

Article

Bioethics, Law and Deontology in Greek Undergraduate Medical, Dental and Nursing Curricula: A National Cross-Sectional Comparative Study

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Abstract

Since the 1960s, Bioethics, Law and Deontology have become increasingly integrated into healthcare education in response to the growing ethical, legal and professional complexity of clinical practice. This national cross-sectional comparative study aimed to investigate the presence and structural characteristics of Bioethics, Law and Deontology teaching in Greek undergraduate Medical, Dental and Nursing curricula. Online study guides and syllabi for the academic year 2024–2025 from all Greek public Medical ($n = 7$), Dental ($n = 2$) and Nursing ($n = 9$) Departments were systematically reviewed. Data regarding course presence, type, semester allocation, European Credit Transfer and Accumulation (ECTS) credits and teaching hours were extracted and analyzed using descriptive and comparative statistics. Courses related to Bioethics, Law and Deontology were identified in 17 of 18 Departments (94.4%). The mean teaching hours per Department were 37.4, with Nursing Departments demonstrating higher teaching loads. However, 50% of Departments reported fewer teaching hours than the minimum proposed by the UNESCO Bioethics Core Curriculum. Considerable heterogeneity was observed regarding course structure and curricular integration. These findings suggest the need for greater curricular harmonization and strengthened Bioethics, Law and Deontology education in Greek undergraduate healthcare training.

Keywords: Bioethics; Jurisprudence; ethics professional; curriculum; education medical; education dental; education nursing



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1. Introduction

Bioethics is a comprehensive term referring to the study of moral issues that arise in the practice of Medicine, healthcare, and biological sciences. It is generally understood as a normative reflection on moral principles and values in healthcare [1]. Law, in contrast, refers to the legal framework and formal regulations that govern healthcare practice, restrain unethical conduct and enforce professional accountability [2]. Deontology, derived from the Greek words “deon” (duty) and “logos” (study), is a moral theory emphasizing the obligation to adhere to moral duties and professional rules irrespective of outcomes [3].

Although Bioethics, Law and Deontology are closely interconnected, they represent conceptually distinct domains with different theoretical foundations and purposes. Bioethics primarily addresses moral reasoning and ethical justification, Law establishes binding legal norms and institutional enforcement mechanisms, whereas Deontology focuses on professional duties, codes of conduct and standards of professional behavior.

Nevertheless, these domains remain linked through their shared regulatory role in health-care practice. Bioethics provides the moral principles that justify professional conduct, Law transforms these ethical principles into binding legal obligations and Deontology converts ethical and legal expectations into concrete professional duties. Therefore, these three domains should not be viewed as separate curricular components, but as complementary layers of the same normative framework that shapes the education, decision-making and accountability of future physicians, dentists and nurses [2,4,5].

Historically, the term “*Bioethics*” was first mentioned by Fritz Jahr in 1926, while its global dimension was introduced in 1971 by biochemist Van Rensselaer Potter in his book “*Bioethics: A Bridge to the Future*” [6]. Before the official appearance of the term “*Bioethics*” the concept can be found in various forms, already since the time of Hippocrates in the Hippocratic Oath. The principle “*primum non nocere*”—that is, “*first, do no harm*”—is a precursor to the bioethical principle of non-maleficence that remains valid today [7]. The Hippocratic Oath is considered as an ancient code of professional conduct in healthcare, including not only bioethical principles, but also deontological issues [8]. In modern times, during the Doctors’ Trial, which took place after the Nuremberg Trials in 1946, physicians who had conducted Medical experiments without the consent of the subjects were prosecuted. As a result of the trial, the Nuremberg Code was established, consisting of 10 principles defining the conduct of scientific Medical research and focusing on the rights of research participants [9,10]. Subsequently, in 1964, the World Medical Association (WMA) created the Declaration of Helsinki, which has been revised seven times to date and focuses on the obligations of researchers toward the participants in their studies [10].

During the 1960s, due to scientific and technological progress, even before the official emergence of the term “*Bioethics*”, the first efforts were made to highlight humanistic values, aiming at the “*humanization*” of Medical Science. In the field of education, the first programs emphasizing humanistic values were launched at U.S. universities: *Behavioral and Environmental Biology* (University of California, Davis), *Humanistic Values in Patient Care and Social and Cultural Dimensions* (University of Florida), *Social Sciences, Ethics and Philosophy* (SUNY Stony Brook), and *Ethics and Religion in Medicine and the Health Professional* (Medical College of Virginia). These programs began enthusiastically, although with little experience in teaching non-technical subjects in Medical Schools. Their goal was to introduce students to ethical thinking, considered essential for responsible physicians at that time [11].

During the 1970s, after the official appearance of the term “*Bioethics*”, the field turned toward philosophical ethics. The National Research Act of the United States established a commission that organized a four-day conference in 1974 at the Belmont Conference Center. The aim was to create ethical guidelines for research, which became known as the Belmont Report [10]. At the educational level, two approaches to Bioethics prevailed. The first, adopted by Georgetown University, regarded Bioethics as a branch of philosophical ethics. The second, supported by the University of Wisconsin, was broader, encompassing biology, ecology, and the environment in relation to ethics [11]. Within a few years, the study of Medical Ethics became a formal field of ethical analysis, and the teaching of Bioethics became part of the curricula of most Medical Schools, even beyond the United States [11,12]. Bioethics had already become a tool for resolving ethical conflicts. By the late 1970s, the term “*Bioethics*” encompassed the humanities, classical studies and Medical Ethics [11].

During the 1990s, Bioethics expanded on a global scale. The bioethical principles proposed by Beauchamp and Childress (autonomy, beneficence, non-maleficence, justice) were partly challenged, and alternative approaches to bioethical issues began to emerge [11,13]. Legal and religious dimensions of Bioethics were also introduced. Legal issues had always bordered on philosophical ethics, and many legal cases often revolved around questions of

Medical Ethics. Religion, on the other hand, continues to be considered a source of moral values—for both patients and health professionals [11].

In the modern era, the field of Bioethics has expanded significantly, addressing even economic and psychosocial issues. It often provides solutions to interpersonal conflicts, communication barriers, and ethical dilemmas [11,14]. In 2019, on the 40th anniversary of the first edition of their book *“Principles of Biomedical Ethics”* Beauchamp and Childress published its revised 8th edition [13]. Regarding education, many Health Science Schools around the world now include Bioethics, Law and Deontology in their curricula [15–28].

