





SHEET E

DOCTORAL COURSE IN LEARNING SCIENCES AND DIGITAL TECHNOLOGIES

Course: XXXVIII

Estimated starting date of the course: 1/11/2022

Coordinator: Professor Pier Cesare Rivoltella (PO) – Area 11 SSD M-PED/03 – Università Cattolica del Sacro Cuore

Associate doctoral course of "national interest" pursuant to art. 11 of Ministerial Decree 226/2021

Administrative headquarters: DEPARTMENT OF HUMAN SCIENCE, LITERATURE, CULTURAL HERITAGE, EDUCATIONAL STUDIES – UNIVERSITY OF FOGGIA

Length: 3 years

Curricula: YES

1) E-LEARNING. Within the framework of the most advanced international studies and through the typical methods of digital educational research, this line of research addresses the following subjects:

- LMS and virtual environment: area of digital environments and platforms to support teaching and learning processes, also including social networking systems for formal and informal learning;

- e-tutoring, methods and techniques of moderation: area of e-tutoring and e-moderation strategies aimed at managing the communicative interactions of online learning groups and educational communities in formal and informal contexts;

- instructional design and learning design: area of educational design with special attention to the dimension of the principles and models of Instructional Design and a focus on methodological and applicative developments in the field of learning design;

- learning assessment and certification: area of assessment and certification of learning in the context of hybrid, blended and online teaching with a focus on educational assessment, peer evaluation, e-feedback, e-assessment, self-assessment and peer tools assessment.

2) TECHNOLOGY ENHANCED LEARNING. This line of research addresses the following subjects:

- integration of technologies in teaching: area of teaching technologies and related applications in different educational and training contexts (school, university, business, etc.) for the improvement of teaching practices; this area also includes research perspectives attributable to the field of professional development in the area of educational innovation;

- learning support: area of methods, techniques and tools to support learning processes, including self-regulated learning and self-direct learning, in the light of the contributions offered by the different learning theories (cognitivism, constructivism, post-constructivism, connectivism, experiential learning, transformative learning, etc.);

- augmented teaching: area of mixed and augmented reality technologies, immersive technologies and virtual reality for the design of immersive learning environments with a focus on technical, cognitive and socio-emotional dimensions;

- assistive technologies: area of technologies for disability and BES and methodologies for the design and development of inclusive educational processes (e.g. Universal Design for Learning); this area also includes the subject of techniques and strategies for the integrated management of the classroom and the improvement of communication processes, including different targets clustered by age, social groups and educational and training contexts, including the multilingual and intercultural ones;

- disciplinary technologies and education: area of teaching technologies in the various disciplinary fields with a focus on both the theoretical-methodological (e.g. epistemologies of the disciplines) and strategic-applicative aspects, within the framework of a broader vision aimed at reconsidering







the relationship between disciplines and the concept of "disciplinary content".

3) NEW LITERACIES. Within the framework of the most advanced international studies and through the typical methods of digital educational research, this line of research addresses the following subjects:

- data literacy and information literacy: area of studies on the concept of literacy and its evolution from an educational, psychological, semiotic and socio-cultural perspective with a focus on the concepts of "data" and "information" in the broader context of digitalization of communication and information processes;

- digital literacy: area of studies on the concept of literacy and its evolution from an educational, psychological, semiotic and socio-cultural perspective with a focus on digital media and technologies in the broader context of digitalization of communication and information processes;

- visual literacy: area of studies on the concept of literacy and its evolution from an educational, psychological, semiotic and socio-cultural perspective with a focus on visual languages in the broader context of digitalization of communication and information processes.

4) NEUROEDUCATION. Within the framework of the most advanced international studies and through the typical methods of digital educational research, this line of research addresses the following subjects:

- the teaching brain, namely the study of neuroscientific problems related to the educational work of the teacher: positive and negative stress, calorie consumption and efficiency in the classroom, implications of care-giving;

- the learning brain, namely the study of the main issues related to learning: motivation, attention, memory, contribution of visuals to learning;

- microlearning, namely the techniques for circumscribing contents according to their more effective presentation and ease of learning. The educational work of the teacher: positive and negative stress, calorie consumption and efficiency in the classroom, implications of care-giving;

- spaced learning, in particular time management techniques and the use of active breaks, as well as methods and applications based on just-in-time teaching.

