

Topics for Entrance Interviews for the Study Program

Management in Nuclear

Detailed material for studying the topics will be available on the study program website by the end of the year.

- 1. Typology of businesses:** Application of typological criteria in managerial decision-making; criteria for selecting a legal form; core characteristics of the main legal forms of business.
- 2. Business assets:** Classification and measurement; depreciation and amortization of non-current assets (including intangible assets); nature and structure of current assets, operating cycle and turnover; indicators of working-capital (current-asset) utilization.
- 3. Business costs:** Nature and classification and their managerial use; break-even analysis and its role in economic decision-making; the importance, options, and tools for cost reduction.
- 4. Supply and demand in product and service markets:** Definitions and determinants; market equilibrium; prohibitive (choke) prices for demand and supply, saturated demand; surplus/shortage and their implications for consumer and producer surplus and total (net) economic welfare.
- 5. Financial statements as information sources for analysis:** Financial statements under single-entry and double-entry bookkeeping; characteristics and structure of each component; key formal and substantive differences between Slovak accounting regulations and IFRS; interpretation and implications for financial analysis.
- 6. Corporate capital, performance, taxation, and depreciation policy:** Acquisition of equity capital from internal and external sources; the role of contributed capital at formation and during growth across legal forms; determination of the enterprise's profit/loss and factors influencing its level; taxation mechanism; depreciation policy—accounting vs. tax depreciation—and the effects of capital freed through depreciation.
- 7. Management and Manager:** The concept of management. The individual functions and levels of management. The role of the manager in a company and managerial roles (interpersonal roles, informational roles, and decisional roles). Differences in management from a territorial perspective.
- 8. Planning and Organizing:** The essence and goal of planning, basic types of plans from a time-based and content-based perspective. Types of organizations according to the scope of realities/objects to which the term organization applies, main activities of organizations. Formalization, centralization, specialization, and hierarchy of authority. Main types of organizational structures.

9. Control and Control Mechanisms: The fundamental principles of control. The control process and action steps. Process of comparing standards and performance, process of taking corrective actions. Possibilities for reducing and eliminating the need for control.

10. Leading People in Organizations and Communication Process: The core of leading people, differences between leadership and management. Traditional leadership styles, the managerial grid theory, and the situational approach to leadership. The communication process and its components: vertical, horizontal, and diagonal directions of communication. Formal and informal communication. Comparison of motivation, stimulation, and engagement.

I. Atomic nucleus: Composition, radius and mass of atomic nucleus, nuclear binding energy, forces in nucleus, stability vs. radioactivity of nuclei, band of stability.

II. Radioactivity: Radioactive decay law, radioactive half-life, alpha decay, beta decay, gamma rays.

III. Interaction of ionizing radiation with matter: Interaction of gamma rays, Absorption law, interaction of neutrons, microscopic and macroscopic cross section of interaction, interaction of charged particles.

IV. Spontaneous and induced fission: fission mechanism (spontaneous and induced fission), fission energy, fission products.

V. Neutrons in the fission process: immediate neutrons, delayed neutrons, specific density of nuclei in matter, neutron interaction cross section, fission chain reaction, multiplication coefficient, neutron deceleration, subcritical multiplication

VI. Nuclear reactors: classification of reactors, properties of power reactors, classification of reactors by generation, technical characteristics of the latest types of pressurized water reactors.

VII. Fuel cycle: description of the fuel cycle, extraction and processing, enrichment, conversion, nuclear fuel production, fuel operation in a reactor, fuel characterization, fuel reprocessing.

VIII. Prospective reactors: classification of generation IV reactors, requirements for generation IV, safety and economics of operation, current experiences.

IX. Fundamentals of radiation protection: definition of ionizing radiation, three basic types of radiation sources, three basic principles of radiation protection (reasonability, ALARA, compliance with limits), three basic ways to protect against external contamination by radiation (distance, period, shielding).

X. Dosimetric terminology, quantities and units: activity, radiation dose, dose equivalent, radiation weighting factor, effective dose, tissue weighting factor, radiation exposure, becquerel-Bq, gray-Gy, sievert-Sv, electron volt-eV.