

| DEPARTMENT OF ARCHITECTURE<br>BACHELOR DEGREE PROGRAM                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                       |                 |               |                |              |
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| COURSE DESCRIPTIONS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                       |                 |               |                |              |
| Course Code                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Course Name                                           | Core / Elective | Prerequisite  | Credit         | ECTS Credits |
| <b>AR 101</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Introduction to Design</b>                         | <b>Core</b>     |               | <b>(4+8) 8</b> | <b>12</b>    |
| Introducing different design tools and media. Explaining and exercising on the basic concepts, terminology and principles of design. Introducing visual, written and oral techniques for the presentation of a design product. Studio practices for understanding design as a collective process.                                                                                                                                                                                                                                 |                                                       |                 |               |                |              |
| <b>AR 121</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Introduction to Architecture</b>                   | <b>Core</b>     |               | <b>(3+0) 3</b> | <b>5</b>     |
| Roots of architecture; the scope of architecture in theory and practice; an overview of architecture in the context of historical developments, related disciplines; introduction to the basic vocabulary of architecture which includes natural & manmade environment, building, architectural space, structure, construction, trends & styles, etc.; fundamentals of architectural design concerning form, shape, colour, texture, etc., and exploration of architecture as an embodiment of ideas & various design approaches. |                                                       |                 |               |                |              |
| <b>AR 161</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Graphic Communication</b>                          | <b>Core</b>     |               | <b>(2+2) 3</b> | <b>6</b>     |
| Fundamental skills of drawing materials and media such as different kinds of paper, pencil, paint and ink as well as drawing tools like t-square, set square, compass etc. 2-dimensional and 3-dimensional drawing techniques such as orthographic drawing and projection, perspective drawing, sketching. Basic presentation and rendering skills such as model making, shading, hatching, sheet organization etc.                                                                                                               |                                                       |                 |               |                |              |
| <b>MATH 121</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Basic Mathematics I</b>                            | <b>Core</b>     |               | <b>(4+0) 4</b> | <b>4</b>     |
| Elementary algebra, functions, graphs, coordinate geometry, calculus, differential equations.                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                       |                 |               |                |              |
| <b>ENG 101</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Development of Reading and Writing Skills I</b>    | <b>Core</b>     |               | <b>(3+0) 3</b> | <b>3</b>     |
| This is a course that aims to develop skills to analyze paragraphs and essays, reading skills and written and spoken communication skills.                                                                                                                                                                                                                                                                                                                                                                                        |                                                       |                 |               |                |              |
| <b>AR 102</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Introduction to Architectural Design</b>           | <b>Core</b>     | <b>AR 101</b> | <b>(4+8) 8</b> | <b>12</b>    |
| Explaining basic methods of documentation and analysis for the natural and built environment. Introducing physical and social definitions of space and place. Collective site and studio work for grasping spatial relations in the natural and built environment in the human scale and their enhancement for simple uses. Individual studio practices integrating spatial organization with construction skills.                                                                                                                |                                                       |                 |               |                |              |
| <b>AR 122</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>History and Theory of Architecture I</b>           | <b>Core</b>     |               | <b>(3+0) 3</b> | <b>3</b>     |
| Impact of economic and political structures on architecture and urbanism. Emergence of various building types throughout history and their varieties in time and space. The diversity in the building materials and construction techniques employed in the Antiquity. The variety in the growth, transformation, and spread of architectural traits and settlement patterns. The context of ground-breaking achievements in architecture and urbanism.                                                                           |                                                       |                 |               |                |              |
| <b>AR 152</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Building Technology and Science I</b>              | <b>Core</b>     | <b>AR 161</b> | <b>(2+4) 4</b> | <b>4</b>     |
| Components of two storied masonry buildings will be thought including Load bearing walls, Soil types, Line foundation, Solid ground floor, Reinforced concrete floor, Timber floor, Load transferring roof, Suspended roof.                                                                                                                                                                                                                                                                                                       |                                                       |                 |               |                |              |
| <b>AR 182</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Introduction to Building Materials and Physics</b> | <b>Core</b>     |               | <b>(2+0) 2</b> | <b>3</b>     |

Course provides the students the main and essential knowledge about building materials required for understanding relationship between design and materials. Introduction to building envelope, life safety, building costs, and sustainable design concepts is provided. It gives the basic tools required for the selection and a proper use of materials in the building construction field. It includes the types of building materials, mechanical, physical and chemical characteristics of materials, standards of materials, their simple use and application techniques based on the latest technical developments. It starts with common traditional building materials: stone and brick as unit materials, then timber and steel as materials used in skeleton systems, composite materials such as concrete, polymers, plastics and vinyl, synthetics and lastly glass and paintings.

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| <b>AR 164</b> | <b>Computer Applications for Designers</b> | <b>Core</b> |  | <b>(1+2) 2</b> | <b>3</b> |
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This course aims to provide students with general proficiency in computational tools utilized by designers. The first half focuses on manipulation of raster and vector formats. Lab sessions provide an introduction to professional image editing and computer aided design software. The second half focuses on architectural modeling and establishes the fundamentals of Building Information Modeling systems.

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| <b>ENG 102</b> | <b>Development of Reading and Writing Skills II</b> | <b>Core</b> |  | <b>(3+0) 3</b> | <b>3</b> |
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This is a course which aims to equip students with the skills to analyze essays and articles, to write an organized essay and article, to make presentations, to take notes while listening and reading skills, which will help them in their academic studies.

