



ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ

Εθνικόν και Καποδιστριακόν
Πανεπιστήμιον Αθηνών

— ΙΔΡΥΘΕΝ ΤΟ 1837 —

ΣΧΟΛΗ ΕΠΙΣΤΗΜΩΝ ΤΗΣ ΑΓΩΓΗΣ

ΠΑΙΔΑΓΩΓΙΚΟ ΤΜΗΜΑ ΔΗΜΟΤΙΚΗΣ ΕΚΠΑΙΔΕΥΣΗΣ

COURSES FOR CIVIS STUDENTS

- 1) Introduction to the Nature of Science (NOS): Epistemology and History
(Professor K. Scordoulis, G. Katsiaboura) **WINTER SEMESTER**
- 2) Environmental Ethics and Climate Crisis (Professor K. Scordoulis, G. Katsiaboura)
SPRING SEMESTER
- 3) SocioScientific Issues in Biology and Geography
(Professor Evangelia Mavrikaki & Apostolia Galani) **WINTER SEMESTER**
- 4) School-based education for drug, alcohol and internet abuse prevention
(Professor A. Tsiboukli) **SPRING SEMESTER**
- 5) Special topics in Mathematics Education (Professor C. Misailidou)
WINTER SEMESTER
- 6) Emerging Technologies in Education (Professor G. Koutromanos)
WINTER SEMESTER
- 7) Systemic approaches and complexity in interdisciplinary mathematics education
(Professor A. Moutsios-Rentzos) **SPRING SEMESTER**
- 8) Theory of Literature and Literary Criticism. An Introduction.
(Professor Tzina Kalogirou) **SPRING SEMESTER**
- 9) Literature Teaching :Theory and Practice. (Professor Tzina Kalogirou)
WINTER SEMESTER

COURSE DESCRIPTION

- 1) Introduction to the Nature of Science (NOS): Epistemology and History
(Professor K. Scordoulis, G. Katsiavoura) **WINTER SEMESTER**

History and Epistemology of Science

Introduction

The Medieval World View

Basic Astronomical Phenomena and Planetary Models.

Astronomical Models. Qualitative and quantitative. "Saving the Appearances."

Planetary Astronomy and the Ptolemaic Paradigm. A model of success for 1500 years.

Copernicus v. Ptolemy. The Copernican Revolution as anomalistic. The equivalence of Copernican and Ptolemaic astronomical models.

Kepler's Laws; Heavenly harmony and Pythagoreanism.

Reflections on the Copernican Revolution

The Old Physics of Motion: Aristotle. Impetus.

The New Physics: Kinetics - the 'why' of motion.

The New Physics Completed. Galileo's Trial.

Newton. His life. The apple myth.

The Grand Design: Newton's Principia. Contents, Laws, Rules of Reasoning.

The New Scientific Method of the Seventeenth Century. Galileo, Bacon, and Descartes

The Legacy of the Scientific Revolution. Considerations and Reflections.

The Beginning of Modern Physics: Rutherford to Planck

Einstein, 1905 and Special Relativity; General Relativity.

Bohr and the Theory of the Atom

Copenhagen, and the Creation of Quantum Mechanics

The Interpretation of Quantum Mechanics. The Legacy of Modern Physics

The following are the required texts for the course:

H. Butterfield: The Origins of Modern Science

B. L. Cline: Men Who Made a New Physics

I.B. Cohen: Birth of a New Physics

- 2) SocioScientific Issues in Biology and Geography (Professor Evangelia Mavrikaki & Apostolia Galani) **WINTER SEMESTER**

SocioScientific Issues in Biology and Geography

Teachers: Evangelia Mavrikaki & Apostolia Galani

Type of course: Not mandatory

Semester: Fall

Description: The continuous developments in the field of science and technology directly affect society and the way the latter deals with science. The terminology socio-scientific issues (SSI) that appeared (arisen) within the science education

community states that many of the issues that science deals with, are not amenable to obvious and unique solutions but are issues that are amenable to alternative proposals for resolution depending on the perspective. For this reason, they are considered to be an ideal framework for the development of informal reasoning and argumentation in order to support a variety of opinions.

