HELLENIC OPEN UNIVERSITY

Lifelong Learning Center

Programme Study Guide

«STEAM education for all learners: Incorporating STEAM and Inclusive education practices in everyday teaching»»

PATRA, 2024

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A. General Information & Programme Description

Program Title: STEAM education for all learners: Incorporating STEAM and Inclusive education practices in everyday teaching

Total duration (in number of hours and number of weeks): 50 hours/ 5 weeks

ECTS credits: 2

Implementation Method and monitoring procedures: In distance

Thematic Field : Science and Technology

Curricular Units of the Programme:

1. Introduction to the course
2. STEAM education
3. Inclusive and Special Education
4. Inclusive STEAM Education (part A)
5. Inclusive STEAM Education (part B)

Purpose and expected learning outcomes of the programme:

The MOOC titled "STEAM education for all learners: Incorporating STEAM and Inclusive education practices in everyday teaching" supports the teachers' professional development to build foundational understandings, strategies, and competences for becoming Inclusive STEAM educators through self-regulated learning and community building activities.

Specifically, the MOOC focuses on three thematic areas for which specific modules address relevant competences. The thematic areas are as follows:

1. STEAM education,

2. Inclusive and Special Education, and

3. Inclusive STEAM education.

Based on the "Joint Curriculum for STEAM in Special Education" (Pavlou et al., 2023) the competences guiding the development of the MOOC concern mostly the educator role "Educator as inclusive STEAM teacher- trainer-tutor". Competences relevant to the "Educator as an Inclusive STEAM Education designer and creator" and "Educator as a community member" roles are addressed as well (Sakellaropoulou et al., 2023).

Upon completion of the program, participants will have developed the skills to:

• Develop knowledge of Inclusive and Special Education.

• Develop knowledge of the STEAM education approach.

• Apply inclusive STEAM teaching and learning techniques in Inclusive STEAM classrooms.

• Understand the impact of STEAM Education in Inclusive Educational Environments.

• Learn about resources and (Assistive Technology) tools for Inclusive STEAM Education.

• Understand how to develop learners' profiles for Inclusive STEAM Education

• Develop understanding about techniques and methods to assess and monitor individual learners' needs and performance in Inclusive STEAM context.

• Develop understanding on how to Facilitate all learners' STEAM and Inclusive competences.

• Participate and collaborate in the national and international educational communities of the SpicE project.

• Enhance their understanding of EU policies that promote STEAM Education and Inclusion.

Whom the project is aimed at:

The main target group of the training program are pre- and in-service primary school teachers. Nevertheless, the participation to the MOOC is open to all individuals who have an interest in the aforementioned areas, such as educators of all educational levels and subject areas (e.g., Science, Technology, Arts), special/inclusive education educators, school managers/directors, undergraduate students in their last years of studies, postgraduate students from non-formal educational institutions, educational policy makers etc. The participants should have a background in education, either through acquired teaching experience or by being enrolled or holding a degree in Educational Sciences or a relevant field.

Details of the Scientific Director

Full Name: Achilles D. Kameas

Title: Professor, Dean of School of Science & Technology

Email of Scientific Officer: kameas@eap.gr

Department: Hellenic Open University

School: Science and Technology

Full curriculum vitae of the Scientific Director (link of the CV):

https://www.researchgate.net/profile/Achilles-Kameas

https://www.linkedin.com/in/achilleskameas/

Short CV of the Scientific Director *(text up to 200 words accompanied by a photograph of the Scientific Director describing the main elements of his/her CV and documenting the scientific relevance to the project)*

Dr. Eng. Achilles D. Kameas is Professor of Pervasive Computing Systems at Hellenic Open University (HOU). He serves as Dean of the School of Science & Technology, Member of the Board of HOU Lifelong Learning Center and the HOU Gender Equality Committee and Director of the HOU Internal Evaluation Unit. He is the Director of Studies of the MSc course "Pervasive and Mobile Computing Systems" and Head of the Ubiquitous and Mobile Computing, Quality and Ambient Intelligence Laboratory. He is the Founder and Head of DAISSy Research Group (http://daissy.eap.gr) and Scientific Coordinator of RU3 at Computer

