extremum. Conditional extremum problems. Necessary conditions of the first order. Second-order prerequisites. Sufficient extremum conditions.

<b>Subject</b>	<b>Management of business operations of hi-tech industries</b>
<b>Credits (hr.)*</b>	<b>2 3E (72 h)</b>
<b>Synopsis</b>	
<b>Chapters:</b>	<b>Short content:</b>
Business reengineering	The concept of reengineering. The definition of "business reengineering" proposed by M. Hammer and D. Ciampi are the four key words of this definition.
Basic concepts of process management in enterprise restructuring	Definition of "business process", its characteristics. The main indicators for assessing the effectiveness of business processes. Which is not business reengineering. The concept of the value chain.
Knowledge management system	Results of identification of business processes. Interface business processes with a requirement. Interface of business processes using a schedule.
Business Process Reengineering Technology	Objectives of business process reengineering. Features of enterprises where business process reengineering is most effective. Conditions for successful business process reengineering. The concept of a knowledge management system. Typical mistakes in reengineering. System design technology. Stages of the system development life cycle. Basic requirements of design technology. Methodologies for modeling business processes. Technological network for business process reengineering.

<b>Subject</b>	<b>Strategic development of an innovative enterprise</b>
<b>Credits (hr.)*</b>	<b>10 3E (360 h)</b>
<b>Synopsis</b>	
<b>Chapters:</b>	<b>Short content:</b>
Topic 1. Formation of strategic intentions of the organization	The content of the strategic vision and mission of the organization. Requirements for the formation of the mission. The main approaches to the definition of the mission of the organization: mission as a philosophy, as a detailed characteristic, as a motto. Strategic goals and their relationship with the mission. The main areas of development of strategic goals. Criteria for the effectiveness of goals. Requirements for the development of strategic goals. The main directions of strategic goals. Structure of strategic goals. The procedure and methods of establishing strategic goals. The hierarchy of goals ("goal tree"), the levels of goal decomposition and the basic rules for its construction. Goal-based management method.
Topic 2. Strategic analysis of the organization's environment	Analysis of the functioning of the organization's environment. Analysis of the external environment: analysis of the external environment of the far and near environment. Key elements of macro environment segments. PEST analysis of trends that are essential to the organization's strategy. Analysis of the main economic indicators of the development of the industry. Diagnostics of the main competitive forces according to the model of 5 Porter forces. The strategic meaning of the five competitive forces. Driving forces causing changes in the structure of competitive forces. Strategic groups of competitors and prediction of their possible behavior. Key Success Factors (KFU) and assessment of the prospects for the development of the industry. Analysis of the internal environment. Analysis of competitive advantages: SWOT analysis, unweighted

	and weighted assessments of competitive strength, Strategic analysis of production costs and the "chain" of values by M. Porter. Analysis of key (core competencies).
Topic 3. Strategic position of the organization	The concept of strategic business zones. Formation of a portfolio of types of business. Objectives and main stages of portfolio analysis. Matrix analysis of the business portfolio. The Boston Advisory Group (BCG) Matrix and the McKinsey Model: Advantages and Disadvantages. Assessment of the attractiveness of the industry and the strategic position (competitive position) of the business unit. Porter matrix and Ansoff matrix. Strategy Set Management.
Topic 4. The organization's strategy	The content of the strategy. Types of strategies. The main strategies of competition, their essence, advantages and risks. The use of offensive and defensive strategies to maintain and protect a competitive advantage. Basic (reference) business development strategies. Strategies for concentrated, integrated and diversified growth, their varieties and conditions of use. Reduction strategies. Combined strategies. Functional strategies. Production strategy, marketing strategy, personnel management strategy, innovation strategy, investment strategy, foreign economic activity strategy, financial strategy. The process of choosing a strategy.

