MATRIX

of existing Master course

(Technical University of Moldova Faculty of Urbanism and Architecture)

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| Name of compulsory chair | Year | Semester | Number of ECTS | Number of elective chairs | List of available elective chairs | short description | relation between the contents and RETHINK’s theme |
| Urban Planning | | | | | | | |
| Psyhopedagogy | 1st year | 1 semester | 5 | not available | not available | 1. Psychopedagogy in Higher Education (Technical): regularities, axioms, principles, the subject of psycho-pedagogy; university education in the context of new needs’ system; competences; SWOT analysis of the technical university education system. 2. Didactical in terms of Higher Education: the education process; components and characteristics; dynamic of educational process; concept of educational content; effective learning conditions; teaching communication. 3. Learning cognitive, energizing and regulatory mechanisms: the role of affectivity in learning; role of motivation in learning; attention; will; communication and language. 4. The concept of educability in the context of Higher Education: theories of educability; factors of development and training of human personality; intelligence development as objective of university education. |  |
| Statistical and metrological analysis of measurements | 5 | Mathematical modeling, general issues, examples. Numerical computation: classic and contemporary look. Probabilistic models. Definitions of probability: classical, statistical, geometric expertise, axiomatic with applications in quality control of products, the Monte-Carlo method. Basic concepts and theorems of probability theory. The independence of the events, Bernstein's example. Bayer's formula, applied. Bernoulli scheme. Random variables, discrete, continuous. Typical numerical average, standard deviation as quality assessment equipment. Distribution functions, density, studying the most important types of distributions. Limit theorems. Basics of mathematical statistics, the overall selection (population), and selection (sample). Empirical numerical characteristics. Empirical distribution functions. The problem of statistical estimates. The conditions for the estimate to be "good quality". Point estimates of the mean, variance in different conditions. Estimation of confidence intervals, hypothesis verification. Planning on graphs. Critical Path Method. Applying mathematical logic device in electronic computing systems design. |
| Management and quality assurance | 5 | Quality - determinant of enterprise competitiveness. The essence of quality management. The concept of Total Quality Management (TQM). Quality management according to ISO 9000:2000 standards. Quality Management System documentation. Structure of the Quality Management System. Implementation of Quality Management System in the enterprise. ISO 22000 is the security of the products. Environmental Management Systems ISO 14000. |
| Investments efficiency in construction | 5 | The economic essence of investment. The concept of investment. The investment policy of the state. The investment strategy of Republic of Moldova. Time value of money. The effect of inflation on the value of money. Rationale the discount rate. Methods of determination of investment expenditures. Sources of financing of investment projects. Determination of net cash flow. The principles of economic efficiency assessment. Methods of evaluating the economic efficiency of the project. Substantiation of economic efficiency of investments. |
| Bases of applied research | 5 | Advantages of active experiment. The general scheme for solving technological problems on the base of methods probabilistic statistics. Type of matrices. Operations on matrices. Basics of the theory of experiment planning. The sequence of solving problems. Planning and deduction Matrix matrix equation for determining the coefficients of the mathematical model. Probabilistic characteristics and attributes of linear models. The calculation of the Fisher information matrix and covariance matrix dispersion. Dispersion projected value of the output parameter. Plans for 3.4 and more factors. Randomization. Planning fractionally. Saturation and excess plans. Mixing effects. Quarter lines. Mixing effects. Example. Determination extreme areas. Example of rapid ascent to the surface response. Far zone description. Second degree orthogonal planes, orthogonal central compositional rotation. Analysis mathematical model. Interpretation of results obtained using mathematical models planned experiment. Criteria for assessing the quality of the plans used in the mathematical theory of experiment. |
| Modern materials in construction | 5 | 1. Information about the industrial base on manufacture of building materials in the Republic of Moldova. The importance of knowledge production technologies of construction science and practice her essence and tasks. The tendency of development of the industry of building materials with characteristic performance.  2. Raw materials for the production of building materials and modern methods of determining their main properties.  3. The basic processes of physico-chemical technologies for the production of building materials. 4. Building materials with characteristics effective and modern methods of determination of their basic properties |
| Total 1 sem. |  |  | 30 |  |  |  |  |
| Modern methods in urban planning | 1st year | 2 semester | 5 | not available | not available | 1. Systemic land approach. Territorial urban planning. Administrative land structure. Theory of territorial, local and partial classification. Relationship between urban planning and architecture, urban planning and engineering, urban planning and population, and so forth. 2. Urban planning’s social problems. Sustainable development of land and human factor. Urban planning’s demographic problems. Urban infrastructure. Systems for social maintenance services and their structure. 3. City-village reference. Labor force attraction centers. Administrative centers (hubs). Economic hubs. Financial hubs. Recreation hubs. 4. Fundamental urban planning models. Work methods and criteria based systems. Endorsement of urban planning resolutions. Theory of urban planning systems. Geographical theories. Interaction between different urban planning elements. 5. Present day urban planning politics. Problems of big cities. Problems of small towns. 6. Spatial arrangement of built property. Pedestrian, personal and public transportation access. 7. Buildings urban planning functions: housing, industrial, financial, commercial, administrative, transportation, etc. 8. Criterion and background elements for urban planning. International practice. |  |
| Special structures | 5 | 1. Long span buildings. Applications. Flat systems (space frames). Beam structures: diagrams, general dimensions, cut section types. Rigid frame structures. Arch structures. General stability verification of arches. 2. Spatial reticular structures. Building systems. Composition of the reticular structures. Structural analysis of the reticular structures. 3. Structures with cable suspended roofs. Types. Cable thrust. Roof covering execution. Flexible cable structural analysis. 4. Multistory metal structures. Multistory buildings. High-rise setup. Resistance structures. 5. Towers. Metal poles for overhead power lines. 6. Reservoirs. Types of reservoirs. Vertical cylindrical reservoirs. Horizontal cylindrical reservoirs. Spherical reservoirs. Structural analysis elements. Pull determination using membrane theory. Linking effects. Strength elements dimensioning. 7. Bunkers. Construction principles. Structural analysis. |