5) KNOWLEDGE ARCHITECTURE. Within the framework of the most advanced international studies and through the typical methods of digital educational research, this line of research addresses the following subjects:

- Knowledge Management, namely everything concerning the management of knowledge in blended learning contexts and through the use of digital environments;

- Open Educational Resources, namely their educational use, the philosophy of open knowledge relating to them, as well as the technological solutions and policies relating to their availability;

- the indexing and categorization of knowledge through the use of Web Ontologies, namely their use for the refinement of construct definition and linguistic therapy practices in the scientific community;

- Information Retrieval, or the effective techniques for retrieving information through the use of information and social methodologies;

- the knowledge economy, namely the management logics of sharing and accessing information.

6) DATA, PRIVACY & POLICIES. Within the framework of the most advanced international studies and through the typical methods of digital educational research, this line of research addresses the following subjects:

- big data and analytics: area of study on the generation, management and use of big data in the education domain in the broader context of digital citizenship and e-democracy;

- systems for the protection of personal data: area of study on the protection of personal data, right to information and to oblivion, in particular for the education domain and the people of school age;

- detection of privacy by design and privacy by default throughout the various stages of provision of digital content for educational purposes, also according to the different ages and characteristics of the recipients of the content provided.

7) EDUCATIONAL AI. Within the framework of the most advanced international studies and through the typical methods of digital educational research, this line of research addresses the following subjects:

- intelligent and phygital systems for education: area of study on intelligent systems and humanmachine interaction (phygital) for the presentation of content and effective methodologies in the world of education;







- social and educational robotics: area of study on socially interactive robotics and on the ethical, psychological and educational implications of the boundaries of robotics and its potential especially towards unprivileged people;

- machine learning in education: area of study on the perspectives of machine learning in the education domain, and its ethical and social implications in terms of personalized learning and data analytics

- bots and personal digital assistants: area of study on portable technologies and their potential in terms of education as well as cautions of use, digital well-being and pervasiveness.

8) GAMING. Within the framework of the most advanced international studies and through the typical methods of digital educational research, this line of research addresses the following subjects:

- video & serious games: game-based learning area for the design and development of gaming environments dedicated to supporting teaching and learning processes with attention to design, cognitive, emotional, socio-relational dimensions;

- exergames for rehabilitation and adaptation: area of cognitive rehabilitation and the enhancement of learning, also through the adaptation of disciplinary contents and teaching / learning strategies;

- e-sports: area of methods and technologies both to counteract the sedentary lifestyle to support the promotion of physical well-being, also for the benefit of people residing in culturally deprived areas and manage and counteract the risks of pervasive videogame phenomenology;

- gamification and playful learning: educational planning and game design area aimed at identifying game elements to support the achievement of specific learning objectives and greater user involvement;

- immersive environments: information technology area with particular attention to xReality and 360 videos, aimed at the design and creation of immersive environments and content relevant to the education domain, in particular for secondary and higher education.

Total number of positions available No. 89 of which:

- No. 21 positions through scholarships granted by accredited universities;
- No. 42 positions through scholarships granted by Ministerial Decree No. 351/2022;
- No. 4 positions through scholarships granted by Ministerial Decree No. 352/2022:
 - No. 4 grants co-financed by: DGS S.p.A; Protom Group S.p.A.; Eraclito S.r.L.; S2E Sprint srl;
- No. 22 positions without scholarship.

