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**O. M. BEKETOV NATIONAL UNIVERSITY
of URBAN ECONOMY in KHARKIV**

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FEATURES OF THE REHABILITATION CENTERS ARCHITECTURE

LECTURE NOTES



*(for students second (master`s) level of higher education
specialty 191, G17 – Architecture and Town Planning)*

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INTRODUCTION

The relevance of the discipline “Features of the rehabilitation centres architecture” is determined by the need to equip students with the knowledge required to address one of the most pressing issues in Ukraine today – the development of rehabilitation centres aimed at restoring the health of the population. In the current context, medical rehabilitation – both physical and psychological – has become particularly significant. Consequently, the identification and development of architectural design approaches for facilities of this type are of urgent importance.

It is essential to understand the processes of interaction between individuals experiencing health-related or emotional difficulties and their surrounding environment, as well as their interaction with other people. Equally important is the study of the mechanisms that facilitate the reintegration of individuals requiring rehabilitation into society, and the principles governing the formation of a material-spatial environment that responds to their specific needs.

The search for effective ways to improve rehabilitation systems in Ukraine is especially relevant in relation to restoring physical capacities, supporting adaptation after injuries and trauma, enhancing the quality of rehabilitation services, and developing appropriate infrastructure. Furthermore, the outbreak of large-scale war in Ukraine in 2022 and the resulting increase in the number of injured military personnel have created an urgent demand for specialised rehabilitation programmes and facilities for service members.

Identifying the principal aspects of the architectural formation of rehabilitation centres – including urban planning, functional-spatial and typological considerations – is therefore highly relevant. In the contemporary world, specialised institutions such as rehabilitation centres play a crucial role in improving and maintaining the quality of life and health of individuals with special needs. They constitute an essential component in the processes of recovery and social reintegration.

The educational component “Features of the rehabilitation centres architecture” is offered as an elective module within the second (master's) level architectural programme and is delivered over one semester. The structure and content of the lecture sessions correspond to the approved module specification (see Table 1.1).

Table 1.1 – Lecture plan

Lecture notes of discipline «Features of the rehabilitation centers architecture»		
Num.	Content	Number of aud. hours
Module 1		
Content module 1 Basics of rehabilitation centers typology		
Theme 1	Introduction to the discipline. Terminology and main problems of forming rehabilitation centers	2
Theme 2	Factors and prerequisites for the emergence of rehabilitation centers. Main areas of research on rehabilitation facilities	2
Theme 3	Stages of formation of the main typological features of rehabilitation centers	4
Content module 2 Design features of rehabilitation centers		
Theme 4	Features of typological structures of rehabilitation centers. Sociological research of rehabilitation institutions	4
Theme 5	Main characteristics of modern rehabilitation centers and their spatial organization	2
Theme 6	Methods and means of organizing rehabilitation centers and requirements for their organization	4
Content module 3. Modern trends in the design of rehabilitation centers		
Theme 7	Conceptual foundations for the formation of rehabilitation institutions	4
Theme 8	Theoretical foundations of universal design in the formation of a full-fledged inclusive space of rehabilitation facilities. Requirements for the organization of an inclusive environment	4
Theme 9	Search for new directions in the typology of rehabilitation centers. Modern trends in their formation	4
Total		30

CM1 BASICS OF REHABILITATION CENTERS TYPOLOGY

THEME 1 Introduction to the discipline. Terminology and main problems of forming rehabilitation centers

Lecture plan:

1. Definition of the main tasks and familiarization with the terminology of the discipline.
2. The main problems of forming rehabilitation facilities at the present stage.
3. The main approaches to solving the problems of forming rehabilitation centers.

The modern world faces numerous challenges in the field of healthcare, including the growth of musculoskeletal and cardiovascular diseases, as well as an increasing number of people requiring rehabilitation after injuries and surgical interventions. In Ukraine, the relevance of this problem is currently very high, as confirmed by statistical data from the Ministry of Health, which indicate an annual increase in morbidity rates, as well as in the number of people wounded during hostilities and affected by the war who require rehabilitation services.

Legislative acts such as the Law of Ukraine “On Rehabilitation of Persons with Disabilities in Ukraine” and the Resolution of the Cabinet of Ministers of Ukraine No. 110 of 1 February 2017 “On Approval of the Regulation on Rehabilitation of Persons with Disabilities” establish the legal framework and regulate the provision of rehabilitation services. In addition, in accordance with the National Strategy for Healthcare Reform in Ukraine up to 2030, one of the key objectives is to improve the accessibility and quality of medical services, including rehabilitation and health-improvement services. Along with the Strategy, the Order of the Cabinet of Ministers of Ukraine dated 17 January 2025 No. 34-r approved the operational action plan for its implementation for 2025–2027.

At the international level, important documents include the UN Convention on the Rights of Persons with Disabilities, which emphasises the necessity of ensuring access to rehabilitation services, and the World Health Organization (WHO) Declaration on Health and Development, which highlights the importance of rehabilitation measures for improving quality of life.

The growing demand for rehabilitation services increases the relevance of creating infrastructure that meets the needs of people with disabilities and those recovering from injuries. In this context, architecture plays a decisive role in ensuring a barrier-free and comfortable environment for patients.

A rehabilitation center is an organisation engaged in the physical, psychological, social and moral-spiritual recovery of individuals who have experienced diseases of the nervous system, musculoskeletal system, sensory organs, etc., as well as those with mental and behavioural disorders.

The purpose of rehabilitation is the correction and improvement of the patient's physical, psychological, mental and social condition.