| Urban and interurban traffic planning | 5 | 1. General concepts on streets and urban roads. Urban road system. Urban streets classification. Transportation influence on road design. 2. Elements of an urban road plan. Design of road cut section. Positioning of engineering systems in the cut section. Width calculation of the carriage way and sidewalks. 3. Design of the longitudinal urban road profile. Vertical curves. Street visibility at the intersections. 4. Passageways beyond road limits. Plan positioning. Types, characteristics of passageway elements. Design dimensions. Car street parking. Definitions of the street shell; types and characteristics. 5. Definitions on urban transportation. Historical data on the evolution of public transportation. Classification of urban transportation. Public transportation. Future development of public transportation. City plan as a basis of the transportation system; classification of cities. 6. Urban traffic planning. Estimation of the number of transportation units on a circuit. Coordination of different circuits. 7. Public transportation design. Project’s materials component. Preemptive project design. City land division into transportation zones. Zone interrelation. Preemptive transportation system specification. Estimation of the number of transportation units. |
| Civil buildings design methodology | 5 | 1. Notions on present day methods of civil engineering building design. Civil building’s foundations design methodology. 2. Ground subsidence determination. Methods for subsidence removal. Terrain compaction. Slab foundation design and construction methods. Pile foundations construction methods. Pile testing methods. Methods for designing civil buildings foundations. 3. Structural analysis, reinforcing and concreting of strip footings, spread footings and slab foundations. Structural analysis methods for foundations on subsiding and uplifting grounds. 4. Design methodology of concrete frame buildings. Data preparing for the structural analysis of a multistory building using “SCAD” structural analysis software. Deployment of the concrete diaphragm walls. 5. Structural analysis of the concrete frame’s stiffness, and methods of improving its stiffness. Civil building’s concrete floor’s design methodology. Present day methods for structural analysis of concrete floors residing on four sides. Reinforcement and concreting of slabs and beams. 6. Methods for beam’s steel anchoring. Concrete frame building with the use of present day materials. Structural analysis and construction of enclosing building’s structures. Closing element’s junction to the building’s concrete frame. 7. Handrail and parapet design. Monolithic building design. Present day structural analysis methods of monolithic buildings. Reading and understanding structural analysis done with the “SCAD” software; steel selection for wall reinforcement. |
| Urban and rural area design methodology | 5 | 1. Hierarchy of urban systems. Regional and local town systems and ways of development. District systemization. Industrial districts. Recreation areas. Agro-industrial districts. Complex assessment of regions, natural resources and labor force. 2. City and rural area design. Classifications. Moldova’s demographic structure. Moldova’s small towns. Methods of laying out residential areas in cities and rural areas. 3. Estimation parameters for urban planning. Population estimation. Estimation methods: work balance method, statistical method. Usage of statistical data, censuses, etc. for the population estimation. Land estimation of cities and rural areas. 4. Land choice for small town emplacement. Complex applications of land use for construction. 5. Functional and systemization structure of cities and rural areas. Functional zones. Layout rules of functional zones. Sanitary protection zones. Functional diagrams. City and rural area configuration. 6. Industrial and social services districts. Industrial district components: nodes, regions, production zones and factories. Sanitary protection zones. 7. Exterior transportation zones. Communication zones. Passenger stations. Water transportation, airports, cargo and passenger ports. 8. Residential areas. Organization, systemization and layout of residential areas in cities and rural areas. The structure of residential areas. Definitions. Residential area key elements. 9. Urban and rural transportation grids. The influence of natural factors on the layout of the transportation network. Types of road networks. Classifications. Urban transportation. 10. New green areas in cities and rural areas. Classification of green areas. |
| Thermal rehabilitation of buildings | 5 | 1. Hygrothermal requirements, requirements that that depend on the dwelling comfort and the reduction exploitation energy. 2. Performance criteria and levels regarding dwelling hygrothermal comfort. Achievement of the hygrothermal comfort in dwellings. 3. Human – environment heat exchange. Resulting temperature. Global coefficient for thermal transfer. 4. Energy consumption in Moldova. General characteristic of the Moldova’s energetic grid. Strategies for further development of the national energetic grid. 5. Advantages and hazards of thermal rehabilitation. 6. Dwelling ventilation. Ventilation control. The principles of heat loss through ventilation. 7. General principles on heat loss through transmission process. 8. Methods for thermal rehabilitation of building elements. Thermal rehabilitation of walls, roofs and floors. 9. Presentation of materials. Choice of materials. Implementation criteria. 10. Thermal rehabilitation investment recovery time. Thermal and energetic building audit. Building’s energy efficiency. |
| Total 2 sem. |  |  | 30 |  |  |  |  |
| Master thesis | 2nd year | 3 semester | 30 | not available | not available | The main objectives of the development process master thesis are:  • formulation and correct evaluation of the issues proposed in the dissertation for the research;  • select and analyze sources of technical information, economic, patents, about the problems are analyzed in this thesis;  • reasoning methodology applied or developed to solve the problem formulated above;  • argument developed solutions and decisions;  • correct use of research tools - computers, laboratory equipment - as tools for optimization, design, analysis, synthesis and evaluation;  • systematization, consolidation and expansion of knowledge, theoretical and practical knowledge of the specialty and their use at the decision of tasks of scientific, technical, economic and production;  • development of skills to work independently and knowledge of research methods and experiment at the decision of tasks and issues developed in the thesis of the master |  |
| Total 3 sem. |  |  | 30 |  |  |  |  |
| Total for Master course: | 1,5 years | 3 semesters | 90 |  |  |  |  |

