

ANNEX EN-26-ECON-M1-632

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Art. 1 - Type

The University of Pavia has activated a I level **Post-Bachelor Vocational Program** in '**eXplainable Artificial Intelligence in healthcare Management (xAIM)**' at the **DEPARTMENT OF ECONOMICS AND MANAGEMENT**, for the 2026/27 academic year.

Edition: 5

Disciplinary area: SCIENCES AND TECHNOLOGY

Art. 2 - Training objectives, job opportunities and course appeal

The goal of the xAIM (Post-Bachelor) Vocational program is to provide digital skills in the area of healthcare management by training highly skilled professionals in the healthcare area, as well as to raise learners' awareness of emerging ethical issues and the impact Artificial Intelligence (AI) is having on society.

Students will learn the fundamentals of Machine Learning and Data Science, then know how to manage and analyze large, heterogeneous, and complex amounts of data that characterize the healthcare industry. In order to enable a clear understanding of the data and proper interpretation of the results, emphasis will be placed on its impact in the healthcare sector.

The entire program focuses on the existing state of the art and possible future applications of AI in health care through the acquisition of practical knowledge as well as the development of the ability to apply the skills acquired. To complete the program, emphasis will be placed on the ethical and social implications of AI applications as well as legal considerations.

By taking part in various seminars and attending a final internship held at partner institutions throughout Europe, students will be able to develop and evaluate reliable AI solutions, as well as understand their potential, limitations, and their implications for the health professions, patients, and society as a whole.

The professional figures formed in the xAIM program can find opportunities in all job positions that require cross-functional skills between AI and health care because those who complete the program will be able to analyze and process the data needed to apply AI solutions, as well as interpret the results provided by AI by assessing their relative risks and challenges.

Healthcare facilities will be able to make use of highly specialized figures capable of working alongside physicians and professionals in the health care field, who can provide support in the implementation of intervention and diagnosis protocols based on data and empirical evidence. The same figures will be able to suggest the most effective approaches to the management of pathology, the burden of comorbidities and the variables that most influence the evolution of clinical pictures. They will also be able not only to speed up prognostic evaluations, but also to make them more accurate and precise by implementing the most suitable algorithms.

Graduates with a background in Computer Science and related subjects will be eased by a solid understanding in data analytics and computer science knowledge, while graduates with a background in health care will be able to communicate to the former the needs and requirements of patients that AI solutions are called upon to address.

The xAIM program is delivered in synergy with other European partners, namely Goethe University Frankfurt (Germany), Leibniz University Hannover (Germany), Keele University (UK), and finally the University of Ljubljana (Slovenia). The title will be awarded by the University of Pavia.

Art. 3 - Program's curriculum

The Vocational Program has a duration of 18 months and comprises a total of 2,250 hours, broken down according to the table below.

The set of planned training activities is designed to enable course participants to acquire **90 university credits (ECTS)**.

The teaching modules are organized as follows and will be **taught in English**:

Module	SSD	Language	L(h)	STD(h)	OL(h)	Ex(h)	Tot(h)	ECTS
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1) Transforming healthcare	ECON-06/A Economia aziendale	English	0	72	48	30	150	6
	Contents: -Management of Healthcare Organizations -Financial resources -Manage the complexity of the implementation of AI-based activities -Provide support to decision-making process in a multi-objective environment							
2) AI and healthcare workforce	ECON-06/A Economia aziendale	English	0	72	48	30	150	6
	Contents: -Acceptance of AI by healthcare professionals/managing change; -Redesigning roles and systems; -Use of AI in Education and Training; -Patients safety and clinical governance considerations; -Who has primacy - doctor or machine? Medical-legal aspects; -AI and the clinician patient relationship - interacting with expert patients, potential disempowerment of clinicians, potential to devalue clinical roles; -New roles/professions in healthcare - bioinformaticians, data managers, informatics; -Social and psychological aspects of computer-mediated communication.							
3) Data Driven Healthcare	STAT-01/A Statistica	English	0	72	48	30	150	6
	Contents: -Information modeling (files, databases) -Data in healthcare (biological, clinical, administrative and research) -Electronic data collection -Interoperability -Descriptive statistics -Univariate analysis -Bivariate analysis -Inferential statistics							
4) Introduction to Data Science	STAT-01/B Statistica per la ricerca sperimentale e tecnologica	English	0	72	48	30	150	6
	Contents: -Introduction to data science. Typical problems and applications. Introduction to supervised and unsupervised learning. -Introduction to techniques of data mining and knowledge discovery in databases, with emphasis on their application in medicine. Data preprocessing, visualizations (types and appropriate use). -Data clustering techniques, cluster explanation. -Dimensionality reduction techniques, projections. -Predictive models: classification, regression. -Overfitting. -Model evaluation. -Explanations of predictive models, SHAP values. -Practical examples of data science from medicine, bioinformatics, and healthcare.							
5) Z-Inspection®: A process to assess trustworthy AI in practice	ECON-06/A Economia aziendale	English	0	72	48	30	150	6
	Contents: -Introduction to the EU framework for Trustworthy AI -The Z-Inspection® process -Assessment of AI use cases in healthcare							
6) Trustworthy AI	STAT-01/A Statistica	English	0	72	48	30	150	6
	Contents: -Assessment of (digital) health technologies -Framework for achieving Trustworthy AI -Trustworthy AI: principles and measurement -Statistical learning models - Machine learning models -Accuracy -Robustness -Explainability -Fairness							
Moduli a scelta (4 moduli in totale)								