The aforementioned granted positions are allocated to accredited universities as follows:

- University of Foggia: No. 5: Ministerial Decree No. 352/2022
- Università degli Studi Gabriele D'Annunzio Chieti-Pescara: No. 2 Ministerial Decree 351/2022 within the scope of: *Public Administration*;
- Università degli Studi Suor Orsola Benincasa Naples: No. 1 Ministerial Decree 351/2022 within the scope of: *PNRR*;
- University of Calabria: No. 1 Ministerial Decree 351/22 within the scope of: *Public Administration*;
- University of Siena: No. 1;
- Polytechnic University of Marche: No. 1 Ministerial Decree 351/2022 within the scope of: PNRR;
- Libera Università degli Studi "Maria S.S Assunta" LUMSA: No. 1 Ministerial Decree 351/2022 within the scope of: *PNRR*;
- E-CAMPUS Online University: No. 2;
- University of Padova: No. 1;
- University of Turin: No. 1;
- University of ROME LA SAPIENZA: No. 1 Ministerial Decree 351/2022 within the scope of: *Public Administration*;
- IUL Online University: No. 2;
- Università Cattolica del Sacro Cuore: No. 2 Ministerial Decree 351/2022 within the scope of: PNRR;
- University of Salerno: No. 2:
 - No. 1 Ministerial Decree 351/2022 within the scope of: PNRR;
 - No. 1 Ministerial Decree 351/2022 within the scope of: Public Administration;
- University of Trento: No. 1 Ministerial Decree 351/2022 within the scope of: PNRR;







- LUISS Libera Università Internazionale degli Studi Sociali Guido Carli: No. 3:
 - No. 1 Ministerial Decree 351/2022 within the scope of: PNRR;
 - No. 2 Ministerial Decree 351/2022 within the scope of: *Public Administration*;
- University of Bologna: No. 1 Ministerial Decree 351/2022 within the scope of: *Digital Transition;*
- University of Palermo: No. 1 Ministerial Decree 351/2022 within the scope of: Public Administration;
- University of Florence: No. 1 Ministerial Decree 351/2022 within the scope of: Digital Transition;
- University of Bergamo: No. 1 Ministerial Decree 351/2022 within the scope of: *PNRR*;
- University of Urbino Carlo Bo: No. 2 Ministerial Decree 351/2022 within the scope of: PNRR;
- Universitas Mercatorum Online University: No. 4 Ministerial Decree 351/2022 within the scope of: *PNRR*;
- University of Udine: No. 1 Ministerial Decree 351/2022 within the scope of: *Public Administration*;
- Pegaso Online University: No. 10;
- University of Basilicata: No. 1 Ministerial Decree 351/2022 within the scope of: Public Administration;
- Giustino Fortunato Online University: No. 6:
 - No. 4 Ministerial Decree 351/2022 within the scope of: PNRR;
 - No. 2 Ministerial Decree 352/2022;
- University of Pisa: No. 1 Ministerial Decree 351/2022 within the scope of: Public Administration;
- University of Cagliari: No. 1 Ministerial Decree 351/2022 within the scope of: PNRR;
- University of Parma: No. 1 Ministerial Decree 351/2022 within the scope of: PNRR;
- Libera Università di Bolzano: No. 1 Ministerial Decree 351/2022 within the scope of: PNRR;
- University of Milano: No. 1 Ministerial Decree 351/2022 within the scope of: Public Administration;
- University of Modena and Reggio Emilia: No. 2 Ministerial Decree 351/2022 within the scope of: PNRR;
- University of Naples Federico II: No. 1 Ministerial Decree 351/2022 within the scope of: *Public Administration*;
- University of Bari: No. 1;
- University of Genova: No. 1;
- University of Molise: No. 1;
- UKE Università Kore di Enna: No. 1 Ministerial Decree 351/2022 within the scope of: PNRR;
- University of Sannio di Benevento: No. 1 Ministerial Decree 351/2022 within the scope of: PNRR.

Short description of the research projects:

The doctoral course in Learning Sciences and Digital Technologies is designed to better study the functioning of the mind in its interaction with technologies and social and material contexts in educational processes. Doctoral students will study the neuroscientific basis of learning, the main pedagogical-educational theories and digital design with the aim of developing new technologies, analyzing large-scale educational data, designing new training and docimology methods. A special focus will be dedicated to the training of people with disabilities and special educational needs in formal, informal or non-formal contexts and to educational and rehabilitation strategies in vulnerable or socially unprivileged populations. Attention will also be paid to the legal aspects concerning data management and the protection of privacy as well as the perspective of gender, equity and well-being in the relationship between individuals and within organizations. The students attending the doctoral course in Learning Sciences and Digital Technologies will be able to explore the use of technologies to solve complex problems through the realization of theoretical and empirical studies. Students will develop their expertise through the participation in relevant research projects that will involve both the academic and industrial / professional communities. Participation in research projects carried out in our laboratories and research centers, in the laboratories of accredited bodies (businesses, schools, hospitals, clinical centers-IRCCS) and in public and / or private research institutes will be promoted. This will make it possible to address, through research, issues that have important repercussions on the individual well-being and on active participation in the various reference contexts; it will allow for the development of skills in the actualization of research projects and in the use of the results obtained to implement interventions and good practices capable of transforming training activities also from an inclusive perspective. Students will therefore be able to apply the outcomes of a theoretical or technical work to an innovation mediated by technologies aimed at promoting educational experiences that increase the quality of life of children, adolescents and adults in different settings. The potential of new technologies in creating new links and forms of participatory social relations in learning and organizational contexts will also be considered. The program was developed with the awareness that design, social and contextual variables of learning, the 1 educational science, neuroscience and cognitive and developmental psychology and special pedagogy are fundamental elements to reconsider







training in different contexts, even in special educational settings. All students will have the opportunity to choose an application project in a preferential technological area, such as: programming, digital animation, simulation, robotics, interaction design, serious games, tangible interfaces, application of AI modules for learning environments, development of applications to promote learning processes in clinical or atypical populations, augmented reality, digital and data literacy. The laboratory experiences will aggregate the disciplinary knowledge on specific problems and the whole training plan will be based on the constant dialogue between theory and practice, through methodologies such as EAS and PBL to promote students' creativity constantly challenging real problems. Up to 40% of the training will be delivered online; courses and training activities will benefit from the contribution of academics from international universities and research centers and will be delivered in English up to a maximum of 70% of the entire curriculum.

The course aims to develop a professional identity in the area of learning sciences, taking into account the ethical aspects and giving a contribution to the development of research and its applications in different fields (training, business, society); know, understand and analyze theories related to learning and cognition; design technological solutions and integrated teaching environments to promote meaningful learning; design and implement rigorous research in the learning sciences; master quantitative, qualitative and blended research methods; know how to use dedicated software for data analysis and text forms; use qualitative approaches, case studies, ethnographies, participatory observation, narrative reports and design-based research to study educational processes and social contexts; plan the implementation of surveys: the definition of items and questions, preparation and administration, analysis and review, validation; develop, implement, monitor and assess meaningful learning experiences in formal, informal and non-formal contexts; analyze research and take part in academic debate through discussion, paper submission, article production and review; develop skills and leadership in universities, companies, institutions, social and health realities. Expected career and professional opportunities. Upon completion of the doctoral course, thanks also to the variety of curricula offered such as "e-Learning: LMS, e-tutoring, methods and techniques of moderation, instructional design, assessment and certification of learning", "Technology Enhanced Learning: integration of technologies in teaching, learning support, inclusion and assistive technologies, disciplinary technologies and teaching "," New Literacies: Data Literacy, Information Literacy, Digital Literacy, Visual Literacy "," Neuroeducation: teaching brain, learning brain, microlearning, spaced learning "," Knowledge Architecture: knowledge management, OER, Web ontologies, information retrieval, knowledge economy "," Privacy & policies: big data, analytics, data protection systems, information law, security, network regulation ", "Educational AI: intelligent systems, social and educational robotics, machine learning, bots and personal digital assistant " and " Gaming: video & serious games, exergames for rehabilitation and adaptation, e-sports, gamification and playful learning ", students will have a variety of professional opportunities. Among these, the main ones concern: research in the educational, training and technological areas in public and private bodies; product development in training companies, creative industry and edutainment; Instructional Designer in industrial as well as public and private contexts; research on the development of technologies in the health sector in IRCCS, public and / or private bodies; leadership as academics and researchers in universities and companies, designers and evaluators of formal and informal learning environments, and in the decision-making process of learning technologies.

