Mimarlık ve Yaşam Dergisi
Journal of Architecture and Life
9(3), Aralık Sayısı, 2024, (451-474)
ISSN: 2564-6109
DOI:

Research Article

Comparative Analysis of Engineering Courses in Architecture Faculties in Türkiye

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Abstract

During the construction phase of buildings, there are major problems due to the lack of overlap between architectural and engineering projects. These problems are based on education. Education should primarily be of a quality that unites the two disciplines, not separates them, and should be uniform in all universities. Equalization of architecture departments, which have differences in education with other universities in the world today, is an important problem on a macro scale. This study reveals the educational structure in terms of Civil Engineering courses in the Architecture departments of 22 well-established State Universities in Türkiye. In this context, the research comparatively reveals the differences in terms of ECTS, instructor status, contents, execution methods, semesters, related additional courses, elective and compulsory status, and prerequisites of the courses in question. In addition, the employment status of faculty members of architecture faculties in terms of civil engineering courses is examined, and the reflections of this situation on education are discussed. The data for the study were obtained from the websites of the 'YÖK (Council of Higher Education) Atlas', the official websites of the universities, and interviews with the relevant faculties. In the universities studied, the data of the courses in question are listed in tables, and those deemed necessary are analyzed graphically. As a result of the research, it is determined that there are differences in ECTS, course contents, course programs, semesters, and faculty members of the courses. The contents of the courses conducted under different titles and the number of universities are revealed. In this context, it is attempted to create a basis for a uniform curriculum proposal that will remove these differences in education and bring a positive working process among architects and between architects and engineers in professional practice.

Keywords: Architecture Faculties in Türkiye, Civil Engineering Courses, Structural System and Building Project Design, Uniform Curriculum

Türkiye'deki Mimarlık Fakültelerinde Mühendislik Derslerinin Karşılaştırılmalı Analizi

Öz

Yapıların inşaat aşamasında mimarlık ve mühendislik projelerinin örtüşmemesinden kaynaklı büyük sıkıntılar yaşanmaktadır. Bu sorunların temeli eğitimdir. Eğitim öncelikle iki disiplini birbirinden ayıran değil birleştiren nitelikte ve üniversitelerin tümünde tek tip olmalıdır. Bugün dünyadaki diğer üniversitelerle eğitim açısından farklılıkları bulunan mimarlık bölümlerinin denkleştirilmesi makro ölçekte de önemli bir sorundur. Araştırmada Türkiye'de 22 adet köklü Devlet Üniversitesinin Mimarlık bölümlerinde

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Received Date / Gönderim Tarihi: 10.01.2024
Accepted Date/Kabul Tarihi: 10.09.2024

İnşaat Mühendisliği dersleri açısından eğitim yapısı ortaya konulmaktadır. Bu bağlamda, araştırmada söz konusu derslerin AKTS, öğretim elemanı durumu, içerikleri, yürütülme şekilleri, dönemleri, ilgili ek dersler, seçmeli ve zorunlu olma durumları ve ön koşulları açısından farklılıkları karşılaştırmalı olarak ortaya konulmaktadır. Ayrıca mimarlık fakültelerinin inşaat mühendisliği dersleri açısından öğretim üyesi çalıştırma durumları incelenmekte ve bu durumun eğitime yansımaları irdelenmektedir. Çalışma verileri "YÖK Atlası"nın internet siteleri, üniversitelerin resmi internet siteleri ve ilgili fakültelerle yapılan görüşmeler yoluyla yapılan araştırmalar neticesinde elde edilmektedir. Üzerinde çalışılan üniversitelerde söz konusu derslere ait veriler tablolarla listelenerek gerekli görülenlerin grafik olarak analizi yapılmaktadır. Araştırma sonucunda söz konusu derslere ait AKTS, ders içerikleri, ders programları ve derslerin yürütüldüğü dönem ve öğretim üyeleri ile ilgili konularda farklılıklar olduğu tespit edilmektedir. Farklı başlık altında yürütülen derslerin içerikleri ve üniversitelerin sayısı ortaya konulmaktadır. Bu bağlamda, eğitimdeki bu farklılıkları kaldırarak, meslek pratiğinde mimarlar arasında ve mimar ve mühendisler arasında olumlu çalışma sürecini getirecek tek tip müfredat önerisine zemin oluşturulmaya çalışılmaktadır.

Anahtar Kelimeler; Türkiye'de Mimarlık Fakülteleri, İnşaat Mühendisliği dersleri, Taşıyıcı sistem ve yapı projesi tasarımı, Tek tip müfredat

1. Introduction

As the project's creators, architects need to make decisions by combining many disciplines. For this reason, architectural education is a special field with great differences compared to the education of other disciplines (Ayıran, 1995, p. 19-21). The interdisciplinary approach has a key role in abstracting the lessons from the transfer of knowledge based on a single discipline, helping to produce innovative ideas, gaining a holistic perspective, and realizing permanent learning (Edeer, 2005, p. 78-84). The interdisciplinary approach provides a connection between different disciplines, gives a distinct perspective on a subject, and increases the thinking power of the student by keeping him/her active (Yıldırım, 1996, p. 12). In Leahey's (1999, p. 72) studies, he stated that success was higher in classes that continued teaching with interdisciplinary activities. Gardner and Mansilla (1994, p.14-18), after examining the development of students' intelligence and some skills by using different disciplines in programs, stated that the students left the area limited by the discipline and showed success in subjects such as seeing the whole and making associations.

Many studies worldwide aim to improve architectural education and overcome deficiencies. Recent organizations working on architectural education are the European Association of Architecture Schools (EAAE), the European Network of Heads of Architecture Schools (ENHSA), and the European Architecture Policy (EFAP) Forum. The Hanya Declaration, signed in 2001, re-adopted in 2003, and revised in 2007, which is part of the work of the European Association of Architecture Schools (EAAE) and the European Network of Heads of Architecture Schools (ENHSA), states that architectural education that will provide entry into professional practice can be realized with a program of at least five years or 300 credits according to the European Credit Transfer System (ECTS). Nonetheless, in Türkiye, which is not a member of the EU in terms of course contents and credits, uncertainties and insolubilities continue in terms of integration with the world in architectural education. In most countries, including the U.S. and Europe, architectural undergraduate education is five or six years. On a global scale, it is particularly important for architects working abroad to work in our country and for architects working in our country to work abroad in terms of developing the exchange of professional knowledge beyond the issue of finding a job (Yücel, 2010, p. 8-15).

The National Architectural Accrediting Board (NAAB) is the only organization that accredits "professional" degree-granting educational institutions in the United States. In 2006, the organization became an international organization for several reasons, including the globalization of the architectural profession, American architects working around the world, architects from other countries increasingly seeking job opportunities in the United States, and architectural service providers asking NAAB for help in improving educational standards. In the content of a document prepared by NAAB in headings that should be followed exactly, analytical thinking, which is the 2nd item of the 35-item Student Performance Criteria, which is among the 13 criteria of the unique characteristics of the Department of Architecture and the success of its students, and the 18th item Structural systems are directly related to the discipline of civil engineering (Dostoğlu, 2010, p. 449).

Inspired by the laws of economics and governed by mathematical calculation, the engineer reconciles us with the laws of the universe and brings us into complete harmony (Corbusier, 2013, p. 17). Especially in engineering courses where analytical thinking is tried to be developed, it is an important problem not only for architects but also for engineers today that engineering courses are based on rote memorization by remaining at the level of knowledge, and students are not taught where to use this knowledge. It requires skills such as analytical thinking, brainstorming, logical reasoning, solving complex problems, and decision-making. One of the most effective and simple ways to develop analytical thinking is to solve math problems. Construction action: "It is to realize a form suitable for any desired purpose and the structure that will sustain this form, with a material suitable for the purpose, within the possibilities of the construction technique" (Kuban, 2016, p. 42). In this context, it is necessary for the architect to develop analytical thinking skills in building project design and to collaborate with civil engineers, the closest discipline. In addition, information is easily accessible today. For this reason, it should not be forgotten that the understanding of education and training should adopt an understanding of the thinking and problem-solving process based on where and how to find and use information rather than memorizing and storing information (Öcal and İnce, 2012, p. 98-101).