The main objective of rehabilitation centres is to help individuals restore or improve physical, cognitive, emotional and social skills that have been impaired because of illness, injury or disability. These centres may provide physical therapy, therapeutic exercise, speech therapy sessions, psychological support, occupational training and other types of therapeutic services.

Rehabilitation centers represent a rather complex type of facility, which must include many functional units and provide a wide range of services. It is necessary to develop effective architectural solutions for rehabilitation centres that meet modern requirements of safety, functionality and aesthetics, ensure maximum efficiency of use, and consider contemporary trends.

Rehabilitation centres play an important role in restoring the health and quality of life of people who require long-term medical care after injuries, surgeries or illnesses. Their goal is to provide patients with comprehensive assistance that includes physical, psychological and social support. In such institutions, patients receive professional services from doctors, physiotherapists, psychologists and social workers, which facilitates their full return to active life. The development of rehabilitation centres is a relevant issue in modern healthcare worldwide, as they help reduce disability rates and promote the integration of people with disabilities into society.

Unfortunately, at present there are no specifically developed design standards for rehabilitation institutions. Moreover, this problem is complicated by the insufficient scientific basis that considers the specifics of injuries, diseases and disabilities. Addressing the above-mentioned issues will make it possible to properly organise the spatial environment of rehabilitation facilities, which in turn will ensure comfortable conditions for patients and increase the effectiveness of their rehabilitation process.

The development of the theoretical foundations for the design of rehabilitation facilities continues at the present time, considering that the emergence of rehabilitation institutions was initially driven by social and military challenges, especially after the World Wars, which significantly influenced their architecture and functional structure.

THEME 2 Factors and prerequisites for the emergence of rehabilitation centers. Main areas of research on rehabilitation facilities

Lecture plan:

1. Prerequisites for the emergence of rehabilitation facilities.
2. The main factors determining the formation of the architectural and planning structure of rehabilitation institutions.
3. Historical prototypes of rehabilitation facilities of various types.

According to historical sources, the first medical institutions for military personnel were formed by the end of the 1st century BCE and were further developed in Imperial Rome. They were called *valetudinaria* (Latin: *valetudo*, *valetudinis* – health). They were initially staffed by free physicians, and from the 1st century CE military doctors began to predominate in the military *valetudinaria* of Imperial Rome. One physician usually served three legions concentrated in a single camp, where up to 200 beds were provided for 12,000–15,000 soldiers. The military *valetudinarium* was located within the structure of the camp but did not have a strictly fixed position. Most often, it was placed in the central part of the camp.

During the Early Middle Ages, the practice of military hospitals disappeared, and this function was assumed by monastic complexes. Unlike the Roman *valetudinarium*, the medieval monastic hospital did not include pools or baths, nor

any other proper conditions for maintaining hygiene. On the contrary, hospitals often simultaneously served as shelters for beggars and vagrants, which turned them into centres of disease and parasites. Thus, the architectural features of medieval medical institutions were represented in the form of monastic complexes, which possessed individual stylistic characteristics depending on their regional location.

The first large-scale project of a rehabilitation-type facility was the Hôtel des Invalides in Paris, the construction of which was completed in 1676. Its dimensions are truly impressive; in some sources it is even referred to as a small town. The territory of the complex covers 13 hectares. It includes the Soldiers' Church with the Cathedral, various museums, and barracks for patients. Special workshops were created for leisure and occupational activities. From the point of view of volumetric-spatial organisation, the complex represents a linear composition with a closed system of courtyards, headed by the Cathedral of Saint Louis — a striking example of French Classicism.

The formation of an understanding of rehabilitation centres as separate medical institutions began in the twentieth century because of advances in medicine, social policy and approaches to the treatment of patients requiring recovery after illness, injury or psychological disorders. After the First and Second World Wars, due to the need to rehabilitate many wounded soldiers, disabled persons and veterans, the idea of specialised institutions for medical and physical rehabilitation began to develop. Since then, terminology related to rehabilitation centres has continued to evolve, considering new medical and technological achievements.

The process of development of the organisation of rehabilitation centres can conventionally be divided into three significant periods.

The concept of rehabilitation has ancient roots. Even in ancient civilisations, various methods were used to restore health after illnesses and injuries. For example, in Ancient Egypt physicians used massage and physical exercises to treat the sick and injured. In Ancient Greece and Rome, such prominent physicians as Hippocrates and

Galen applied massage, diet, water procedures and physical exercises to treat various diseases.

During the Middle Ages, the development of rehabilitation methods was limited due to the dominance of religious interpretations of illness. However, monasteries and religious institutions often performed the functions of early forms of rehabilitation centres, where the sick were cared for and provided with basic medical assistance.

The development of rehabilitation centres accelerated significantly in the twentieth century, particularly after the First and Second World Wars, when the need to restore the health of soldiers became critically important. During the First World War, Queen Mary's Hospital was opened, specialising in servicemen with amputations. The hospital was founded in 1915, primarily by Mary Eleanor Gwynne-Holford, as a military hospital for wounded soldiers. During the war, 26,000 soldiers who had lost limbs received treatment there. Later, it became a centre for the production and fitting of prostheses.

At the beginning of the twentieth century, many military hospitals in the United States were small and scattered across different parts of the country. The growing need for high-quality medical care for servicemen after the Spanish-American War of 1898 prompted the army leadership to establish a major medical institution. Walter Reed Army Medical Center became one of the leading military medical centres in the United States. During the First World War, it significantly expanded its capacity to treat wounded soldiers returning from Europe. In the 1920s and 1930s, it also became an important educational and research centre for military medical personnel, particularly surgeons trained to treat combat injuries.

At the beginning of the twentieth century in America, clinics began to operate in which various measures were used to address both physical and psychological problems of patients.

