



Bioethics teaching in Italian Medical Degree Programs (MDP): an overview

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Abstract

The systematic integration of ethical and humanistic dimensions into medical education in Italy has progressively strengthened since the late 1990s. However, no studies currently provide an up-to-date and comprehensive mapping of the teaching of bioethics within Italian Medical Degree Programs (MDPs). To provide a complete and systematic overview of bioethics courses included in the MDPs offered by Italian universities. Using the official list of Italian universities published by the Ministry of Universities and Research, a manual review of the institutional websites of all universities offering MDPs – whether taught in Italian or English – was conducted. Only mandatory courses containing at least one of the following keywords in their title were included: bioetica, etica, morale (Italian) or bioethics, ethics, moral (English). Elective courses were excluded. A subsequent manual search of publicly available online sources was carried out to verify the consistency between each course instructor’s academic degree and the Scientific-Disciplinary Sector (SSD) of the course. The reference academic year was 2025–2026. A substantial portion of the examined curricula (~71%) included courses in ethics or bioethics. With the exception of three atypical cases, these courses were predominantly assigned to two medical SSDs – Legal Medicine and History of Medicine – while a smaller share (~18%) was assigned to Moral Philosophy. An overall consistency of approximately 78% was observed between the SSD and the academic degree of the instructors. In light of the distinction introduced by the “Gelmini reform” between bibliometric and non-bibliometric sectors, 81% of bioethics courses are placed within bibliometric areas. This placement effectively locates bioethics within the scientific domain of knowledge, raising questions about the implications of such classification for the identity and development of a discipline that is inherently interdisciplinary.

Keywords Bioethics · Ethics · Medical education · Curriculum

Introduction

Bioethics emerged as an autonomous academic discipline between the late 1960s and early 1970s, in an international context marked by rapid technological advances and the resulting rise of unprecedented moral questions.

The first structured university teaching initiatives developed in the United States: as early as 1967, the Pennsylvania State University College of Medicine introduced modules in medical ethics for medical students (Barnard 1989), and between 1969 and 1973 landmark institutions such as the Hastings Center (1969) and the Kennedy Institute of Ethics at Georgetown University (1971) were established. These centres became major hubs for training and research, playing a decisive role in shaping the earliest academic curricula in bioethics.

In Europe, the integration of bioethics into university education began shortly thereafter. The United Kingdom was among the first countries to include medical ethics systematically within higher education programs, supported by institutions such as King's College London and Imperial College London (Chadwick 2018). A significant role was also played by the Université catholique de Louvain, whose strong philosophical and ethical tradition facilitated the dissemination of bioethical reflection across Europe. During the 1980s, the Netherlands became a reference point owing to the establishment of centres dedicated to health ethics at Utrecht University and Maastricht University (Claudot et al. 2007).

In Italy, the teaching of bioethics began to spread in the mid-1980s, initially as an optional educational activity within a few medical faculties, including the Università Cattolica del Sacro Cuore, which was among the first institutions to introduce it (Sgreccia 1996). The more systematic and stable integration of ethical and humanistic components into medical education was achieved, however, only from the late 1990s onwards. This development was supported by policy documents issued by the Permanent Conference of Presidents of Medical Degree Programs (MDPs), particularly the Manifesto of Intent for the 2000–2002 triennium, which identified bioethics, medical deontology, and the medical humanities as essential components of medical training objectives (Danieli 1995).

This gradual institutionalisation of bioethics within higher education coincided with broader reforms affecting the national university system. Notably, the so-called “Gelmini reform” (Law No. 240 of 30 December 2010) introduced significant changes in the structure of Italian academia and research, particularly regarding recruitment and career advancement procedures for academic staff.

One of the most consequential elements of the reform was the introduction of differentiated evaluation criteria for the scientific output of scholars based on their Scientific-Disciplinary Sectors (SSDs), the fundamental organizational units of Italian university teaching. Each SSD, defined by a specific code, identifies the thematic, methodological, and didactic domain of a discipline, and is associated with an official thematic descriptor (*declaratoria*) describing its scientific content, research activities, and teaching scope.

