



Master's Program

Course Description of Restoration and Renovation of Historic Buildings and Sites

Remarks:

According to the Academic Instruction of the University, in the academic system, each theoretical credit is presented in 16 or 17 hours, each practical credit in 32 or 34 hours, and each of the workshop credit in 48 or 51 hours.

There are some different types of the courses passed by a master student at this university, as listed below:

1. Basic
2. Major
3. Specialized
4. Elective
5. General
6. Workshop
7. Project

Each one of these types contains some courses to be passed, according to the educational regulations passed by the Ministry of Science, Research and Technology of Iran. The grading system in this university is from 0 to 20. The minimum passing grade for a course leading to a Master's Degree is 12.

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Course	Credits	Description
Methodology of Research	2	(Duration: 34 hours Practical & 17 hours Theoretical) (Type of Course: Major) This course will provide an opportunity for participants to establish or advance their understanding of research through critical exploration of research language, ethics, and approaches. The course introduces the language of research, ethical principles and challenges, and the elements of the research process within quantitative, qualitative, and mixed methods approaches. Participants will use these theoretical underpinnings to begin to critically review literature relevant to their field or interests and determine how research findings are useful in forming their understanding of their work, social, local and global environment.



<p>Recognition of Historic Buildings Architecture</p>	<p>(Duration: 34 hours Practical & 17 hours Theoretical) (Type of Course: Major)</p> <p>The method and how to know the architecture of a historical building is desired, in this direction, the unknown part of the information in the physical and structural fields, structural and artistic features of the style in the desired building due to destruction, erosion or any other reason is important and will give special dimensions to the study process.</p> <p>Syllabus:</p> <p>First, students individually or in groups of 2 select and examine a historical and cultural monument that meets the desired conditions with the opinion of the supervisor. In the future, according to the topic and according to the existing facts and unknown elements and information, they will provide a scheduled program. Initial visits and preparation of photos and general sketches and necessary consultations with technical professors and supervisors will help in the collection of the above information. Then, with quantitative and qualitative investigations, the information needed to know the said building will be listed and with the guidance of the professor, field work (direct encounter and parallel library studies and interviews with experts and knowledgeable people) will be followed step by step. In a direct encounter, it will be necessary to take a detailed (brick by brick) of the existing situation for the purpose of part of the technical and physical information. Paying attention to the unknown and required information that complements the existing information is taken into account, therefore, it will be important to take documents from the signs of such information and the professor's timely guidance. In the direct encounter, the latest written information about the work, expert opinions and description of the building will be compared by globetrotters. Finally, the obtained information will lead to hypotheses about the initial condition of the building and the changes in the constructions, as well as its condition. In documenting the current situation, attention will be paid to all factors as they are. Also, paying attention to the scope of the work and its ownership and changes and developments over time, identifying all the factors and components related to the architecture of the work and understanding and introducing it, the materials used and their causes and occasions, the executive details of the important elements, behavior and correlation effects Materials over time, the covering system (arch, arch, dome and other coverings) and its implementation technique, the review of the techniques used and the introduction of the related secrets and measures and the discovery of the sequence of works, the structural system and the overall structure of the spaces and the logical connection Among them, the analytical characteristics of single and combined structural factors, foundations and bases of columns, roofs, coils, ties, waist covers, etc. The system of decorations, motifs and various decorative techniques of brickwork, plastering, ... and classification of stylistic factors. The system and network of water supply and wastewater management facilities, lighting and how to use different spaces during the day and seasons. Studies of location, stylistics, typology of architectural, technical and engineering values. It is necessary to provide accurate architectural maps in different scales or to enlarge more of the state of the architectural elements of the building in different stages. Final analysis of the project based on the principles and theoretical foundations of restoration.</p>
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<p>Technical English</p>	<p>2</p>	<p>(Duration: 34 hours Theoretical) (Type of Course: Major) Teaching words, terms and texts from common sources of the field of study in order to develop students' knowledge to use the scientific and technical sources of the field of study in English so that students can read English texts related to their field of study and understand its meanings to the desired extent.</p>
<p>Seismic Retrofit of Valuable Historic Building Structures</p>	<p>2</p>	<p>(Duration: 34 hours Practical & 17 hours Theoretical) (Type of Course: Elective) Familiarity with the phenomenon of earthquakes and its destructive effects on buildings and familiarization with methods of retrofitting existing historical and non-historical buildings and methods of repairing damage caused by earthquakes. Syllabus: Familiarity with the principles of earthquake engineering. Getting to know the concepts of ductility and energy absorption in seismic design. Getting to know the shapes, members and sections that are optimal and resistant to earthquakes and their location in buildings. Getting to know the principles and practical concepts of earthquake rituals (2800 Iran, etc.). Familiarization with optimal design methods based on the impact of earthquakes. Examining major earthquakes in Iran and the world and getting to know the weak points of buildings. Familiarity with retrofitting methods of existing buildings (historical and non-historical). Getting to know the methods of repairing and restoring historical and non-historical buildings damaged by earthquakes.</p>
<p>Introduction to Restoration Laboratory Methods</p>	<p>1</p>	<p>(Duration: 34 hours Practical) (Type of Course: Major) Familiarization with the methods, equipment and methods of laboratory research in the restoration of historical buildings. Syllabus: Getting familiar with the methods of chemical analysis of traditional mortars and determining the percentages of constituent materials. Familiarity with the laboratory methods of changing and modifying materials and materials according to the conditions and type of restoration, such as the production of moisture-resistant plaster coatings. Increasing the compressive strength of clay. Modification of cement mortars according to the type of restoration. Stone restoration methods. Methods of cleaning stone and brick surfaces. Capillarity cutting methods and water absorption properties of bricks. Testing and investigating the use of chemical resins in the restoration of historical buildings and investigating their beneficial and harmful effects on columnar materials and materials. Familiarity with advanced identification methods in restoration such as ion chromatography, endoscopy, acoustic emission, radiography, ultrasound, thermography, etc.</p>