The integration of Bioethics, Law and Deontology into undergraduate healthcare education is increasingly important due to the growing ethical, legal and professional challenges faced by healthcare professionals in contemporary clinical practice. Advances in digital health technologies, artificial intelligence (AI), Precision Medicine, health data governance and patient autonomy have expanded the ethical, legal and professional responsibilities of physicians, dentists and nurses, highlighting the need for adequate undergraduate training in these fields worldwide [29–32]. As these global developments also affect the Greek healthcare system, healthcare professionals in Greece are confronted with similar ethical, legal and professional challenges, further emphasizing the importance of integrating Bioethics, Law and Deontology education within Greek undergraduate healthcare curricula. Despite the recognized importance of education in these fields, limited evidence exists regarding how these subjects are incorporated into Greek undergraduate healthcare curricula and whether substantial differences exist among Medical, Dental and Nursing Departments. A national comparative evaluation is therefore necessary to identify current educational practices, curricular similarities and gaps, as well as the extent to which these disciplines are formally integrated into healthcare training programs in Greece. Such information may contribute to future curriculum development, educational planning and the strengthening of ethical, legal and professional competencies among future healthcare professionals. Therefore, the objectives of this study were: (a) to investigate which Greek undergraduate Medical, Dental and Nursing Departments include the teaching of Bioethics, Law and Deontology in their curricula and (b) to compare the main characteristics of these courses across the examined Departments.

2. Materials and Methods

2.1. Study Design

This study was designed as a national cross-sectional comparative study of Greek undergraduate Medical, Dental and Nursing curricula. The study investigated the formal curricular integration of Bioethics, Law and Deontology within undergraduate Medical, Dental and Nursing education by examining structural curricular indicators reported in official academic documents. The study focused on the documented presence, organization and curricular weight of these subjects and did not assess educational quality, competency achievement or learning outcomes.

2.2. Setting

The study was conducted in Greece and included all public undergraduate Departments of Medicine, Dentistry and Nursing operating during the academic year 2024–2025. Data collection was performed through review of the official online study guides and syllabi published on Departmental websites [33–50]. Data extraction was performed during August 2025.

2.3. Participants

All Greek public university Departments offering undergraduate degrees in Medicine, Dentistry or Nursing were eligible for inclusion. In total, 18 Departments were included: seven Medical, two Dental and nine Nursing Departments. Postgraduate programs were excluded. Courses were considered eligible if their official title contained at least one of the following predefined keywords: “Ethics”, “Bioethics”, “Deontology”, “Law” or “Jurisprudence”. Courses containing ethics-related, legal or deontological content without explicit reference to these terms in the title were not included in the primary analysis.

2.4. Variables

The extracted variables included: (a) Department name, (b) academic discipline (Medicine, Dentistry or Nursing), (c) course title, (d) course type (mandatory or elective), (e) teaching type (exclusive or combined), (f) semester allocation, (g) European Transfer and Accumulation System (ECTS) credits per course, (h) weekly teaching hours, (i) total teaching weeks, (j) total teaching hours per course. At the Department level, the following aggregate variables were additionally calculated: (a) total ECTS credits per Department and (b) total teaching hours per Department.

These variables were selected because they represented the common and consistently available curricular indicators across the official online study guides and syllabi of all examined Departments, thereby allowing standardized national-level comparison. In particular, course type (mandatory vs. elective) serves as an indicator of institutional values, signaling whether a university considers ethical training an indispensable core competence or a peripheral asset. Teaching hours were additionally selected because the UNESCO Bioethics Core Curriculum has proposed a minimum of 34 teaching hours for Bioethics education, providing an internationally recognized reference framework for evaluating the extent of curricular exposure to ethics-related instruction [51]. Meanwhile, ECTS credits represent the formal operationalization of academic workload, as established within the European Credit Transfer and Accumulation System framework proposed by the European Commission [52].

Variables, such as learning outcomes, faculty qualifications, competency acquisition and assessment validity were not systematically available across all Departments and were therefore not included.

2.5. Data Sources and Measurement

Data were extracted from official online study guides, curricula and syllabi available on Departmental websites. Eligible courses were identified using the predefined title-based keywords. Teaching type was categorized as exclusive when the course focused specifically on Bioethics, Law and/or Deontology and combined when these disciplines were integrated within broader multidisciplinary courses. Total teaching hours per course were calculated by multiplying weekly teaching hours by the total number of teaching weeks. At the Department level, aggregate variables were additionally calculated, including the total ECTS credits allocated to Bioethics, Law and Deontology courses and the total teaching hours devoted to these disciplines.

2.6. Bias

Several potential sources of bias were considered. Information bias may have occurred because the study relied exclusively on publicly available online curriculum documents, which may not have been equally updated or equally detailed across Departments.

Misclassification bias may have also occurred because ethics-related or legal and deontological teaching integrated within broader courses may not have been identified if

the predefined keywords were absent from the course title. Consequently, the title-based search strategy may have underestimated the actual curricular presence of Bioethics, Law and Deontology teaching.

Observer bias during course identification and data extraction was minimized through the use of predefined eligibility criteria, standardized search terms and uniform extraction procedures across all Departments.

Reporting or publication bias may have occurred because Departments with more comprehensive, transparent or frequently updated online curricular documentation may have appeared to provide greater integration of Bioethics, Law and Deontology compared to Departments with limited or incomplete publicly available information. Therefore, the findings reflect the formally published curricular content available in the public domain and may not fully capture all internally delivered educational activities.

2.7. Study Size

The study size was determined by the total absolute population of eligible Greek public undergraduate Medical ($n = 7$), Dental ($n = 2$) and Nursing ($n = 9$) Departments operating during the academic year 2024–2025. Because the study includes 100% of all national institutions ($n = 18$), it functions as a census-based evaluation, rather than a sample-size-based study. Consequently, standard *a priori* statistical power calculations for sample size justification are not applicable, as the data reflects the entire institutional universe, rather than a stochastic sub-sample. To ensure mathematical validity for inferential comparison despite the naturally limited size of specific strata (Dental), the single valid course unit from the Dental discipline ($n = 1$) was utilized strictly for descriptive mapping, while inferential testing was restricted to two primary sub-strata (Medical vs. Nursing).

