Course Title	**Code**	**Semester**	**Hour (T+P)**	**Credit**	**ECTS**
Material and Technology 4	ARCH 306	Spring (4th semester)	1 + 4		6
Pre-requisites	-				
Language of Instruction	English				
Course Type (Required / elective)	Compulsory				
Course Coordinator	-				
Instructor /e-mail	Dr. Öğr. Üyesi H. Nur KIZILYAPRAK / nur.kizilyaprak@marmara.edu.tr; nur.kizilyaprak@gmail.com				
Assistan(s)	Araş. Gör. Rumeysa TEMEL / rumeysa.temel@marmara.edu.tr				

Goals	It is aimed to gain the student the ability to design building element systems by integrating technical knowledge with design, considering the primary performance criteria.	
Learning Outcomes	1. Gaining the ability to make decisions about the type, material and layout of the structural system of a building and to express them with appropriate drawing techniques. 2. Gaining the ability to make appropriate material decisions regarding functional building elements in line with performance requirements. 3. Gaining the ability to design and detail functional building elements from a holistic point of view. 4. Gaining the ability to make comprehensive designs, to plan the design process, to produce drawings in the technique required by each design stage, and to prepare 3D models expressing the combination of materials, systems and components. 5. Gaining the ability to integrate the structural system and functional building element systems by considering the building as a system.	
Course Content	- Constructional design will be carried out for a building that the students of the MU Faculty of Architecture and Design will design according to a function that they think of a lack in Dragos Campus. - A two-storey building with a basement will be designed in this context, with a maximum floor area of 75-100 m2. - Floor height will be taken as … m - The project land is the area where the single-storey building currently functions as a cafe. Here are the important studies intended within the scope of the course to be conducted as studio work; ● **Analysis of sample projects** related with the project topic ● **Design of building element systems** with in the frame of requirements, criteria, and possibilities. ● **Integrating building elements with each other** in line with a holistic perspective (Design and integration of exterior wall-roof, exterior wall-floor, exterior wall-window, exterior wall-door, staircase-floor, and exterior/interior wall-interior partition points) The process of design includes preliminary project studies, structural system arrangements (with models and drawings), drawings of 1/50 scaled application project, analysis of 1/20 scale facade system detail including roof, vertical circulation, and foundation systems, designing of wet area and 1/5 scale details. Key points for the course: ● Building Element Design course is a student-centered studio course, and it is essential that students come prepared to the course, complete the expected work during the course and make submissions specified in the program on time. ● Studies will proceed according to the schedule given below. ● There is an **80% attendance requirement**. Students who do not fulfill the attendance requirement are deemed unsuccessful and cannot submit a project at the end of the semester.	
Assessment Criteria	**Assessment Components**	
	Midterm Grade	**% 40**
	Final Grade	**% 60**
	TOTAL	**%100**