The significance of this proximity is demonstrated by the fact that architecture and civil engineering could not be separated for a long time in the historical process. It is observed that the initial building designs were usually gathered by a single professional person called an architect or master builder (Kanoglu and Berköz, 1993, p. 314). In the historical process, architecture and civil engineering have been inseparable disciplines. The formation of a new type of engineer as engineer-architect-artist with the Renaissance movement around 1000 BC (Yağcı, 2007, p. 61) and the engineering calculations we see in the works of Mimar Sinan are just two of the historical examples that reveal the necessity of the architect's engineering knowledge for a good design. Following the French Revolution in 1795, Napoleon founded the Ecole Polytechnique to train civil engineers to be employed in the design and construction of public buildings needed by the young republic, and thus, the beginning of formal and scientific civil engineering education definitively separated engineering from architecture (Kanoglu and Berköz, 1993, p. 313--337). By the mid-1950s, there were numerous public projects such as hospitals, schools, tunnels, bridges, and highways; modern industrial, commercial, and military facilities; and many other comprehensive projects (Yağcı, 2007, p. 1-10). This led to the need to train specialists for different projects.

Architectural design is an overly complex process that requires the optimization of important parameters such as building materials, construction technologies, structural system design, and material selection in terms of economy, aesthetics, and safety. Architectural design is a combination of different disciplines and sub-subjects of

architecture in terms of the information load it carries. These complex relationships need to be considered together, and ultimately, architectural design involves a process that aims to reach the most optimal solution (Tokman, 2012, p. 35). Communication between the two disciplines during the project and building project's implementation and utilization phases is essential. These processes do not work independently. They contain information that is different from each other. Communication issues are important in all three stages. The most critical issue for the two disciplines in the first phase, the project phase, is that the structural system design made by the architect should not change to the extent that it will affect the architectural project after the engineering calculations. Within this scope, selection of structural materials, their dimensions, locations, and directions must work positively for both disciplines. Civil engineering is the closest discipline to architecture structural system design. At the interface between engineering and architecture, architects understand what engineers want to do and think, and engineers understand what architects want to do and think (Dickson, 1999, p. 53). From the architect's point of view, this situation covers many interrelated issues, such as the effects of the vertical continuity of the structural system on the design, the selection of the correct flooring system, the selection of non-bearing structural elements depending on the structural material, and regulations. The second stage, the problems experienced at the construction site, can deepen depending on the project stage. Today, the most important problem of construction site chiefs is the problems arising from the lack of overlap between architecture and engineering projects and the lack of knowledge in terms of project reading (Demirci, 2020, p. 27). Although it is said that the two professions will work together in the project process, this is not the practice case. In education, the two disciplines are educated independently of each other and are far away from each other.

Regarding construction site works, the responsibilities of the two disciplines are determined equally for building projects per the regulation. It only gives civil engineers responsibility for some different structures. Civil engineers can be the site supervisor for sheet piles, piling, ground anchoring, earthquake isolation and similar foundation systems and shoring structures and excavation works, jet-grouting, soil compaction, and similar ground improvement works, demolition works, rock-carved storage works, free-standing water tanks, earthquake isolated building works, post-tensioned-prestressed building works (Hergüner and Oral, 2015, p. 95-104).

In his article, he reveals the differences in course hours, credits, and contents in architectural education and reveals the existence of differences in the education programs in the architecture departments of the world countries. The architecture consists of chairs for building, urbanism, and restoration. Deficiencies in the field of education are a detailed issue that needs to be addressed with research studies specific to the existing chairs within the scope of the practitioners of the architectural profession, students, educators, professional chambers, relevant institutions, regional conditions, and worldwide education measures. In this context, we see that research in architectural education is examined from a very general perspective.

The problems experienced between the two disciplines in the project, and implementation processes and the differences in education between universities (Nalçakan and Polatoğlu, 2008, p. 79-103) reveal the inadequacy of research and practice on the subject. Being an earthquake country, it is important that engineering knowledge, which is the economic and safety dimension of structural system design, coincides with the architect's design in form and shape. If the architect does not have this information, he/she cannot develop a common language with the engineer and works

distantly. On the other hand, the engineer produces projects without considering the existing design.

In this context, the most significant problems occur at the construction site stage; the construction process becomes unmanageable due to the time given, the construction site plan and economy, and the buildings being constructed before the mistakes can be corrected (Demirci, 2020, p. 21). The prevention of earthquake-related destruction today should start with changing the education system, in addition to building inspection, related institutions and organizations, project designers, supervisors, and regulations. There is a need for programs that will reveal the seriousness of the work in education and prepare students for the profession. In this situation, the credits of the courses, their contents, the way they are carried out, the supporting internships and elective courses, internships, which courses should be carried out together with engineers, and what changes can be made in terms of course operation in terms of two disciplines should be revealed, and the architectural, structural system design should be organized in a way that combines the architect and engineer in practice and can bring a positive working process. Studies carried out on a global scale should be followed, and standards should be provided. However, it is also important to take into account the fact that our country is in an earthquake zone in the execution of the courses.

The research examines the engineering courses that shape architectural education in this context. In the architecture departments in Türkiye, education and training programs, project and construction site processes are reviewed, comparisons are made, and suggestions are made to eliminate the problems that will be experienced in practices at the interface of architecture and engineering to improve the curriculum and to solve them with a scientific approach.

2. Method of the Research

The study was conducted in architecture departments affiliated with 22 architecture faculties in Türkiye. Universities whose course contents and programs have been clarified in the selection of universities were preferred. Within this context, the scope of the study is limited to the engineering courses, contents, ECTS and credits, semesters, additional courses that will contribute to engineering courses, elective and compulsory status, and prerequisites in these architecture departments. The content of some civil engineering courses with different names is analyzed, and the civil engineering courses they correspond to are given in the Findings section. Furthermore, Table 1 lists the relevant research on the topic after 2020 (Biket and Sevimli, 2023, p. 203-228; Dinçer et al., 2022, p. 791-805; Özeren, and Kalaycı, 2023, p. 94-119; Çalışkan and Karakuş, 2023, p. 527-537; Gürdallı and Yücel, 2006, p. 99-103; Kurum and Arabulan, 2023, p. 60-82; Sönmez and Mutlu, 2021, p.72-79; Yorgancıoğlu, 2016, p.153-166; Şuta, 2022, p. 1547-1574; Berkan and Öztaş, 2023, p.793-810; Özeren, and Kalaycı, 2023, p. 94-119; Çalışkan and Karakuş, 2023, p. 527-537;Toka,2021, p.118-139).

Table 1. Current Relevant Post-2020 Studies

Title	Conclusion and Contribution to the Literature
Comparative Analysis of Interior Architecture Education Programs in Türkiye: Examining the Confusion of Professional Identity (Biket and Sevimli, 2023,p. 203-228)	It has been noted that there is a need to ensure curriculum-point type matching by eliminating the minor differences between the Departments of Interior Architecture and Environmental Design and reorganizing the curricula of the departments where interior architecture professions are taught, taking into account the inseparability of the fields.
A Lifelong (Informal) Learning Experience in Architectural Design Education: The Case of KBU Department of Architecture with Competitions (Dinçer et al., 2022, p. 791-805)	The experimental study conducted at the interface of professional experience and lifelong learning yielded positive results, especially in terms of students' self-confidence and cooperation. It was also confirmed that competition experiences are an important motivational tool.
Current Status and Diversifications of Architectural Education in Türkiye (Özeren, and Kalaycı, 2023, p.94-119)	It identifies the shortcomings of architectural education and profession in Türkiye and offers recommendations for educational development. Among these recommendations is for all universities to enter a common accreditation process and become a member of the national accreditation platform, MİAK (Accreditation Association for Architectural Education). It is then suggested that MİAK (Accreditation Association for Architectural Education) should move to an international level by providing a global cooperation. It is also suggested that the duration of architectural education in Türkiye should be increased to six years and a new curriculum should be proposed. According to the findings, it was observed that the unbalanced increase in the number of faculty members was met by part-time faculty members supported from outside, especially in foundation universities. Although this situation provides a solution in the short term, it negatively affects the quality of education in the long term. Furthermore, the inability of architectural education institutions in Türkiye to achieve international accreditation leads to a loss of prestige in the international arena.
Relation of the Structural Design and Architectural Design in Architectural Education: A Survey among Undergraduate Students (Çalışkan and Karakuş,2023, p.527-537)	This study is an important snapshot of the architectural undergraduate students' thoughts and approaches to the position of structure and structural-related education in architectural education. While designing and deciding on the curriculum academicians, the students' learnings should also be evaluated near architectural education's theoretical and practical background
The place of formal architectural education in the formation of the architect (Gürdallı and Yücel,2006, p. 99-103)	At a time when rational programs and closed systems are losing their influence, the importance of incorporating the spontaneity of architecture and the knowledge of experience has been emphasized in the re-establishment of formal architectural education to have the power to resist the imposition of everyday life.