2.8. Quantitative Variables

The quantitative variables included ECTS credits per course, weekly teaching hours, total of teaching weeks, total of teaching hours per course, total ECTS credits per Department and total of teaching hours per Department. The remaining variables were categorical.

2.9. Statistical Methods

Data were analyzed using IBM SPSS Statistics for Windows, version 29.0 (IBM Corp., Armonk, NY, USA). Quantitative variables were summarized using means and standard deviations ($M \pm SD$), while qualitative categorical variables were presented as Frequencies and Percentages (N, %). Prior to applying inferential tests, the distribution of all continuous workload metrics (ECTS credits, weekly hours and total of teaching hours) was formally evaluated for normality, using the Shapiro–Wilk test, alongside skewness and kurtosis analyses. Upon verifying that data did not systematically violate parametric mathematical assumptions ($p > 0.05$), parametric inferential procedures were employed. To address the extremely small size of the Dental stratum ($n = 1$ analytical course unit), this category was excluded from group testing to maintain mathematical validity regarding variance homogeneity. An independent samples *t*-test was utilized to evaluate systemic workload differences between the two primary operational sub-strata (Medical vs. Nursing Departments). To determine the practical educational relevance of statistically significant findings, Cohen's *d* effect sizes were calculated and interpreted as small (0.2), medium (0.5) or large (0.8). Structural correlations between continuous workload parameters were mathematically evaluated, using Pearson's *r* correlation coefficient. No imputation was performed for missing data. Family-wise error inflation across the primary variables was controlled using the Bonferroni adjustment framework, where applicable. Exact *p*-values are reported, with the significance threshold maintained at $p < 0.05$. No adjustment for confounding was performed, as the study did not aim to estimate causal relationships.

Sensitivity considerations focused on the possibility that the title-based search strategy may have underestimated the true presence of Bioethics, Law and Deontology teaching within broader courses.

3. Results

3.1. Structure of the Curricula

Greek undergraduate curricula in the Departments of Medicine include 6 years of studies (12 semesters) and offer 360 ECTS credits. Dental undergraduate curricula include 5 years of studies (10 semesters) and offer 300 ECTS credits, while studies in Nursing Departments last 4 years (8 semesters) and offer 240 ECTS credits.

3.2. Course Data Analysis

As shown in Table 1, in all but one Department ($n = 17$; 94.4%), there was at least one course related to Ethics/Bioethics/Deontology/Law/Jurisprudence, except for the Department of Dentistry, NKUA. Overall, 22 related courses were identified (10 taught in the Departments of Medicine, one taught in the Department of Dentistry, AUTH and 11 taught in the Departments of Nursing) (Table 2). Regarding the type of courses, it appeared that the vast majority were mandatory ($n = 16$; 72.7%), while elective courses were limited to a smaller percentage ($n = 6$; 27.3%) (Figure 1). In particular, in Medical Departments, 60% of the courses were mandatory ($n = 6$), whereas in Nursing Departments the percentage reached 81.8% ($n = 9$). In all but two Departments ($n = 16$; 88.9%) there was at least one mandatory course related to Ethics/Bioethics/Deontology/Law/Jurisprudence. In reference to the type of teaching (combined or exclusive), we found that in 20 courses (90.9%) “exclusive teaching” was adopted (Figure 2). “Combined teaching” was adopted in the Medical Department, NKUA (Medical Ethics was taught in combination with Epistemology and History in Medicine) and in the Medical Department, UOC (Deontology teaching was combined with Forensic Medicine) (Table 1). Regarding the distribution across semesters, it was observed that the courses were not evenly distributed. The highest concentration was found in the 1st and 7th semesters (22.7% each). In Medical Departments, the courses were taught more often in the 1st and 9th semester (20% each), while in Nursing Departments in the 7th semester (36.4%). In the remaining semesters, the presence of courses was more limited, with percentages ranging from 4.5% to 13.6%. It was also observed that in the 8th and 10th semesters, no courses were recorded at all.

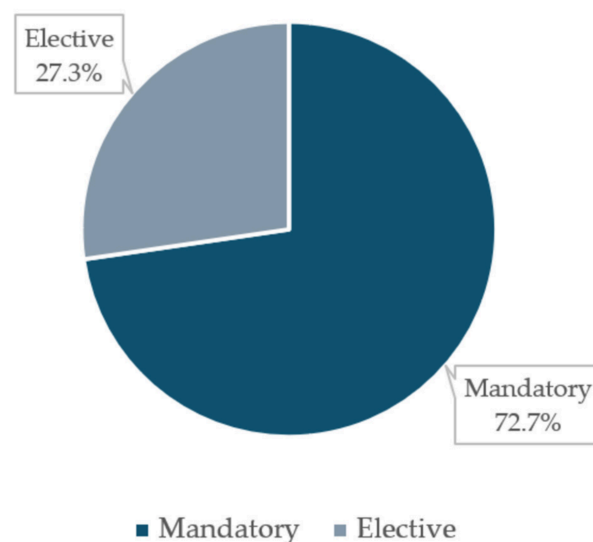


Figure 1. Course type.

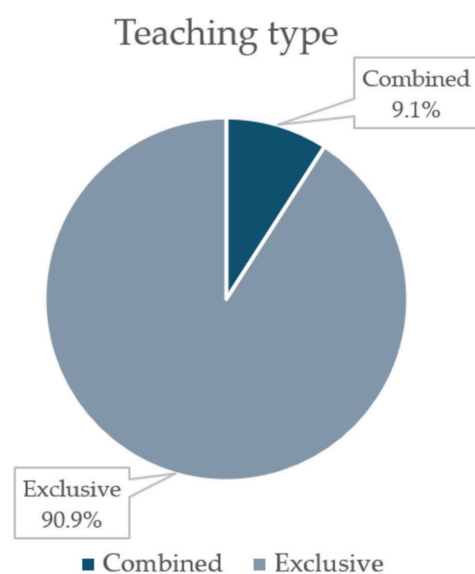
Table 1. Bioethics, Law and Deontology courses in the Greek Departments of Medicine, Dentistry and Nursing and their main features.