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| <b>SP191</b> | <b>Summer Practice I</b> |  |  | <b>0</b> | <b>2</b> |
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Measured Drawing (2 Weeks)

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|--------------|---------------------------|--|--|----------|----------|
| <b>SP192</b> | <b>Summer Practice II</b> |  |  | <b>0</b> | <b>4</b> |
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Surveying And Mapping Knowledge (4 Weeks)

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| <b>AR 201</b> | <b>Architectural Design I</b> | <b>Core</b> | <b>AR 102</b> | <b>(4+8) 8</b> | <b>11</b> |
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To introduce the concepts, terms and methods for understanding a place in the urban context. Explaining the concepts of public space and private space. To realize necessary studio practices for designing a public building which has a simple architectural program in accordance with a design idea. Understanding the relation between the spatial organization of a building and its design of structural system. To introduce different techniques for presenting the project.

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| <b>AR 221</b> | <b>Architectural History and Theory II</b> | <b>Core</b> |  | <b>(3+0) 3</b> | <b>3</b> |
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Survey of the major characteristics of building modes and techniques found in classical Turkish and European architecture from the demise of the West Roman Empire to the emergence of modern architecture around 1850 with reference to the main periods of architectural history; principles of periodization in architectural history and characterization of regionality such as structures, materials, workmanship, the organization of architectural activity, building types, social functions of architecture, and the modes of perceiving architecture; exercises, examinations and assignments directed at the development of the ability to interpret the built environment.

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| <b>AR 231</b> | <b>Structures in Architecture I</b> | <b>Core</b> |  | <b>(3+0) 3</b> | <b>3</b> |
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Mechanics of materials, vectors and vector active systems. Centroids and centre of gravity. Moments and moment of inertia. Analysis of beams and trusses.

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| <b>AR 251</b> | <b>Building Technology and Science II</b> | <b>Core</b> | <b>AR 161</b> | <b>(2+2) 3</b> | <b>3</b> |
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Site preparation (Soil modification), Skeleton structure system including material introduction, foundation types (point, mat and pile foundation), floor types (one-way, two-way, waffle, and flat slab), columns, beams, vertical circulation (stairs, ramps, elevators, and escalators), doors (material type, size, frame components, hardware), windows (material type, size, frame components, hardware).

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| <b>AR 281</b> | <b>Building Physics I</b> | <b>Core</b> |  | <b>(2+2) 3</b> | <b>3</b> |
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| Energy and its efficiencies are considered by using Energy Performance Regulations in Buildings; and heat and moisture transfer in buildings are investigated based on Heat Insulation Regulations in Buildings.                                                                                                                                                                                                                                                            |                                                  |             |  |                 |          |
| <b>ENG 201</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>Advanced Reading and Communication Skills</b> | <b>Core</b> |  | <b>(3+0) 3</b>  | <b>3</b> |
| This is a course which aims to enable students to form a project by combining their skills to use English efficiently with their knowledge of architecture.                                                                                                                                                                                                                                                                                                                 |                                                  |             |  |                 |          |
| <b>TURK 201</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Turkish Language I</b>                        | <b>Core</b> |  | <b>(2+0) NC</b> | <b>2</b> |
| Definition of the language and the place and importance of language as a social institution in life, relationship with culture-language, language-society and thought-language, place among the world languages of Turkish, exchange of words between languages, vocabulary, basic grammatical features and evaluated the current status of present state.                                                                                                                  |                                                  |             |  |                 |          |
| <b>TURK 203</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Turkish for Foreigners I</b>                  | <b>Core</b> |  | <b>(2+0) NC</b> | <b>2</b> |
| Turkish sound knowledge of basic level, simple sentence structures, establish a dialogue, introducing yourself.                                                                                                                                                                                                                                                                                                                                                             |                                                  |             |  |                 |          |
| <b>HIST 201</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Principles of Atatürk I</b>                   | <b>Core</b> |  | <b>(2+0) NC</b> | <b>2</b> |
| The modernization of the Ottoman Empire during the nineteenth and early twentieth centuries, the spread of nationalism, and the revolutionary changes in Ottoman institutions and society that led to the Empire's demise, the transitional period from the Empire to the national state and the foundation of the Turkish Republic following the national struggle led by Mustafa Kemal Atatürk.                                                                           |                                                  |             |  |                 |          |
| <b>HIST 203</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>History of Turkish Revolution I</b>           | <b>Core</b> |  | <b>(2+0) NC</b> | <b>2</b> |
| The modernization of the Ottoman Empire during the nineteenth and early twentieth century's, the spread of nationalism, and the revolutionary changes in Ottoman institutions and society that led to the Empire's demise, the transitional period from the Empire to the national state and the foundation of the Turkish Republic following the national struggle led by Mustafa Kemal Atatürk.                                                                           |                                                  |             |  |                 |          |
| <b>AR 202</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Architectural Design II</b>                   | <b>Core</b> |  | <b>(4+8) 8</b>  | <b>9</b> |
| To introduce the concepts of rural environment and natural environment. Explaining the concepts, terms and methods for understanding a place in the rural and natural context. To realize necessary studio practices for providing the analysis of an architectural program including public, semi-public and private spaces. To inquiry the effects of natural or rural environment to architectural design. To introduce different techniques for presenting the project. |                                                  |             |  |                 |          |
| <b>AR 222</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Architectural History and Theory III</b>      | <b>Core</b> |  | <b>(3+0) 3</b>  | <b>3</b> |
| Impact of technological change on architecture. The emergence of disciplines and separate professions from within architecture. The avant-garde. Architecture as cultural product. Emergence of professional institutionalization and technical expertise. Theoretical positions and their built results. Social programs and their reflections on architecture. Technologies of representation and architectural production.                                               |                                                  |             |  |                 |          |
| <b>AR 232</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Structures in Architecture II</b>             | <b>Core</b> |  | <b>(3+0) 3</b>  | <b>3</b> |
| An introduction to strength of materials. Stress, strain, torsion, internal forces, stresses in beams.                                                                                                                                                                                                                                                                                                                                                                      |                                                  |             |  |                 |          |
| <b>AR 252</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Building Technology and Science III</b>       | <b>Core</b> |  | <b>(2+2) 3</b>  | <b>4</b> |
| Light weight exterior walls (claddings, curtain wall, material type and applications), light weight interior walls (stud partitions, drywalls, prefabricated modular panels), surface covering materials on walls and ceilings, surface covering materials on floors, surface covering materials for suspended ceilings, bathrooms (sanitary, installation, cabinets, units), kitchens(sanitary, installation, cabinets, units).                                            |                                                  |             |  |                 |          |
| <b>AR 264</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Computer Aided Architectural Modeling</b>     | <b>Core</b> |  | <b>(2+2) 3</b>  | <b>3</b> |