<b>Subject</b>	<b>Innovative Personnel Management Technologies</b>	
<b>Credits (hr.)**</b>	<b>3 3E (108 h)</b>	
<b>Synopsis</b>		
<b>Chapters:</b>	<b>Short content:</b>	
Personnel in the management system of the organization	Personnel management as an educational and scientific discipline. The place of personnel management in the management system. Personnel as an object and subject of management. Personnel policy in personnel management.	
Methodological foundations of personnel management	Scientific foundations and principles of personnel management. Scientific approach and methods of personnel management. Leadership and personnel management styles.	
Organization, functioning and improvement of the personnel management system	Personnel management system: concepts, purpose, structure, principles of construction. Organizational design and implementation of the project of the personnel management system. Improvement of the personnel management system	
Formation of the organization's personnel	Planning and forecasting of personnel needs. Organization of personnel marketing. Registration of labor relations, selection, placement, career guidance and labor adaptation of personnel.	
Use of the organization's personnel	Organization of labor of personnel. Motivation and stimulation of labor activity of the organization's personnel. Business assessment and certification of personnel	

<b>Subject</b>	<b>Digital technologies of innovative production</b>	
<b>Credits (hr.)**</b>	<b>6 3E (216 h)</b>	
<b>Synopsis</b>		
<b>Chapters:</b>	<b>Short content:</b>	
Digital Economy: Concept, Goals and Objectives, Structure Tendencies and prospects for the development of the digital economy Features of management and interaction in the digital economy Industrial Internet. Big data. Components of robotics and sensors.	Basic concepts of the digital economy. Goals and objectives of the digital economy. Global trends in the digital economy. Legal regulation of the digital economy. Digitalization as a factor in the formation of new economic technologies Architecture of management and regulation systems in the digital economy.	



Virtual and augmented reality technologies. Wireless communication technologies. Neurotechnologies and artificial intelligence. Experience of foreign countries in the development of the digital economy	Industrial Internet: Definition and Evolution of Technology. Data mining. Machine learning. Wireless communication technologies. Product lifecycle management. Simulation and supercomputer modeling of products. The life cycle of the introduction of digital technologies, Additive technologies and rapid prototyping. Assessment of the economic efficiency of the introduction of digital technologies. Methods for assessing digital transformation. Digital Transformation Assessment Indices.
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<b>Subject</b>	<b>Geoinformation Systems and Applications</b>
<b>Credits (hr.)**</b>	<b>3 3E (108 чac.)</b>
<b>Synopsis</b>	
<b>Chapters:</b>	<b>Short content:</b>
Introduction to remote sensing and HS. Types of remote sensing and HS and areas of application	Definition and review of the history of remote sensing and the evolution of remote sensing and remote sensing systems. Electromagnetic radiation: terms, definitions, physical laws, spectrum, sources of electromagnetic radiation.
Physical foundations of remote sensing and HS. Sensors & Platforms	Active and passive systems, mapping and other systems. The concept of resolution in remote sensing: spatial, spectral, radiometric and temporal. Earth observation orbits and platforms.
Acquisition and pre-processing of remote sensing and HS data. Methods for interpreting remote sensing and HS data	Obtaining, processing and creating information products. Stages of remote sensing and data analysis. Decryption. Deciphering signs. Digital Image Processing.

<b>Subject</b>	<b>Strategic controlling at an innovative enterprise</b>
<b>Credits (hr.)**</b>	<b>6 3E (216 h)</b>
<b>Synopsis</b>	
<b>Chapters:</b>	<b>Short content:</b>
Topic 1. The essence, tasks and functions of controlling. History of controlling. Basic interpretations.	The role of controlling in the enterprise management system. The history of the emergence and development of controlling in business structures American and German controlling models Tasks and tools of controlling. Catalogue of controlling tasks Systematization of definitions of the term “controlling”. Interpretation of controlling as a “management system” Organization of the formation of strategic management
Topic 2. Differences between operational and strategic controlling	Strategic and operational controlling in the management system. The essence of strategic effectiveness. Strategic management tools. Controlling the external environment. Objects of controlling in the enterprise Classification of objects of controlling. Creation of a controlling system at the enterprise.
Topic 3. The main tasks and functions of strategic controlling.	Tasks of strategic controlling. Identification of critical external and internal strategic positions. Control of the main indicators in accordance with strategic goals. Participation in setting strategic goals. Participation in the development of strategies. Analysis of strategic effectiveness. Strategic reflection. Controlling functions. Collection and processing of information on different “tiers” of the control system. Formation of a system of strategic and operational planning; Coordination of management activities to achieve the set goals; Ensuring the rationality of the management process; Study of trends in the development of an enterprise in a market economy.
Topic 4. Fundamental Principles of Justification of Management Decisions in Innovation Controlling	The concept of costs for the entire life cycle of the product Target costing and continuous Cost improvement. Establishment of samples. Improvement of business processes. Process controlling. Business Process Management: Description Replaced by Controlling The idea of controlling a business process through information systems.