Department	Course Title	Course Type	Teaching Type	Semester
Department of Medicine, NKUA	Epistemology, History and Ethics in Medicine	Mandatory	Combined	1st
Department of Medicine, AUTH	Medical Jurisprudence and Deontology	Mandatory	Exclusive	7th
Department of Medicine, UTH	Medical Responsibility and Ethics	Mandatory	Exclusive	4th
Department of Medicine, UOI	Medical Ethics, Deontology and Jurisprudence	Mandatory	Exclusive	1st
Department of Medicine, UOC	Forensic Medicine-Deontology	Mandatory	Combined	11th
	Biomedical Ethics	Elective	Exclusive	9th
	Clinical Ethics Issues	Elective	Exclusive	12th
Department of Medicine, UOP	Bioethics	Mandatory	Exclusive	5th
Department of Medicine, DUTH	Bioethics	Elective	Exclusive	9th
	Medical Ethics, Law and Deontology	Elective	Exclusive	2th
Department of Dentistry, AUTH	Ethics-Deontology-Jurisprudence in Dentistry	Mandatory	Exclusive	1st
Department of Dentistry, NKUA		NA		
Department of Nursing, NKUA	Jurisprudence and Deontology in Nursing	Mandatory	Exclusive	2nd
	Bioethics	Elective	Exclusive	1st
Department of Nursing, UTH	Bioethics and Professional Law	Mandatory	Exclusive	2nd
Department of Nursing, UoP	Law and Bioethics	Mandatory	Exclusive	1st
Department of Nursing, DUTH	Ethics and Deontology of Nursing Science	Mandatory	Exclusive	7th
Department of Nursing UOI	Bioethics and Health Law	Mandatory	Exclusive	7th
Department of Nursing, HMU	Bioethics	Elective	Exclusive	4th
Department of Nursing, UWA	Bioethics-Law of Nursing Profession	Mandatory	Exclusive	3rd
Department of Nursing, IUG	Ethics and Deontology of Nursing Science	Mandatory	Exclusive	7th
Department of Nursing, UOP	Law-Deontology in Nursing	Mandatory	Exclusive	6th
	Bioethics	Mandatory	Exclusive	7th

NA: Not applicable.

Table 2. Bioethics, Law and Deontology courses by Department category.

Department	Frequency (N)	Percentage (%)
Medical	10	45.5%
Nursing	11	50%
Dental	1	4.5%

**Figure 2.** Teaching type.

3.3. Analysis of Descriptive Statistics by Course Type

The analysis of courses based on their type (mandatory vs. elective) revealed significant differences both in terms of workload and in terms of their duration (Table 3). Initially, mandatory courses accumulated a higher number of ECTS credits (mean = 2.75) compared to elective courses (mean = 2.17). A similar pattern was observed in teaching hours. Mandatory courses were taught for an average of 2.5 h per week, while elective courses were taught for 1.67 h. Regarding duration, mandatory courses spanned approximately 13.4 weeks, whereas elective courses were limited to 11.3 weeks. The difference became even more pronounced when considering the total teaching hours. Finally, mandatory courses reached an average of 33.5 h, whereas elective courses reached an average of 18.3 h.

Table 3. Descriptive statistics analysis by course type (mandatory vs. elective).

Variables	Course Type	Frequency (N)	Mean (M)	Std. Deviation (SD)
ECTS credits per course	Mandatory	16	2.7500	0.77460
	Elective	6	2.1667	0.40825
Weekly teaching hours	Mandatory	16	2.5000	0.73030
	Elective	6	1.6667	0.51640
Total of teaching weeks	Mandatory	16	13.4375	0.72744
	Elective	6	11.3333	2.58199
Total of teaching hours per course	Mandatory	16	33.5000	9.44458
	Elective	6	18.3333	6.08824
Total of teaching hours per Department	Mandatory	16	41.37	18.88
	Elective	6	42.16	17.80
ECTS credits per Department	Mandatory	16	3.56	1.86
	Elective	6	4.50	1.64

3.4. Analysis of Descriptive Statistics by Department

As shown in Table 4, ECTS credits of each course ranged from 2 to 4, with an average of 2.59 (2.2 in Medical Departments, 2.8 in Nursing Departments). Most commonly, 2 ECTS credits were awarded, particularly in the Departments of Medicine (e.g., UOC, DUTH, UTH). However, in the Department of Dentistry, AUTH, 4 ECTS credits were given. ECTS credits per Department ranged from 2 to 7, with an average of 3.35 (3.14 in Medical Departments, 4 in the Department of Dentistry, AUTH, and 3.4 in Nursing Departments). The undergraduate curriculum of the Department of Nursing, UOP included two courses related to Ethics/Bioethics/Deontology/Law/Jurisprudence, giving the highest number of ECTS credits per Department (7 credits in total).

Table 4. ECTS credits and workload of Bioethics, Law and Deontology courses.

Department	Course Title	ECTS Credits per Course	ECTS Credits per Department	Weekly Teaching Hours	Total of Teaching Weeks	Total of Teaching Hours per Course	Total of Teaching Hours per Department
Department of Medicine, NKUA	Epistemology, History and Ethics in Medicine	3	3	4	13	52	52
Department of Medicine, AUTH	Medical Jurisprudence and Deontology	2	2	2	15	30	30
Department of Medicine, UTH	Medical Responsibility and Ethics	2	2	3	14	42	42
Department of Medicine, UOI	Medical Ethics, Deontology and Jurisprudence	2	2	2	15	30	30

Table 4. Cont.