Table 1. Current Relevant Post-2020 Studies (continued)

Concept Term in Architectural Education and Profession (Kurum and Arabulan, 2023, p. 60-82)	A questionnaire was prepared, and the results were evaluated with graphic expressions to get an idea about the view of the architects and students on the concept subject and the position of the concept in the architectural profession and architectural education.
The role and importance of occupational health and safety in architectural education (Sönmez, and Mutlu, 2021, p.72-79)	Recommendations are made about the importance of the course as architects have a role in occupational health and safety in the construction site and use phase.
The Relationship Between Architectural Education and Professional Practice: A Terrain Map from an Educational Perspective the Relationship Between Architectural Education and Professional Practice: Mapping the Terrain from an Educational Perspective (Yorgancıoğlu,2016, p.153-166)	While there are professional expectations about the role and responsibilities of architecture schools in the training of future architects, there are also ongoing attempts to define the professional profile of the architect and the aims of architectural education.
Architectural Education and Project Management (Şuta, 2022, p. 1547-1574;nt in Türkiye)	In this period when project management and project manager discipline is so important in the world, it is thought that revealing the educational situation, especially within the scope of Architecture education and developing suggestions on this issue will contribute to the literature.
An Analysis of Learning Styles and Personality Types of Students in the Techniques of Architectural Presentation Course (Berkan and Öztaş,2023,p.793-810)	The development of architectural education needs to determine the learning styles of students in the process of creating the course curriculum. This study aimed to evaluate the relationship between the learning styles of first-year architecture students and their success performance in the "Architectural Expression Methods" course and to discuss the relationship between learning styles-gender and learning styles-course curriculum.
Comparative Analysis of Architectural Education in Türkiye and the World and the Effects of Globalization on Architectural Education (Özeren, and Kalaycı,2023, p.94-119)	The differences between architecture departments in Türkiye and architecture departments in the world in terms of education are summarized. Education years, credits, elective course differences, etc. a general comparison is made.
Integrated education experience and curriculum proposal in architectural education (Toka,2021,p.118-139)	In this study, the results of the Architectural Expression Techniques course and Introduction to the History of Culture and Art courses in the Department of Architecture based on the integrated education model are evaluated and based on this experience, an integrated curriculum proposal including eight semesters is proposed for the department of architecture at the undergraduate level.

The six closest studies to the research can be listed as follows according to the degree of closeness; The first of the studies is Eriş and Ağan (2020, p. 423-439), which revealed that the curricula of the departments where interior architecture professions are taught need to be reorganized by considering the inseparability of the fields. The second closest study in this context is Çalışkan and Karakuş (2023, p.527-537), in which student opinions on the relationship between architectural and structural design were made with student surveys, and it was revealed that architectural and structural design processes are not independent and should be carried out together. However, there are differences in terms of methodology and courses covered. The third close study, the research

conducted by Nalçakan and Polatoğlu (2008, p. 79-103), draws attention to the fact that there are differences in general comparisons for some universities in the world and six well-established state universities in Türkiye. However, today, due to the increasing number of universities and the accreditation studies on international architectural education, especially after 2014, the issue needs to be reconsidered. The fourth study is close to the research conducted by Yorgancıoğlu (2016, p. 153-166) in the context of the recommendations given in terms of professional practice of engineering courses of the architectural profession in a part of the results of the current study. Another close study is Yazıcı (2014, p.155-168), which aims to discuss the relationship between learning styles-gender and learning styles-course curriculum for all architecture courses. However, it differs in terms of method and courses. Özeren and Kalaycı (2023, p. 94-119) is an article directly related to the purpose of the study.

The Research Model is given in the figure 1. As seen in the research model, the study is conducted in 3 stages. In the first stage, the course contents, ECTS, and semesters of civil engineering courses carried out in well-established state universities, especially those with clear building chairs and programs, are listed. In the second stage, the information in the lists is supported by graphs, and the differences between the universities are revealed and analyzed with percentages. In the conclusion part of the research, firstly, the place and importance of all existing studies are discussed. Secondly, the differences are concluded, and suggestions are made by making a connection with professional practice. Thirdly, the research that can be done to move education forward is discussed. In the research method, data are obtained in 3 stages among well-established state universities:

- Websites of the 'YÖK (Council of Higher Education) Atlas',
- Official websites of universities
- Interviews with relevant faculties

The aim is to compare education in Türkiye in the context of the efficient execution of engineering courses in the architecture department and to create a basis for a uniform curriculum proposal that will bring a positive working process in the architectural profession.

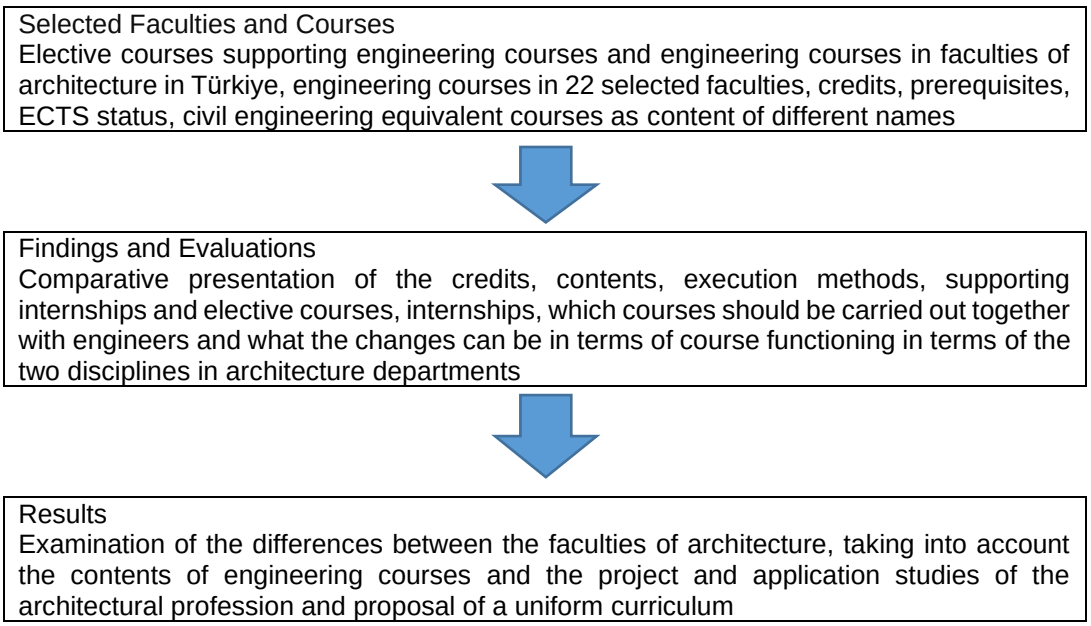

Figure 1. Research Model

3. Findings

3.1. Engineering Courses, Their Content, Current Faculties and Course Information

Table 1 shows the Civil Engineering courses (numerical logic for load, load distribution-based structural system selection, and dimension selection) and their contents, Table 2 shows the courses supporting Civil Engineering (numerical courses combining architectural, structural system design and form (shape) and for collaborative work with engineering discipline in the construction site process) and their contents. (URL-1, URL-2, URL-3, URL-4) Table 3 shows the Engineering courses, compulsory and elective courses, theory and practice in the architecture departments of the Faculties of Architecture of 22 state universities in Türkiye. (URL-5; URL-6; URL-7; URL-8; URL-9; URL-10; URL-11; URL 12; URL-13; URL-14; URL-15; URL-16; URL-17; URL-18; URL-19; URL-20; URL-21,URL-22,URL-23,URL-24) The information about the courses given in the table was taken especially from architecture departments with earthquake engineering department.