WEEKLY TOPICS AND PREPARATIONS		
Weeks	**Weeks**	**Initial Studies**
Week 1 **18.02.2025**	**Introduction:** Explanation of the course content. Giving the subject and the land. Establishment of working groups. **Studio Works & Discussions:** PRELIMINARY DESIGN STAGE ● SW: Site Plan (1/200) ● SW: Case Studies ● SW: Preliminary Project Studies (1/200)	**Assignment:** Site Plan (1/200), Case Study, Preliminary Project Studies (1/200)
Week 2 **25.02.2025**	**Studio Works & Discussions:** PRELIMINARY DESIGN STAGE ● D: Site Plan (1/200) ● D: Case Studies Analysis ● D: Preliminary Project Studies (1/200)	**Assignment:** Plans, sections, elevations (1/100)
Week 3 **04.03.2025**	**Short Lecture:** 1/50 Architectural Drawing Techniques **Studio Works & Discussions:** FINAL DESIGN STAGE ● D: Plans, sections, elevations (1/100) ● SW: Structural system studies (1/100)	**Assignment:** Structural system drawings (1/50) ● Formwork plan & partial sections ● Foundation plan
Week 4 **11.03.2025**	**Studio Works & Discussions:** CONSTRUCTION DESIGN STAGE ● D: Formwork plan & partial sections (1/50) ● SW: Structural system 3D model (1/50) (Digital or physical)	**Assignment:** Plans, sections, elevations (1/50)
Week 5 **18.03.2025**	**Studio Works & Discussions:** CONSTRUCTION DESIGN STAGE ● D: Plans, Sections (1/50) ● D: Elevations (1/50) & Façade examples and material research	**Assignment:** Plans, Sections (1/50), Elevations (1/50) & Façade examples and material research
Week 6 **25.03.2025**	**Studio Works & Discussions:** CONSTRUCTION DESIGN STAGE ● Plans, Sections (1/50) ● Elevations (1/50) & Façade examples and material research	**Assignment:** Plans, Sections (1/50), Elevations (1/50) & Roof systems plans and sections
Week 7 **01.04.2025**	**HOLIDAY: RAMADAN EID**	
Week 8 **08.04.2025**	**Studio Works & Discussions:** CONSTRUCTION DESIGN STAGE ● Roof systems plans and sections (1/50)	
Week 9 **14-20.04.2025**	**MIDTERM SUBMISSION LIST:** ● Site Plan (1/200) ● Foundation Plan (1/50) ● Formwork plan & partial sections (1/50) ● Plans (1/50) (Basement, Ground, 1st Floor) ● Sections (1/50) (2 sections) ● Elevations (1/50) (Main Facades - 2) ● Roof Plan & partial sections (1/50) ● Structural system 3D model (1/50) (Digital or physical)	**MIDTERM EXAM:** Designing Building Element Layering (1/10)
Week10 **22.04.2025**	**Studio Works & Discussions:** DETAIL DESIGN STAGE ● SW: Designing Building Element Layering (1/10) **Short Lecture:** System Detail and Point Detail Drawing Techniques	**Assignment:** System Detail (Plan-Sections-Elevation) (1/20) (from stair)
Week 11 **29.04.2025**	**Studio Works & Discussions:** DETAIL DESIGN STAGE System Detail (Plan-Sections-Elevation) (1/20) (from stair)	
Week 12 **06.05.2025**	**Studio Works & Discussions:** DETAIL DESIGN STAGE ● System Detail (Plan-Sections-Elevation) (1/20) (from stair)	**Assignment:** All Point Details (1/5)
Week 13 **13.05.2025**	**Studio Works & Discussions:** DETAIL DESIGN STAGE ● All Point Details (1/5) ○ Roof – External Wall Connection ○ External Wall – Door / Window Connection ○ External Wall – Ground Floor – Basement Wall Connection ○ Basement Wall – Raft Foundation Connection	**Assignment:** Stair (Plan-Sections-Elevation) (1/20)
Week 14 **20.05.2025**	**Studio Works & Discussions:** DETAIL DESIGN STAGE ● Stair (Plan-Sections-Elevation) (1/20)	**Assignment:** Stair – Detail (1/5)
Week 15 **27.05.2025**	**Studio Works & Discussions:** DETAIL DESIGN STAGE ● Stair – Detail (1/5)	**Assignment:** Building Envelope System plan, section, elevation (1/20) + 3D System model (1/20)

Week 16 **03.06.2025**	**Studio Works & Discussions:** DETAIL DESIGN STAGE • D: Building Envelope System plan, section, elevation (1/20) • D: 3D System model (1/20) • SW: Drawing of layering details on plans, sections and elevations (1/50)	**Assignment:** Drawing of layering details on plans, sections and elevations (1/50)
Week 17 **10.06.2025**	**Studio Works & Discussions:** DETAIL DESIGN STAGE • D: Building Envelope System plan, section, elevation (1/20) • D: 3D System model (1/20) • D: Drawing of layering details on plans, sections and elevations (1/50)	**FINAL SUBMISSION STUDIES**
FINAL WEEK **16-29.06.2025**	**FINAL SUBMISSION:** Drawings: • Construction Drawings (plans, sections, elevations) (1/50) • System Detail Drawings: Partial Section, Partial Elevation, Partial Plans (1/20) • Point Details (1/10, 1/5, 1/2) • Material Catalogue / Poster – Source Catalogue Model (3D): • System Model (1/20)	

IMPORTANT NOTES

The assignments include research and drawings to be completed at home. Each student will submit a file at the end of the semester containing the technical information, drawings, catalogues, course notes, etc. that they have gathered as a result of their research in order to complete the assignments. The students' drawings will be returned to them after being evaluated by the instructor. However, a digital copy of the evaluated drawing must be uploaded to the relevant web platform after the class. This digital submission will also serve as proof of attendance.

PROCESS

1. Analyzing sample designs related to the project subject

The process involves analyzing sample designs related to the project topic by examining selected case studies from specific sources. These analyses will focus on various aspects, including structural, spatial, formal, dimensional, and material/technology usage. This individual study will serve as a foundation for the final project design.