Short description of the research projects referred to in the PNRR (Ministerial Decrees 351 and 352 of 2022):

The doctorate in "Learning Sciences and Digital Technologies" aims to train the next generation of researchers and experts in the area of designing new learning environments and teaching and learning methodologies. The doctoral course will focus on educational innovation in formal, informal and non-formal contexts: from school to businesses and leisure, with a specific focus on lifelong learning. This course aims to represent a national and international point of reference in the area of application, through a network of laboratories located in the main Italian universities. A feature of this doctoral course lies in its multi and transdisciplinary connotation with contaminations from hard and human science. The faculty board will be comprised of members from the psychological, pedagogical, legal, neuroscientific, computer science and engineering areas. The course training is consistent with the specific objectives of the PNRR referred to in the selection notice in question: the reference is to the strengthening of research and dissemination of innovative models for basic and applied research conducted in synergy with universities and companies; in fact, as per decree, the new innovative doctorates aspire to increase the effectiveness of the actions of public administrations, below the average of the main European partners, affecting the share of personnel highly skilled in STEM subjects (Science, Technology, Engineering and Mathematics), clearly inferior to the human and law subjects. The doctorate in "Learning Sciences and Digital Technologies" is consistent with "M4C1.4 REFORM AND ENHANCEMENT OF







DOCTORATES", with particular regard to investment 4.1: "Extension of the number of research and innovative doctorates for the public administration and cultural heritage "and investment 3.3:" Introduction of innovative doctorates that respond to the innovation needs of enterprises and promote the recruitment of researchers from enterprises ". Consistency is particularly expressed in the promotion of new professional figures starting from high-profile skills required in the labor market. The proposal of the doctoral program promotes innovative and frontier figures, with the ability to actively collaborate with specialists from different areas, thanks to the expertise in different subjects. The background and focus, is specifically the improvement of learning, with specialists able to design, implement and assess innovative learning and teaching environments, using new technologies in a consistent and conscious process starting from well-placed methodologies. With respect to the PNRR measure referred to in the paragraph, the proposal clearly captures one of the "Key Enabling Technologies" and, more specifically, Artificial Intelligence (AI). This KET is part of the "Educational AI: intelligent systems, social and educational robotics, machine learning, bots and personal digital assistant" curriculum which specifically refers to the application of AI in educational fields and to the well-focused use of new technologies in the educational and teaching area. In addition to the specification of the primary investment of the selection notice, the doctorate can have a transversal impact on Mission 4 of the PNRR "Education and Research". The doctorate will train new professionals capable of designing, managing, updating and evaluating the shortcomings of learning environments as regards the application of digital technologies, bridging existing gaps and applying sustainable solutions. Specifically, the figures will have a direct impact on M4-C1.2 "Improvement of the recruitment and training processes of teachers" as an active professionalism capable of promoting the development of digital skills of school staff to encourage an accessible, inclusive and intelligent approach to digital education, through the design of learning environments, starting from the DigiCompEdu framework. Likewise, the impact is also evident in M4-C1.3 "Expansion of skills and strengthening of infrastructures" as it favours professionals capable of providing advanced training in teacher training courses within universities with a view to improvement of digital skills and STEM as proposed by the investment "New skills and new languages". The PhDs will support School 4.0 through the transformation of school spaces in the direction of connected learning environments and the management and design of technologically advanced laboratories. Finally, the course will focus on highlighting, addressing and contrasting the dimensions of gender inequality and stigmatization in the organization of study, teaching, work and services provision.

Admission prerequisites:

All Master's Degrees or the corresponding Postgraduate Degrees or the corresponding Degrees obtained according to the system prior to Ministerial Decree 509/99 or the corresponding equivalent qualifications.

Admission procedures:

The selection will be based on the assessment of qualifications, research project and oral exam.

The research project written in compliance with the enclosed format (**appendix No. 1**), will be assessed using the criteria referred to in **appendix No. 2**.

During the oral exam, the research project presented by the candidate at the time of the application will also be discussed and the knowledge of the English language will be ascertained.

The assessment will take place pursuant to art. 6 of the selection notice.