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| The course offers students fundamental information toward strengthening their mastery over the design processes by using 3D architectural and solid modelling softwares. In this context, one of the 3D architectural drawing software packages will be used as the application medium and computer aided conceptual design techniques and computer aided presentation techniques will be taught by using this software.                                                                                                                                                |                                           |             |               |                 |           |
| <b>TURK 202</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>Turkish Language II</b>                | <b>Core</b> |               | <b>(2+0) NC</b> | <b>2</b>  |
| Turkish writing expression, identification, discussion and practical training for oral and written expression.                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |             |               |                 |           |
| <b>TURK 204</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>Turkish for Foreigners II</b>          | <b>Core</b> |               | <b>(2+0) NC</b> | <b>2</b>  |
| A study on the simple sentence structure of Turkish with tenses, possessive suffixes with -e, -de, -den, or -(y)i and certain structures necessary for fluent communication.                                                                                                                                                                                                                                                                                                                                                                                            |                                           |             |               |                 |           |
| <b>HIST 202</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>Principles of Atatürk II</b>           | <b>Core</b> |               | <b>(2+0) NC</b> | <b>2</b>  |
| The foundation of Turkish Republic, Principles of Atatürk and major events and changes that have taken place in politic, society, economy, and culture as a results of revolution for reorganization of state and society.                                                                                                                                                                                                                                                                                                                                              |                                           |             |               |                 |           |
| <b>HIST 204</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>History of Turkish Revolution II</b>   | <b>Core</b> |               | <b>(2+0) NC</b> | <b>2</b>  |
| The foundation of Turkish Republic, Principles of Atatürk and major events and changes that have taken place in politic, society, economy, and culture as a results of revolution for reorganization of state and society.                                                                                                                                                                                                                                                                                                                                              |                                           |             |               |                 |           |
| <b>AR 290</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>Summer Practice III</b>                |             |               | <b>NC</b>       | <b>4</b>  |
| Construction Site / Archaeological Site Practice (6 Weeks)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                           |             |               |                 |           |
| <b>AR 301</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>Architectural Design III</b>           | <b>Core</b> | <b>AR 202</b> | <b>(4+8) 8</b>  | <b>13</b> |
| To design a public building in an urban context. Introducing necessary concepts, theories and methods for understanding and analyzing a part of urban fabric. To inquiry the concept of public space. To design a public building including a basic program element. To introduce different techniques for presenting the project.                                                                                                                                                                                                                                      |                                           |             |               |                 |           |
| <b>AR 331</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>Structures in Architecture III</b>     | <b>Core</b> |               | <b>(2+2) 3</b>  | <b>4</b>  |
| Overview of the statics of structures. Stress analysis of statically determinate structures. Beams, frames, arches and cables. Structural characteristics of statically indetermined structures. Stress analysis of indeterminate beams and frames. Moment area theorems. Slope deflection method. Moment distribution method.                                                                                                                                                                                                                                          |                                           |             |               |                 |           |
| <b>AR 351</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>Building Technology and Science IV</b> | <b>Core</b> |               | <b>(2+2) 3</b>  | <b>5</b>  |
| The primary content of the studio is an overview of vector active and section active systems. The content includes short lectures, study model building and testing.                                                                                                                                                                                                                                                                                                                                                                                                    |                                           |             |               |                 |           |
| <b>AR 381</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>Building Physics II</b>                | <b>Core</b> |               | <b>(2+2) 3</b>  | <b>4</b>  |
| The course aims to provide an introduction to theoretical foundations in architectural acoustics and lighting. The course is designed in two sections: First half of the semester covers acoustics: Physics of sound; human hearing; outdoor and indoor sound propagation; sound insulation; design guidelines for room acoustics and noise and vibration control. Second half is dedicated to lighting: Light and vision, physics of light; visual perception and visual comfort; light sources; indoor lighting calculation; daylighting; lighting design principles. |                                           |             |               |                 |           |
| <b>AR 302</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>Architectural Design IV</b>            | <b>Core</b> |               | <b>(4+8) 8</b>  | <b>10</b> |
| To introduce the concepts of housing and dwelling. To design a housing project in the urban context. To analyse the relation between urban life and housing life. To design a housing complex including both housing units and different programs. To introduce different techniques for presenting the project.                                                                                                                                                                                                                                                        |                                           |             |               |                 |           |
| <b>AR 332</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>Structures in Architecture IV</b>      | <b>Core</b> |               | <b>(2+2) 3</b>  | <b>4</b>  |

Characteristics of reinforced concrete. Axially loaded columns. Beams with single and double reinforcement. Beams axially loaded with large eccentricities. Design of beams with respect to shearing effects. One way-two way slab design. Types of footing and design of footings. Concept and methods of pre-tension. Connection of structural steel elements. Fundamentals of steel design.