In this lesson, topics such as the Climate change crisis and the COVID-19 pandemic are the main topics to be analyzed. Various biological, geographical, societal, economical and other factors that affect or are affected by these issues will be identified. Students will be trained to identify appropriate and reliable data sources, work in groups to analyze these data and provide arguments to support decisions on issues that arise and are relevant to climate change and the COVID-19 pandemic.

Learning outcomes: By the end of the course, students will be able to provide examples of SSIs

to recognize the multifaceted nature of the SocioScientific Issues (SSIs)

to analyze SSIs and provide evidence based solutions

to provide high level arguments

identify reliable data sources.

They will also acquire the skills to use SSIs to promote

their students' argumentation skills and

their students' scientific literacy.

sustainability.

Literature:

Evagorou, M., Nielsen, J.A., & Dillon, J. (eds) (2020). Science Teacher Education for Responsible Citizenship: Towards a Pedagogy for Relevance through Socioscientific Issues (Contemporary Trends and Issues in Science Education). Springer.

Sadler T. D. (2011). Socio-scientific Issues in the Classroom. Springer.

Simonneaux L. (2007). Argumentation in Science Education: An Overview. In: Erduran S., Jiménez-Aleixandre M.P. (eds) Argumentation in Science Education. Science & Technology Education Library, vol 35. Springer, Dordrecht.

https://doi.org/10.1007/978-1-4020-6670-2_9

Ratcliffe, M., Grace, M. (2003). Science Education For Citizenship: Teaching Socio-Scientific Issues. McGraw.

Powell, Wardell A (2020). Socioscientific Issues-Based Instruction for Scientific Literacy Development. IGI Global.

Teaching methods:

Teachers' lectures and students' presentations / discussions / storytelling

Inquiry based learning

Project based learning

Expeditionary learning OR Field based learning

Evaluation method: essays

Language: English

3) School-based education for drug, alcohol and internet abuse prevention
(Professor A. Tsiboukli) **SPRING SEMESTER**

Course Description

The current course focuses on school-based drug and alcohol prevention lifelong learning programmes. Drug and alcohol aetiology together with the prevalence of the phenomenon are also presented. Sociocultural factors and the role of the family in the onset of drug and alcohol use, are discussed. Emphasis is placed on peer groups and significant others in the onset of drug and alcohol use, together with school dropout. Primary, secondary, and tertiary prevention programmes are presented, and early prevention and intervention programmes are discussed together with risk and protective factors in the social network. Stages of change, motivational interviewing and relapse prevention models are also presented within the lifelong learning interventions. The role of the media and the social networks in relation to school reentry and social reentry for adolescents and adults accordingly are also discussed as protective or risk factors.

Expected outcomes

By the end of the course, students are expected to increase their knowledge and skills in relation to lifelong learning intervention and drug and alcohol prevention programmes within the school setting. They will be able to present prevention strategies and policies and re-create knowledge that will assist them in applying school-based drug and alcohol prevention and intervention programmes.

Course content

- Prevalence of drug and alcohol use
- Psychosocial variables and drug and alcohol use onset
- Familial factors and the social support network
- The role of peers and significant others
- Lifelong learning, Prevention and Early intervention
- Models and tools of prevention programmes in lifelong learning settings
- Primary, secondary, and tertiary prevention programmes
- The stages of change from use to abstinence
- Motivational Interviewing and Relapse Prevention
- The role of media and social networks
- School drop-out, prevention of school-drop-out and social re-entry
- Referrals and lifelong learning.

References:

- Handbook of Drug Abuse Prevention [electronic resource], ISBN: 9780387354088
HEAL-Link Springer eBooks.
- EMCDDA (2020). ESPAD Report 2019 — Results from the European School Survey Project on Alcohol and Other Drugs. Lisbon:EMCDDA
- Edwards, Griffith (2000). Alcohol: The World's Favorite Drug. NY: St. Martin's Press .

- 4) Special topics in Mathematics Education (Professor C. Misailidou)
WINTER SEMESTER

Special Topics in Mathematics Education I

The course offers an insight in selected areas of Mathematics Education such as “The number concept”, “Basic Concepts in Mathematics”, “Interactions of language and Mathematics” etc. The students will investigate in depth the selected area via lectures, group exercises and self-study and will be provided with lecture notes. They will be assessed for the course through a written essay.