7) Advanced AI Assessment	ECON-06/A Economia aziendale	English	0	72	48	30	150	6
	Contents: -HTA principles -Implementation of HTA in different healthcare systems -AI assessment							
8) Introduction to healthcare management	ECON-06/A Economia aziendale	English	0	72	48	30	150	6
	Contents: -Quality in Healthcare Organizations -Performance Management -Financial Management in Health -Commissioning and Licensing -Project management -Leadership in Healthcare -International competition and cross-border healthcare services							
9) Coding in Python	STAT-01/A Statistica	English	0	72	48	30	150	6
	Contents: -What is a programming language and what can it be used for; -Python essential syntax -Variables and data structures: basic data types, strings, tuples, lists, and dictionaries; -Control structures: conditionals, loops, functions; -Intro to Object Oriented Programming: classes, objects and methods; -Leveraging external libraries: installing, importing and usage							
10) Computer Vision	STAT-01/B Statistica per la ricerca sperimentale e tecnologica	English	0	72	48	30	150	6
	Contents: Image processing; Image classification -Multi-layer perceptrons + gradient descent -Deep learning -Convolutional neural networks and advanced architectures -Object detection -Image Segmentation -Recurrent neural networks -Video Analysis							
11) Advanced topics in AI	STAT-01/B Statistica per la ricerca sperimentale e tecnologica	English	0	0	0	0	0	0
	Contents: -Search, MDPs, CSPs - introduction to probability theory and Bayes' Nets, -Decision Networks -Value of Perfect Information Reinforcement Learning -HMMs -Particle Filtering and Machine Learning							
12) AutoML	STAT-01/B Statistica per la ricerca sperimentale e tecnologica	English	0	0	0	0	0	0
	Contents: -Hyperparameter Optimization, -Neural Architecture Search, -Bayesian optimization, -Evolutionary algorithms, -Multi-fidelity optimization and gradient-based optimization, -Useful meta strategies for speeding up the learning itself or AutoML							

13) Text Mining	STAT-01/B Statistica per la ricerca sperimentale e tecnologica	English	0	0	0	0	0	0
	Contents: -Dealing with unstructured data in healthcare -Text preprocessing, concordances and collocations -Clustering and cluster exploration on medical texts -Word enrichment and keyword techniques -Vector presentation of documents -Predictive modeling on text data -Topic modeling -Semantic analysis and document summarization -Sentiment analysis							
14) Information Ethics and legal aspect	GIUR-11/A Diritto privato comparato	English	0	0	0	0	0	0
	Contents: Module A -What is information ethics? Why is it useful? -Introduction to ethical theories and frameworks. -Information ethics applied to specific issues, e.g., human rights, information access, privacy, cybersecurity, etc. -Scholarly and media literature on generally discussed/documented issues with AI/ML, including AI/ML causing/being used in ethically problematic situations with a progressive focus on medical applications. -Thought experiments and trolley problems, whose reasoned analysis will draw on information ethics principles. Module B -Digital Rights and Data ownership -Right to privacy and its legislation (GDPR) -Informed consent and patient autonomy -Legal design techniques in health -Data-driven decisions in health and AI and actors liability -Re-use of personal data in healthcare and research -Medical Device Regulation							
PARTIAL			0	720	480	300	1500	60
Internship/Stage		English					450	18
Final exam		English					300	12
TOTAL							2250	90
L Lectures; STD Study; OL Online lessons; EX Exercise, practical activities								

Participation by members in the various training activities is structured as follows:

- internships, practical exercises, and laboratory work: attendance is mandatory
- lectures or online lessons: attendance is mandatory for 75% of the total number of hours scheduled.