Department	Course Title	ECTS Credits per Course	ECTS Credits per Department	Weekly Teaching Hours	Total of Teaching Weeks	Total of Teaching Hours per Course	Total of Teaching Hours per Department
Department of Medicine, UOC	Forensic Medicine-Deontology	2	6	2	14	28	60
	Biomedical Ethics	2		2	8	16	
	Clinical Ethics Issues	2		2	8	16	
Department of Medicine, UOP	Bioethics	3	3	3	14	42	42
Department of Medicine, DUTH	Bioethics Medical Ethics, Law and Deontology	2	4	1	13	13	26
		2		1	13	13	
Department of Dentistry, AUTH	Ethics-Deontology-Jurisprudence in Dentistry	4	4	1	13	13	13
Department of Dentistry, NKUA				NA			
Department of Nursing, NKUA	Jurisprudence and Deontology in Nursing Bioethics	4	6	3	13	39	55
		2		2	13	26	
Department of Nursing, UTH	Bioethics and Professional Law	3	3	3	13	39	39
Department of Nursing, UoP	Law and Bioethics	3	3	3	13	39	39
Department of Nursing, DUTH	Ethics and Deontology of Nursing Science	2	2	2	13	26	26
Department of Nursing UOI	Bioethics and Health Law	3	3	2	13	26	26
Department of Nursing, HNU	Bioethics	3	3	2	13	26	26
Department of Nursing, UWA	Bioethics-Law of Nursing Profession	2	2	2	13	26	26
Department of Nursing, IUG	Ethics and Deontology of Nursing Science	2	2	2	13	26	26
Department of Nursing, UOP	Law-Deontology in Nursing Bioethics	4	7	3	13	39	26
		3		3	13	39	78

NA: Not applicable.

Regarding the total teaching hours per course, significant variation was observed, ranging from 13 to 52 h, with an average of 29.36 h (28.2 in Medical Departments, 13 in the Department of Dentistry, AUTH, 31.9 in Nursing Departments). In the Departments of Nursing, the distribution of teaching hours per course is more concentrated, mainly ranging between 26 and 39 h, in contrast to the Departments of Medicine, which show greater variation with several discrepancies among them. Significant variation was also found regarding the total of teaching hours of Bioethics, Law and Deontology per Department, ranging from 13 to 78 h, with an average of 37.41 h (40.3 h in Medical Departments, 13 h in the Dental Department, AUTH, 37.9 h in the Nursing Departments).

The comparison between ECTS credits and total of teaching hours per course showed no apparent correlation, as Departments with many teaching hours allocate few ECTS credits, while Departments with fewer hours assign proportionally more. For example:

- At the Department of Medicine, NKUA, 52 h correspond to 3 ECTS credits;
- At the Department of Medicine, DUTH, only 13 h correspond to 2 ECTS credits;
- At the Department of Nursing, UOP, 39 h correspond to 3.5 ECTS credits.

3.5. Analysis of Independent *t*-Test Results

Table 5 shows the independent samples *t*-test comparing mandatory and elective courses. To examine differences in mean values, the statistical analysis showed clear distinctions between mandatory courses and elective courses. In terms of ECTS credits, it was observed that mandatory courses had a higher average (2.75) compared to elective courses (2.17). This difference was statistically significant ($p = 0.035$, <0.05). Similarly, regarding weekly teaching hours per course, mandatory courses appeared more demanding, with an average of 2.5 h per week, while elective courses' average was only 1.67 h. This difference was also statistically significant ($p = 0.019$, <0.05). For the total number of teaching weeks, although mandatory courses show a longer duration (13.43 weeks) compared to elective courses (11.33 weeks), the difference was not statistically significant ($p = 0.103$, >0.05). Regarding the total of teaching hours per course, the difference was notably larger, as mandatory courses average 33.5 h, while elective courses have only 18.3 h. This difference was statistically significant ($p < 0.001$, <0.05).

Table 5. Independent samples *t*-test comparing mandatory and elective courses.

Variables	Levene's Test for Equality of Variances		<i>t</i> -Test for Equality of Means					
	F	Sig.	t	df	Significance One-Sided <i>p</i>	Significance Two-Sided <i>p</i>	Mean Difference	Std. Error Difference
ECTS credits per course	5.041	0.036	2.283	17.177	0.018	0.035	0.583	0.255
Weekly teaching hours	1.499	0.235	2.548	12.895	0.010	0.019	0.833	0.278
Total of teaching weeks	39.176	<0.001	1.967	5.301	0.052	0.103	2.104	1.069
Total of teaching hours per course	1.781	0.197	4.424	14.233	<0.001	<0.001	15.166	3.428
Total of teaching hours per Department	0.101	0.753	−0.91	9.543	0.465	0.929	−0.79	8.667
ECTS credits per Department	0.003	0.955	−1.148	10.181	0.139	0.277	−0.937	0.816

To examine structural variations according to academic discipline, an independent samples *t*-test was conducted comparing the two primary sub-strata: Medical ($n = 10$ courses) and Nursing ($n = 11$ courses) Departments. The single standalone course from the Dental Department ($n = 1$) was excluded from inferential group testing to satisfy mathematical assumptions regarding variance homogeneity. Prior to the analysis, a Shapiro–Wilk test confirmed that the continuous variables did not systematically violate normality assumptions ($p > 0.05$). The *t*-test revealed a statistically significant difference regarding ECTS credits per course ($t = -2.35$, $p = 0.030$, Cohen's $d = 1.02$), demonstrating a mathematically large effect size. Specifically, Nursing Departments allocated a higher average credit workload (2.82 ± 0.75 ECTS credits) to these subjects compared to Medical Departments (2.20 ± 0.42 ECTS credits). Conversely, no statistically significant differences were observed between Medical and Nursing Departments regarding weekly teaching hours ($p = 0.443$) or total teaching hours per course ($p = 0.445$) (Table 6).

Table 6. Independent samples *t*-test comparing Medical and Nursing Departments.

Variables	Department Category	N	Mean (M)	Std. Deviation (SD)	T-Value	<i>p</i> -Value (Two-Sided)	Cohen's <i>d</i> (Effect Size)
ECTS credits per course	Medical Departments	10	2.2000	0.42164	−2.352	0.030	1.02 (Large)
	Nursing Departments	11	2.8182	0.75076			
Weekly teaching hours	Medical Departments	10	2.2000	0.91894	−0.784	0.443	-
	Nursing Departments	11	2.4545	0.52223			
Total of teaching weeks	Medical Departments	10	12.7000	2.58414	−0.367	0.718	-
	Nursing Departments	11	13.0000	0.00000			

Table 6. Cont.