Technology Institute and Press “Diophantus”. Achilles is the national representative in CEN PC428 on e-competences and ICT professionalism, member of the Board of ALL DIGITAL European network (was the Chair between 2019-21), and member of the CEPIS IT Professionalism in Europe, the EADTU Diversity & Inclusion WG, the ELOT Standardization Committee on Resilient and Smart Cities, the National Digital Skills and Jobs Coalition and the ReBrain Greece initiative. He has participated in more than 100 EU and national R&D projects, has published more than 200 scientific articles, co-authored more than 10 books and received more than 2000 citations. Achilles has been promoting an inclusive society as a result of digital transformation, via teaching and developing MOOCs and blended courses. He has contributed to standards EN 16234 and ISO 37101, to DigComp 2.2 and to the occupational profile of Intercultural Mediator and co-authored the Manifesto for Enhancing Digital Competences across Europe and the Manifesto for Intelligent Environments. His current research interests include technology enhanced learning, STE(A)M education, smart environments and zero energy buildings, digital cultural heritage, digital skills and flexible learning paths.

Teachers

Brief CV of tutor 1: Natalia Spyropoulou

Natalia Spyropoulou has over 10 years of experience in developing and delivering engaging and interactive e-learning solutions for adult learners of various abilities and backgrounds. She is a Senior Researcher and Project Manager at the DAISSy research group of Hellenic Open University (HOU). Research topics: STEAM Education, STEM education, TEL, Competence Development, Teacher Professional Development, Adult Education, Online Learning, Higher Education, MOOCs, Instructional Design.

Brief CV of tutor 2: Georgia Sakellaropoulou

Georgia Sakellaropoulou has over 14 years of experience in educating students with Moderate Disabilities in ICT fields. She is a Junior Reseacher at the DAISSy Research Group of Hellenic Open University and a PhD student in the fields of educators' professional development in Inclusive STEAM Educational approach for students with Mild Disabilities. Topics of interest: ICT in Special Education, STEAM in Special Education, Inclusive Education, Inclusive STEAM Education for students with Mild Disabilities, Educators' Competence Development.

Brief CV of tutor 3: Lefkothea Kartasidou

Lefkothea Kartasidou is a Professor in Special Education at the Department of Educational and Social Policy of the University of Macedonia (Greece). She has a B.A. in Preschool Education, Department of Preschool Education, Aristotle University of Thessaloniki and Ph.D. in Special Education, University of Cologne, Germany. She has worked as Special Educator at a Special School, as a Preschool Educator in West Attica and as a Music teacher at Music High School in Katerini, Greece. She has published on Special Education in Greek and international Journals. Her current research interests include: Special education approaches, Music education of students with disability, Perceptual motor development and skills, intellectual disability, Social Skills, Self-determination and Transition.

Brief CV of tutor 4: Ioannis Agaliotis

Ioannis Agaliotis is Professor of Instructional Methodology for the Education of Students with Disabilities at the Department of Educational & Social Policy of the University of Macedonia, Thessaloniki, Greece.

He teaches at the Undergraduate and Postgraduate level of Studies courses on Learning Disabilities, Instruction of Mathematics in Special Education, Instructional Methodology for Students with Disabilities, Differentiated Instruction, and Inclusive Education. He directs the Postgraduate Program of Studies in “Special Education and Rehabilitation” and the Laboratory for “Educational and Social Inclusion of Individuals with Learning and Behavior Difficulties”. He has participated in several EU-funded programs, and he has served for five years as co-editor of the journals “Insights into Learning Disabilities: From Prevailing Theories to Validated Practices” and “Strategies for Successful learning”, published by the Non-Profit Organization “Learning Disabilities Worldwide”, situated in Massachusetts, USA. He has published extensively, both in Greece and internationally, books and papers on various issues of Special Education. His research interests include: Educational Assessment, Instruction of Academic and Social Skills to Students with Mild Disabilities, Differentiated Instruction, Curricula for Students with Disabilities, and Inclusive Education.