<p>Study and Recognition of Historical Sites</p>	<p>2</p>	<p>(Duration: 68 hours Practical) (Type of Course: Major) Familiarizing students with the stages and methods of studying and knowing a center, collection or historical context. Syllabus: In order to implement this course, students individually or in groups of 2 will examine an urban complex on the scale of a historical center and relevant documents, including historical photos, sketches and old maps, and compare them with the evidence available on the spot. In this way, the historical course and developments of the range will be determined, while the maps of the above range will be updated. In this exercise, special attention is paid to the relationship between economic, cultural and social conditions with the physical collection. Finally, by accurately identifying the historical values, their classification and grading will be considered along with photography, and the acceptable values of the historical context will be taken. And it will be in its place on the range map. Also, the new values that exist in the study area and are significant from the economic, social and cultural point of view will be identified.</p>
<p>Pathology of Historic Buildings and Sites</p>	<p>2</p>	<p>(Duration: 34 hours Theoretical) (Type of Course: Major) Identifying and analyzing the causes of transformation, erosion, damage and destruction of historical buildings and structures. Syllabus: Knowing the disturbing factors affecting historical monuments, including physical, chemical, mechanical, biological factors, human interventions, etc. at the scale of a single building and texture. Failure process and static foundations in the pathology of historical monuments. Knowing how to distribute stresses in the soil under the foundation, how to load the foundations of historical buildings, investigating damages and damaging factors to the foundations and various damages in the foundations. Getting to know the lines of force in the walls and the impact of the openings on it and examining the weaknesses and complications. Analysis and description of damages and cracks resulting from the behavior of the forces affecting the building and rotational, twisting, etc. movements in the walls. Analysis of the way arches are loaded, the causes of their deformation and the resulting cracks in the arch. Analysis of the way the dome is loaded and its cracks based on the forces of the domes. Introducing the earthquake phenomenon and analyzing and describing the cracks resulting from the earthquake and identifying the weak points of the buildings against it. Knowing the damage of flat masonry and wooden arches, composite structures in historical buildings. Understanding the phenomenon of moisture, types of moisture and its sources, and describing and analyzing the primary and secondary damages of moisture. Investigating various damages such as material fatigue and acid rain. Recognizing the damage of historical tissues in terms of physical, social, urban development, unreasonable planning, urban management, etc. Understanding the transformations in the contexts and their causes, the destruction of the center of the neighborhoods, the loss of hierarchy and physical and social cohesion, etc. in historical urban fabrics.</p>