Topic 5. Basic concepts of justification of management decisions in strategic controlling.	Balanced Scorecard of the Balanced Scorecard. A modern concept of strategic analysis A Strategic Approach to Cost Behavior Analysis Strategic positioning The concept of the value chain
Topic 6. Strategic Controlling Tools	Portfolio analysis. BCG Matrix, Porter 5C. Potential analysis. Growth curve. SWOT analysis. Strategic gaps (GAP analysis). Balanced Scorecard. Balanced Scorecard (BSS) Scenario development, etc.
Topic 7. Goal-setting and planning. Strategic planning in the enterprise.	Fundamentals of planned activities at the enterprise Target picture and targets Profit target indicators Budgeting
Topic 8. Fundamentals of integrated cross-functional enterprise management	Management process and structure of the enterprise, cost controllability

<b>Subject</b>	<b>Economics of high-tech industries</b>
<b>Credits (hr.)**</b>	<b>5 3E (180 h)</b>
<b>Synopsis</b>	
<b>Chapters:</b>	<b>Short content:</b>
Introduction to the discipline “Economics of high-tech industries”	The term “high-tech”, modern approaches to its understanding. Classification of knowledge-intensive industries. Innovation process as an object of management. Innovation process: concept, structure, content of work in high-tech industries
Innovations as the content of a knowledge-based industry and a factor of economic growth	Preliminary analysis of innovations and preparation of a pricing business plan. Macroeconomic prerequisites for innovation. Product selection and competitive strategy. Assessment of sales markets. Evaluation of competitors. Product life cycle. Analysis of trends in the development of industries. The place of the enterprise in the industry. Justification and analysis of the future marketing strategy: the main elements of the marketing plan, the rationale for the policy
The structure of the high-tech sector of the Russian economy	Features of market relations of high-tech firms. Supply, demand, and price patterns
Macroeconomic factors and trends influencing the development strategy of high-tech enterprises	Factors influencing the development strategy of high-tech enterprises. Opportunities of economic science and successful practices of management of high-tech enterprises.
The system of dynamic optimization of economic and technological development of a high-tech enterprise	The concept and patterns of development of the economic and technological complex of firms. The origin of firms and their development. Personnel of high-tech industries.

<b>Subject</b>	<b>Marketing of innovative products</b>
<b>Credits (hr.)**</b>	<b>3 3E (108 h.)</b>
<b>Synopsis</b>	
<b>Chapters:</b>	<b>Short content:</b>
Strategic Management Process and Marketing of Innovative Products	Strategic management and marketing; Unmanagement of marketing; Study of the product in the marketing activities of the organization; Analysis of the effectiveness of marketing activities; Building a strategic pyramid; Marketing strategies of competition; Analysis of the general situation in the industry and competition in it;
Marketing strategies in the overall strategy of the company. Types of marketing strategies	Methods of collecting marketing information; Evaluation of the effectiveness of the current strategy; Strengths and weaknesses of the organization. Market opportunities and threats; Competitiveness of prices and costs of the organization; Assessment of the company's competitive position; Assessment of strategic problems; General characteristics and basic concepts of foreign economic activity; Organization of international cooperation in innovative industries; General