The formation of rehabilitation centres is a complex process that depends on the interaction of many factors. Among these are urban planning, medical, typological,

volumetric-spatial, structural, economic, social and other factors, all of which must be considered to provide optimal conditions for patient rehabilitation.

The relevance of the influence of the architectural environment on patient rehabilitation is becoming increasingly evident within the contemporary approach to medicine and health recovery. The architectural environment in which patients undergo rehabilitation directly affects their physical and psycho-emotional recovery.

THEME 3 Stages of formation of the main typological features of rehabilitation centers

Lecture plan:

1. Prerequisites for the formation and main approaches to the creation of rehabilitation facilities.
2. Formation of modern types of rehabilitation centers in the second half of the twentieth century.
3. Stages of architectural formation of rehabilitation centers.

In the second half of the twentieth century, the active development of medicine began, alongside the expansion of rehabilitation facilities.

After the Second World War, the Korean War, and the Vietnam War, a vast number of veterans with serious injuries required recovery. This prompted governments and organisations to establish specialised institutions for the rehabilitation of the wounded. Following the end of the Second World War, rehabilitation began to gain significant importance in medicine due to the increase in disability cases, physical, mental and somatic diseases, the birth of children with genetic disorders, and the growing number of accident victims, which led to efforts aimed at reintegrating these population groups into society.

In 1965, the first hospital dedicated to the rehabilitation of people with spinal cord injuries – the Institute Guttmann was opened in Barcelona. The centre specialises in neurological rehabilitation and the treatment of patients with spinal cord injuries. The establishment of this centre was driven by the need for modern and effective treatment methods for patients who had sustained severe spinal injuries as a result of accidents and military actions.

After several military conflicts, including the Arab Israeli wars, Israel faced the necessity of creating specialised institutions for the treatment of wounded soldiers and civilians. The Loewenstein Rehabilitation Hospital was established as a centre for treating patients with neurological and orthopaedic injuries. In addition, the institution specialises in rehabilitation after traumatic brain injuries and strokes.

Rehabilitation centres have undergone significant changes reflecting the evolution of approaches to treatment and patient recovery. The main characteristics of these centres have become the integration of advanced technologies, a multidisciplinary approach, an emphasis on individualised treatment, and psychosocial support.

In recent years, the war in Ukraine has caused a complex range of consequences, including political, economic, social, demographic and urban impacts, among many others. It affects the life and health of every individual, deeply influencing both physical health and the psychological sphere of the personality, particularly in the case of those who have suffered because of hostilities. In this context, medical rehabilitation – both physical and psychological becomes especially important after injuries or upon completion of combat service.

Rehabilitation processes after injuries must be comprehensive in nature. Both medical and physiotherapeutic procedures must be involved, which can help alleviate inflammatory processes, accelerate recovery, reduce the risk of physical and psychological complications, and decrease the degree of disability. For this reason, buildings themselves must follow a comprehensive approach in shaping the functional and planning organisation of rehabilitation centres. One of the most common consequences of psychological trauma is post-traumatic stress disorder (PTSD), the symptoms of which are experienced by more than 75% of affected individuals, both among combat participants and civilians.

Rehabilitation processes are aimed at helping in various directions: after damage to the musculoskeletal and nervous systems accompanied by impaired motor activity; after psychological trauma; for the elimination of inflammatory processes and tissue

consolidation; for the restoration of blood circulation; and for recovery after injuries, surgical interventions, concussions and complications.

Therefore, rehabilitation centres represent a complex type of facility. This is because they must include many functional units and provide a wide range of services. Such institutions must offer various diagnostic and therapeutic functions, physiotherapy procedures and psychological support, laboratory diagnostics, emergency care, and other services.

The architect's task is to consider the rehabilitation centre as a unified mechanism, to resolve and coordinate the relationships between functional blocks and numerous spaces, to organise patient flows, and to address many other issues while considering constantly developing medical technologies.

Unfortunately, at present the field of rehabilitation in Ukraine faces numerous problems. The system remains fragmented, and people with disabilities, injured military personnel and civilians are often left alone with their difficulties.

The issue of creating multifunctional rehabilitation centres requires a comprehensive approach that includes the analysis of research from various fields. Many scientific and theoretical studies focus on medical and socio-psychological aspects of rehabilitation. Moreover, there are currently no design standards for rehabilitation centres that would consider the specifics of human activity and the influence of architecture on the recovery process.

Studies by foreign architects analyse contemporary approaches to the creation of medical rehabilitation facilities oriented towards the needs of military personnel, particularly those who have sustained severe combat injuries. The main attention is given to organisational and architectural solutions that promote effective rehabilitation. Researchers examine the experience of the United States, where emphasis is placed on a multidisciplinary approach combining medical, physical and psychological care. An example is the rehabilitation centre in Palo Alto, considered one of the exemplary facilities. Its architecture contributes to stress reduction using horizontal structures, green areas and spacious courtyards.

The environment in which a patient stays can either reduce stress levels or contribute to their increase. Interior design featuring natural lighting, open spaces and elements of nature (green areas, gardens) help to reduce anxiety and promotes faster recovery.

Theoretical research on the architectural formation of rehabilitation centres demonstrates that contemporary approaches are based on the combination of functionality, ergonomics, accessibility and the creation of a therapeutic environment. Successful architectural examples, such as centres in Israel, Germany and Ukraine, illustrate the importance of integrating modern technologies and natural elements to achieve the best rehabilitation outcomes. Possible ways of addressing social problems through architecture and design include the formation of specialised spaces within the urban environment, where being present may have a positive impact, restore vital energy and enhance human potential. It is necessary to consider all possible manifestations of the psychological influence of the environment at all stages of design and to apply progressive directions in the development of architectural organisation of rehabilitation centres.