Table 2. Civil Engineering Courses (URL-1, URL-, URL-3 and URL-3)

Lessons	Contents
Static	Basic concepts and principles. Vectors and vector operations. Moment concept; moment of a force with respect to a point and an axis, pair of forces, creation of equivalent system. Equilibrium of bodies, free body diagram, statics of a point of matter, statics of a rigid body. Center of gravity. Moments of inertia, radius of inertia, parallel axes theorem. Truss systems, calculation of internal forces of bars in truss systems: Nodes method, Section method. Internal forces and diagrams of isostatic beams; differential relations between bending moment, shear force and distributed load.
Strength	Basic concepts and principles of strength. Material properties. Simple cases of strength; simple axial normal force, heat exchange effect and resulting stresses, compatibility equations and applications. Simple shear force and its applications, rivet and welding calculations. Stress-strain relations. Simple bending and applications. Compound strength cases: normal force and bending, shear bending. Stress states at a point: uniaxial and biaxial stress states. Graphical representation of stress states: Mohr's circle and its applications. Elastic curve

Table 2. Civil Engineering Courses (continued)

Structure Statics	Internal force calculations and diagrams in isostatic plane frames. Gerber beams. Energy methods, calculation of elastic strain energy. Castigliano theorems and their applications. Calculating displacement and rotation of beams and simple frames: Unit load method, applications with Maxwell-Mohr product table. Hyperstatic systems: force method, moment distribution method and applications.
Reinforced Concrete	This course aims to provide the students with information about the physical properties and components of concrete, basic principles and methods in reinforced concrete calculation, behavioral properties of reinforced concrete, design of beams (single and double reinforced, single and double reinforced in simple bending) and columns (centrally loaded and compound bending), and shear effect in beams, and to explain them with simple examples and calculations and to teach their applications for the integration of reinforced concrete structural systems with architectural design.

Table 3. Universities-Civil Engineering and Related Courses-AKTS-Period, Prerequisite, Elective Courses (URL-5; URL-6; URL-7; URL-8; URL-9; URL-10; URL-11; URL 12; URL-13; URL-14; URL-15; URL-16; URL-17; URL-18; URL-19; URL-20; URL-21,URL-22,URL-23 and URL-24)

Number	Universities - Weight of courses, related courses, (Compulsory-Elective), Faculty Member Status	Engineering Courses	T-U, ECTS
1	Abdullah Gül University	Structure 1	Compulsory,3 (2 + 1),4 ECTS,3rd semester, No Prerequisite
	Yapı Teknolojileri	Structure 2	Compulsory,3 (2 + 1),4 ECTS,4rd semester, Structure 1 prerequisite
2	Akdeniz University Project Construction and Management (3 ECTS credits) Materials and Structural Systems (2 ECTS credits) Construction Site Management and Organization (2 ECTS Credits)	Architecture and Structural Systems I (3 ECTS Credits)	Compulsory, 3 ECTS, 3rd semester
		Architecture and Structural Systems II (3 ECTS credits)	Compulsory, 3 ECTS, 4rd semester
		Structure and Construction Methods I and II	3-0,4 ECTS, 3rd and 4rd semester
3	Balıkesir University	Static-Strength	2-0,Compulsory-4 ECTS, 3rd semester
4	Bolu Abant Izzet Baysal University,	Static-Strength	1-2, 2 ECTS,3rd semester
		Structural systems I, Reinforced concrete	3-0 3AKTS,4rd Semester
		Structural Systems II (Building Statics - Steel Structures)	(3-0) 3 ECTS, 5th semester

Table 3. Universities-Civil Engineering and Related Courses-AKTS-Period, Prerequisite, Elective Courses (continued)

5	Bursa Uludag University, Elective Courses Earthquake Resistant Structural Design (5th Semester, No Prerequisite), Steel Structures, Steel Structure Design (6th Semester), Contemporary Structural Systems, Reinforced Concrete Structures, Reinforced Concrete Structure Design, Advanced Engineering Applications (7th Semester), Prefabricated Structures (8th Semester)	Static-Strength	1-2, 3 ECTS,3rd semester
		Structural System Design I	2-0,3 ECTS,5rd semester
		Structural System Design II	3 ECTS,3 ECTS,6rd semester
6	Çukurova University (Lecturer, Department of Architecture, Department of Civil Engineering) Structural system design (Reinforced concrete design, 3rd semester, no prerequisite), Earthquake Resistant Structure Design, 4th semester, no prerequisite), Contemporary Structural System Design, (no prerequisite, Compulsory, 5th semester)	Static	2-0, 3 ECTS, Compulsory, 3rd semester
		Strength	2-0 2 ECTS,4th Semester, Compulsory
		Building Statics I	2-0 3 ECTS,5rd Semester, Elective, No Prerequisite
		Building Statics II	2-0 3 ECTS, Elective, No Prerequisite
		Reinforced Concrete	3-0 3 ECTS, Compulsory, No Prerequisite, 6rd Semester, 6rd Semester, 5rd Semester
		Building Statics	2-0,3 ECTS,4rd Semester, Compulsory
7	Dokuz Eylul University (Lecturer, Department of Architecture, Department of Civil Engineering) Elective Courses, 5th Semester Construction Technologies mainly, Architectural Design of Structures Against Earthquakes, (6th Semester) Structural Design of Structures with Steel Materials, (6th Semester), Multi-storey and high-rise structure design problems, Building and design economics, Reinforced Concrete II, Housing construction with steel materials, Design principles of reinforced concrete slabs and their applications in architecture (7th Semester), Contemporary steel structure systems, Wood Construction systems (8th Semester)	Static	3-0,3 ECTS,2rd semester,
		Strength	3-0,3 ECTS,4rd semester, MIM 2615 - STATICS
		Building Statics	3-0,3 ECTS,5rd semester, MIM 2618 - STRENGTH
		Contemporary Structure Building Systems	2-1,3 ECTS,5rd semester
		Reinforced Concrete	3-0,3 AKTS 6rd semester, MIM 2618- STRENGTH

Table 3. Universities-Civil Engineering and Related Courses-AKTS-Period, Prerequisite, Elective Courses (continued)

8	Erciyes University There are no prerequisites for compulsory courses (Steel structures)	Static – Strength	2-0, 2AKTS,3rd semester
		Reinforced concrete and steel	2-0 2AKTS,4rd semester
		Structure Design	2-2,4 ECTS,5rd semester
		Structure Economics and Management I and II	2-0,3 ECTS,6rd semester and 7rd semester
		Structure Planning and Management	2-0,3 ECTS,5th semester
9	Fırat University (Lecturer, Department of Architecture, Department of Civil Engineering)	Static	3-0 4 ECTS,1rd semester
		Strength	3-0, 4 ECTS, 2rd semester, No prerequisite
		Structure Statics	4-0, 5 ECTS, 3rd semester, No prerequisite
		Steel Structures	3-0,3 ECTS,3rd semester, No prerequisite
		Reinforced Concrete Structures	2-2, 4 ECTS, 4rd semester, No prerequisite
10	Gazi University Architectural Design and Construction Technology (Elective, 7th semester), Prefabrication (Elective, 8th semester), Building Ground Relationship ((Elective, 6th semester)	Static in Architecture	2-1, 3 ECTS, 2rd semester
		Carrier System Information	2-0,2 ECTS,1rd semester
		Strength in Architecture	2-1 3 ECTS,4rd semester, No prerequisite
		Structural Analysis in Architecture (Structural Statics)	2-1,3 ECTS,3rd semester, No prerequisite
		Reinforced Concrete in Architecture	2-1 3 ECTS,5rd semester, No prerequisite
		Earthquake Resistant Structure Design	2-0,3 ECTS,7rd semester, No prerequisite

Table 3. Universities-Civil Engineering and Related Courses-AKTS-Period, Prerequisite, Elective Courses (continued)

11	Gebze Technical University (Construction Management and Economics, High-rise Structures) (Lecturer, Department of Architecture, Department of Civil Engineering)	Static - Strength	2-2, 3 ECTS, 2nd semester,
		Structure Statics	2-2, 3 ECTS, 3rd semester
		Structural systems and technologies I	2-2, 5 ECTS, 2rd semester
		Structure-Soil Relationship	2-0,3 ECTS,4th semester
		Structural systems and technologies II (CONCRETE)	2-2 5 ECTS,5rd semester
		Structural systems and technologies III (STEEL AND WOOD)	2-2 5 ECTS,6rd semester
		Earthquake Resistant Structure Design	2-0,5 ECTS,7rd semester
12	Hatay Mustafa Kemal University Reinforced concrete practice in architecture (Elective),3-0 4 ECTS	Static - Strength	3-0 3 ECTS,3rd semester
		Structure Statics	3-0 4 ECTS,4rd semester
13	Istanbul Technical University (Turkish) Earthquake-resistant structure design, (4th semester) (Lecturer, Department of Architecture, Department of Civil Engineering)	Static	2-0, 2. 5 ECTS,1rd semester
		Strength	2-0,3 ECTS,2rd semester, MIM 113 MIN DD or MIM 113E MIN DD Prerequisite
		Structure Statics	1-1,2 ECTS,3rd semester, MIM 152 MIN DD or MIM 152E MIN DD
		Steel Structures	1-2-,2.5 ECTS,3rd semester, MIM 152 MIN DD or MIM 152E MIN DD, Prerequisite
		Structure and Construction Methods	2-2-,5 ECTS,3rd semester
		Reinforced concrete structures	2-2, 4 ECTS, MIM 152 MIN DD or MIM 152E MIN DD Prerequisite,4th Semester
		Construction Management and Economics	2-2-,5 ECTS,6th semester