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| <b>AR 352</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Building Technology and Science V</b>    | <b>Core</b>     |               | <b>(2+2) 3</b> | <b>4</b>  |
| This course illustrates the major materials and methods used to finish a building's exterior and interior surfaces. In addition to interior and exterior finishes, course will be a study of mechanical and electrical system types, how they are built, and how they affect the construction project. Topics will include air conditioning, heating, plumbing, fire protection, electrical power, electrical lighting and building control systems and cost issues. The analysis of current construction drawings will be integrated into each topic. Architect's managerial role and leadership for the integration of these systems will also be covered.                                                                                                                                                                                                                                                                                                                     |                                             |                 |               |                |           |
| <b>AR 390</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Summer Practice IV</b>                   |                 |               | <b>NC</b>      | <b>4</b>  |
| Architectural Office Practice (6 Weeks)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                             |                 |               |                |           |
| <b>CP 401</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Urban Design Studio</b>                  | <b>Core</b>     | <b>AR 302</b> | <b>(4+8) 8</b> | <b>12</b> |
| Application of urban design theory, methods and techniques to specific large scale development and redevelopment endeavours with metropolitan areas. Strategies for change in large areas of cities to be developed over time, involving different actors. Developing designs into a natural, man made, historical and cultural outlooks; enabling desirable activity patterns; conceptualising built form; providing infrastructure and services systems. This course involves a teamwork of architecture and planning students; requires individual designs on design and planning guidelines.                                                                                                                                                                                                                                                                                                                                                                                 |                                             |                 |               |                |           |
| <b>AR 451</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Project and Building Management</b>      | <b>Core</b>     |               | <b>(3+0) 3</b> | <b>6</b>  |
| Project management principles, techniques and tools that are being used in the field. Cost, scope, quality, time concepts. Project inception, design, construction, and operation and maintenance phases. Leadership, cost control and total quality management concepts.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                             |                 |               |                |           |
| <b>CP 453</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Urban Planning and Design Principles</b> | <b>Core</b>     |               | <b>(3+0) 3</b> | <b>4</b>  |
| This course is specifically designed for planners and architects that aim to discover the uneasy interplay between the urban mass and its surrounding urban environment from individual building to the city as a whole. The course topics comprise three broad parts. The first part is devoted to art of site planning process covering site analysis (i.e. soil analysis, geological and geomorphologic analysis, topographical analysis, climatic analysis, noise analysis, user analysis), preparation of programme, and finally design stage. The second part of the course includes urban design method and techniques applying to different design context and scales. The third part includes the legal framework of planning and design at various scales such as regulations and legal procedures of land development and building permitting. Though the emphasis will be on Turkish practice, the third part will also demonstrate examples from western countries. |                                             |                 |               |                |           |
| <b>AR 402</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Architectural Design V</b>               | <b>Core</b>     | <b>CP 401</b> | <b>(4+8) 8</b> | <b>18</b> |
| To design a public building having a complex architectural program in an urban context. Understanding and analyzing a special part of an urban fabric. To realize necessary studio practices for creating original design ideas and producing an architectural program To introduce different techniques for presenting the project.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                             |                 |               |                |           |
| <b>AR 310</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Introduction to Photography</b>          | <b>Elective</b> |               | <b>(2+2) 3</b> | <b>4</b>  |
| This course enables the students visualize the pictures, shoot, develop and print what they see. It is also designed to teach compositions and principles of Photography including light, shade, shape form and pattern.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                             |                 |               |                |           |
| <b>AR 311</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Freehand Drawing from Observation</b>    | <b>Elective</b> |               | <b>(3+0) 3</b> | <b>4</b>  |