Variables	Department Category	N	Mean (M)	Std. Deviation (SD)	T-Value	p-Value (Two-Sided)	Cohen's d (Effect Size)
Total of teaching hours per course	Medical Departments	10	28.2000	13.79855	−0.785	0.445	-
	Nursing Departments	11	31.9091	6.78903			
Total of teaching hours per Department	Medical Departments	10	42.8000	14.39753	−0.038	0.970	-
	Nursing Departments	11	43.0909	20.53024			
ECTS credits per Department	Medical Departments	10	3.6000	1.71270	−0.485	0.633	-
	Nursing Departments	11	4.0000	2.04939			

3.6. Correlations

This section presents the individual correlations of the quantitative variables. The following were found:

- **Weekly teaching hours—total teaching hours per course:** strong positive and statistically significant correlation of $r = 0.949$, $p < 0.001$, was observed.
- **ECTS credits per Department—total teaching hours per Department:** strong positive and statistically significant correlation of $r = 0.834$, $p < 0.001$, was observed.

Figure 3 illustrates the Pearson correlation Heatmap.

Pearson Correlation Heatmap

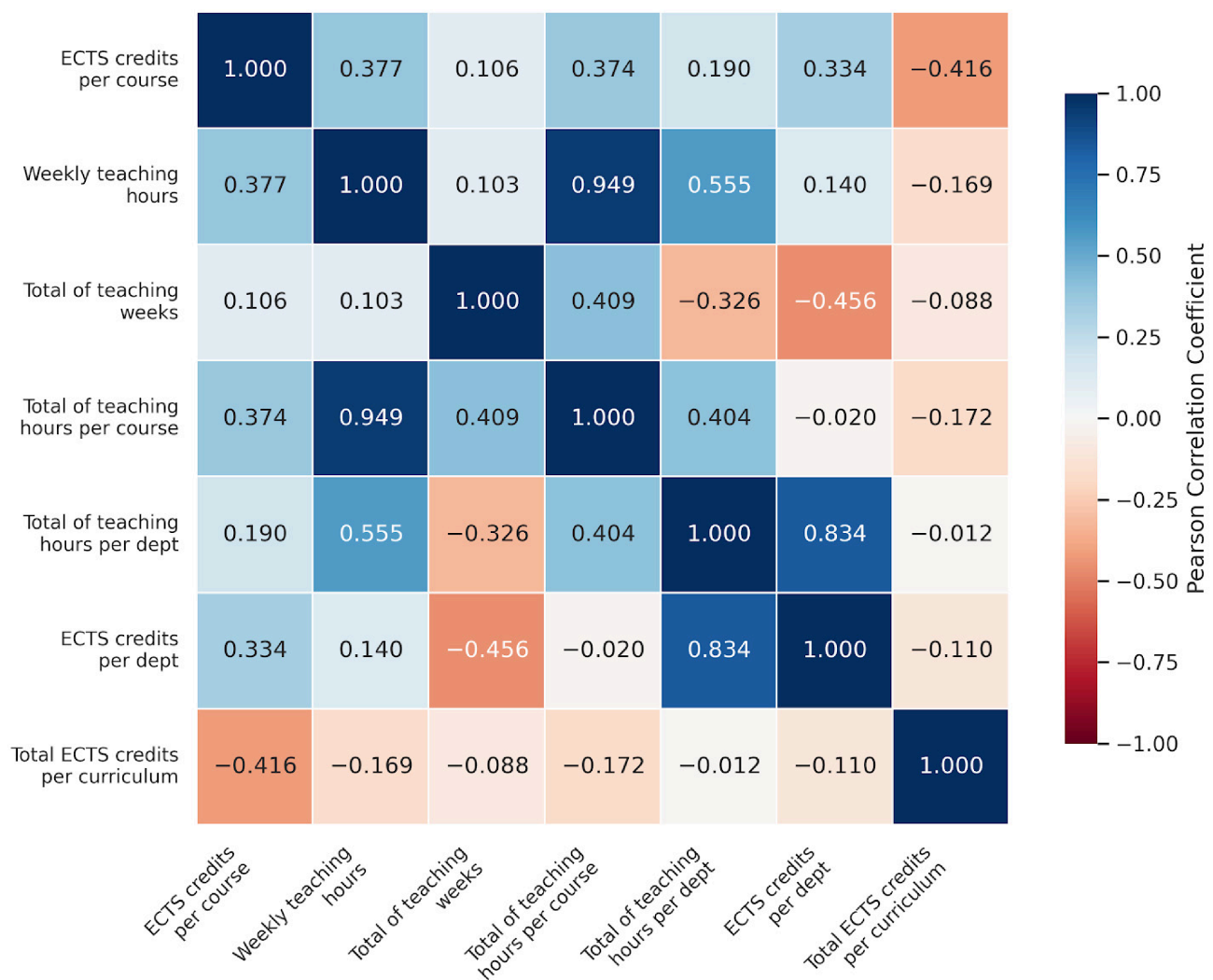


Figure 3. Pearson correlation heatmap.

4. Discussion

In most undergraduate curricula (94.4%), there was at least one course related to Ethics/Bioethics/Deontology/Law/Jurisprudence, except for the Department of Dentistry, NKUA. However, in this Department, topics related to Bioethics and Deontology, such as basic principles of verbal and non-verbal communication, dentist–patient communication and professionalism are taught as part of the mandatory course “Social Dentistry” in the 6th semester [40]. In Spanish Medical Schools, Ferreira-Padilla et al. found that Bioethics and Deontology were taught in all schools ($n = 56$) [17]. However, Shirazi et al. reported that none of the 13 examined undergraduate Medical colleges in Pakistan offered Bioethics as a separate course, while Bioethics teaching was sporadic and largely dependent on individual faculty initiatives [53].

Furthermore, regarding the teaching type, Medical Department, NKUA and Medical Department, UOC, employed “combined teaching” in Bioethics, Law and Deontology. In Spain, “combined teaching” was employed in 29 (51.79%) Medical Schools, while 27 (48.41%) Medical Schools adopted “exclusive teaching” [17]. Papastavrou et al., in a recent international comparative study across six European countries, highlighted that in most countries ethics is an independent course; however, in Ireland, ethics is taught in the context of other modules [19]. The adoption of “exclusive teaching” in Bioethics, Law and Deontology by all Greek Nursing Departments may indicate a greater emphasis on the formal and autonomous teaching of ethical and professional competencies.