According to the most recent revision of disciplinary descriptors (Ministerial Decree No. 639 of 2 May 2024), bioethics is explicitly included in six SSDs: MEDS-02/C History of Medicine, MEDS-25/A Legal Medicine, MVET-04/B Veterinary

Internal Medicine, PHIL-03/A Moral Philosophy, GIUR-17/A Philosophy of Law, and GSPS-01/A Political Philosophy. This means that bioethics may be taught by academics from diverse and broad disciplinary backgrounds – History of Medicine, Legal Medicine, Veterinary Medicine, Moral Philosophy, Philosophy of Law, and Political Philosophy – reflecting its inherently cross-disciplinary nature spanning medical, legal, philosophical, and veterinary domains.

The “Gelmini reform” also introduced a distinction between bibliometric and non-bibliometric SSDs. Bibliometric SSDs, typical of scientific disciplines such as medicine, chemistry, biology, and physics, are evaluated primarily through quantitative indicators (e.g., number of indexed publications, citations, h-index). Non-bibliometric SSDs, characteristic of humanities disciplines such as law, philosophy, and literature, are assessed chiefly on the basis of monographs and articles published in journals with an ISBN or included in the official register compiled by the Italian National Agency for the Evaluation of Universities and Research Institutes (ANVUR). Consequently, bioethics may be taught either by academics belonging to bibliometric sectors (History of Medicine, Legal Medicine, Veterinary Medicine) or by those in non-bibliometric sectors (Moral Philosophy, Philosophy of Law, Political Philosophy).

The aim of this contribution is to provide an overview of bioethics teaching within the MDPs offered by Italian universities. Specifically, the study seeks to identify the exact course titles, their corresponding SSDs, and the degree of alignment between the SSD of each course and the academic background of the instructor.

Materials and methods

Using the official list of Italian universities published by the Ministry of Universities and Research (2025), we conducted a manual search of institutional websites and examined the corresponding curricula of all universities offering MDPs taught either in Italian or English.

It is important to note that, within the curricula of MDPs, courses do not generally appear as standalone modules; rather, they are incorporated into integrated courses that group together multiple disciplines, which may be heterogeneous in content.

Only mandatory courses whose titles contained at least one of the following keywords were included: *bioetica*, *etica*, *morale* (Italian) or *bioethics*, *ethics*, *moral* (English). Elective courses were excluded, as their availability may vary from year to year, making them unsuitable for comparison across curricula.

For each course included in the analysis, we extracted the exact title and its corresponding SSD. Subsequently, through a manual search of publicly available online sources, we verified the consistency between each instructor’s academic degree and the SSD of the course.

The data extraction sheet is provided in the [Appendix](#). The reference academic year for the entire analysis was 2025–2026.

Results

In Italy, 49 universities are currently offering MDPs, of which 41 are public and 8 are private. Nationwide, a total of 97 MDPs are offered. For 3 programs, the corresponding curricula could not be accessed. In 27 curricula (~29%), no courses were identified whose title contained the words *bioetica*, *etica*, *morale*, *bioethics*, *ethics*, or *moral*.

The results presented below refer to the 67 curricula that were available for analysis and are organized according to the items included in the data extraction sheet.

Course titles

Across the 67 curricula examined, 79 relevant courses were identified, distributed as follows:

- 31 courses whose title consisted solely of *bioetica* or *bioethics*;
- 25 courses in which the term *bioetica* or *bioethics* appeared within a broader title;
- 23 courses that included one of the terms *etica*, *morale*, *ethics*, or *moral*.

The course titles containing *bioetica* or *bioethics* were: *Bioetica clinica*; *Bioetica clinica e progresso medico*; *Bioetica e deontologia*; *Bioetica e deontologia professionale*; *Bioetica e sicurezza del paziente*; *Bioetica e storia della medicina*; *Bioetica/medicina legale*; *Introduzione alla bioetica*; *Medicina legale e bioetica*; *Medicina legale e bioetica clinica*; *Questioni di bioetica clinica*; *Storia della medicina – Bioetica*; *Bioethics and Patient Safety*; *Bioethics/forensic medicine*; *History of Medicine and Bioethics*.