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| Drawing studies based on objects, local interior and exterior spaces, and the human figure. Perspective drawing, proportioning, line drawing, tone drawing, and drawing with color. Freehand drawing from life, using a pencil, ink, charcoal, crayon, and watercolor media.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                     |                 |  |                |          |
| <b>AR 312</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Architectural Portfolio Design</b>               | <b>Elective</b> |  | <b>(3+0) 3</b> | <b>4</b> |
| The course will work as a design workshop and it will include model photography techniques, instruction in computer page formatting soft wares and graphic design. Possible portfolio formats will be discussed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                     |                 |  |                |          |
| <b>AR 313</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Computer Aided Architectural Drawing</b>         | <b>Elective</b> |  | <b>(2+2) 3</b> | <b>4</b> |
| The course offers students fundamental information on 2D CAD softwares for sketching, designing, and preparing presentations in the design process. Contents of the course include fundamental drawing tools such as line, polygon, and circle, layers in drawings, modification techniques, and plotting techniques based on technical drawing conventions. One of the 2D architectural drawing softwares will be used as the application medium of one of the drawing conventions enumerated above.                                                                                                                                                                                                                                                                                                                                                                                                           |                                                     |                 |  |                |          |
| <b>AR 328</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Ancient Egyptian Architecture</b>                | <b>Elective</b> |  | <b>(3+0) 3</b> | <b>4</b> |
| This course illustrates the major three ancient Egyptian architecture periods; 1- Pharonic (Pharaonic) Architecture, 2- Greek, Roman and Coptic Architecture, 3- Islamic Architecture. The focus of the course study will be on the materials, structure, vernacular architecture issues.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                     |                 |  |                |          |
| <b>AR 330</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Form Structure Relation</b>                      | <b>Elective</b> |  | <b>(2+2) 3</b> | <b>4</b> |
| <p>Basic physical principles and simple structural systems will be thought.</p> <p>The first part of the course presents the basic physical principles and includes the following:</p> <ul style="list-style-type: none"> <li>• Vector representation, resultant forces, distributed forces</li> <li>• Translational and rotational equilibrium</li> <li>• Newton laws</li> <li>• Moment, free-body diagrams, types of loads</li> </ul> <p>The second part of the course considers the behavior of structural systems and their components in architecture and includes the following:</p> <ul style="list-style-type: none"> <li>• Basic stresses and strain of components</li> <li>• Structural requirements; equilibrium, stability, strength</li> <li>• Support and conection types</li> <li>• Simple structural systems; form active structures, trussed systems, framed systems, shell systems</li> </ul> |                                                     |                 |  |                |          |
| <b>AR 333</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Earthquakes and Building Behavior</b>            | <b>Elective</b> |  | <b>(3+0) 3</b> | <b>4</b> |
| What Is Earthquake, Intensity Of Earthquakes And Magnitude Definition, Design Principles Of Earthquake Resistant Buildings, Introduction To Turkish Code, Repair And Strengthening, Earthquake Architecture.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                     |                 |  |                |          |
| <b>AR 335</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Historic Building Materials</b>                  | <b>Elective</b> |  | <b>(3+0) 3</b> | <b>4</b> |
| Starting with the brief explanation of construction techniques in historic structures, introduction of stone, earth and wood used in their natural states, and those such as adobe, brick, mortar and concrete that are prepared by means of special processes with the materials found in nature. In addition, the preparation techniques of other construction materials used for the purpose of protection and decoration are also introduced.                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                     |                 |  |                |          |
| <b>AR 336</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Contemporary Earth Architecture</b>              | <b>Elective</b> |  | <b>(3+0) 3</b> | <b>4</b> |
| Evaluation of traditional construction methods and the use of earth as a construction material in the light of historical cases; explanation of physical and chemical characteristics of earth as a building material; the search for use of earth as an alternative construction material in contemporary architecture.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                     |                 |  |                |          |
| <b>AR 355</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Professional Ethics in the Built Environment</b> | <b>Elective</b> |  | <b>(3+0) 3</b> | <b>4</b> |

General principles and concepts of professionalism and ethics, including topics like personal values, personal integrity, trust, responsibility, duty and service will be discussed in detail. Awareness of ethics in architecture, ethical reasoning and decision making in solving ethical dilemmas, practices, professional conduct, leadership and community responsibilities are the core topics to be covered.

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| <b>AR 361</b> | <b>Digital Media and Architectural Design</b> | <b>Elective</b> |  | <b>(3+0) 3</b> | <b>4</b> |
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This course seeks to bring in new viewpoints to the architectural design-oriented experimental 'representation' production processes by introducing the undergraduate students with the creative opportunities provided by digital media tools.

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| <b>AR 382</b> | <b>Ecological Studies in Architecture</b> | <b>Elective</b> |  | <b>(3+0) 3</b> | <b>4</b> |
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Theoretical framework of ecological approach and its reflection to architecture; The concepts of green and sustainable architecture; Historical evolution of ecological design in architecture; The examples of different approaches in ecological point of view from Turkey and the other countries.

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| <b>AR 383</b> | <b>Lighting Analysis in Building Physics</b> | <b>Elective</b> |  | <b>(2+2) 3</b> | <b>4</b> |
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This is a course to introduce principles of lighting design and analysis of buildings under the basic issues of building physics; and to conduct research methods for these topics. The education method is based on lectures with working assignments and practical exercises. Students will conduct research into each issue of lighting in simple problems and report them. The aim is to set a strong link with theory and practical problems.

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| <b>AR 384</b> | <b>Introduction to Architectural Acoustics</b> | <b>Elective</b> |  | <b>(3+0) 3</b> | <b>4</b> |
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In order for architects to have a better grasp of the acoustic aspects of our built environment, the physics of sound as well as the principles of auditory perception should be well understood. This course introduces the basic principles in architectural acoustics. Topics include: Sound and hearing, indoor/outdoor sound propagation, sound insulation, design guidelines for room acoustics and noise control.

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| <b>AR 385</b> | <b>Building Form and Thermal Performance</b> | <b>Elective</b> |  | <b>(3+0) 3</b> | <b>4</b> |
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Thermal phenomena and thermal comfort and energy efficient building design will be explored in this course. For improving a perspective focused about thermodynamics, fluid mechanics and heat transfer; definitions about all disciplines are made; first law of thermodynamics, conservation of mass, fundamentals of fluid dynamics are explained; and heat transfer mechanisms between building and surrounding are considered. Topics are also included indoor air quality, weather data relevant to building design, passive heating and cooling systems and Energy Performance Regulations in Buildings. It will be emphasized some practice examples based on students' designs.

