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	Prof. Dr. İkbal ÇETİNER				
Instructor /e-mail	Dr. Öğr. Üyesi H. Nur KIZILYAPRAK / nur.kizilyaprak@marmara.edu.tr				
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, taking into account 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 **13.02.2024**	**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 **20.02.2024**	**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 **27.02.2024**	**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 5.03.2024	**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 **12.03.2024**	**Studio Works & Discussions:** CONSTRUCTION DESIGN STAGE ● D: Plans, Sections (1/50) ● D: Elevations (1/50) & Façade examples and material researches	**Assignment:** Plans, Sections (1/50), Elevations (1/50) & Façade examples and material researches
Week 6 **19.03.2024**	**Studio Works & Discussions:** CONSTRUCTION DESIGN STAGE ● Plans, Sections (1/50) ● Elevations (1/50) & Façade examples and material researches	**Assignment:** Plans, Sections (1/50), Elevations (1/50) & Roof systems plans and sections
Week 7 **26.03.2024**	**Studio Works & Discussions:** CONSTRUCTION DESIGN STAGE ● Roof systems plans and sections (1/50)	**MIDTERM SUBMISSION STUDIES**
Week 8 **01.04.2024 - 07.04.2024**	**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)
Week 9 **9.04.2024**	**HOLIDAY: RAMADAN EID**	
Week 10 **16.04.2024**	**Studio Works & Discussions:** DETAIL DESIGN STAGE ● SW: Designing Building Element Layering (1/10) ● **Short Lecture:** System Detail and Point Detail Drawing Techniques	**Assignment:** Point Details (1/5)
Week 11 **23.04.2024**	**HOLIDAY: Ulusal Egemenlik ve Çocuk Bayramı (National Sovereignty and Children's Day)**	
Week 12 **30.04.2024**	**Studio Works & Discussions:** DETAIL DESIGN STAGE ● System Detail (Plan-Sections-Elevation) (1/20) (from stair)	**Assignment:** All Point Details (1/5)
Week 13 **7.05.2024**	**Studio Works & Discussions:** DETAIL DESIGN STAGE ● All Point Details (1/5) o Roof – External Wall Connection o External Wall – Door / Window Connection o External Wall – Ground Floor – Basement Wall Connection o Basement Wall – Raft Foundation Connection ● **…**	**Assignment:** Stair – P-S-E (1/20)
Week 14 **14.05.2024**	**Studio Works & Discussions:** DETAIL DESIGN STAGE ● Stair – P-S-E (1/20)	**Assignment:** Stair – Detail (1/5)
Week 15 **21.05.2024**	**Studio Works & Discussions:** DETAIL DESIGN STAGE ● Stair – Detail (1/5)	**Assignment:** Building Envelope System plan, section, elevation (1/20)

Week 16 **28.05.2024**	**Studio Works & Discussions:** DETAIL DESIGN STAGE ● D: Building Envelope System plan, section, elevation (1/20) ● D: System model (1/20) (Examples) ● SW: Drawing of layering details on plans, sections and elevations (1/50)	**FINAL SUBMISSION STUDIES**
FINAL WEEK **03.06.2024 - 14.06.2024**	**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: ● System Model (1/20)	

IMPORTANT NOTES

The assignments include research and drawings to be done at home. Each student will submit the technical information / drawing / catalog / course note etc. in a file at the end of the semester, that he / she has reached in a result of the research he / she has done to be able to draw the assignments. The drawings done by the students will be returned to the student after it is evaluated by the instructor. However, the digital copy of the drawing after the evaluation should be uploaded to the relevant web area after the class. This copy, at the same time, will also be considered as attendance.

PROCESS

Analyzing sample designs related to the project subject; It includes the examination of sample projects taken from a specific source in terms of structural, spatial, formal, dimensional, material/technology usage, etc. This study, which will be useful for final project design, will be carried out as an individual study.

Studies on the design and integration of building element systems consist 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. **Using the information** includes the use of the information previously transferred and collected during this period in the design of building elements.

In the process of "collecting and analyzing information";

- properties (visual impact, load bearing, heat/vapor, water/moisture, sound, fire performances, etc.), dimensions and application methods of materials/systems that can be used in the components of all building element systems and that can meet the priority performance requirements
- details on the integration of building element systems with each other

will be researched and analyzed. At the end of the semester, technical information/drawings/catalogs/details etc. of all materials/systems used in the project will be submitted individually in a file together with the project.

In the process of "using the information"; the studies to be carried out by using of the collected and analyzed information;

- Design of exterior walls, joinery (doors/windows), roofs, floors, stairs and interior partition systems taking into account environmental factors and user requirements,
- Design and integration of exterior wall-roof, exterior wall-floor, exterior wall-window, exterior wall-door, stair-floor, exterior/interior wall-interior partition points

cover. Drawing scale: 1/20, 1/10 or 1/5.

COURSE OUTCOMES

MID-TERM 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)

FINAL OUTPUTS

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., Ahşap Kapılar, Yapı Endüstri Merkezi, 1995.
- Binan, M., Doğramalar, Ahşap Pencere, Kipaş, 1985.
- Binan, M., Tabii Dış Duvar, İ.T.Ü. Mimarlık Fakültesi, 1961.
- Binan, M., Yapı Elemanları, Çizimler ve Açıklamalar, İ.T.Ü. Vakfı, 1994.
- Blanc, A., Internal Components, Mitchell's Building Series, B.T. Batsford Limited, London, 1991.
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- Busch, A., Floorworks, Longmeadow Press, 1992.
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- Foster, J. S., Structure and Fabric, Part 1 (Mitchell's Building Construction Series), B.T. Batsford Limited, London, 1986.
- Foster, J. S., Raymond Harrington, R., Structure and Fabric, Part 2 (Mitchell's Building Construction Series), B.T. Batsford Limited, London, 1986.
- Galilaa, K.J., Wossnig, P., Holzbau für Architekten 1, 2, WEKA, 2000.
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- Hardie, G. M., Building Construction, Principles, Practices, and Materials, Prentice Hall, 1995.
- Hardy, S., Time Saver Details for Roof Design, Mc GrawHill, 1998.
- Herzog, T., Krippner, R., Lang, W. Façade Construction Manual, Birkhaeuser, 2004.
- 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.
- İzgi, U., Pencere – Hafif Cepheler, Yardımcı Koruyucular, Yay Yayıncılık, 1983.
- Jiricna, E., Staircases, Laurence King, 2001.
- Jones, J.C., Design Methods, Van Nostrand Reinhold, New York, 1992.
- Kaltenbach, F., Translucent Materials - glass, plastic, metals, Birkhauser, Germany, 2004.
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- Levy, S. M., Construction Building Envelope and Interior Finishes, Databook.
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- Mc Evoy, M., External Components, Mitchell's Building Series, B.T. Batsford Limited, London, 1991.
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- Ronner, H., Öffnungen, Birkhauser Verlag, 1991.
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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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