Concerning the course type, we found that in 88.9% of the examined Departments, there was at least one mandatory course related to Bioethics, Law and Deontology. In particular, in Medical Departments 60% of the courses were mandatory, whereas in Nursing Departments the percentage reached 81.8%. Similarly, in Turkey, Bengü found that 84.3% of ethics courses in undergraduate Nursing curricula were obligatory [23], whereas Ferreira-Padilla et al. reported that the percentage reached 72.72% in Spanish Medical Schools, which was higher than the observed in Greek Medical Departments [17]. In Europe, Papastavrou et al. reported that ethics courses are compulsory in most countries [19]. The higher proportion of mandatory Bioethics, Law and Deontology courses, particularly in Greek Nursing Departments, may reflect a stronger institutional emphasis on ensuring that all graduates acquire foundational ethical, legal and professional competencies required for contemporary healthcare practice.

Regarding the semester allocation of Bioethics, Law and Deontology we found that they were most taught during the 1st and 7th semesters (22.7% each). International literature demonstrates considerable heterogeneity in the semester allocation of these courses across undergraduate healthcare curricula [16,19,23]. De Lemos Tavares et al. studied the undergraduate Medical curricula in Portuguese-speaking countries and found that in 52.9% of Brazilian Medical Schools, Bioethics was taught in the 1st year, whereas in 71.4% of Portuguese Medical Schools it was taught in the 3rd year [16]. In Turkish undergraduate Nursing curricula, ethics course was taught mostly in the 3rd and 5th semester [23].

In Greek undergraduate curricula, ECTS credits per course ranged from 2 to 4, with a mean of 2.59. The Department of Dentistry, AUTH, awarded the highest number of ECTS credits per course (4 credits). Nursing Departments allocated a higher mean number of ECTS credits (2.8) compared with Medical Departments (2.2 credits), suggesting greater importance attributed to the teaching of Bioethics, Law and Deontology within Nursing education. In public Spanish Medical schools, the mean number of ECTS credits was 2.88, slightly lower than that observed in Greek Medical Departments (3.14 credits) [17]. In Turkey, 45.5% of the undergraduate Nursing programs offered ethics courses corresponding to 2 ECTS credits [23], whereas in Greek Nursing curricula, 55.6% of the courses allocated 3 ECTS credits. Since ECTS credits represent the expected student workload attributed

to a course within the curriculum [52], differences in ECTS credit allocation may reflect variations in the institutional prioritization of Bioethics, Law and Deontology teaching. In the present study, mandatory courses tended to allocate more ECTS credits than elective courses, potentially suggesting a greater curricular importance attributed to Bioethics, Law and Deontology within core healthcare education.

According to the guidelines of UNESCO Bioethics Core Curriculum, the minimum recommended workload for Bioethics education is 34 contact hours [51]. In the present study, substantial variability was observed regarding the total teaching hours of Bioethics, Law and Deontology per Department, ranging from 13 to 78 h, with a mean of 37.41 h. Medical Departments allocated a mean of 40.3 h, the Department of Dentistry, AUTH allocated 13 h, whereas Nursing Departments allocated a mean of 37.9 h. Similarly, Papastavrou et al. reported considerable heterogeneity among six international Nursing curricula, with teaching duration ranging from 2 to 3 h weekly over 6–13 weeks to more extensive courses comprising 12–54 h or more. [19]. In Portuguese-speaking countries, de Lemos Tavares et al. found that 31% of Medical Schools allocated fewer than 30 teaching hours to Bioethics, whereas 65.5% allocated more than 30 h [16].

In addition to difference in teaching hours, notable variation was also observed regarding the relationship between teaching hours and ECTS credit allocation. The comparison between ECTS credits and total teaching hours per course showed no apparent correlation, as some Departments allocated relatively few ECTS credits despite many teaching hours, whereas others assigned proportionally more credits with fewer hours. However, when the total ECTS credits allocated to Bioethics, Law and Deontology were examined in relation to the total teaching hours at Departmental level, a strong positive and statistically significant correlation was observed ($r = 0.834$, $p < 0.001$). These findings suggest that the ECTS credit allocation at the individual course level is not determined solely by teaching hours, but may also reflect additional factors, such as self-directed study, assessment workload and learning outcomes. At the same time, Departments allocating more overall teaching time to Bioethics, Law and Deontology also appear to attribute greater curricular importance to these disciplines through higher ECTS credit allocation. Therefore, the apparent discrepancy between the course-level and the Department-level findings may reflect differences between individual course allocation practices and the broader curricular prioritization of Bioethics education.

Beyond the total number of teaching hours, the quality and effectiveness of Bioethics, Law and Deontology education also depend on the implementation of appropriate teaching methodologies and valid assessment strategies that promote ethical reasoning and professional competence. Recent literature suggests that undergraduate ethics education commonly combines traditional lectures with interactive teaching methodologies, including case-based learning, small group discussions, simulation, role play and clinical scenario analysis [19,54–56]. Although the present study did not systematically evaluate teaching methodologies or assessment practices, limited information retrieved from the online study guides and syllabi suggested that lectures combined with case study scenarios, group work, role play and debates were among the most commonly reported educational approaches. Assessment methods frequently cited in the literature include written examination, such as contextualized multiple choice and/or open questions and essays, as well as oral examination, including the Objective Structured Clinical Examination (OSCE), oral presentations, group oral examinations and direct faculty observation of the student–patient interaction [57]. In the examined Greek undergraduate healthcare curricula, the limited available online information indicated that written exams featuring multiple choice questions and/or short-answer questions were the most commonly reported assessment tools, followed by

written essays and oral presentations, methods that are also endorsed by the UNESCO Bioethics Core Curriculum [51].

Another question concerning the teaching of Bioethics, Law and Deontology is who should serve as the course instructor. The Romanell Report recommends that, regardless of the teaching methods employed, the instructional team should be interdisciplinary, including philosophers, bioscientists and lawyers, to “reinforce the team approach required in clinical practice” [58,59]. In Greece, the instructor is typically a bioscientist or a lawyer. However, at certain Departments, such as the Medical Departments of AUTH and UOC, Bioethics, Law and Deontology courses are conducted by a team, consisting of a bioscientist and a lawyer [34,37].