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| <b>AR 403</b> | <b>Studio in Product Design</b> | <b>Elective</b> |  | <b>(2+2) 3</b> | <b>4</b> |
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This studio course focuses basically on design problem analysis and design problem solving within the fundamental concepts of Industrial Design (ID). It is formed in three parts. The first part of the course (introduction) is a warm-up design project that introduces the discipline, the profession and the industrial design process (observation, research, brain storming, idea generation, sketching, models, trial&error, visualisation, presentation etc.) briefly to the students. The second part of the course aims to focuses on the relation between the user and the product / the human body and the object. With this project, participants will realize the steps of ID process; observation, research, market research & analysis, idea generation, material analysis, learning production techniques, user-product scenario development, using anthropometric data, modeling and presentation. In the third part of the course, a conceptual project related to everyday life and culture will be conducted. The participants first observe, document and analyze everyday life and the local culture they live in, social interactions, attitudes, values and life styles related to the local culture. By doing this, the participants will reach some concepts and facts and these concepts and facts will be their source or inspiration for developing a product. By the end of this project, the participants not only will learn the importance of ethnography and the routines of everyday life in ID; but also will understand that local culture and everyday life is a good source of product innovation.

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| <b>AR 404</b> | <b>Studio in Architectural Conservation</b> | <b>Elective</b> | <b>CP 401</b> | <b>(2+2) 3</b> | <b>4</b> |
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Concepts and definitions for architectural conservation. Documentation and research types and methods for single buildings, urban environments, and archaeological sites. Data interpretation and decision-making for the conservation of single buildings, urban environments, and archaeological sites. Projects and implementations for the conservation of registered and unregistered single buildings and urban environments, and registered archaeological sites and buildings.

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| <b>AR 405</b> | <b>Studio in Interior Design</b> | <b>Elective</b> |  | <b>(2+2) 3</b> | <b>4</b> |
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Students will be introduced to the design process, basic design vocabulary and basic technical knowledge. Professional practices and responsibilities, trade resources, and the value of interior design organizations will be discussed. Through a series of theoretical lectures, projects and activities an exploration of the work of notable interior designers and architects, students will begin to identify the various aspects of interior design to which they personally respond. Special emphasis is placed on the interrelationship of design elements and principles, spatial organization and sequencing, human anthropometrics and conceptual problem solving in three-dimensional space.

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| <b>AR 406</b> | <b>Studio in Landscape Design</b> | <b>Elective</b> |  | <b>(2+2) 3</b> | <b>4</b> |
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Students will be introduced to historical development of landscape architecture and contribution of landscape architecture to architecture. In addition, technical and detailed information of soft landscaping and hard landscaping will be held. Soft landscape elements will include soil types and properties, sprinkler and drip irrigation systems, a comprehensive knowledge of plant material (trees, shrubs, ground covering and vines), hard landscape elements will include detailed information such as properties and application of pavement materials, landscape lighting and water elements.

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| <b>AR 423</b> | <b>Introduction to Ottoman Readings in the History of Architecture</b> | <b>Elective</b> |  | <b>(3+0)3</b> | <b>4</b> |
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The study of reading the XIX and XX. century texts that printed ottoman scripts related to history of architecture, recognize Arabic and Persian origin words which are not used today, apply reading and writing of Turkish suffixes.

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| <b>AR 424</b> | <b>Regionalism in Architecture</b> | <b>Elective</b> |  | <b>(3+0) 3</b> | <b>4</b> |
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The prominent role of architectural regionalism to internalize modernity for the countries that went through an Express modernization process can be observed both in the boundaries of the “region” in question, and the ways in which the contexts, the boundaries of the “region” in question, and the ways in which the vernacular/traditional architecture informs and inspires the new work have been left undetermined and open to multiple interpretations –ranging from those that directly use the parts of vernacular building examples to those that value abstraction that do not lead to any direct visual correspondance to some precedent. Especially for the countries that are positioned at the periphery of architectural (knowledge) production, regionalist examples turned out to be a norm and their lack has been diagenalism without falling into essentialist limitations or problematic binary constructs both in the specific case of Turkey and in the world in general.

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| <b>AR 425</b> | <b>Contemporary Archaeological Approaches to Architectural Heritage</b> | <b>Elective</b> |  | <b>(3+0) 3</b> | <b>4</b> |
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This is a technical elective seminar for fourth-year undergraduate and graduate students who are interested in the contemporary significance of those architectural remains, in urban and rural settings including archaeological sites that are considered as our architectural heritage. The course requires an active participation from the students throughout the semester, through research, reading, discussion and writing on topics introduced by the instructor in lectures and supporting reading assignments. Compulsory readings will be on selected theoretical and methodological issues that will be opened to discussion through case studies to be submit 2.500–3.000-word essays on the discussion topics, relating selected cases to the reading assignments. The course will conclude by student presentations wherein each student will introduce a selected case from a precise theoretical and/or methodological viewpoint. In addition to active participation in class discussions, four short essays and these oral presentations on visual documentation, a 6.000–8.000-word essay on the case studies will be evaluated in grading.

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| <b>AR 426</b> | <b>Spatial Perception and Representation</b> | <b>Elective</b> |  | <b>(3+0) 3</b> | <b>4</b> |
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This is an elective course presenting the fundamental theories and concepts related with the relationship of architectural space, perception, and representation. The objective of the course is to facilitate an experimental approach about the perceptual dimensions of architectural space and communicate this through different kinds of representation methods and media. The course content consists of: the main theories and case studies related with spatial perception developed in the field of philosophy and psychology; the relationship between different types of senses, the physical dimensions of space, and activities/practices in space; perceptual experiments within contemporary art; the relationship between the perceptual sphere and spatial memory, analysis and representation of different spatial and perceptual layers.