Table 3. Universities-Civil Engineering and Related Courses-AKTS-Period, Prerequisite, Elective Courses (continued)

16	Istanbul University (Department of Architecture, Department of Civil Engineering)	Static – Strength	3-0 4 ECTS,2nd semester
		Behavioral analysis of structural systems (Structure Statics)	2-0 4 ECTS,3rd Semester, No Prerequisite
		Design of Structural Systems 1	2-2, 4 ECTS, No Prerequisite
		Design of Structural Systems 2	2-2 4 ECTS, No Prerequisite
		Construction Management and Economics	2-2,4 ECTS,6th semester, No prerequisite
17	Karadeniz Technical University Steel Structures 6th Semester	Static-Strength	2-2 4 ECTS, 2nd semester
		Structure Statics	1-1 3 ECTS,3rd semester
		Reinforced Concrete Structures	2-2 4 ECTS,4th semester
18	Kırklareli University Construction Systems (5th semester), Contemporary Structural Systems, (6th semester), Steel Structures, Timber Structures (6th semester)	Static -Strength I	2-0, 3 ECTS, 3rd semester
		Static-Strength II	2-0 2 ECTS,4th semester
		Reinforced Concrete	2-2, 6 ECTS, 5th semester
19	Muğla Sıtkı Koçman University	Structural Engineering I (Structural Statics I)	2-0 2 ECTS,3rd semester
		Structural Engineering II (Structural Statics II)	2-0 2 ECTS,4th semester
		Building Technologies I, II, III, IV	
18	Niğde Ömer Halis Demir University	Static -Strength	2-0 3 ECTS,3rd semester
		Structural Analysis (Structure Statics)	2-0 8 ECTS,4th semester
		Structural System Design	2-0 3 ECTS,5th semester
19	On Dokuz Mayıs University Construction Management Economics, Prefabricated Structures, (7th semester), Earthquake Based Structure Design, 5th semester,	Static	2-0, 3 ECTS, 2nd semester
		Strength	2-0,3 ECTS,3rd semester
		Structural systems in architecture	2-2-,3 ECTS,5th semester
		Structure and Project Management	2-2,3 ECTS,8th semester

Table 3. Universities-Civil Engineering and Related Courses-AKTS-Period, Prerequisite, Elective Courses (continued)

20	Middle East Technical University	Building Construction Technologies	4th semester, 3 credits
		Building Design in Architecture I and II	Period 5 and Period 6
21	Trakya University	Static-Strength	2-0 3 ECTS,3rd semester
		Structure Statics	2-0 3 ECTS,4th semester
		Reinforced Concrete	2-0 3 ECTS,5th semester
22	Yıldız Technical University (Lecturer, Department of Architecture, Department of Civil Engineering) Reinforced Concrete in Architecture, Steel structures, Earthquake factor in design, Project Construction Management, Contemporary structural systems	Static-Strength	2-2, 4 ECTS, 2nd semester
		Structural Statics in Architecture Structural Design I and II	2-0, 3 ECTS, 3rd semester, MIM1042 prerequisite, 2-0,3 ECTS,4th semester

3.2. Credits, Contents and Execution of Engineering Courses

As summarized in Table 4, in the faculties of architecture of 22 state universities in Türkiye, 50% of the engineering courses are taught separately as static-strength, 27.27% as static-strength together, 40.91% as structural statics, 40.91% as reinforced concrete. 59.09% of the courses are taught under different titles and contents. The name and content of the courses in the ten architecture departments with different titles, other engineering courses, and faculty status are analyzed to each other and listed in Table 5. The differences in civil engineering ECTS status given in Table 3 are summarized in Figure 3 according to the number of departments. While 11 architecture departments conduct the course as Static and Strength course, 36.36% of them have 3 ECTS, 9.09% have 4 ECTS, 9.09% have 2.5 ECTS, 83.33% of 6 architecture departments have 3 ECTS, 66.67% have 4 ECTS, 33. 33% 2 ECTS, 22.22% 5 ECTS, 88.89% 3 ECTS, 22.22% 2 ECTS, 22.22% 4 ECTS, and 55.56% 4 ECTS, 55.56% 3 ECTS, 11.11% 2 ECTS, 11.11% 5 ECTS, 11.11% 6 ECTS in Reinforced Concrete. In Table 5, the contents of the load -bearing system- related courses and their proximity to construction courses are given. Table 6 shows which disciplines the courses are taught by faculty members.

Table 4. Percentage of Civil Engineering Courses

Courses	Number of Universities	Percentage %	% (ECTS)
Statics and Strength	10	45.45	%36.36, (3)-%9.09 (4)-%9.09(2.5)
Static-Strength	6	27.27	%83.33(3)-%63.63(4)-%33.33(2)
Structure Statics	8	36.36	%18.18(5)-%88.89(3)-%22.22(2)-%22.22(4)
Reinforced Concrete	8	36.36	%55.56(4)-% 55.56(3)-%11.11(2)-%11.11(5)-%11.11(6)

Table 4. Percentage of Civil Engineering Courses (continued)

Engineering-related courses with different titles and contents (Structural Systems I and II, Architecture and Structural Systems I and II, Structural Analysis, Structural Engineering I and II)	10	59.09	-

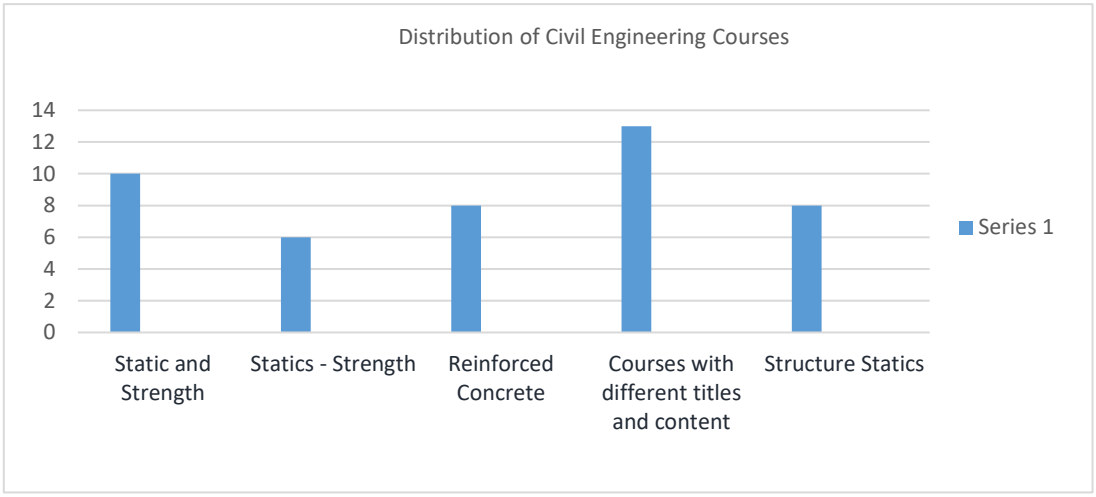

Figure 2. Distribution of Civil Engineering Courses According to the Way They Are Conducted

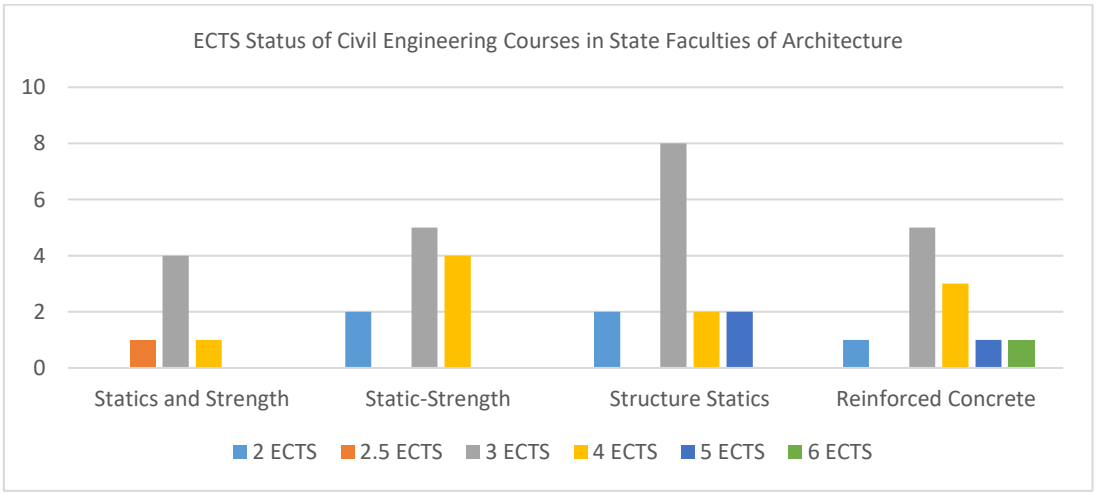

Figure 3. 22 ECTS Status of Civil Engineering Courses in State Architecture Faculties