CM 2 DESIGN FEATURES OF REHABILITATION CENTERS

THEME 4 Features of typological structures of rehabilitation centers.

Sociological research of rehabilitation institutions

Lecture plan:

1. Features of rehabilitation facilities, functional organization.
2. Requirements and design problems, hierarchy of types.
3. The influence of promising directions in the medical care system on the architectural and planning structure of rehabilitation facilities.

The main objective of rehabilitation centres is to help individuals restore or improve physical, cognitive, emotional and social skills that have been impaired because of illness, injury or disability. These centres may provide physical therapy, therapeutic exercise, speech therapy sessions, psychological support, occupational

training and other types of therapeutic services. In the contemporary concept of such institutions, not only medical equipment and the professionalism of doctors are important, but also the environment in which patients undergo recovery.

Rehabilitation centres can be classified according to the following factors:

- type of services (physical therapy, psychological support, vocational rehabilitation, addiction treatment, post-operative rehabilitation, etc.);
- specialisation (centres may focus on specific categories of patients, such as military personnel, children with disabilities, individuals with substance dependence, etc.);
- type of institution (large hospitals with rehabilitation departments, specialised medical centres, outpatient clinics, rehabilitation clinics);
- level of care (from basic physical therapy to a comprehensive approach including physical, psychological and social rehabilitation);
- location and service coverage (regional centres serving a defined territory, or local centres providing services at the community level);
- type of rehabilitation (medical, physical, social, vocational or psychological).

Specialists distinguish several types of rehabilitation facilities according to structural complexity:

- full-cycle rehabilitation centers;
- rehabilitation centres located within settlements;
- rehabilitation centres located outside settlements;

specialised rehabilitation centres focused on one primary type of treatment.

The urban planning and functional-spatial structure of rehabilitation centres of the second type is, in general, like that of existing rehabilitation centres. They are located within defined regions and may function only within those cities or near them. In addressing the tasks of such centres, it appears advisable to supplement them with separate modular blocks specialising in specific aspects of rehabilitation.

This involves expanding the range of rehabilitation services and the corresponding spaces. First, this concerns solar therapy – including sun and ultraviolet baths. This type of rehabilitation centre also foresees an increase in recreational spaces with natural landscaping and water surfaces within the “warm” contour of the building. These additions are necessary for deeper and more effective rehabilitation of individuals experiencing a constant deficit of natural surroundings. It is also considered important to actively use open spaces for solar therapy and sports grounds in the rehabilitation process. In addition, it is advisable to increase spaces associated with solar procedures and necessary water elements (pools, fountains, etc.). The presence of natural vegetation in “winter gardens” within recreational zones is also important for effective rehabilitation. In this regard, large rehabilitation centres with full staffing and equipment can generally be organised only in large cities.

In terms of planning structure, such a centre may consist of a series of treatment rooms and a separate row of spaces including physiotherapy areas, a small swimming pool and a winter garden. All these spaces are united by a single communication area with a dining zone, vertical landscaping, soft furnishings, finishes in warm tones (wood), and, most importantly, maximum openness to sunlight.

It should also be noted that this central multifunctional space is not only a unifying element connecting all functional blocks, but also a meaning-forming one. The unifying space serves as a meeting place for patients, doctors and visitors; it is a zone of communication and an effective element of psychological rehabilitation.

In certain cases, it appears promising to develop not full centres but small rehabilitation modules. From an urban planning perspective, they may be located in small settlements, bases or near them. Such a module represents a facility with a minimum set of rehabilitation services, primarily related to urgent rehabilitation, and is serviced by a limited number of specialists. It may also provide remote computer-based diagnostics and recommendations for optimal procedures. In terms of functional-spatial organisation, the module also includes engineering-technical and

service blocks. The energy supply of such a module may be provided by solar or wind installations.

Prospective directions such as the individualisation of rehabilitation, the implementation of smart home technologies, a multidisciplinary approach and integration with nature are transforming the structure of rehabilitation institutions. The layout is shifting from a corridor-based system to modular planning, incorporating open rehabilitation spaces, simulated apartments, spacious socialisation areas and a barrier-free environment.

THEME 5 Main characteristics of modern rehabilitation centers and their spatial organization

Lecture plan:

1. Architectural and planning organization and spatial composition of rehabilitation centers.
2. The main structural features of the organization of large rehabilitation centers as multifunctional facilities.

Modern rehabilitation centers are becoming true oases for health restoration and patient recovery. Their architectural design is based on advanced technologies, innovative concepts and a deep understanding of the needs of medical rehabilitation.

Researchers identify several types of rehabilitation:

1. Medical rehabilitation is a complex of measures that includes methods for accelerating recovery, stimulating reparative and regenerative processes, identifying and strengthening compensatory mechanisms, and correcting general resistance of the body and immunity. This patient-centered process involves a team of healthcare professionals working collaboratively to develop and implement an individual rehabilitation plan that addresses the patient's physical, psychological, social and professional needs.

2. Physical rehabilitation involves the therapeutic and preventive use of physical exercises and natural factors within a comprehensive process aimed at restoring health, physical condition and working capacity.

3. Psychological rehabilitation (sometimes referred to as social rehabilitation) is a complex of restorative medical measure aimed at rebuilding the mental and physical capacities of a person with a mental disorder to a controlled level, that is, to a level enabling the ability to work.

Because of these processes, a specific type of institution has developed – the rehabilitation center – which may provide several types of rehabilitation services or deliver a complex of rehabilitation direction.