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| <b>AR 427</b> | <b>Environmental Psychology</b> | <b>Elective</b> |  | <b>(3+0) 3</b> | <b>4</b> |
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Primary concepts introduced by the field of environmental psychology; The psychological and behavioral effects of physical space.

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| <b>AR 428</b> | <b>Orientalism and Architecture</b> | <b>Elective</b> |  | <b>(3+0) 3</b> | <b>4</b> |
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The course will focus on Orientalism in architecture and responses to it through the analysis of examples chosen from Ottoman and European buildings from 18th century to present. The discussion on architecture is strengthened with the examples chosen from visual and literary arts, especially travel notes and 19th century Orientalist paintings from France and England.

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| <b>AR 429</b> | <b>Introduction to Architectural Restoration</b> | <b>Elective</b> |  | <b>(3+0) 3</b> | <b>4</b> |
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The practice of architectural restoration is inseparable from both its cultural and technical aspects. This understanding is valid for evaluating the values and problems of the architectural artifact studied, and developing a design approach for the architectural restoration problem. It is indispensable to grasp the contemporary developments in the field starting with the international charters and continuing through the principle decisions in the country. Thus this course consists of the presentation of significant case studies and reading of texts on architectural restoration with an eye to the heritage values, conservation problems, intervention approaches and implementation principles.

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| <b>AR 433</b> | <b>Thinking on the History of Structure</b> | <b>Elective</b> |  | <b>(3+0) 3</b> | <b>4</b> |
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This course is the first on the different definitions on the concept of structure for undergraduate students in architecture. It is also about new visions on the history of structure. The primary aim is to familiarize them with some epistemological concepts and discussions on these new visions and to introduce students to these concepts as the major elements of architectural epistemology. In this way, it is aimed to constitute new readings on the history of structure.

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| <b>AR 434</b> | <b>Designing the Geometry of Motion</b> | <b>Elective</b> |  | <b>(2+2) 3</b> | <b>4</b> |
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Kinematics fundamentals; degrees of freedom; types of motion; links, joints and kinematic chains; mobility analysis; kinematic inversion; four-bar mechanisms; the Grashof condition; linkages more than four bars; mechanized structures in architecture. Discussion on the artistic and architectural kinetic examples.

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| <b>AR 435</b> | <b>Design of Earthquake Resistant Buildings</b> | <b>Elective</b> |  | <b>(3+0) 3</b> | <b>4</b> |
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What Is Earthquake, Definition Of Loads That Are Exposed To Structure, Introduction To Turkish Code, Properties Of Building Materials, The Behavior Of Steel and Reinforced Concrete Buildings Under Earthquake Loading, Comparing The Behavior Of Structures.

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| <b>AR 436</b> | <b>Architecture and Urban Settlement of İzmir</b> | <b>Elective</b> |  | <b>(3+0) 3</b> | <b>4</b> |
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Course includes issues of geographical locations, relations with harbour, its close environs, the architectural formations and functional distributions of City of İzmir. Course is also includes macro-form, residential districts and transportation systems of the city throughout the history.

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| <b>AR 437</b> | <b>Contemporary Building Materials and Systems</b> | <b>Elective</b> | <b>AR 252</b> | <b>(3+0) 3</b> | <b>4</b> |
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| Contemporary construction concerns about these building materials and systems will be discussed also through integrating the presentations by specialists (professionals) invited to the course: Cement and concrete, steel and preservation of steel, their applications in buildings, partition wall systems, curtain walls, insulation materials, building chemicals, sanitary equipment and ceramic tiles, fire protection, seismic safety, energy efficiency and sustainability, BIM applications.                                                                                                       |                                                          |                 |  |                |          |
| <b>AR 440</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>Architectural Design Approaches</b>                   | <b>Elective</b> |  | <b>(3+0) 3</b> | <b>4</b> |
| A comparative analysis and criticism of architectural design approaches such as iconic, canonic, pragmatic, analogic and etc in an historical perspective.                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                          |                 |  |                |          |
| <b>AR 444</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>Programming and Evaluation in Architecture</b>        | <b>Elective</b> |  | <b>(3+0) 3</b> | <b>4</b> |
| The course will emphasise the role of programming and evaluation in architectural design. The objective of the course is to show the continuity between programming, design, and evaluation in architecture. The course will introduce different techniques of programming and evaluation in architecture.                                                                                                                                                                                                                                                                                                    |                                                          |                 |  |                |          |
| <b>AR 446</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>Design Evolution</b>                                  | <b>Elective</b> |  | <b>(3+0) 3</b> | <b>4</b> |
| An evolutionary approach to design history with examples from ancient artifacts to industrial products and high technology with respect to human abstraction and evolutionary theories.                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                          |                 |  |                |          |
| <b>AR 447</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>Rural Built Environment</b>                           | <b>Elective</b> |  | <b>(3+0) 3</b> | <b>4</b> |
| Introduction to Rural Built Environment, Basic Definitions of Rural Settlements, Elements of Built Environment, Dwelling and Settlements Relationship, Spatial Organisation in Dwelling, Spatial Elements of Rural Dwellings, Structural and Construction Systems of Rural Dwellings.                                                                                                                                                                                                                                                                                                                         |                                                          |                 |  |                |          |
| <b>AR 454</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>Construction Project Planning and Scheduling</b>      | <b>Elective</b> |  | <b>(2+2) 3</b> | <b>4</b> |
| Principles and applications of planning and scheduling a construction project. Analysis and control of construction projects. Learning and using computer software techniques for planning, scheduling and resources control.                                                                                                                                                                                                                                                                                                                                                                                 |                                                          |                 |  |                |          |
| <b>AR 455</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>Construction Administration</b>                       | <b>Elective</b> |  | <b>(3+0) 3</b> | <b>4</b> |
| Review of construction contract and administration process, writing and understanding material specification according to Turkish standards and estimating construction cost.                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                          |                 |  |                |          |
| <b>AR 456</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>Building Economics</b>                                | <b>Elective</b> |  | <b>(3+0) 3</b> | <b>4</b> |
| Cost planning and cost control methods in planning, design and implementation phases of building production processes. Construction and running costs, substitution principle in cost planning.                                                                                                                                                                                                                                                                                                                                                                                                               |                                                          |                 |  |                |          |
| <b>AR 462</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>Housing Studies</b>                                   | <b>Elective</b> |  | <b>(3+0) 3</b> | <b>4</b> |
| Housing in human perspective, housing in cross cultural perspective, Housing in urban perspective, problems of urban and suburban living, Housing and public policy, housing market, housing types in Turkey are planned to be included in to the content of the course.                                                                                                                                                                                                                                                                                                                                      |                                                          |                 |  |                |          |
| <b>AR 472</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>Architectural Building Types of Medieval Anatolia</b> | <b>Elective</b> |  | <b>(3+0) 3</b> | <b>4</b> |
| The teaching content includes the buildings of medieval Anatolia within the context of chronological and cultural structure and interactions with neighboring geographies' life styles and events. Anatolian buildings with different in type and quantity whether their structural condition are will be presented. Encouraging to read different resources there will be discussions on presentations that make possible to perceive different dimensions of subjects. With the help of images, characteristic features of buildings be emphasized and cultural heritage concept will be briefly presented. |                                                          |                 |  |                |          |
| <b>AR 473</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>Selected Issues on Architecture and the City</b>      | <b>Elective</b> |  | <b>(3+0) 3</b> | <b>4</b> |