<p>Introduction to Techniques of Historic Buildings Restoration</p>	<p>2</p>	<p>(Duration: 34 hours Theoretical) (Type of Course: Major) Understanding the details of construction and the methods of protection, strengthening and restoration of historical buildings. Syllabus: Knowing the methods of temporary and permanent protection by using all the factors of restraining the internal and external forces of the building. Curbing arches, domes and walls in different ways. Knowing the methods of sewing cracks in the foundations of walls, arches and domes. Knowing the methods of repairing and strengthening foundations. Knowing the methods of removing moisture and drying the building. Knowing the methods of changing the system of load-bearing forces in the building. Knowing the insulation methods in the building. Knowing the repair methods of plaster. Knowing the methods of strengthening buildings against earthquakes. Knowing the methods of repairing wooden roofs and beams. Knowing the tools and equipment used in restoration operations. Knowledge of stone restoration methods. Knowing the methods of restoring the facade layer attached to the building. Knowing the restoration methods in the body and decorative ceilings.</p>
<p>Application of Computer in Analysis and Design</p>	<p>2</p>	<p>(Duration: 34 hours Practical & 17 hours Theoretical) (Type of Course: Elective) Familiarity with the use of structural analysis software in the analysis of historical monuments. Syllabus: Reminding and general familiarity with the structural behavior of historical buildings. General familiarity with the types of software used in the structural analysis of historical buildings and to know the strengths and weaknesses of each one. General familiarity with the basics of theory and how to perform analysis by computer. Getting to know the strengths and weaknesses of analyzing historical buildings with computers. Familiarity with laboratory data required in computer analysis. Familiarity with types of static and dynamic analyzes and relevant regulations. Familiarity with loading historical monuments. Getting to know how to model historical buildings. Practical acquaintance with one of the powerful software in the structural analysis of historical buildings. Familiarity with the method of inference, deduction and application of analysis results.</p>



<p>Architectural Restoration Design</p>	<p>2</p>	<p>(Duration: 68 hours Practical) (Type of Course: Major) The ability and implementation of the basic steps and methods of preparing architectural protection and restoration plans. Syllabus: Introducing restored architectural works inside and outside the country and criticizing and evaluating them. Knowing the past state of the work from various technical, construction, artistic, architectural, historical, cultural, social, environmental aspects and its various values and messages. Evaluation, analysis and conclusion of the existing state of injuries (physical and nonphysical). An overview of the theories, foundations and philosophy of conservation and restoration and its compatibility with the cultural, historical and natural conditions of the studied work and formulation of policies and theoretical foundations of restoration. Summarizing and determining scientific strategies, methods of dealing with the issue and methods of restoration. Preparation of complete proposed plans for protection and restoration of the studied building and preparation of its details and technical and scientific maps in such a way as to guarantee the creation of balance in the building.</p>
<p>Restoration of Historic Buildings Workshop</p>	<p>2</p>	<p>(Duration: 102 hours Practical) (Type of Course: Major) Acquaintance with the scientific and practical issues and principles governing the restoration operations of historical buildings and how to implement them. Syllabus: Teaching and practicing how to build, implement and restore a hypothetical small silent unit of traditional architecture or carrying out restoration operations according to the scientific principles of restoration under the supervision of a teacher and master traditional craftsmen in an active historical monument workshop with the participation of the relevant organization.</p>