Brief CV of tutor 5: Rosabel Martínez

Rosabel Martínez is Assistant Professor in the Department of General Didactics and Specific Didactics at the University of Alicante (UA). She has earned a PhD from University of Alicante. She is a graduate in Primary Education Teacher by the UA (where she was awarded the extraordinary degree's award) and graduate in Psychology (psychologist membership number: CV16700) by the Universitat Oberta de Catalunya (UOC). She is a member of the research group GIDU-EDUTIC/IN (Research Group on University Teaching-Education and Information and Communication Technologies. Inclusive Education) (VIGROB-330) of the University of Alicante. Her research work focuses on the integration of digital technology in education.

Brief CV of tutor 6: Aitana Fernández

Aitana Fernández is PhD in Educational Research from the University of Alicante (Cum Laude) and Assistant Lecturer (LOU) in the area of Didactics and School Organisation in the Department of General Didactics and Specific Didactics. She takes part in research and teaching innovation projects in Higher Education. Her main line of study is anxiety in education and associated school problems. The results obtained have been published in articles and book chapters, and have been presented at national and international education conferences.

Brief CV of tutor 7: Copelia Mateo

Copelia Mateo is Associate Professor in the Department of Innovation and Didactic Training in the Faculty of Education at the University of Alicante. She has participated in intercultural and extracurricular activities for American students at the Council on International Education Exchange (CIEE) Alicante. She has participated in different research projects and research networks in university teaching. His doctoral research focuses on the incorporation of new technologies in the teaching and learning of English as a foreign language. Specifically in the creation of Virtual Language Learning Environments.

Brief CV of tutor 8: Rosabel Roig

Rosabel Roig is Doctor in Pedagogy (extraordinary award) and Professor at the University of Alicante [UA] in the Department of General Didactics and Specific Didactics with the research profile "Curricular integration of ICT in contexts of teaching-learning and inclusive education". She is Director of the UNESCO Chair on Education, Research and Digital Inclusion (https://catedraunesco.ua.es). She is coordinator of the Doctoral Programme in Educational Technology Applied to Knowledge (TEAC). She is editor of the scientific electronic journal Journal of New Approaches in Educational Research (NAER) (http://www.naerjournal.ua.es), indexed in SCOPUS and ESCI.

Brief CV of tutor 9: Mihail Kozhuharov

Mihail Kozhuharov, PhD is a Chief Assistant Professor at Trakia University - DIITT. He has a Doctorate in Economics and Management, a Master's degree in Industrial Management and a Bachelor's Degree in Mechanical Engineering. He is interested in application of Information and Communication Technologies in education, in particular STEAM technologies in engineering disciplines/science. His current research is related to STEAM Education Teaching and Learning. He is the Director of THE STEAM Center at DIITT, Trakia University. He teachers different disciplines in STEAM long-term training of pedagogical specialists and short-term in-service teacher training

Brief CV of tutor 10: Mariya Zhelyazkova

Mariya Zhelyazkova, PhD is an Assistant Professor at Trakia University - DIITT. Her scientific interests are topics related to STE(A)M, Augmented and Virtual Reality (AR/VR), e-learning and the application of Information and Communication Technologies in education. Professional experience: teaching assistant in informatics and information technologies. She is the creator of the Educational Multimedia Application "Tsarevgrad Tarnov" – special application for children which is used in The Veliko Turnovo Museum of History and of the International Symposium "Education'21". Mariya teaches in the STEAM long-term training of pedagogical specialists and short-term in-service teacher trainings.

Brief CV of tutor 11: Marilena Savva

Marilena Savva holds a PhD in the field of Educational Technology at Durham University in the United Kingdom. She holds a B.A. degree in Pre-Primary Education from the University of Cyprus, as well as an M.A. in Inclusion and Special Educational Needs from the University of Birmingham. Since 2020, she has held the position of research assistant within the Research in Science and Technology Education Group (ReSciTEG). She is actively engaged in a diverse range of initiatives that are National and EU-funded projects. Her research interests focus on optimizing the application of digital technologies for educational purposes in schools, assessing the efficacy of technology-enhanced interventions, and devising strategies to aid teachers in enhancing the quality of teaching and learning in their classrooms.