The course titles containing *etica*, *morale*, *ethics*, or *moral* were: *Deontologia ed etica medica*; *Etica*; *Etica e deontologia*; *Etica e principi morali*; *Etica medica*; *Filosofia morale*; *Filosofia morale e medicina*; *Storia della medicina ed etica*; *Ethics*; *Ethics and Behavioural Sciences*; *Ethics and Law*; *Ethics of Technology*; *Medical and Moral Philosophy*; *Medical Ethics*; *Moral Philosophy/Fundamentals of Anthropology and Ethics*.

Scientific-disciplinary sectors

Our analysis shows that, among the 79 identified courses, 38 (~48%) are assigned to the SSD of Legal Medicine (MEDS-25/A), 24 (~30%) History of Medicine (MEDS-02/C), and 14 (~18%) Moral Philosophy (PHIL-03/A).

Unexpectedly, three courses are assigned to SSDs whose thematic descriptors do not include *bioethics*: Medical Statistics (MEDS-24/A), General Psychology (PSIC-01/A), and Administrative Law (12/D1).

Figure 1 illustrates the graphical distribution of the SSDs to which the identified courses belong.

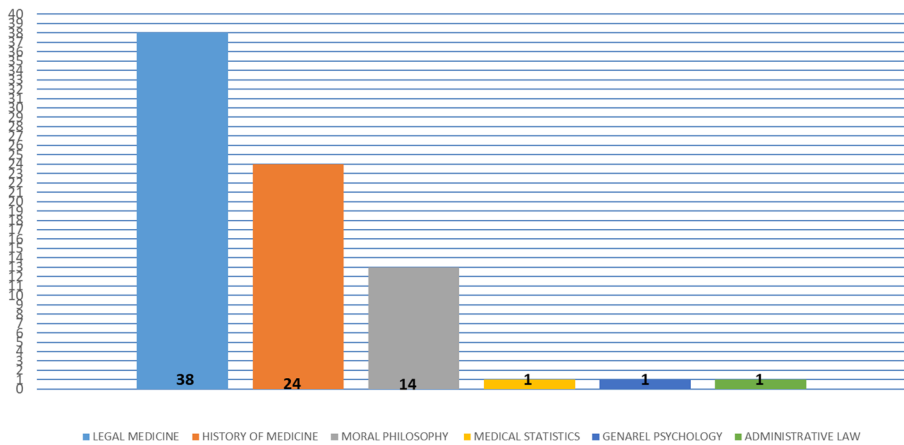


Fig. 1 Distribution of the SSDs of ethics and bioethics courses within the curricula of Italian universities

Consistency between scientific-disciplinary sector and instructor's degree

Our analysis indicates an overall correspondence of approximately 78% between the SSD and the academic degree of the instructor, meaning that in most cases instructors hold a degree consistent with the SSD to which the course is assigned.

However, we identified 17 exceptions, structured as follows:

- 7 cases in which the instructor held a degree in Philosophy, while the course was assigned to the SSD of History of Medicine.
- 2 cases in which the instructor held a degree in Humanities, while the course was assigned to the SSD of History of Medicine.
- 1 case in which the instructor held a degree in Medicine and Surgery, while the course was assigned to the SSD of General Psychology.
- 1 case in which the instructor held a degree in Medicine and Surgery, while the course was assigned to the SSD of Moral Philosophy.
- 1 case in which the instructor held a degree in Law, while the course was assigned to the SSD of Legal Medicine.

We also observed five cases of partial consistency:

- 1 case in which the course was divided into three modules, all assigned to the SSD of Legal Medicine: two of the instructors held a degree in Medicine and Surgery (thus consistent), while the third held a degree in Law.
- 2 cases in which a single course under Legal Medicine was taught by two instructors: one with a degree in Medicine and Surgery (consistent) and the other with a degree in Law.
- 1 case in which a single course under Legal Medicine was taught by two instructors: one with a degree in Medicine and Surgery (consistent) and the other with a degree in Anthropology.