The training period may not be suspended.

Transfers to similar Vocational Programs at other universities are not allowed.

Art. 4 - Progressive knowledge checks

Ongoing assessment for each course/module is carried out through an intermediate test and/or at the end of the module itself in the forms of multiple-choice tests, exercises, reports, workshops or project work.

Art. 5 - Final degree examination and award of qualification

The final test will consist in the discussion of a thesis related to a project carried out under the supervision of a member of the program teaching staff. This will be based on the issues tackled during the course, in the practical sections and during the internship.

At the end of the Vocational Program, participants who have completed all the activities and fulfilled all the requirements, will be awarded the **Post-Bachelor Vocational Program's Diploma in "eXplainable Artificial Intelligence in healthcare Management (xAIM)"**.

Art. 6 - Faculty

Teaching will be held by faculty from the University of Pavia, and from other universities as well as by highly-qualified professional experts.

Art. 7 - Admission requirements

The Vocational Program is intended for those who have obtained a **Bachelor's Degree**, in accordance with the Ministerial Decree No. 270/04, in **one of the following classes**:

- (L-2) Classe delle lauree in Biotecnologie
- (L-7) Classe delle lauree in Ingegneria civile e ambientale
- (L-8) Classe delle lauree in Ingegneria dell'informazione
- (L-9) Classe delle lauree in Ingegneria industriale
- (L/SNT2) Classe delle lauree in Professioni sanitarie della riabilitazione
- (L/SNT1) Classe delle lauree in Professioni sanitarie, infermieristiche e professione sanitaria ostetrica
- (L/SNT3) Classe delle lauree in Professioni sanitarie tecniche
- (L-13) Classe delle lauree in Scienze biologiche
- (L-16) Classe delle lauree in Scienze dell'amministrazione e dell'organizzazione
- (L-18) Classe delle lauree in Scienze dell'economia e della gestione aziendale
- (L-27) Classe delle lauree in Scienze e tecnologie chimiche
- (L-29) Classe delle lauree in Scienze e tecnologie farmaceutiche
- (L-31) Classe delle lauree in Scienze e tecnologie informatiche
- (L-35) Classe delle lauree in Scienze matematiche
- (L-41) Classe delle lauree in Statistica.

The Vocational Program is intended, also, at those who have obtained a **Bachelor's Degree**, in accordance with the Ministerial Decree No. 509/99, **in one of the following classes**:

- (1) Classe delle lauree in biotecnologie
- (8) Classe delle lauree in ingegneria civile e ambientale
- (9) Classe delle lauree in ingegneria dell'informazione
- (10) Classe delle lauree in ingegneria industriale
- (SNT/2) Classe delle lauree in professioni sanitarie della riabilitazione
- (SNT/1) Classe delle lauree in professioni sanitarie, infermieristiche e professione sanitaria ostetrica
- (SNT/3) Classe delle lauree in professioni sanitarie tecniche
- (12) Classe delle lauree in scienze biologiche
- (19) Classe delle lauree in scienze dell'amministrazione
- (17) Classe delle lauree in scienze dell'economia e della gestione aziendale
- (21) Classe delle lauree in scienze e tecnologie chimiche
- (24) Classe delle lauree in scienze e tecnologie farmaceutiche
- (26) Classe delle lauree in scienze e tecnologie informatiche
- (32) Classe delle lauree in scienze matematiche
- (37) Classe delle lauree in scienze statistiche

The program is also aimed to those who obtained a Master's Degree in:

- Diploma di laurea specialistica/magistrale a ciclo unico e previgente ordinamento in Medicina e chirurgia LM41, 46/S

and degrees in accordance with the previous regulations in:

- Biotecnologie
- Ingegneria civile e ambientale
- Ingegneria dell'informazione
- Ingegneria industriale
- Scienze delle professioni sanitarie della riabilitazione
- Scienze infermieristiche e ostetriche
- Scienze delle professioni sanitarie tecniche
- Scienze biologiche
- Scienze dell'amministrazione
- Scienze dell'economia e della gestione aziendale
- Scienze e tecnologie chimiche
- Scienze e tecnologie farmaceutiche
- Scienze e tecnologie informatiche

- Scienze matematiche
- Scienze statistiche

The maximum number of places available is **35**.