Brief CV of tutor 12: Yvoni Pavlou

Yvoni Pavlou holds a Bachelor's degree in Education and an M.A. and Ph.D. degree in "Learning in Natural Sciences" (University of Cyprus, Department of Education). She has been working as a teaching assistant and a researcher at ReSciTEG since 2015. She participated in several national and EU-funded projects (e.g., SNAC Polar Star, LfE, Digi-Science, SALL). Her research interests concern the development of digitally enhanced learning environments, teachers' professional development for designing and implementing current educational methods (e.g., Open Schooling, Inquiry-based approach, STE(A)M, living labs) in formal and non-formal learning environments and the experimentation with physical and virtual manipulatives for K-12.

Brief CV of tutor 13: Deyana Peykova

Deyana holds a Bachelor's degree in pedagogy from Plovdiv University, Bulgaria. She is the deputy headmistress at Hristo Smirnenski Primary School, one of the more modern schools in the small town of Rakovski, Bulgaria.

B. Programme Structure

Programme Thematic Units & their Description

Title of Teaching Unit 1: **Introduction**

Summary description of the purpose and content of the TU1: Participants will be introduced to the project the course, the platform (e.g., tools, structure) and the format of the training program (e.g., tutors, assignments, educational approach). The participants will also introduce themselves to the overall community to initiate the building of a constructive dialogue.

The learning objectives of the introductory module are as follows:

- Become familiar with the learning environment (modules, duration, assignments/assessment/badges system).

- Interact with other learners in the e-learning community and become familiar with its tools and features.

- Become motivated to include Inclusive STEAM practices in their class/school.

- Participate and collaborate in local, national, and international educational communities, including schools and educators

Week 1 is comprised of the following three modules:

M1.1. Structure of the MOOC and the training program. In this module, the background and rationale of the MOOC will be presented, as well as the overall learning objectives, requirements, and structure of the MOOC. In addition, the learners will familiarize themselves with the platform and the ways they can interact with peers, and the MOOC tutors.

M1.2. The SpicE project. In this module, participants will be introduced to the SpicE project and its approach, and the importance of Inclusive STEAM education.

M1.3. Building a community of Inclusive STEAM educators. With the use of the forum, the learners will introduce themselves to the rest of the participants. The participants will be able to exchange experiences and good practices, mention their expectations of the training program etc.

Duration in hours, Value in ECTS: 5,5 hours, 0,22 ECTS

Responsible trainers*:* Natalia Spyropoulou and Georgia Sakellaropoulou

Title of Teaching Unit 2: **STEAM education**

Summary description of the purpose and content of the TU2: During the second week of the MOOC, teachers' needs related to the development of understanding and strategies relevant to STEAM education will be addressed, by focusing on the development of relevant competences. The overall goal of Week 2 is to develop a foundational theoretical background of STEAM education (relevant frameworks, teaching practices for developing students' STEAM skills, exemplary cases of STEAM education activities, etc.).

Week 2 is comprised of the following three modules:

M2.1. The STE(A)M educational approach. This module provides an overview of the STEAM approach, based on relevant literature

M2.2. Developing students' STEAM competences. This module focuses on presenting educational strategies and tools for developing students' STEAM competences.

M2.3. Assessment in STEAM activities/projects. This module focuses on familiarizing participants in formative and summative assessment methods to identify students' progress in STEAM activities/projects.

Duration in hours, Value in ECTS: 11,5 hours, 0,46 ECTS

Responsible trainer: Marilena Savva, Yvoni Pavlou, Mihail Kozhuharov, Mariya Zhelyazkova, Deyana Peykova, Natalia Spyropoulou and Georgia Sakellaropoulou

Title of Teaching Unit 3: **Inclusive and Special education**

During the third week of the MOOC, teachers' needs related to the development of understanding and strategies of Inclusive education will be addressed, by focusing on the development of relevant competences (Demonstrate and apply knowledge of Inclusive and Special Education; Identify and select appropriate resources and (Assistive Technology) tools for Inclusive STEAM Education; Facilitate all learners' Inclusive competences; Assess and analyze individual learners' activity/project performance in Inclusive STEAM classrooms; Participate and collaborate in local, national, and international educational communities, including schools and educators).