Basically, the course is about understanding the urban space as a whole, the mutual relation between the buildings, people, and places. The course is about the changing perceptions of urban space from the perspectives of different disciplines. The course has three explicit aims. Firstly, to explore the relationship amongst architecture, city and design by provide a conceptual and historical background. Secondly, to explore and discuss both critically and creatively. Thirdly, to present a topic by using textual and visual materials. The method of the course is based on active learning.

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| <b>AR 475</b> | <b>Architecture of the Republican Era</b> | <b>Elective</b> |  | <b>(3+0) 3</b> | <b>4</b> |
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Starting in the nineteenth century we explore the. major issues that guided the architectural discourse and practice in the country like modernity, tradition, region, identity and globality. While focusing on the architectural works and discussions in the country, we also draw parallels with that of other countries, western or not.

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| <b>AR 482</b> | <b>Building Performance Simulation for Sustainable Design</b> | <b>Elective</b> |  | <b>(2+2) 3</b> | <b>4</b> |
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By using dynamic simulations models (DSMs), a designer has a possibility to compare different design options in terms building performance. Besides, DSMs are pedagogical tools offering to bring easily the subjects of building physics into architectural design. In this course, the use of building performance simulation tools are taught as a support to architectural design process. It demonstrates how the design can be evolved any using d tested to give optimum performance in terms of energy.

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| <b>AR 483</b> | <b>Design Principles of Energy Efficient Building</b> | <b>Elective</b> |  | <b>(2+2) 3</b> | <b>4</b> |
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This course illustrates the principles design of energy efficient building in four major contexts; Global context, site context, building context, and renewable energy context. In addition, it illustrates the design tools and design methods of energy efficient building. Case studies of existing energy efficient building will be covered and some other applications.

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|---------------|--------------------------------------------|-----------------|--|----------------|----------|
| <b>AR 484</b> | <b>Ottoman and Republican Architecture</b> | <b>Elective</b> |  | <b>(3+0) 3</b> | <b>4</b> |
|---------------|--------------------------------------------|-----------------|--|----------------|----------|

The course will introduce different architectural periods with their distinctive specialties, outstanding buildings and major architects from the Ottomans to our today. The specific buildings of the periods will be presented and evaluated by the help of written and visual documents.

|               |                                    |                 |  |                |          |
|---------------|------------------------------------|-----------------|--|----------------|----------|
| <b>AR 485</b> | <b>Integrated Building Systems</b> | <b>Elective</b> |  | <b>(3+0) 3</b> | <b>4</b> |
|---------------|------------------------------------|-----------------|--|----------------|----------|

Introducing systems related to the electric, electronic and mechanic installations using in buildings are realized by using existing examples. Integrated systems effected by wind and sun are investigated.

|               |                                                                              |                 |  |                |          |
|---------------|------------------------------------------------------------------------------|-----------------|--|----------------|----------|
| <b>AR 486</b> | <b>Design Principles of Passive Heating and Cooling Systems of Buildings</b> | <b>Elective</b> |  | <b>(3+0) 3</b> | <b>4</b> |
|---------------|------------------------------------------------------------------------------|-----------------|--|----------------|----------|

- Definitions of sustainable energy sources and their potentials.
- Methods of calculation of energy need and energy losses of a selected small scaled residential building.
- Energy options of gain with the passive systems.
- Design guidelines for heating a building by passive systems.
- Characteristics and scaled drawings of passive heating building elements and components.
- Design of a small scaled building heated by passive systems.