MATRIX

of existing PhD (Doctorate) course

(Technical University of Moldova Faculty of Urbanism and Architecture)

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| --- | --- | --- | --- | --- | --- | --- | --- |
| Name of compulsory chairs | Year | Semester | Number of ECTS | Number of elective chairs | List of available elective chairs | short description | relation between the contents and RETHINK’s theme |
| 212.02 Urbanism and urban planning | | | | | | | |
| - PhD Laboratory | 1st year | 1 semester | 30 |  |  | Realization of the research program according to the individual plan | Depending on the research program of the dissertation |
| Total 1 sem. |  |  | 30 |  |  |  |  |
| - Foreign language.  - Informatics  - PhD Laboratory | 1st year | 2 semester | 5  5  20 |  |  | Foreign language study by doctoral candidates and competitors is conceived as a activity-oriented knowledge deepening and strengthening the competences acquired above in academic studies. Improve oral and written communication skills regarding professional activity and scientific. Capacity for analysis and synthesis of information contained in a speech scientific. Upgrading of skills transfer (translation) of the foreign language into maternal and vice versa specialized texts.  Basic concepts in informatics. Personal computers and networks of computers. Operating Systems. Applicative programs. Databases. Computer Programming. High-level programming language. Informational systems and advanced information technology. Internet. www - Service. Informational systems and advanced information technology.  The intermediary results of the research program elaborated following the model of annual report are presented by the doctorate candidate for examination within the scientific conferences / seminars. |  |
| Total 2 sem. |  |  | 30 |  |  |  |  |
| -- PhD Laboratory | 2nd year | 3 semester | 30 |  |  | Realization of the research program according to the individual plan |  |
| Total 3 sem. |  |  | 30 |  |  |  |  |
| - History and methodology of the research domain  - PhD Laboratory | 2nd year | 4 semester | 5  25 |  |  | Philosophy of knowledge, epistemology. Philosophy of science. Epistemology. Logical and methodological aspects of science. Scientific methods. Forms of scientific knowledge and methodological elements of logical analysis. Methodology technical creativity. Methods for activation of thinking. Specific aspects of a research organization. Planning research. Documentation of scientific research. Presentation of research results. Specific issues concerning scientific research in the fields of engineering.  The intermediary results of the research program elaborated following the model of annual report are presented by the doctorate candidate for examination within the scientific conferences / seminars. |  |
| Total 4 sem. |  |  | 30 |  |  |  |  |
| - PhD Laboratory | 3rd year | 5 semester | 30 |  |  | Realization of the research program according to the individual plan |  |
| Total 5 sem. |  |  | 30 |  |  |  |  |
| - Dissertation | 3rd year | 6 semester | 30 |  |  | The doctorate studies end with the defending of the doctorate thesis. The doctorate thesis is defended within a public session; the procedure of its defending is established by NCAA. |  |
| Total 6 sem. |  |  | 30 |  |  |  |  |
| Total doctorate course | 3 years |  | 180 |  |  |  |  |