2. Studies on the design and integration of building element systems

This process consists of the process of **collecting and analyzing** involves accessing and analyzing information from various sources about the design, construction and usage processes of building elements. The sources to be handled will be books, magazines, catalogs and internet sites related to the subject. **Applying the collected information** includes the use of the information previously transferred and collected during this period in the design of building elements.

a. Collecting and analyzing information:

During this stage, the following aspects will be researched and examined:

- Properties of materials and systems used in building elements, including:
  - Visual impact
  - Load-bearing capacity
  - Thermal and vapor performance
  - Water and moisture resistance
  - Sound insulation
  - Fire resistance
- Dimensions and application methods of these materials/systems
- Details on the integration of different building element systems

At the end of the semester, each student will submit a compiled file containing technical information, drawings, catalogues, and details of all materials/systems used in the project, alongside the final project.

b. Applying the collected information:

Using the analyzed data, students will conduct design studies that focus on:

- The design of exterior walls, doors & windows, roofs, floors, stairs, interior partition systems
- The integration of exterior wall–roof connections, exterior wall–floor connections, exterior wall–window junctions, exterior wall–door junctions, stair–floor connections, interior and exterior wall–partition junctions

The required drawing scales are 1/20, 1/10, or 1/5, depending on the level of detail.

COURSE OUTCOMES

MID-TERM OUTPUTS	**FINAL OUTPUTS**
• Site Plan (1/200) • Foundation Plan (1/50) • Formwork plan & partial sections (1/50) • Plans (1/50) (Basement, Ground, 1st Floor) • Sections (1/50) (2 sections) • Elevations (1/50) (Main Facades - 2) • Roof Plan & partial sections (1/50) • Structural system 3D model (1/50) (Digital or physical)	Drawings: • Construction Drawings (plans, sections, elevations) (1/50) • System Detail Drawings: Partial Section, Partial Elevation, Partial Plans (1/20) • Point Details (1/10, 1/5, 1/2) • Material Catalogue / Poster – Source Catalogue Model: • System Model (1/20)

RESOURCES

Books

- Aka, İ., Betonarme Yapı Elemanları, Birsen Yayınevi, 1987.
- Allen, E., Iano, J., Fundamentals of Building Construction, Materials and Methods, John Wiley and Sons, Canada, 1990.
- Allen, E., Architectural Detailing; Function, Constructibility, Aesthetics, John Wiley and Sons, 1993.
- Allen, W., Envelope Design for Buildings, Architectural Press, 1997.
- Ayaydın, Y., Betonarme Çok Katlı Prefabrike İskelet Sistemler, Kurtiş, 1992.
- Ayaydın, Y., Büyük Açıklıklı Prefabrike Betonarme Yapılar, Kurtiş, 1989.
- Ayaydın, Y., Taşıyıcı Duvar Perdeli Prefabrike Yapılar, Yılmaz, 1987.
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- Binan, M., Yapı Elemanları, Çizimler ve Açıklamalar, İ.T.Ü. Vakfı, 1994.
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- Foster, J. S., Raymond Harrington, R., Structure and Fabric, Part 2 (Mitchell's Building Construction Series), B.T. Batsford Limited, London, 1986.
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- Hardy, S., Time Saver Details for Roof Design, Mc GrawHill, 1998.
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- Herzog, T., Natterer, J., Timber Construction Manual, Birkhaeuser, 2004.
- Hoke J.R., Architectural Graphic Standards, John Wiley and Sons, New York, 1994.
- Ilgaz, T., Dış duvarlarda ısı korunumu.
- İzgi, U., Kapılar - Hafif Bölmeler 1,2, YEM Yayın, 2003.
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- Jiricna, E., Staircases, Laurence King, 2001.
- Jones, J.C., Design Methods, Van Nostrand Reinhold, New York, 1992.
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Magazins

- Detail - Institut für internationale Architektur Dokumentation GmbH, München.
- deutsche bauzeitschrift, DBZ - Bertelsmann Fachzeitschriften, Gütersloh, “bautechnik”
- deutsche bauzeitung, DB - Deutsche Verlags Anstalt, Stuttgart, “technik”
- the architects’ journal, AJ - Emap Communications Ltd., London, “working details”, “building study”

Catalogues

- YAPI KATALOĞU, Yapı Endüstri Merkezi Yayın Bölümü, İstanbul.
- YAPI MALZEMELERİ KATALOĞU, TMMOB Mimarlar Odası İstanbul Büyükkent Şubesi, İstanbul.

Websites

- www.insaat-yapi.gen.tr
- www.yapitr.com
- www.yapirehberi.net
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AKTS / ÇALIŞMA SAATLERİ TABLOSU			
Aktiviteler	**Süre (Hafta)**	**Süre (Saat)**	**Çalışma Saati**
Ders Süresi (sınavlar dahil 14xToplam haftalık ders saati sınavlar dahil)	14	6	84
Ders Dışı Çalışma Saatleri (Hazırlık çalışmaları, Eleştiri Ödevleri, İnternet Çalışmaları, vb.)	14	1	14
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