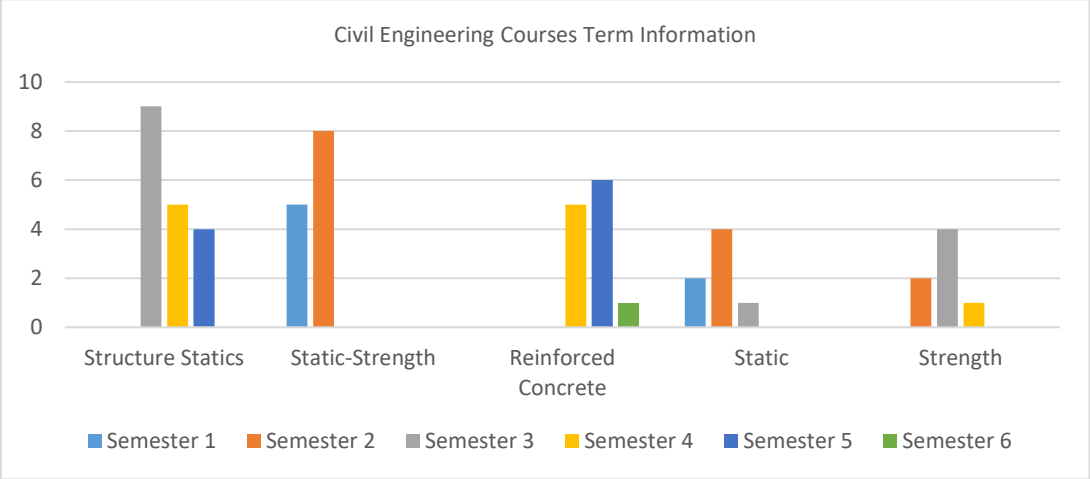

Figure 4. Course Periods in Architecture Departments Conducting Civil Engineering Courses

Table 5. Civil Engineering Course Information in 10 Architecture Departments with Different Titles

Courses	University	Content and Faculty	Other Engineering courses conducted
Structure I and Structure II	Abdullah Gul University	Literature Structural System Knowledge (architecture faculty member)	-
Architectural and Structural Systems I and II	Akdeniz University	Literature Structural System Knowledge (architecture faculty member)	-
Carrier systems I	Bolu Abant Izzet Baysal University	Reinforced Concrete and Structural Statics I	Static-Strength
Carrier systems II		Steel Structures and Structural Statics II	Static-Strength
Carrier System Design Carrier system design and technologies I, II, III	Bursa Uludag University	Carrier system knowledge (architecture faculty member)	
		Reinforced Concrete, Timber and Steel carrier system design (architecture faculty member)	
Reinforced concrete practice in architecture (elective)	Hatay Mustafa Kemal University	Reinforced Concrete	Static-Strength, Structural Statics
Structure Technologies I, II, III, IV	Muğla Sıtkı Koçman University	Reinforced Concrete, Steel Construction	Structural Engineering I and II
Carrier System Design	Niğde Ömer Halis Demir University	Reinforced concrete (Civil engineering faculty member of the architecture department)	Static-Strength
Structural Analysis		Structure Statics	
Structural systems in architecture	On dokuz Mayıs University	Structure Statics (Earthquake Resistant Structure Design elective)	Statics and Strength
Building Construction Technologies	Orta Doğu Teknik University	Structure Production Techniques	-
Structural Design in Architecture I and II		Structure Project	-
Structural Design in Architecture I and II	Yıldız Technical University	Development of structural system design according to different structural system materials (Civil engineering faculty member of architecture department, ITU Civil Engineering)	Static-Strength Structural Statics in Architecture

In the context of revealing the competence in terms of carrier system design of structural projects in architecture departments, Table 6 lists 22 architecture departments in terms of the departments to which civil engineering course instructors are affiliated.

Table 6. 22 Affiliated Departments of Civil Engineering Course Instructors in the Department of Architecture

By engineering faculty members working in the department of architecture	By faculty members from the Department of Civil Engineering	By the architect faculty members of the engineering courses
1. Çukurova University 2. Dokuz Eylul University 3. Erciyes University 4. Euphrates University 5. Gebze Technical University 6. Istanbul Technical University 7. Istanbul University	1. Balıkesir University 2. Bolu Abant Izzet Baysal University 3. Gazi University 4. Hatay Mustafa Kemal University 5. Karadeniz Technical University 6. Kirklareli University 7. Muğla Sıtkı Koçman University 8. Nigde Omer Halis Demir University 9. On dokuz Mayıs University 10. Trakya University 11. Yildiz Technical University	1. Abdullah Gül University 2. Akdeniz University 3. Bursa Uludag University 4. Middle East Technical University

The distribution of Civil Engineering Courses According to the Way They Are Conducted is graphed in Figure 2, 22 ECTS Status of Civil Engineering Courses in State Architecture Faculties is graphed in Figure 3, Course Periods in Architecture Departments Conducting Civil Engineering Courses is graphed in Figure 4.

In Figure 5, the departments to which the course Instructors are affiliated are given graphically.

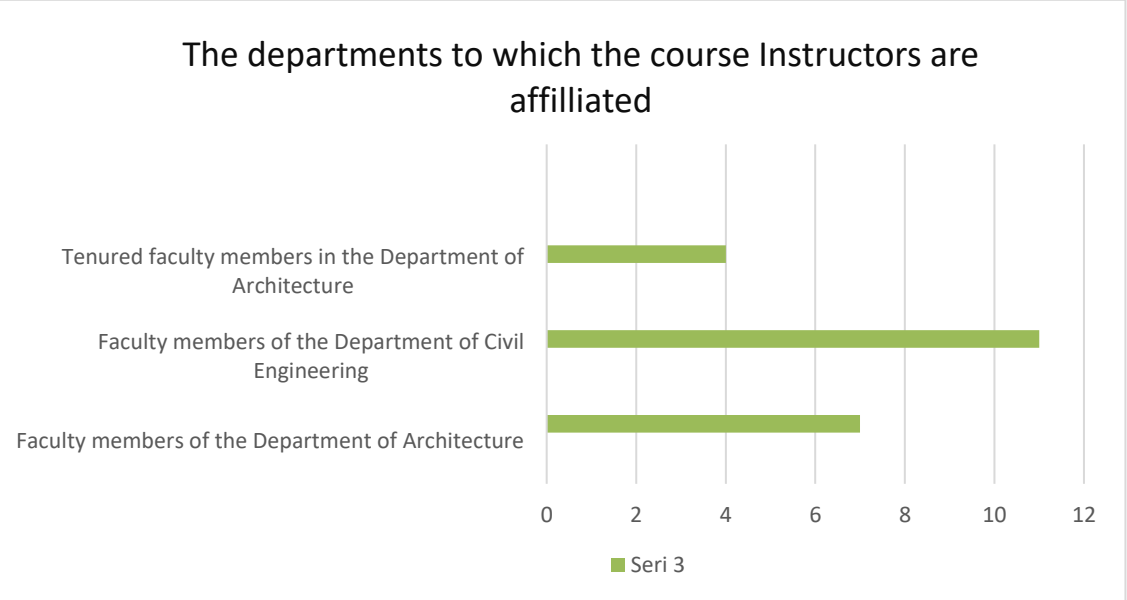

Figure 5. The departments to which the course Instructors are affiliated are given graphically.

4. Discussion and Conclusions

This defect in the education system in terms of our country, which is located in the earthquake zone, causes great problems in terms of the reliability of the work done in the project and construction stages in the applications.