- 1 case in which a single course under Legal Medicine was taught by two instructors: one with a degree in Medicine and Surgery (consistent) and the other with a degree in Philosophy.

Discussion

Since the early 2000s, some scholars have argued that bioethics is experiencing a decline, or even progressing toward gradual exhaustion (Lo Sapio 2017). Albert Jonsen (2000) suggested that the era in which the discipline distinguished itself through intellectual originality and the courage to challenge medical paternalism – affirming patient autonomy – had effectively come to an end. In a similar vein, Gilberto Corbellini (2007) described Italian bioethics as lacking momentum, having exhausted its initial driving force and reduced itself to a self-referential exercise, signalling the end of its most vital phase.

A different but complementary line of critique is offered by Jonathan Baron, whose book *Against Bioethics* (2006) does not lament the decline of bioethics as a discipline, but rather questions the normative adequacy of mainstream bioethical reasoning itself. Baron argues that much contemporary bioethics relies excessively on intuitive moral judgments, deontological constraints, and principled prohibitions, often at the expense of a systematic evaluation of consequences. From this perspective, bioethics is not exhausted because it has lost relevance, but because it has become methodologically rigid and insufficiently responsive to empirical evidence and outcome-based reasoning.

At least within the healthcare domain, these pessimistic predictions do not appear to have materialized. On the contrary, a broad view of the biomedical landscape shows that bioethical expertise is more indispensable than ever: examples include the proliferation of MDPs and the resulting need to train future physicians in the medical humanities; the steady increase in national and international research projects requiring rigorous ethical oversight; the growing complexity of clinical and care-related issues; and the expanding demand for bioethical expertise in research evaluation, such as in Health Technology Assessment (HTA) or in the work of Ethics Committees assessing clinical studies.

At the university level, bioethics in Italy continues to maintain, at least formally, a significant presence, as it is explicitly mentioned in six SSDs, making it a potential area of teaching and research across six distinct academic disciplines.

From our analysis of the curricula of Italian MPDs – which, to our knowledge, represents the first systematic study on this topic – a substantial proportion (~71%) includes courses in ethics and bioethics. With the exception of three anomalous cases, these courses are assigned to two medical SSDs: Legal Medicine (~48%) and History of Medicine (~30%). A smaller portion (~18%) falls under Moral Philosophy. We also observed a general correspondence (~78%) between the SSD of the course and the academic degree of the instructor.

When considering the distinction introduced by the “Gelmini reform” between bibliometric and non-bibliometric SSDs, approximately 81% of ethics and bioethics courses fall within bibliometric sectors (i.e., courses assigned to Legal Medicine, History of Medicine, Medical Statistics, and General Psychology), whereas only 19% are located in non-bibliometric sectors (Moral Philosophy and Administrative

Law). As a result, the majority of ethics and bioethics teaching is positioned within the scientific domain of knowledge – an outcome that raises important questions about the appropriateness and implications of this placement. Bibliometric sectors are, in fact, those of the empirical sciences. Empirical research certainly represents a significant component of the possible methods of inquiry in bioethics: it generally aims to generate data and evidence in support of a thesis or an argumentative position, drawing on tools and methods typical of the biomedical sciences (observational studies, qualitative and quantitative investigations, systematic reviews, etc.) (Corsico 2025; Wangmo et al. 2024; Zeiler 2020; Davies et al. 2015). For example, one might hypothesize that early access to palliative care contributes to reducing – or even preventing – requests for euthanasia or physician-assisted suicide. An empirical study could then consist of testing the soundness of this hypothesis by comparing the number of requests for euthanasia and assisted suicide between two homogeneous groups of patients, only one of which received early palliative care.

However, an equally fundamental part of bioethics does not belong to the empirical domain but rather to the theoretical-argumentative one. This includes, first, normative ethics, which seeks to clarify what ought to be done in specific circumstances by identifying principles, criteria, and argumentative strategies that guide moral decision-making. At an even deeper level lies metaethics, which examines the very foundations of moral judgment: the meaning of ethical terms, the justification of norms, and the conditions of possibility for a shared ethical language (Sgreccia 2007).