In general, rehabilitation institutions provide transitional care for patients who no longer require emergency medical assistance but are not yet ready for independent living. The length of stay in rehabilitation centers usually ranges from several days to two weeks for non-traumatic orthopedic, cardiovascular and neurological conditions, and up to several months in long-term acute care centers for the treatment of traumatic brain and spinal cord injuries. Patients often could choose where to undergo rehabilitation, and admission to rehabilitation centers may occur prior to planned surgeries; even rehabilitation after unexpected traumatic events is often planned during the patient's stay in an acute care hospital.

Rehabilitation staff also have specific needs, such as rest areas like those required in acute care facilities. Other needs, such as internal office spaces overlooking therapy zones for continuous patient observation, are specific to rehabilitation specialists. Moreover, the rehabilitation sector is moving towards collaborative care, requiring the integration of various disciplines. Up to eight disciplines may be involved, supporting specialized communication, conferences and coordinated patient treatment.

To effectively support care, the environment must motivate patients to leave their rooms, preventing isolation and encouraging interaction with other patients. Therefore, the creation of shared lounge and communication areas is an essential component of the recovery process in rehabilitation facilities.

To meet diverse patient needs, flexibility and environmental control are key factors. For example, patients may need the ability to regulate lighting intensity or to

use partial walls to segment space. Large open gyms are also important, allowing staff to monitor multiple patients simultaneously and enabling easy movement between equipment. These gyms should include private areas, such as three-sided treatment zones with front curtains for individual therapy sessions and discussions of progress and further steps.

The environment must also consider the needs of different patient groups undergoing rehabilitation. For example, enclosed spaces that provide safety and minimize distractions for one group may cause feelings of claustrophobia in another.

Exterior design – including courtyards, driveways and pathways, should be both safe for patients and therapeutic in nature. It is advisable to incorporate materials commonly encountered in patients' homes or communities, including asphalt, textured paving stones, brick paths, wooden logs and even gravel.

The development and implementation of new projects for multifunctional rehabilitation centers is an important social task of the present time, as most existing facilities are not focused on restoring the physical and psychological health of military personnel. The application of multifunctionality in the design of such centers makes it possible to address all aspects of rehabilitation for defenders: medical, physical, psychological, social and military-professional. This complex solution is particularly relevant in conditions of limited urban space, high building density, high land prices and increasing transport capacity. The effective distribution and optimal combination of the center's functions constitute an important scientific and practical task under contemporary conditions.

THEME 6 Methods and means of organizing rehabilitation centers and requirements for their organization

Lecture plan:

1. Differentiation of medical and residential spaces of rehabilitation centers.
2. Architectural planning and design tools of formation.
3. Normative and ergonomic requirements for the organization of premises in rehabilitation centers.

The functional and planning organization of rehabilitation centers must take into account the necessity of creating clearly defined zones for treatment, rehabilitation, rest and social interaction. Planning solutions should ensure logical functional zoning and effective internal logistics between spaces. Importance is given to flexibility of spatial use, accessibility for people with limited mobility, and compliance with contemporary ergonomic standards.

A rehabilitation center typically includes several key spatial components. The reception area serves as the primary point of entry for patients and visitors. It is here that patients are registered, visitors are directed, and information is provided. This space forms the first impression of the institution and therefore should be clearly organized, welcoming and easy to navigate.

Administrative premises are intended for professional and operational staff, including medical personnel, accountants, consultants and volunteers. In addition to office spaces, staff restrooms must be provided to ensure appropriate working conditions and recovery opportunities for employees.

The medical block comprises consultation rooms and specialized therapy rooms designed for various diagnostic and treatment procedures. These spaces accommodate physicians of different profiles, including general practitioners, rehabilitation specialists, neurologists, cardiologists and psychotherapists. The block also includes physiotherapy rooms equipped for electrotherapy, ultrasound and magnetotherapy, massage rooms, hydrotherapy facilities, mechanotherapy rooms and spaces for therapeutic exercise and kinesiotherapy. Diagnostic facilities such as ultrasound rooms, X-ray rooms and laboratories are integral components of the medical block. Additional specialized spaces may include occupational therapy rooms, manual therapy rooms, sensory rooms for patients with neurological or psychological disorders, telemedicine or monitoring rooms, as well as storage areas for medical equipment and a licensed pharmacy.

The residential block is designed to accommodate patients during their rehabilitation period and must ensure comfortable and restorative living conditions. It

typically includes single and double patient rooms, often with private sanitary facilities. Nursing stations are located on each floor to facilitate continuous care. Additional supporting spaces include medication storage rooms, utility rooms for linen and hygiene supplies, shared sanitary facilities where necessary, common lounges for social interaction and relaxation, as well as laundry and auxiliary service rooms.

The sports and physical rehabilitation block play a crucial role in restoring patients' physical capacities. It includes general gyms equipped with cardio and strength-training equipment, exercise therapy halls for kinesiotherapy sessions led by instructors, hydrotherapy pools with associated changing rooms and showers, and dedicated spaces for yoga, meditation and stretching. Where possible, outdoor sports grounds such as volleyball, basketball or tennis courts may be provided. Sauna or steam rooms can also be incorporated to support relaxation and recovery.

The entrance zone functions as the organizational and communicative core of the centre. It typically comprises a foyer with a registration and information desk, waiting areas with seating, cloakrooms or lockers, admission rooms for new patients, consultation rooms for initial examinations, administrative offices and visitor sanitary facilities.

Recreational spaces form an essential part of the psychological rehabilitation process. These areas may include lounge zones with soft furniture, reading rooms or libraries, quiet rooms for meditation and relaxation, internal green courtyards or gardens for outdoor therapy and walking, game rooms, multimedia halls for educational programmes or film screenings, and specialized rooms for group therapy sessions. Such spaces encourage communication, reduce stress and contribute to social reintegration.