<p>Crisis Management and Post-disaster Reconstruction</p>	<p>2</p>	<p>(Duration: 34 hours Practical & 17 hours Theoretical) (Type of Course: Major) Familiarity with disasters and accidents (natural and man-made) and their destructive effects in cities, villages and the role of humans in the occurrence of unnatural disasters. Acquaintance with crisis, crisis management and methods of dealing with and controlling natural and man-made disasters and planning for organizing and rebuilding after the disaster. Syllabus: Knowledge of disasters and events (natural and man-made) such as earthquakes, floods, tsunamis, volcanoes, droughts, wars, atomic and chemical pollutions, etc. Classifying disasters and their effects on valuable buildings and structures and knowing the ways of coping and controlling them. Familiarity with the role of humans in reducing and intensifying the effects of disasters and accidents (natural and man-made) on valuable buildings and structures. Familiarity with the relationship between accidents, vulnerability and reconstruction of valuable buildings and structures. Acquaintance with crisis and methods of crisis management and relief in Iran and the world. Getting to know the stages before, during and after the accident. Familiarity with the management of reconstruction of valuable buildings and structures and the problems of these collections during the reconstruction period. Getting to know how to protect historical monuments during reconstruction. Getting to know the role of UNESCO and other organizations in times of disaster and crisis. Examining the experiences of other countries in facing disasters and restoring historical monuments.</p>
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<p>Historic Buildings and Sites Rehabilitation Project</p>	<p>3</p>	<p>(Duration: 68 hours Practical & 17 hours Theoretical) (Type of Course: Major) The purpose of this course is to revive and create vitality in certain buildings, elements and collections of historical urban fabric, which is achieved through preserving and prospering the urban life and legalizing the use system, hierarchy and creating diversity and other measures. Syllabus: At first, by remembering the goals of understanding the architecture of historical buildings and contexts, a suitable and complete historical building in the historical context is selected with the opinion of the course professor (preferably from the building or historical collections that have maps of the existing situation.) in the review and studies It is important to pay attention to the following topics in the form of architectural expression. Then, with the obtained results, the design with the goals of life will be discussed. The first chapter: historical background, the primary core of the building with a series of developments and transformations throughout history. The scope of the effect and the sphere of influence and connection with the centers of historical context, properties and connection with the neighborhood in terms of physical, economic, social, cultural characteristics. Placement in the physical judicial organization of the city and its hierarchy and determining the type and characteristics of the activities in the place of the work in order to establish a suitable use. Paying attention to the proposed user system and pedestrian and horse communication in the detailed plans (comprehensive and detailed). Analysis of the physical program in the scope of action of the effect physically and functionally. Power measurement of building physical spaces in connection with the prediction of required functions. The strategies of adapting the spaces of the building's impact area (building and environment) and determining the limits of intervention (minimum) in order to prepare the platform for new livelihood activities. Presumption of health and completion of restoration and protection operations. Examining the needs, possibilities and limitations and the necessity of modifying the physical structure. Paying attention to the compatible and incompatible factors in relation to the physical structure and behavioral system of the environment, traditional society and other needs and considerations. The second chapter: In this chapter, the use of all existing factors and required additions that are directly or indirectly objectified in the architectural design in the form of a specific project that reasonably and artistically meets the predetermined needs of the resident population and users. If it is, it will be paid. Special focus and attention will be focused on the organization of activities in the building's internal environment and communication with the neighbors. The array of designed and desirable landscapes in spaces, centers, between space and outer space, while maintaining the continuity and coherence of architectural and building components. Organizing and enriching green spaces with related activities. Proposing the design and modification of electrical, mechanical and natural facilities in the most appropriate way and place. Lighting and illumination of spaces, paths, passages, etc. Paying attention to the design of equipment and furniture needed for different spaces. In the end, the plan will be presented in various architectural and restoration scale in the form of a detailed map of some of the design factors and 3D models. Final analysis of the project based on the principles and theoretical foundations of restoration.</p>
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Thesis	6	<p>(Type of Course: Major) Application of theoretical and practical learning in the form of a project with emphasis on the implementation of practical work and the restoration and rehabilitation of historical buildings and urban fabrics.</p> <p>Syllabus: Choosing a building or an urban fabric with the coordination of the professor and the organization in charge of building conservation, restoration, and rehabilitation, especially in the student's residence or academic area. Conducting historical, artistic, architectural and technical studies of the building. Preparing maps of the existing condition and pathology of the building and the urban fabric. Conducting relevant tests according to the chosen subject. Analysis of conducted studies. Presenting the restoration and rehabilitation plan with a strong analysis based on restoration theories and its social and economic issues. Writing an academic thesis based on the principles of thesis writing.</p>
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