In other words, the current placement of bioethics within bibliometric sectors in MDPs risks fostering an “empiricist drift,” potentially weakening the argumentative dimension of ethical reasoning. In fact, the implications of this institutional placement extend beyond the sphere of scientific productivity and research assessment, producing indirect but significant consequences for teaching. In academic contexts, teaching is rarely independent from research activity: university lecturers tend to incorporate into their courses scholarly updates that are developed within their own disciplinary and research environment. Therefore, if academic evaluation and career progression are predominantly shaped by bibliometric criteria, lecturers may be implicitly encouraged to focus their scientific work on empirical, data-driven, and publishable outputs, progressively consolidating methodological skills aligned with biomedical paradigms.

While empirical research is undoubtedly valuable and increasingly necessary within contemporary bioethics, there is a risk that this evaluative framework may unintentionally marginalize the humanistic dimension of the discipline, which remains essential for ethics education in medical training. In particular, a robust education in bioethics cannot be reduced to evidence collection or compliance with regulatory standards, but requires strong competence in normative ethics, aimed at clarifying what ought to be done in concrete clinical circumstances through principles, criteria, and rational justification. At an even deeper level, it requires familiarity with metaethical reflection, which investigates the meaning and justification of moral judgments, the structure of ethical reasoning, and the conditions under which ethical language can be shared within pluralistic societies. These dimensions represent the most distinctive contribution of bioethics as a discipline, as they enable clinicians not merely to apply rules, but to deliberate critically about values, duties, and moral responsibility in situations where empirical evidence alone is insufficient.

From this perspective, the dominance of bibliometric sectors in the teaching of bioethics within MDPs may contribute, over time, to an educational imbalance, whereby students are trained to interpret ethical issues primarily through empirical or procedural lenses, while receiving less exposure to the philosophical and argumentative competences that are crucial for cultivating moral discernment, reflective judgment, and genuine ethical deliberation in clinical practice.

This situation is an inevitable consequence of the rigid distinction introduced by the reform between bibliometric and non-bibliometric sectors. Although this distinction was designed to address evaluation needs related to scientific productivity, it is poorly suited to disciplines – such as bioethics – that possess an intrinsically interdisciplinary nature (Spagnolo 2025). Bioethics develops precisely through the intersection of different approaches – clinical, philosophical, legal, and social – and cannot easily be confined within a dichotomy separating empirical sciences from the humanities. The rigidity of this separation is therefore not only epistemologically inadequate but may also distort the very disciplinary identity of bioethics, reducing it to an imperfect hybrid that finds full recognition neither within the scientific domain nor within the humanistic one (Spagnolo 2015).

Limitations of the study

This study has several limitations that warrant consideration. First, the analysis was conducted through a manual review of the curricula available online. Although carried out with care, this procedure does not exclude the possibility of material errors, unintentional omissions, or incomplete information resulting from the irregular updating of institutional websites.

Second, this study is based solely on the formal analysis of course titles and their associated SSDs. This approach does not allow us to determine whether the bioethics instructors have followed an academic path specifically oriented toward the discipline or whether they were assigned to teach it despite having training and research backgrounds not necessarily centred on bioethics. Consequently, the results describe the formal structure of the educational offering but do not allow an assessment of the actual bioethical expertise of the instructors.

Conclusions

This study examined the presence and disciplinary placement of bioethics courses within the MDPs of Italian universities, showing that a substantial proportion of curricula (~71%) include courses in ethics and bioethics. Apart from three atypical cases, these courses are primarily assigned to two medical sectors – Legal Medicine and History of Medicine – while a smaller proportion (~18%) is assigned to Moral Philosophy. An overall correspondence of approximately 78% was also observed between the SSD of each course and the academic degree of the instructor.

Applying the distinction introduced by the “Gelmini reform” between bibliometric and non-bibliometric sectors, 81% of bioethics courses fall within bibliometric areas. This finding effectively positions bioethics within the scientific domain of knowl-

edge, while simultaneously raising questions about the implications that such classification may have for the identity of the discipline itself. In particular, the dominance of bibliometric sectors may contribute to an institutional and epistemological imbalance, indirectly fostering a tendency to frame bioethics predominantly in empirical and procedural terms. While empirical research is undoubtedly an important component of contemporary bioethical inquiry, a robust bioethics education within medical training also requires a solid humanistic foundation, including normative ethics and metaethical reflection, which are essential for developing argumentative competences, critical moral judgment, and deliberative reasoning in clinical practice.