The minimum number of participants to activate the course is **25**.

The Academic Board will also be able to assess whether the conditions for expanding the maximum number of participants are met.

Should the number of applicants exceeds the expected maximum, a selection committee comprising the Coordinator and two Faculty members will be formed to select applicants and create a merit list, expressed in **hundredths**. This list will be determined on the basis of the following evaluation criteria:

- **Up to a maximum of 20 points for the graduation mark** (referred to the admission requirement), broken down as follows:

equal to 110/110 e lode	20 points
between 105/110 and 110/110	15 points
between 99/110 and 104/110	12 points
between 90/110 and 98/110	9 points
under 90/110	5 points

- **Up to a maximum of 5 points for any other post graduation title** concerning the themes of the program, broken down as follows:
 - 5 points for PhD and/or Medical Specialization Diploma and/or Post-bachelor Vocational Program and/or Master Degree (except for Medicine and Surgery LM41,46/S), concerning the themes of the program.

- **Up to a maximum of 15 points for professional experience** related to the topics of the program, which will be evaluated as follows:

- 15 points if more than 2 years
- 10 points if between 1 and 2 year
- 8 points if under a year

- **Up to a maximum of 10 points for the letter of reference**, which will be evaluated as follows:

- 5 points awarded to the relevance to the xAIM program topics of the research topics/experience professional experience of the reference person;
- 5 points assigned to the relevance of the referee's institution in reference to the themes of the xAIM program.

The candidate will be admitted to the interview with a **score of 20 or higher**.

The interview has a maximum score of 50 points and is aimed at assessing the motivation and knowledge of English.

It is considered passed with a **minimum score of 30**.

In case of equal merits, young age will prevail in the ranking. In case of withdrawal of one or more candidates, the vacant place/places will be made available to the next candidate in the ranking, up to the coverage of all available places.

Art. 8 - Deadline for the online application process

Applicants must submit their application for admission in accordance with the procedures, set out in the Call for Admission, **from 17/07/2026** and by the **deadline of 30/11/2026**. The requirements of the Call for admission and this Attachment, must be held by the deadline for application.

Art. 9 - Annexes for the online application process

Applicants must attach, during the online application procedure, the scan of the following documentation:

1. **curriculum vitae** with an indication of the admission requirements and for eventual selection (degree mark, publications,

- postgraduate qualification and professional experience);
2. **reference letter**.

Art. 10 - Tuition and fees

Enrolment

Students enrolling in the Vocational Program, for the 2026/27 academic year, must pay the sum of **€ 4.900**, including: € 16 (stamp duty tax) € 200 (administrative fees).

This amount must be paid in **3 installments**:

- installment 1 of € **2.500 to be paid upon enrollment**
- installment 2 of € **1.200**, to be paid before **01/12/2026**
- installment 3 of € **1.200**, to be paid before **15/02/2027**.

External national or international organisations or bodies may contribute to the conduct of the master's course by providing scholarships for enrolment/internship attendance. Should such agreements be finalised, they will be posted on the Vocational Program's website, along with the award criteria.

Final exam

In order to be admitted to the final exam, candidates must submit a specific application form along with the payment of 116 as a fee for the issuance of the Vocational Program's Diploma (including n° 2 stamp duty tax of 16 paid virtually: one for the parchment and one for the application). The cost of the parchment could be updated by resolution of the Board of Directors after the publication of this notice.

Art. 11 - Website and Organizational Secretary contacts

Any communication and important information regarding candidates and students will be published on the following website:
<https://xaim.eu>

For information regarding the course organization:

Organizational Secretary

E: info@xaim.eu

The contact persons is **Prof.ssa Valentina Beretta**.