The catering block ensures proper nutrition for patients and staff. It generally includes a dining hall or cafe, a fully equipped kitchen with designated areas for dietary meal preparation, buffet areas for light refreshments, food storage rooms and separate serving zones adapted to different dietary requirements.

The organization of rehabilitation facilities in Ukraine is regulated by SCR B.2.2-10:2022 standards, sanitary-hygienic regulations and medical licensing requirements. Premises must meet standards for lighting, ventilation, heating, water supply and fire safety. Each functional space must comply with established minimum area requirements; for example, massage rooms should not be less than 12 sq. meters and therapy halls not less than 24 sq. meters. All spaces must ensure full barrier-free accessibility through the provision of ramps, widened doorways and accessible sanitary facilities.

A modern rehabilitation center should function as a comprehensive institution that integrates medical, residential, sports, recreational and catering facilities into a unified infrastructure. Such an integrated approach ensures effective rehabilitation, comfortable living conditions and opportunities for social interaction, thereby supporting faster physical and psychological recovery of patients

The organization of premises in rehabilitation centers in Ukraine is regulated by SCR B.2.2-10:2022 standards, sanitary-hygienic norms and medical licensing requirements. Premises must have adequate lighting, ventilation, heating and water supply, and comply with fire safety regulations. It is important that the area of each room meets established minimum standards (for example, massage room – from 12 sq m; hall – from 24 sq. m), with properly equipped zones for individual and group therapy, physical rehabilitation (from 12–24 sq. m), specialists' offices, and full barrier-free accessibility (ramps, wide doorways).

A rehabilitation center should function as a comprehensive institution integrating medical, residential, sports, recreational and catering facilities into a unified infrastructure. These blocks ensure full-scale rehabilitation, comfortable living conditions and opportunities for social interaction, thereby contributing to faster patient recovery.

CM 3 MODERN TRENDS IN THE DESIGN OF REHABILITATION CENTERS

THEME 7 Conceptual foundations for the formation of rehabilitation institutions

Lecture plan:

1. Theories and concepts that integrate the functional polymorphism of rehabilitation centers.
2. Features and modern trends in the formation of rehabilitation centers.
3. The concept of forming the architectural and spatial environment of rehabilitation facilities.

Modern concepts for the design of rehabilitation centres encompass a wide range of architectural and technological solutions aimed at ensuring effective patient recovery and providing comfortable working conditions for staff. These concepts are based on the principles of inclusivity, ergonomics, environmental sustainability and technological innovation.

Inclusive design and a barrier-free environment. A fundamental requirement for rehabilitation centers is accessibility for all categories of patients, including individuals with limited physical abilities. Barrier-free access is ensured through the incorporation of ramps, lifts, wide doorways and corridors suitable for wheelchair movement. Steps are replaced with inclined surfaces or lifting platforms to eliminate physical obstacles. Ergonomic solutions are applied to all interior elements, including furniture, equipment placement and medical devices, to guarantee maximum convenience for users with varying physical capacities. Sanitary facilities and care rooms are specially designed to meet the needs of people with disabilities, incorporating grab rails, sufficient maneuvering space and adapted sanitary fixtures.

Flexibility and spatial modularity. Contemporary rehabilitation centers require a flexible planning approach that allows adaptation to different types of therapy and the evolving demands of the rehabilitation process. Buildings are often designed as systems of modular elements that can be reconfigured or repurposed without significant time or financial costs. This enables rapid transformation of functional zones in response to changing needs. The use of movable partitions allows spaces to

be easily restructured for various activities, ranging from group therapy sessions to individual treatment. Multifunctional rooms are increasingly common, with physiotherapy areas capable of being transformed into lecture rooms or other activity spaces as required.

Natural lighting and connection with nature. The influence of the natural environment on patients' psychological and physical well-being is a key aspect of contemporary design approaches. Rehabilitation centers are therefore designed to maximize the integration of nature into interior spaces. Large windows and panoramic facades allow substantial amounts of natural light to penetrate the building, creating a sense of openness and positively influencing patients' emotional state. Internal gardens, landscaped courtyards and planted areas are incorporated to support psychological recovery. Green terraces and roof gardens further enhance ecological performance while providing patients with opportunities to interact with nature even within the building envelope.

Energy efficiency and environmental sustainability. Ecological considerations play a significant role in modern design, affecting both the economic efficiency of the building and its environmental impact. Energy-efficient materials with high thermal and acoustic insulation properties are used to reduce energy consumption for heating and cooling. Renewable energy sources, such as solar panels, wind turbines and heat recovery systems, are integrated to supply part of the building's energy demand, thereby reducing dependence on external energy sources. Water-saving systems, including rainwater harvesting for technical use, low-consumption sanitary fixtures and efficient drainage systems, form essential components of ecological design strategies.

Technological innovations. Modern rehab centers actively implement advanced technologies that enhance rehabilitation processes and improve staff efficiency. Smart building systems enable automated control of climate, lighting and security, optimizing building performance while maintaining patient comfort. These systems can automatically adjust environmental parameters according to the requirements of

specific therapeutic activities. Telemedicine platforms allow remote medical consultations and continuous patient monitoring. Additionally, virtual and augmented reality technologies are increasingly applied in rehabilitation exercises to restore motor skills and support cognitive therapy.

Organization of spaces for socialization and relaxation. An essential component of rehabilitation centers is the provision of spaces that support social interaction and emotional recovery. Shared spaces such as large halls, lounge areas, libraries and cafés allow patients to communicate, spend time with family members or simply relax. Dedicated relaxation zones, including internal gardens and quiet or meditation rooms, provide environments where patients can restore emotional balance and reduce stress.