It may therefore be appropriate to reconsider the division of knowledge introduced by the Gelmini reform, so that intrinsically interdisciplinary fields such as bioethics may be assigned a placement more consistent with their epistemological complexity. One possible solution could be the creation of hybrid or interdisciplinary SSDs, or the introduction of more flexible evaluation frameworks capable of recognizing the legitimacy of both empirical and humanistic scholarship, thereby allowing bioethics to develop without being constrained by a rigid bibliometric/non-bibliometric dichotomy.

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Declarations

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References

- Barnard, D., and K.D. Clouser. 1989. Teaching medical ethics in its contexts: Penn State College of Medicine. *Academic Medicine* 64 (12):744–746. <https://doi.org/10.1097/00001888-198912000-00011>.
- Baron, J. 2006. *Against bioethics*. Cambridge, MA: The MIT Press.
- Chadwick, R., and D. Wilson. 2018. The emergence and development of bioethics in the UK. *Medical Law Review* 26(2):183–201. <https://doi.org/10.1093/medlaw/fwy011>
- Claudot, F., F. Alla, X. Ducrocq, and H. Coudane. 2007. Teaching ethics in Europe. *Journal of Medical Ethics* 33 (8):491–495. <https://doi.org/10.1136/jme.2006.017921>.
- Corbellini, G. 2007. Contestualizziamo la bioetica. *Notizie di Politeia* 23(88):233–240.
- Corsico, P. 2025. Is Hume's law a valid argument against empirical bioethics? *Bioethics* 39(5):512–518. <https://doi.org/10.1111/bioe.13393>
- Danieli, G. 1995. La storia della Conferenza vista attraverso i suoi protagonisti. *Journal of Italian Medical Education* 67:3014–3027.
- Davies, R., J. Ives, and M. Dunn. 2015. A systematic review of empirical bioethics methodologies. *BMC Medical Ethics* 16:15. <https://doi.org/10.1186/s12910-015-0010-3>.
- Jonsen, A.R. 2000. Why has bioethics become so boring? *The Journal of Medicine and Philosophy* 25 (6):689–699. <https://doi.org/10.1076/jmep.25.6.689.6131>.
- Lo Sapio, L. 2017. La bioetica sotto accusa. Osservazioni e considerazioni critiche. *Antropologie* 17:141–156.
- Ministero dell'Università e della Ricerca. 2025. *Le università*. <https://www.mur.gov.it/it/aree-tematiche/universita/le-universita>.
- Sgreccia, E. 2007. *Manuale di bioetica. Volume I: Fondamenti ed etica della vita umana*. Milano: Vita e Pensiero.
- Sgreccia, E., and A.G. Spagnolo. 1996. L'insegnamento di bioetica nel corso di laurea in Medicina e Chirurgia. L'esperienza nell'Università Cattolica del Sacro Cuore. *Medicina e Morale* 4:639–654.
- Spagnolo, A.G. 2025. What future for bioethics in Italian universities? *Medicina e Morale* 74 (3):317–322. <https://doi.org/10.4081/mem.2025.1646>.
- Spagnolo, A.G., and P. Refolo. 2015. Research evaluation: The case of Italian academic bioethics. *Cuadernos de Bioética* 26 (86):117–120.
- Wangmo, T., V. Provoost, and E. Mihailov. 2024. The vagueness of integrating the empirical and the normative: Researchers' views on doing empirical bioethics. *Journal of Bioethical Inquiry* 21 (2):295–308. <https://doi.org/10.1007/s11673-023-10286-z>.
- Zeiler, K., and M. de Boer. 2020. The empirical and the philosophical in empirical bioethics: Time for a conceptual turn. *AJOB Empirical Bioethics* 11(1):11–13. <https://doi.org/10.1080/23294515.2019.1708515>

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