Marketing research in the field of innovative industries.	<p>characteristics and features of the market of space products and services;</p> <p>Analysis of the general situation in the industry and competition in it</p> <p>Marketing research in the field of innovative industries. Analysis of the state of the company</p> <p>Fundamentals of foreign economic activity in innovative industries</p>
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<b>Subject</b>	<b>Supply chain management in an innovative enterprise</b>
<b>Credits (hr.)**</b>	<b>6 3E (216 h)</b>
<b>Synopsis</b>	
<b>Chapters:</b>	<b>Short content:</b>
<p>Basic concepts in the field of management of material and information flows (logistics)</p> <p>Material flows and logistics operations</p> <p>Supply stock.</p> <p>Material movement</p> <p>Warehouse management strategies</p> <p>Strategic Procurement and Production Management</p> <p>Transport Logistics Management</p> <p>Distribution management in production</p>	<p>Goals and objectives of logistics management, logistics systems.</p> <p>The concept of material flow and logistics operations, types, classification. The concept of inventory, inventory management systems in logistics.</p> <p>Strategic warehouse management. The task of choosing between own and rented warehouse, determining the optimal number of warehouses. Procurement management, tasks and functions of procurement logistics, supplier selection, types of needs.</p> <p>Strategic management of production, concepts, flexibility of production systems, types of material flow management systems, the effectiveness of the logistics approach to material flow management in production. Transport Management.</p> <p>The essence of transport logistics, the choice of mode of transport, tariffs and rules of transportation</p> <p>Infrastructure of commodity markets, types of intermediaries, the importance of intermediaries in the commodity market, effective distribution of commodity flows.</p> <p>Management of information logistics, types of information systems in logistics.</p>

<b>Subject</b>	<b>Run time controlling at an innovative enterprise</b>
<b>Credits (hr.)**</b>	<b>5 3E (180 h)</b>
<b>Synopsis</b>	
<b>Chapters:</b>	<b>Short content:</b>
The essence, tasks and functions of operational controlling	<p>Classification of objects of operational controlling.</p> <p>Features and economic content of controlling.</p> <p>A set of organizational and methodological principles of controlling.</p>
Organization of the controlling service. Objects of controlling.	<p>Organization and implementation of the concept of controlling in the enterprise. Basic requirements for creating a controlling service. Job responsibilities. Requirements for qualifications and the role performed. The composition of the controlling service: The main stages of implementation of the controlling system in the enterprise</p>
Financial controlling.	<p>Objectives and main elements of financial controlling. Financial controlling tools. Identification of "bottlenecks" of the enterprise Optimal production program, taking into account the "bottlenecks"</p> <p>Diagnostics of the financial condition and results of the enterprise. Edge Point Method.</p>
Fundamentals of finance in controlling. Management Accounting	Differences from financial and tax accounting.

System (LMS).	Management accounting as the basis of controlling. Classification of various methods of management accounting and their application in controlling. Costs and their classification. Responsibility centers and their classification. Cash method and accrual method. Absorption and direct costing. Margin analysis.
Controlling marketing Controlling innovative projects	The content of the marketing analysis. Types of marketing controlling Project – controlling Analysis of the effectiveness of innovative projects
Information support of controlling	Sources of information. Information systems for solving controlling problems. Information flows in the enterprise in the controlling system. Managerial decision-making in the system of operational controlling
Planning and budgeting in the controlling system	Five basic principles of budgeting. Hierarchy of planning elements. "Master" - the (general) budget and its relationship with the operating and financial budgets. Types of budgets by planning levels. Planning sequence. Analysis of deviations in the controlling system.
Internal control system. Internal control and audit	Organization of the internal control system in the organization. Characteristics of the COSO model of internal control Difference Between Internal Audit and Internal Control. Difference Between External Audit and Internal Audit.

<b>Subject</b>	<b>Ecological Environmental Management at Innovative Enterprises</b>
<b>Credits (hr.)**</b>	<b>3 3E (108 час.)</b>
<b>Synopsis</b>	
Chapters:	Short content:
The main provisions of environmental management of industries. Key tools of environmental management. Implementation of an environmental management system at an industrial enterprise.	Goals and objectives of environmental management in industry. Economic, financial, regulatory, organizational, managerial, reporting and statistical foundations of modern environmental management. International and environmental standards of environmental management. Environmental standardization, environmental labeling, environmental audit, environmental insurance. Development and implementation of an environmental management system at the enterprise, taking into account the characteristics of the industry. Environmental management tools in the resource-saving activities of the enterprise. Principles of sustainable development as the basis for building an environmental management system at the enterprise.