Week 3 is comprised of the following modules:

M3.1. Inclusive and Special Education Approaches. This module focuses on presenting key principles of Inclusive and Special Education, the differences between Inclusive and Special education, as well as relevant educational approaches.

M3.2. Practical solutions and strategies for Inclusive and Special Education. This module focuses on presenting a variety of educational strategies (e.g., UDL) for addressing learners' individual needs, as well as Assistive Technology solutions and practices on how to incorporate relevant tools.

M3.3. Assessment for Inclusive Education. This module focuses on presenting formative and summative assessment methods to identify all learners' needs and progress.

Duration in hours, Value in ECTS: 15 hours, 0,6 ECTS

Responsible trainer: Lefkothea Kartasidou, Ioannis Agaliotis, Marilena Savva, Yvoni Pavlou, Deyana Peykova

Title of Teaching Unit 4: **Inclusive STEAM Education (part A)**

During the fourth week of the MOOC, learners will develop understanding and educational strategies relevant to Inclusive STEAM education, based on related competences (Identify and examine the impact of STEAM Education in Inclusive Educational Environments; Participate and collaborate in local, national, and international educational communities, including schools and educators; Apply inclusive STEAM teaching and learning techniques in Inclusive STEAM classrooms).

Week 4 is divided into two modules:

M4.1. Introducing Inclusive and Special education strategies in STEAM activities/projects. This module showcases strategies (e.g., UDL, DI, ILP) on how inclusive approaches can augment the learning impact and enhance skills development during a STEAM activity/project.

M4.2. The influence of STEAM education in Inclusive and Special Education. This module focuses on how STEAM education approaches and practices can facilitate the development of all learners' needed knowledge and skills.

Duration in hours, Value in ECTS: 8 hours, 0,32 ECTS

Responsible trainer: Rosabel Martinez, Aitana Fernandez, Rosabel Roig, Copelia Mateo, Marilena Savva, Yvoni Pavlou, Natalia Spyropoulou and Georgia Sakellaropoulou

Title of Teaching Unit 5: **Inclusive STEAM Education (part B)**

During the fifth week of the MOOC, learners will continue developing understanding and educational strategies relevant to Inclusive STEAM education, based on related competences (Assess, analyze and monitor learners' needs in Inclusive STEAM context; Develop learners' profiles for Inclusive STEAM Education; Participate and collaborate in local, national, and international educational communities, including schools and educators; Implement policies that promote STEAM Education and Inclusion).

Week 5 is divided into two modules:

M5.1. Educational practices for identifying and monitoring students' needs in STEAM activities/projects. In this module, teachers will be confronted with practical solutions for monitoring the needs, as well as how to combine knowledge from learners' needs assessment and identification, screening of learners' (possible) signs of disabilities and pedagogical STEAM learners' assessment for creating learners' profiles for Inclusive STEAM Education.

M5.2. EU educational policies. EU education policies and procedures for Inclusion and STEAM education (e.g., European Pillar of Social Rights) will be presented and discussed in relevance to the role of an Inclusive STEAM educator.

Duration in hours, Value in ECTS: 10 hours, 0,4 ECTS

Responsible trainer: Rosabel Martinez, Aitana Fernandez, Rosabel Roig, Copelia Mateo, Mihail Kozhuharov, Mariya Zhelyazkova, Deyana Peykova, Natalia Spyropoulou and Georgia Sakellaropoulou

Timetable for the Implementation of Individual Teaching Units:

Unit Title	Week	Hours	ECTS	Teacher
Introduction	**1**	**5,5**	**0,22**	**Natalia Spyropoulou, Georgia Sakellaropoulou**
STEAM education	**2**	**11,5**	**0,46**	**Marilena Savva, Yvoni Pavlou, Mihail Kozhuharov, Mariya Zhelyazkova, Deyana Peykova, Natalia Spyropoulou, Georgia Sakellaropoulou**
Inclusive and Special Education	**3**	**15**	**0,6**	**Lefkothea Kartasidou, Ioannis Agaliotis, Marilena Savva, Yvoni Pavlou, Deyana Peykova**
Inclusive STEAM Education (part A)	**4**	**8**	**0,32**	**Rosabel Martinez, Aitana Fernandez, Rosabel Roig, Copelia Mateo, Marilena Savva, Yvoni Pavlou, Natalia Spyropoulou, Georgia Sakellaropoulou**