Sensory spaces. The design of rehabilitation centers must also address diverse sensory needs, particularly for patients undergoing neurological or psychological rehabilitation. Light and color therapy systems can be incorporated, using adjustable lighting and carefully selected color schemes to stimulate or calm patients as required. Adequate sound insulation is equally important, as it helps create a quiet and peaceful atmosphere essential for effective recovery.

Overall, contemporary rehabilitation center design is oriented towards creating environments that fully respond to patients' needs, promote faster recovery, enhance quality of life and provide comfortable working conditions for staff. Innovative technologies, environmentally responsible solutions, inclusive design principles and the integration of natural elements play a decisive role in shaping modern rehabilitation facilities that meet current societal and healthcare demands.

THEME 8 Theoretical foundations of universal design in the formation of a full-fledged inclusive space of rehabilitation facilities. Requirements for the organization of an inclusive environment

Lecture plan:

1. Modern approaches to organizing space for low-mobility population groups.

2. Requirements for designing a comfortable space for users with various types of physical health limitations
3. Categories of accessibility of the territory, buildings and premises.
4. Requirements for architectural and planning solutions of modern inclusive rehabilitation centers and the implementation of the principles of universal design.

Contemporary experience in the architectural formation of rehabilitation centres is focused on combining functionality, accessibility and therapeutic effectiveness. The design of such facilities provides the creation of a barrier-free environment for people with disabilities, the use of natural lighting, green areas and adaptive sports grounds to support both physical and emotional recovery.

People with reduced mobility (PRM) are defined as individuals who experience difficulties in independent movement, accessing services or necessary information, or orienting themselves in space. This category includes persons with disabilities, individuals with temporary health impairments, pregnant women, elderly citizens and people with baby strollers.

The growing emphasis on inclusivity and accessibility has led to the widespread implementation of barrier-free design, adapted premises for physical rehabilitation and social spaces that promote patient integration into the community. Adaptive sports facilities are actively introduced, and natural elements are incorporated into building design and surrounding landscapes to enhance the recovery process.

Modern rehabilitation facilities are designed to be motivating, welcoming, safe and accessible. From spatial planning and equipment selection to the balance between open and private zones, every aspect is created with the goal of achieving measurable therapeutic outcomes. The result is a space that is itself therapeutic, where each design detail serves a specific rehabilitative purpose.

An analysis of design and construction practices for specialized rehabilitation facilities of various profiles reveals a consistent and progressive development of volumetric and planning solutions. Rehabilitation institutions continuously adapt to evolving societal and governmental demands.

The design of comfortable spaces for people with physical health limitations is based on the principles of universal design, ensuring barrier-free access, safety and independence. Key requirements include step-free entrances, ramps with a slope not exceeding 5 %, circulation widths of at least 1,5 meters, contrasting visual markings and accessible wayfinding systems. These requirements address physical accessibility, spatial orientation and overall comfort for all categories of users.

Inclusive design standards require that entrance areas and horizontal circulation routes be level with the ground and free of thresholds. Where stairs are present, they must be supplemented with ramps or lifting devices. Doorway widths should generally range between 0,85 and 0,9 meters. Internally, corridors should be at least 1,5 metres wide to allow wheelchair turning. Flooring must be even, non-slip and free from obstacles. Navigation systems should include contrast markings on glass doors, stairs and hazardous zones, as well as tactile paving for individuals with visual impairments. At least one universally accessible toilet cabin must be provided, designed for wheelchair users. Control elements such as lift buttons, switches and door handles should be installed at heights between 90 and 110 centimeters. Lighting should be bright and evenly distributed, and information panels should contain large, legible fonts and pictograms. Compliance with these requirements ensures safe and comfortable use of space for individuals with mobility, visual and hearing impairments.

In designing contemporary rehabilitation facilities, an eco-dominant approach should be applied. This approach represents a strategy for creating buildings and environments in which ecological principles are prioritized and determine all structural, aesthetic and engineering decisions. It minimizes environmental impact, ensures energy efficiency and creates a healthy environment for patients.

The first principle of the eco-dominant approach is the maximum safety of the built environment for human health. In rehabilitation design, priority must be given to environmentally friendly materials and technologies that do not harm occupants or that minimize negative impacts.

The second principle concerns the creation of optimally comfortable indoor conditions. Proper lighting and a favorable microclimate must be ensured so that individuals feel physically and psychologically comfortable. This principle extends to the organization of all building systems, including heating, water supply, electricity, ventilation and lighting.

The third principle involves ecological safety and the use of natural materials. Artificial materials should be minimized where possible, and natural, safe alternatives should be applied. The integration of natural elements into interiors is encouraged. Preference should be given to locally sourced materials that can be extracted, processed and transported with minimal environmental cost.

The fourth principle focuses on recreating elements of the natural environment within living spaces. Nature-integrated design solutions should ensure abundant natural light and air, as well as the incorporation of water features, plants, aquariums, natural wood furniture, pebbles, shells and other organic materials.

The fifth principle emphasizes the use of natural color palettes to support psychological comfort. Soft, pastel tones inspired by natural landscapes help patients regain strength and restore emotional balance.

The sixth principle addresses the rational use of resources. Environmental preservation must be considered at all stages of the building's life cycle, including construction, operation and eventual decommissioning. Waste reduction, recycling and the use of secondary materials are encouraged. Modern technologies allow significant reductions in electricity, water and fuel consumption, as well as improved thermal efficiency. Where possible, alternative energy sources should be integrated to conserve natural resources.