<b>Subject</b>	<b>Innovative technologies of ecological/environmental management in industries</b>
<b>Credits (hr.)**</b>	<b>3 3E (108 h)</b>
<b>Synopsis</b>	
Chapters:	Short content:
Economic development and environmental factors. Use and protection of renewable natural resources. Use and protection of non-renewable natural resources	Stages of the Club of Rome. Aims and objectives of the Stockholm Conference and the Rio Conference. Principles of sustainable development. Nats. sustainable development programs. Sustainable development. From technogenic to sustainable type of development.  Innovative technologies for the use, protection and renewal of water, air resources, soil and biota. Innovative technologies for the use, non-renewal and protection of mineral resources.

Environmental pollution Greening of economic sectors. International experience in solving environmental problems.	Chemical, physical, biological and informational pollution of the environment. Economic damage due to environmental pollution. Innovative methods of combating various types of pollution.  The economic mechanism of greening the economy. Innovative methods of environmental management in various industries. Greening the economy and overcoming environmental crises. Effectiveness of environmental protection measures. Key international environmental projects – advantages, disadvantages – efficiency.
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<b>Subject</b>	<b>Assessment of innovative-investment projects effectiveness</b>
<b>Credits (hr.)*</b>	<b>3 3E (108 h)</b>
<b>Synopsis</b>	
<b>Chapters:</b>	<b>Short content:</b>
The main categories of investment analysis. The main categories of investment analysis: project Evaluation of the effectiveness of innovation and investment projects. Basic principles and indicators The content of the economic part of the business plan of the innovation and investment project	The essence of investments and their economic significance. Classification of investments. Dependence of the level of risk on the innovative component of the project. Organizational and economic mechanism for the implementation of the project. Composition of project materials. Features of investment projects. Regulatory documentation, its content and purpose. Efficiency. Cash flows. NPV Net Present Value. IRR Internal Rate of Return. Payback period PB. Profitability Index PI.  Source data. Capital and operating expenses. Revenue component. Nominal and real cash flows. Nominal and real discount rate. Features of determining the discount rate for innovative projects. Development of a model for evaluating economic efficiency in the ME environment. Lease payments. Loan payments: differentiated and annuity. Univariate and multivariate sensitivity analysis. Qualitative Risk Analysis.

<b>Subject</b>	<b>International scientific and technical cooperation (ISTC)</b>
<b>Credits (hr.)**</b>	<b>3 3E (108 h)</b>
<b>Synopsis</b>	
<b>Chapters:</b>	<b>Short content:</b>
- Current state and trends in the development of Russian science - The role and place of the ISTC in the system of state scientific and technical policy of Russia - The main goals and objectives of the ISTC of the Russian Federation	Краткий обзор основных показателей развития российской науки; Межстрановые сопоставления. Основные современные проблемы российской науки, решению которых может способствовать активное развитие МНТС; Ensuring Russian interests in the implementation of the ISTC. The main goals and objectives of the ISTC of the Russian Federation. Cooperation in the field of basic research, including participation in multilateral scientific and technical projects and programs;  Cooperation in the field of applied research and commercialization of the results of intellectual activity; International exchanges of scientific information, scientists, graduate students and doctoral students;

<p>- Priority areas of participation of the Russian Federation in the ISTC</p>	<p>Attracting foreign investment in science and technology; Participation in the work of international organizations; Cooperation in the field of solving global problems; The role of the Russian scientific diaspora in the development of the ISTS of Russia.</p>
<p>- Promotion and dissemination of the results of the ISTC in Russia</p>	<p>Promotion and dissemination of the results of the ISTC in Russia. The main risks and ensuring the scientific and technical safety of Russia in the implementation of the ISTC. Measures to promote Russian interests within the framework of the ISTC.</p>

**HEAD OF THE EP OF HE:**

Associate Professor of the Department of Innovation Management  
in Industries, PhD.

Ju.A. Nazarova