Contemporary healthcare is increasingly shaped by digital transformation, artificial intelligence (AI), machine learning technologies and data-driven Medical practices which are rapidly changing both clinical decision-making and healthcare delivery [29–32]. Consequently, modern Bioethics education extends far beyond traditional topics, such as patient autonomy, beneficence, non-maleficence, confidentiality and professional conduct, to include emerging ethical, legal and deontological challenges associated with technological innovation in healthcare. In recent years, AI-assisted diagnostic systems, predictive algorithms, clinical decision support tools and automated healthcare technologies have become progressively integrated into Medical practice, raising important questions regarding transparency, explainability, accountability and reliability in clinical decision-making [30,31]. In particular, algorithmic bias and unequal representation in healthcare datasets may contribute to discriminatory outcomes or health inequalities affecting vulnerable populations, emphasizing the need for healthcare professionals to critically evaluate the ethical implications of algorithmic Medicine [32]. At the same time, the increasing use of electronic health records, teleMedicine platforms, wearable monitoring devices, mobile health applications and large-scale health data processing has intensified concerns regarding digital ethics, cybersecurity, patient privacy and health data governance. Recent literature highlights the rapid digitalization of healthcare introduces significant ethical and regulatory challenges related to data protection, algorithmic transparency, cybersecurity vulnerabilities and the responsible management of sensitive patient information within digitally interconnected healthcare systems [60–63]. The collection, storage and secondary use of sensitive Medical and genomic data require careful consideration of informed consent procedures, confidentiality safeguards, data ownership and patients’ rights over personal health information [64–66]. Furthermore, the expansion of Precision Medicine and personalized healthcare particularly through genomic and biomarker-based approaches introduces additional ethical challenges related to genetic privacy, equitable access to advanced therapies and the potential misuse of predictive health information [67–69].

These developments demonstrate that contemporary Bioethics is no longer limited to traditional ethical dilemmas but increasingly encompasses complex interdisciplinary issues. Therefore, undergraduate curricula in Medicine, Dentistry and Nursing should continuously evolve to prepare future healthcare professionals to critically understand and address the ethical, legal and deontological implications of rapidly developing Medical technologies. The incorporation of contemporary topics, such as AI ethics, digital professionalism, health data governance, algorithmic fairness and Precision Medicine may contribute to the development of critical thinking in modern healthcare environments.

This study has several limitations that should be considered when interpreting the findings. First, the analysis was based exclusively on publicly available online study guides and syllabi for the academic year 2024–2025; therefore, inaccuracies, outdated information or incomplete website content may have introduced information bias, while potential temporal shifts or future modifications in curriculum structure could not be assessed.

Second, the identification of relevant courses relied on the presence of specific keywords, such as “Bioethics”, “Ethics”, “Law”, “Deontology” or “Jurisprudence” in course titles. As a result, related content integrated within broader courses without explicit terminology may have been underestimated, leading to potential misclassification bias. Third, the study primarily evaluated quantitative and structural curricular indicators, including ECTS credits, semester allocation and teaching hours, rather than qualitative educational dimensions, such as learning outcomes, teaching methodologies, faculty expertise, assessment validity, student competency achievement or the actual effectiveness of ethics education. Consequently, the findings reflect the formal curricular presence and organization of Bioethics, Law and Deontology teaching, rather than its real educational impact. Fourth, a methodological reflection is warranted regarding the statistical framework utilized in this study. Due to the structural reality of the Greek higher education mapping, sub-stratification resulted in uneven and small subgroup sizes, most notably within the Dental discipline, where only a single valid course analytical unit was identified. While inferential statistics (such as independent samples *t*-tests and Pearson correlations) provide an explanatory mathematical structure to evaluate variations, these tests must be interpreted with strict caution. They are intended to reflect systemic, descriptive tendencies within an absolute national framework, rather than to imply statistical robustness or generalizability beyond this specific context. Accordingly, reported statistical significance is balanced by explicit effect size calculations to ensure that the mathematical modeling does not overestimate the practical realities of the available institutional data. Finally, because the study focused exclusively on Greek public healthcare education institutions, the generalizability of the findings to healthcare education systems in other countries may be limited. Healthcare curricula are influenced by country-specific accreditation systems and educational policies [70,71]; therefore, caution is required when extrapolating the present findings beyond the Greek educational context. Nevertheless, this study provides a useful national baseline and a transferable methodological framework for future comparative studies. Future research should extend beyond structural curricular indicators and explore the qualitative and educational effectiveness of Bioethics, Law and Deontology teaching, including learning outcomes, teaching methodologies, competency acquisition, as well as student and faculty perspectives.

5. Conclusions

Teaching Bioethics, Law and Deontology at the undergraduate level ensures that Medical, Dental and Nursing graduates are not only skilled clinicians, but also ethical, legally aware and professionally accountable practitioners, capable of delivering safe, compassionate and just healthcare. The present study demonstrated that almost all Greek Medical, Dental and Nursing Departments have incorporated Bioethics, Law and Deontology in their undergraduate curricula, highlighting the importance of these disciplines within healthcare education. In particular, the data indicated that Greek Nursing curricula prioritize Bioethics, Law and Deontology to a greater extent than Medical curricula. Nevertheless, in half of Greek Departments, the teaching hours of Bioethics were less than the minimum proposed by UNESCO Bioethics Core Curriculum. Hence, the augmentation of the total teaching hours of Bioethics, Law and Deontology in Greek undergraduate curricula may be considered desirable. Furthermore, we propose the adoption of a National Bioethics Core Curriculum for Health Sciences Departments to standardize instruction. By incorporating emerging technologies, such as artificial intelligence (AI), digital health technologies, Precision Medicine and large-scale health data processing and by addressing contemporary ethical issues, including AI ethics, algorithmic fairness, cybersecurity, patient privacy and health data governance, this curriculum may strengthen patient protection,

professional responsibility and legal safety. Ultimately, it will solidify the moral foundation of healthcare practice across Medical, Dental and Nursing professions.

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Abbreviations

The following abbreviations are used in this manuscript:

ECTS	European Credit Transfer and Accumulation System
NA	Not applicable
NKUA	National and Kapodistrian University of Athens
AUTH	Aristotle University of Thessaloniki
UTH	University of Thessaly
UOI	University of Ioannina
UOC	University of Crete
UOP	University of Patras
DUTH	Democritus University of Thrace
UoP	University of Peloponnese
HMU	Hellenic Mediterranean University
UWA	University of West Attica
IUG	International University of Greece

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