The following conclusions were reached in the research conducted on the content, curriculum, credits, and method of execution of civil engineering courses in the architecture departments of 22 state universities;

- Most of the 22 universities conduct Civil Engineering courses under different titles. Most of them conduct the courses as Static-Strength, while the other part conducts separate courses as Static and Strength.
- As a result of the research conducted in 10 architecture faculties with different titles, it is seen that 30% of the architecture departments of universities do not take civil engineering courses, which is the basis of structural system design, and the existing knowledge is at the level of structural system knowledge carried out by architecture professors.
- In universities where civil engineering courses are conducted, the contents of the existing courses are the same, but the theory and practice hours and ECTS status are quite different. The majority of them are carried out as 3 ECTS.
- When Civil Engineering courses are examined in terms of content, they are interconnected and cannot be carried out without understanding a preliminary course. For this reason, it is a prerequisite that the student has completed that course. However, it is seen that this is only the case in old architecture faculties such as ITU, where earthquake engineering lecturers are tenured in the architecture department.
- 18.18% of 22 state universities do not provide civil engineering courses. Architect faculty members conduct structural system courses in 50% of them; they are conducted by faculty members from the civil engineering department. In a small amount of 31.81%, the earthquake engineering chair, which is tenured in the architecture department, is carried out by professors of civil engineering origin.
- In general, statics and strength courses are the first semesters, and universities have differences. In universities where statics and strength are given separately, Static 2nd semester and Strength 3rd semester are weighted. It is seen that Static-Strength 2nd semester, Structural Statics 4th semester, and Reinforced Concrete 5th semester are more weighted. Civil engineering with numerical courses should start after the 1st-semester mathematics course. Determining the semester according to the course contents is essential in this context. Figure 6 shows the functioning model showing the semester flow according to the content and prerequisite status of the compulsory courses in civil engineering.
- As seen in Figure 6, Lesson must be carried out in a certain order. Before starting the next course it should be mantory to achieve success in the previous course.

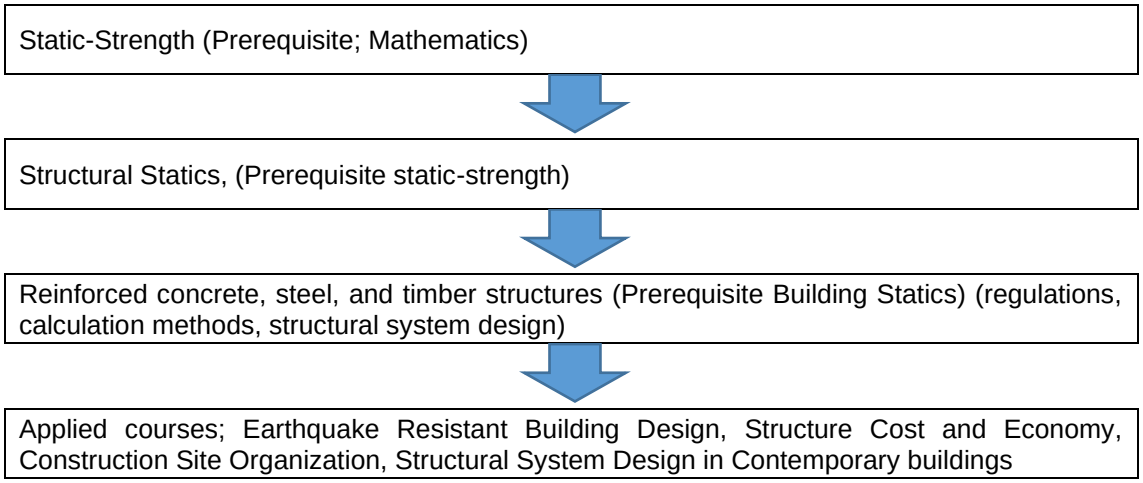

Figure 6. Civil Engineering Courses

- It is observed that practical courses supporting civil engineering are compulsory, sufficient, and appropriate in terms of semesters in universities with earthquake engineering chairs. In other universities, elective courses are generally architecture-oriented due to the lack of permanent faculty members. In Figure 5, it is seen that the practical courses that should be started at the end of all quantitative courses are appropriate in terms of semester locations, ECTS, and contents in 7 universities where there are professors with civil engineering backgrounds in the architecture staff.

Primarily, the existing courses should be conducted in all universities in the same semesters, with the same ECTS and equal theory-practice hours, by civil engineering faculty members who are on the staff of the architecture department and taking into account the prerequisite conditions. Lecturers from the engineering department cannot give courses that meet the objectives of the architecture department, and students are disenchanted with the course and see it as a burden The courses are not productive since the same is true for the faculty members. In addition, practical elective and compulsory courses should be carried out jointly with civil engineering; teaching should be carried out jointly by the faculty members of the two departments according to the subject taught; the determined semesters should ensure the progress of knowledge, it should be of a quality that develops analytical thinking rather than memorization level, internship periods should be determined in connection with the courses.

When the aims of the studies in Table 1 are analyzed, it is seen that there are studies on an international scale that will reveal the problems in the architectural education period and curriculum of many courses, especially design, in interior architecture and architecture departments. However, there are no studies that reveal the problems related to engineering courses and their situation in our country. In addition, many institutions and organizations at national and international levels are conducting research on the equivalence of architectural education. Institutions and organizations at national (MOBBİG, MİDEKON, MİAK - Accreditation Association for Architectural Education, MİMED, etc.) and international level (EU, UNESCO, UIA - International Union of Architects, EAAE - European Association for Architectural Education, ACE - European Council of Architects, ARB - Architectural Registration Board - UK, RIBA - UK, NAAB - National Architectural Accreditation Board - USA, etc.) are also working on architectural education; and when the NAAB's Conditions for Accreditation document dated February 10, 2020, is examined, it is seen that the characteristics and criteria sought in architecture programs (in the USA), which will be subjected to program self-assessment

and then to the evaluation of NAAB visiting teams, differ significantly from the previous 2014 document.

For that reason, the current study should be carried out in two stages. The credits, contents, semesters, prerequisites, and elective and compulsory courses supporting these courses in well-established architecture departments around the world should be examined. The reasons for variations from country to country should be investigated. In this context, NAAB's criteria should be compared with the situation of the courses in our country, and the deficiencies should be revealed.

Author Contribution

The entire study belongs to the author.

Conflict of Interest Statement

There is no conflict of interest with any institution or person within the scope of the study

References

Ayıran, N. (1995). Mimarlık Eğitiminin Geleceğine Genel Doğrultular. In Mimarlık ve Eğitimi Forum 1: Nasıl Bir Gelecek (pp. 19-21). İstanbul: Cenkler Matbaası.

Berkan S.,T., & Öztaş S.,K., An Analysis on Learning Styles and Personality Types of Students in the Techniques of Architectural Presentation Course, Journal of Architectural Sciences and Applications, 8 (2), 793-810

Biket, P., & Sevimli, G. (2023). Türkiye'de Mimarlık Eğitimi ve Proje Yönetimi. Yakın Doğu Üniversitesi Yakın Mimarlık Dergisi, 7 (2), 203-228.

Corbusier, L. (2013). Bir Mimarliğa Doğru (8th ed.). İstanbul: Yapı Kredi Yayınları.

Çalışkan.B. E., & Karakuş, F. (2023). Relation of Structural Design and Architecture. GU J Sci, 11 (3), 527-537.

Demirci, O. (2020). Yüksek Katlı Betonarme Binalarda Projeye Bağlı Aksaklılar ve Hatalar. (Unpublished master's thesis). Avrasya Üniversitesi/Fen Bilimleri Enstitüsü, Trabzon.

Dickson, M. (1999). Building for a Small 471imar-past Parallels, Future Opportunities. McConnochie et al. (Eds). Engineering Architecture (p. 53). Glasgow, UK.

Dinçer, A.E., Özeren Ö., & Yağcı, O.Z. (2020). A Lifelong (Informal) Learning Experience in Architectural Design Education: The Case of KBU Department of Architecture with Competitions. Mimarlık ve Yaşam, 7 (3), 791-805.

Dostoğlu, N. (2010). Mimarlık Eğitiminde Akreditasyon: NAAB ile İlgili Bir Değerlendirme. Mimarlık Eğitiminin Dünü Bugünü Yarını Ulusal Sempozyum. T.M.M.O.B Mimarlar Odası, Konya, p. 449.

Edeer, Ş. (2005). Sanat Eğitiminde Disiplinler Arası Yaklaşım. Ondokuz Mayıs Üniversitesi Eğitim Fakültesi Dergisi, 19, 78-84.

Eriş, E., & Ağan, M. (2020). Türkiye'deki İç Mimarlık Eğitim Programlarının Karşılaştırılmalı Analizi: Mesleki Kimlik Karmaşasının İncelenmesi. Mimarlık ve Yaşam, 5 (2), 423-439.