The eco-dominant approach transforms a building from a passive consumer of resources into an active element of the ecosystem, making it a relevant and progressive direction in contemporary architecture.

To ensure comprehensive rehabilitation, specific design strategies and spatial solutions must be implemented in rehabilitation centers.

Biophilic design represents a concept in architecture and design according to which humans should remain connected to natural environments that historically shaped their development. For this reason, plants, natural light, fresh air, water and open space occupy central positions within this approach.

Universal design refers to the design of products, environments, programmes and services that can be used by all people to the greatest extent possible without the need for adaptation or specialized design. Universal design does not exclude the use of assistive devices for specific groups where necessary. Its goal is to improve the quality of life for all individuals by creating environments, information and products accessible to the widest possible range of users. Universal design is also referred to as inclusive design, design for all or design for life.

THEME 9 Search for new directions in the typology of rehabilitation centers.

Modern trends in their formation

Lecture plan:

1. Architectural and planning organization and spatial composition of rehabilitation centers.
2. Adaptability and flexibility as the main means of solving spatial structure.
3. Trends in the formation of the environment of a modern rehabilitation center and practical means of their architectural implementation.

Rehabilitation treatment as an independent field has emerged in Ukraine relatively recently. Over time, the demand for such services has increased due to the onset of a demographic crisis, the lack of sufficient resources to provide timely and adequate medical care to patients and people with disabilities, and the growing need for comprehensive support. The scope of this field expanded from restoring general health to restoring critical bodily functions at all stages of prevention and rehabilitation. Internationally, experience in establishing health and rehabilitation centers that combine general health support with medical rehabilitation for patients requiring structured treatment programmes has proven successful. Such integration is effective both medically and economically. A comfortable environment must satisfy

aesthetic, psychophysiological and ergonomic needs, ensuring spatial, visual and functional comfort that supports psychological and physiological well-being.

Therefore, the search for ways to improve rehabilitation services in Ukraine, particularly in restoring physical capacity and supporting adaptation after injuries and trauma, as well as enhancing rehabilitation infrastructure, remains extremely relevant.

The architectural formation of rehabilitation centers involves numerous complexities and specific requirements that demand careful consideration. It is necessary to ensure functional efficiency of the complex, optimize logistics and distances between departments, use space effectively across various functional zones, comply with safety standards, guarantee accessibility for people with disabilities, create aesthetically expressive volumetric and spatial compositions, and provide opportunities for future expansion.

Effective architectural solutions must be developed that meet contemporary requirements for safety, functionality and aesthetics, ensure efficient spatial utilization and respond to current design trends. The development and implementation of new multifunctional rehabilitation centers represent both an urgent social challenge and a pressing professional task, as many existing facilities do not meet modern standards or provide comprehensive rehabilitation services.

Specific architectural and planning features should be considered in the formation of contemporary rehabilitation institutions. Multifunctionality enables the integration of medical, physical, psychological and social aspects of recovery within a single complex. Comprehensive design solutions are particularly important in urban contexts characterized by limited land availability, high building density, elevated land prices and increasing transport loads. Rational distribution and optimal integration of functions are essential for effective center operation. A fully inclusive environment must be created, considering the needs of patients with visual, mobility and other impairments. Adaptability and flexibility of spatial organization are also crucial, allowing certain spaces to be reconfigured for different therapeutic activities. The inclusion of natural elements within the structure of the rehabilitation center is

equally important. Landscaped areas for social interaction, rest and relaxation should be organized in both interior and exterior spaces. The use of vegetation, water features and geoplastic landscape forms contributes to health restoration. Balanced color solutions for façades and roofs, based on calm palettes with selective bright accents, can improve emotional well-being and reduce the risk of depressive states.

In addition, it is advisable to follow international standards and recommendations for the design of rehabilitation and healthcare facilities. One such framework is LEED (Leadership in Energy and Environmental Design), which establishes sustainability criteria. National regulations and directives governing construction projects of this type must also be observed.

Contemporary architecture of rehabilitation centres increasingly focuses on creating therapeutic environments that promote faster recovery and improve patients' quality of life.

Key trends include the integration of nature into architectural design. Biophilic design emphasizes the use of natural materials, greenery, daylight and natural ventilation, helping to reduce stress, improve mood and accelerate healing. Therapeutic gardens with diverse plantings, water features and resting areas are commonly incorporated. Panoramic glazing provides visual contact with nature, enhancing relaxation and emotional comfort.

Another significant trend is the creation of a domestic atmosphere within rehabilitation facilities. Providing individual rooms supports privacy and independence, while well-designed common areas encourage communication and social interaction. The use of natural materials such as wood and stone creates a warm and welcoming environment.

Accessibility and universal design principles are also central. A barrier-free environment ensures access to all zones for people with disabilities. Ergonomic furniture and equipment accommodate users with diverse physical capabilities. Information must be accessible to individuals with visual or hearing impairments.

Environmental sustainability and energy efficiency are equally important. The integration of renewable energy sources such as solar panels and wind turbines reduces the ecological footprint of buildings. Rainwater harvesting systems decrease potable water consumption. Energy-efficient materials and technologies reduce heating and cooling costs while minimizing environmental impact.

Modern architectural trends in the form-making of rehabilitation centers thus focus on accessibility, integration with nature and the creation of therapeutic environments. Barrier-free design, adaptive spaces for physical activity and rehabilitation, and the use of natural light and green areas contribute to improved psycho-emotional well-being. Social zones for communication and cultural exchange foster integration into the community. Sustainable solutions that support environmental responsibility further define contemporary rehabilitation architecture.

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КОНСПЕКТ ЛЕКЦІЙ

*(для здобувачів другого (магістерського) рівня вищої освіти
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