Inclusive STEAM Education (part B)	**5**	**10**	**0,4**	**Rosabel Martinez, Aitana Fernandez, Rosabel Roig, Copelia Mateo, Mihail Kozhuharov, Mariya Zhelyazkova, Deyana Peykova, Natalia Spyropoulou, Georgia Sakellaropoulou**
Total	**5**	**50**	**2**	

C. Programme Implementation Methodology, Evaluation & Certification

Teaching & Attending: The teaching design follows the methodology that supports Open and In Distance electronic learning. Teaching through an asynchronous tele-education system is mainly based on the asynchronous study of educational material and development of activities, in order to ensure a high degree of learner autonomy. However, in addition, and based on educational needs, help and guidance will be given by the tutors on a case-by-case basis.
The distribution of the educational and support material is done gradually and on a weekly basis. The educational material is on-line, in digital format, and can be stored locally. It is easily printable for users who prefer printed material.

Description of educational material: Variety of videos, e-documents, presentations, websites, padlets, forums, podcasts, H5P files

Sample of educational material: https://public.3.basecamp.com/p/5L4bdyZnAq9dW98iUv7Q7F6x/vault

How trainees are assessed*:* The assessment of learners, which will lead to a training certificate, will be conducted through multiple choice tests.

At the beginning of each module, a list of prerequisite learning outcomes will be presented to help learners self-assess their level of readiness to take the module.

At the end of each module, the learners will answer a set of Multiple-Choice Questions. An online badge will be awarded to those who complete the test by correctly answering more than 60% of the questions.

Assessment of the Programme
For the evaluation of the services provided by the Programme at the level of educational work as well as administrative and technical support, the Trainee is asked at the end of the Programme to complete a single questionnaire, which includes specific axes and evaluation indicators, which is processed and followed up by the Internal Assessment and Training Unit of H.O.U.[1]

Type of certificate issued

After the successful completion of the programme, a " Training Certificate " and an "Annex to the Certificate of Training" are issued, which include the following information: a) the duration of the

[1] According to the Internal Regulation of the L.L.C., Article 8

programme in hours, b) the teaching method, c) the credit units (ECTS) and d) the titles of the thematic or teaching units of the programme.

The certificates shall be signed by the Scientific Director of the programme, the President of the L.L.C. and shall be available after the completion of the programme. In case of unsuccessful completion of the Programme, a simple 'Certificate of Attendance' will be issued. In addition, payment of the full tuition fees for the Programme is required for the award of the certificates.

Other Obligations of Trainees

In addition to the successful completion of the programme, the following are required from the trainees **for the award of the Certificate**:

- Acceptance of their participation in the programme assessment process

Obligations of Trainers

- Communicates through the training platform with the trainees, answering any questions/clarifications that may have been raised by the trainees.
- Posts announcements on the educational platform regarding the course and the way it is conducted
- Resolves questions, guides learners in the correct study of the training material, suggests additional literature - if requested.
- Encourage trainees to participate in the learning process, if it is found that some of them abstain from the learning process.
- Carry out any task or work related to the educational support of trainees.
- Grades the development questions (open-ended questions) and the trainees' work.

D. Selection Method & Registration in the Programme

Way to register in the programme:

The registration in the Programme is done online by submitting a Registration Application Form at https://apps.eap.gr/kedivim/web/ and at https://spiceacademy.eu/spice-platform/ .

Tuition fees and payment method:

No tuition fees are required, the MOOC is offered free of charge.

The proposed course “STEAM education for all learners: Incorporating STEAM and Inclusive education practices in everyday teaching” has been developed in the framework of the Erasmus+ Teacher Academies project entitled “SpicE - Special Education STEAM Academy”, which is funded by the European Union (ERASMUS-EDU-2021-PEX-TEACH-ACA, Grant Agreement number: 101056159) and coordinated by the Hellenic Open University.

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