ATTENTION: In the research project (appendix No. 1) candidates must indicate No. 5 preferential assignments in order of importance – specifying the type of scholarship where possible – among the accredited universities listed above. The assignments will be based on the highest overall score achieved; namely the winning candidates best placed in the general rankings will have the right to choose among the positions available (art. 7 of the selection notice).

The 22 positions without scholarship will be allocated in relation to the choices of the research fellows for up to 4 positions per venue.

Test completion methods for foreign candidates:

Foreign candidates can choose to take the admission test in English.

Admission test calendar and venue:

Oral test: 19 and 20 September 2022.

Test venue: the oral test will take place online for all candidates. The email address provided by the candidate will be used to arrange the platform and the related *virtual rooms* for connection.







For further information please visit: https://www.unifg.it/it/studiare/post-lauream/dottorati-di-ricerca

Project Format (Appendix No. 1)

Research project proposal

Doctorate of national interest XXXVIII Course in "Learning Sciences and digital technologies"

Candidate:

Title:

Curriculum:







Area of research options

The candidate MUST choose the area of research that best describes his or her project proposal.

- pedagogical-educational area
- $\hfill\square$ psychological area
- □ engineering area
- legal area
- communication area
- □ other: please specify.....

Doctorate venue options

The candidate MUST choose 5 preferential venues among those listed in Sheet E of the selection notice, specifying the type of scholarship, in a descending order of preference (from the most to the least favourite). No. 1 _______ (venue) type of scholarship (<u>if provided for</u> *Ministerial Decree* 351/2022 or 352/2022) No. 2 _______ (venue) type of scholarship (<u>if provided for</u> *Ministerial Decree* 351/2022 or 352/2022) No. 3 _______ (venue) type of scholarship (<u>if provided for</u> *Ministerial Decree* 351/2022 or 352/2022) No. 4 _______ (venue) type of scholarship (<u>if provided for</u> *Ministerial Decree* 351/2022 or 352/2022) No. 5 _______ (venue) type of scholarship (<u>if provided for</u> *Ministerial Decree* 351/2022 or 352/2022)

Abstract (up to 500 characters)

Key words (No. 3)

No. 1 _____

No. 2 _____

No. 3 _____

Context (up to 1000 characters)







Description of the research issue and the theoretical framework (up to 2000 characters)

Targets and outcomes (up to 1000 characters)

Methodology (up to 1000 characters)

Project schedule

Project length (Quarterly intervals)	1	2	3	4	5	6	7	8	9	10	11	12
WP 1:												
Activity 1.1:												
Activity 1.2:												
Activity 1.3:												







Project length (Quarterly intervals)	1	2	3	4	5	6	7	8	9	10	11	12
Activity 1.4:												
Activity 1.5:												
WP 2: Analysis …												
Activity 2.1:												
Deliverable	D1 D3	D2		D5 D8	D6 D9 D5	D4		D5 D10	D6 D9	D11	D7	D5

Tab. ... - Quarterly schedule of research-intervention activities

Project deliverables

WP No.	Deliverable No.	Name of Deliverable	Туре	Quarter of delivery
WP 1	D1			1
WP 1	D2			11
WP 1	D3			1
WP 2	D4			VI
WP 2	D5	Annual monitoring	Report	IV, VIII, XII

Tab.... – Deliverables expected per work package (WP)

Bibliography (up to 20 references)







Project proposal assessment criteria (Appendix No. 2)

Doctorate of national interest XXXVIII Course

in "Learning Sciences and digital technologies"

Project proposal assessment criteria							
Indicator	Description	Maximum score					
Inventiveness	To be understood as the level at which the product introduces a new way of thinking and/or interpreting in relation to the science subject of research, stands out and innovates as against the previous approaches in this regard	From 0 to 10 points					
Methodological accuracy	To be understood as the level at which the product clearly presents the objectives of the research and the state of the art in the literature, adopts a methodology appropriate to the research subject and proves that the objectives have been achieved	From 0 to 15 points					
Effect	To be understood as the level at which the product exerts, or is likely to exert, power over the international scientific community or, in those disciplines where appropriate, over the national one	From 0 to 15 points					

faximum score 40 points.