Gardner, H., & Mansilla, V. B. (1994). Teaching for Understanding within and Across the Disciplines. Educational Leadership, 51 (5),14-18.

Gürdallı, H., & Yücel, A. (2006). Mimarın Formasyonunda Formel Mimarlık Eğitiminin Yeri. İstanbul Teknik Üniversitesi Dergisi, 5 (1), 99-103.

Hergüner, M. A., & Oral, E. L. (2015). Şantiye Şeflerinin Sorumlulukları. Çukurova Üniversitesi Mühendislik Mimarlık Fakültesi Dergisi, 30 (1), 95-104.

Kanoğlu, A., & Berköz S. (1993). Türkiye'de Yapım Yönetimi Eğitimi. İnşaat Mühendisliği XII. Teknik Kongresi, Ankara,313-337.

Kuban, D. (2016). Osmanlı Mimarisi. (2nd ed.). İstanbul: Yapı-Endüstri Merkezi.

Kürüm, H., & Selin Arabulan, S. (2023). Concept Term in Architectural Education and Profession. Journal of Multidisciplinary Studies in Education, 7 (3), 60-82.

Leahey, L. K. (1999). An Interdisciplinary Approach to Integrated Curriculum. (Unpublished master's thesis). Rowan University, Glassboro.

Nalçakan, H., & Polatoğlu, Ç. (2008). Türkiye'deki ve Dünyadaki Mimarlık Eğitiminin Karşılaştırmalı Analizi ile Küreselleşmenin Mimarlık Eğitimine Etkisinin İrdelenmesi. Yıldız Teknik Üniversitesi Mimarlık Fakültesi E-Dergisi, 3 (1), 79-103.

Öcal, C., & İnce, H. H. (2012). Mühendislik Eğitiminde Güncel Yaklaşımlar. Geleceğin Mühendislik Eğitiminde Endüstri ile İşbirliği Sempozyumu. Süleyman Demirel Üniversitesi, Isparta, pp. 98-101.

Özeren, E. B., & Kalaycı, P. D. (2023). Türkiye Mimarlık Eğitiminin Mevcut Durumu ve Çeşitlenmeleri. International Refereed Journal of Design and Architecture, 29 (5), 94-119.

Sönmez, G., & Mutlu, N. G. (2021). Mimarlık Eğitiminde İş Sağlığı ve Güvenliğinin Yeri ve Önemi. Yıldız Journal of Educational Research, 6 (2), 72-79.

Şuta, O. (2022) Covid-19 Pandemisi ile Değişen Mimari Tasarım Eğitiminin Öğrenci Üzerindeki Etkileri: Trakya Üniversitesi Mimarlık Bölümü Örneği.15 (4), 1547-1574.

Tokman, L. Y. (2012). Mimarlık Üzerine Bir Bilimsel Araştırma: Tasarım, Yöntem, Uygulama. Ankara: Elif Yayınları.

Toka,S.(2021). Mimarlık Eğitiminde Bütünleşik Eğitim Deneyimi ve Müfredat Önerisi,Artuklu Sanat ve Beşeri Bilimler Dergisi,93-151(5).

Yağcı, B. (2007). İnşaat Mühendisliğine Giriş Ders Notları. Balıkesir Üniversitesi Mühendislik Mimarlık Fakültesi. Accessed August 14, 2024 https://www.erbakan.edu.tr/storage/files/department/insaatmuhendisligi/editor/DersSayfalari/IMG/img7.pdf

Erkan Yazıcı, Y., (2014). “Mimarlık Öğrencilerinin Perspektif Çizme Başarısı ile Öğrenme Stilleri Arasındaki İlişki”, Gazi Üniversitesi, Güzel Sanatlar Fakültesi, Sanat ve Tasarım Dergisi, 13, s.155-168.

Yıldırım, A. (1996). Disiplinlerarası Öğretim Kavramı ve Programlar Açısından Doğurduğu Sonuçlar. Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 12 (12).

Yorgancıoğlu, D. (2016)**.** The Relationship Between Architectural Education and Professional Practice: Mapping the Terrain from an Educational Perspective, Surviving between Pedagogy and Practice in Architectural Education, pp. 153-166.

Yücel, S. (2010). Mimarlık Politikaları Oluşturulurken Mimarlık Eğitiminin Biriktirdikleri Biriktirecekleri. Mimarlık Eğitiminin Dünü Bugünü Yarını Ulusal Sempozyum. T.M.M.O.B Mimarlar Odası, Konya, pp. 8-15.

Internet Resources

URL-1: https://debis.deu.edu.tr/ders-katalog/2022-2023/tr/tr_1214_1214_4173.html Accessed: 16.03.2023

URL-2: https://debis.deu.edu.tr/ders-katalog/2022-2023/tr/tr_1214_1214_4175.html Accessed: 16.03.2023

URL-3: https://debis.deu.edu.tr/ders-katalog/2022-2023/tr/tr_1214_1214_4177.html Accessed: 16.03.2023

URL-4: https://debis.deu.edu.tr/ders-katalog/2022-2023/tr/tr_1214_1214_4178.html Accessed: 16.03.2023

URL-5: https://mim.agu.edu.tr/uploads/belgeler/lisans%20dersler%20ve%20ders%20plan%C4%B1%20g%C3%BCncel/AGUarch_Course-%20Catalogues.pdf Accessed: 16.03.2023

URL-6: https://mimarlikbolumu.akdeniz.edu.tr/tr/ders_icerikleri-6970 Accessed: 16.03.2023

URL-7: https://obs.balikesir.edu.tr/oibs/bologna/index.aspx?lang=tr&curOp=showPac&curUnit=36&curSunit=5246# Accessed: 16.03.2023

URL-8: https://mimarlik.ibu.edu.tr/Files/Images/ders-icerikleri-yeni-4062024163343.pdf Accessed: 16.03.2023

URL-9: https://bilgipaketi.uludag.edu.tr/Programlar/Detay/252?AyID=32 Accessed: 16.03.2023

URL-10: https://ebs.cu.edu.tr/Program/DersPlan/499/2024 Accessed: 16.03.2023

URL-11: https://dbp.erciyes.edu.tr/Program/P3.aspx?Fak=106&lang=0&Pro=106011 Accessed: 16.03.2023
URL-12: https://mimarlik.firat.edu.tr/page/3968 Accessed: 16.03.2023

URL-13: https://obs.gazi.edu.tr/oibs/bologna/index.aspx?lang=tr&curOp=showPac&curUnit=10&curSunit=106060482# Accessed: 16.03.2023

URL-14: https://abl.gtu.edu.tr/ects/?duzey=ucuncu&modul=lisans_derskatalogu&bolum=326&tip=lisans Accessed: 16.03.2023

URL-15: https://obs.iste.edu.tr/oibs/bologna/index.aspx?lang=tr&curOp=showPac&curUnit=45&curSunit=5707# Accessed: 16.03.2023

URL-16: https://www.sis.itu.edu.tr/TR/ogrenci/lisans/ders-bilgileri/ders-bilgileri.php Accessed: 16.03.2023

URL-17: https://www.ktu.edu.tr/dosyalar/mimarlik_a11eb.pdf Accessed: 16.03.2023

URL-18: https://mimarlikbolumu.klu.edu.tr/ Accessed: 16.03.2023

URL-19: https://obs.mu.edu.tr/oibs/bologna/index.aspx?lang=tr&curOp=showPac&curUnit=08&curSunit=3273# Accessed: 16.03.2023.

URL-20: https://www.ohu.edu.tr/mimarlikfakultesi/mimarlik/kisa-ders-icerik Accessed: 16.03.2023

URL-21: https://mimarlik.omu.edu.tr/tr/ogrenci/ders-icerikleri/OMU_MIMARLIK_DERS_ICERIKLERI%2024.09.2019.pdf Accessed: 16.03.2023

URL-22: https://catalog.metu.edu.tr/program.php?fac_prog=120 Accessed: 16.03.2023

URL-23: https://mimfak.trakya.edu.tr/akademik-yapi/mimarlik-bolumu/dersler/ Accessed: 16.03.2023

URL-24: http://www.bologna.yildiz.edu.tr/index.php?r=program/view&id=50&aid=38 Accessed: 16.03.2023

URL-25: Doğaner S. Hoşkara Ş.Ö. (2024). NAAB Üzerine Bir Değerlendirme: Uludağ Üniversitesi Mimarlık Bölümü Deneyimi https://xxi.com.tr/i/mimarlik-egitimi-mufredatlari Accessed: 07.08.2024