- 5) Emerging Technologies in Education (Professor G. Koutromanos)
WINTER SEMESTER

EMERGING TECHNOLOGIES IN EDUCATION (Code: 81E001)

The aim of this course is to provide students with basic skills in the use of emerging digital technologies – and their pedagogical use in particular – in teaching and learning. Examples of such technologies include augmented and mixed reality, aerial robotics using drones, wearable technologies, and 3D printing.

The goals of this course are to provide students with the ability to:

- Identify the technological and pedagogical affordances of emerging technologies that can be used in teaching and learning.
- Develop basic technological skills in the use of specific tools and applications of emerging technologies for teaching and learning.
- Design and develop pedagogically substantiated educational applications through the use of emerging technologies.
- Design and develop educational scenarios with the support of emerging technologies.
- Evaluate emerging technologies based on specific pedagogical and technological criteria for the purpose of integrating them in teaching and learning.

- 6) Systemic approaches and complexity in interdisciplinary mathematics education
(Professor A. Moutsios-Rentzos) **SPRING SEMESTER**

(1) GENERAL

SCHOOL	School of Education		
DEPARTMENT	Department of Pedagogy and Primary Education		
LEVEL OF STUDIES	1 st Cycle		
COURSE CODE	81E002	SEMESTER	D, F, G
COURSE TITLE	SYSTEMIC APPROACHES AND COMPLEXITY IN INTERDISCIPLINARY MATHEMATICS EDUCATION		
INDEPENDENT TEACHING ACTIVITIES	WEEKLY TEACHING HOURS	ECTS	
	LECTURES	3	4
COURSE TYPE	<p>General background.</p> <p>Specialisation of general knowledge.</p> <p>Development of skills in interdisciplinary communication and planning of mathematical activities.</p> <p>Development of systemic thinking about mathematics within complex learning environments.</p>		
PREREQUISITE COURSES	NO		
LANGUAGE OF TEACHING AND EXAMINATIONS:	ENGLISH		
THE COURSE IS OFFERED TO ERASMUS STUDENTS	YES		
COURSE WEBSITE (URL)	https://eclass.uoa.gr/courses/PRIMEDU949/		

(2) LEARNING OUTCOMES

Learning Outcomes

Upon successful completion of the course, the students will be able to:

- to know, describe, distinguish, compare, classify, and evaluate basic theories, constructs, and ideas about systemic approaches, complexity, and interdisciplinarity in education and in mathematics education
- to know, describe, distinguish, review and make inferences about effective ways of interdisciplinary teaching mathematics that are included in the curriculum of primary school
- to know, describe, review, and evaluate mathematics teaching decisions for the subject of mathematics in the school class and school unit systems
- to know, describe, review, and evaluate mathematics teaching decisions for the subject of mathematics drawing upon a systemic engineering of the textbooks and the curriculum
- to know, describe, review, make inferences and evaluate direct/indirect ways to support the development of interdisciplinary mathematical thinking in the system of the primary mathematics classroom
- to know, describe, apply, synthesize and organize criteria for the evaluation of mathematics textbooks, as well as to reorganize and adapt them to the needs of students in a class, within the perspective of a systemic, interdisciplinary approach.

General Competences

- Development of logical-deductive thinking and linking with everyday life
- Search, analysis and synthesis of data and literature, using the necessary technologies
- Adapting to new situations
- Problem solving
- Decision-making
- Autonomous work
- Teamwork
- Work in an interdisciplinary, complex environment
- Project planning and management
- Respect for diversity and multiculturalism
- Criticism and self-criticism
- Promotion of creative and critical thinking
- Demonstrate social, professional and ethical responsibility, and sensitivity to gender issues (in mathematics education and more broadly in everyday teaching practice)

(3) COURSE CONTENT

The course includes, but is not delimited to, the following:

- System, learning organization, types of systems.
- Complexity.
- Conceptualisations of interdisciplinarity compare/contrast with multidisciplinary, transdisciplinarity, ST(R)E(A)M etc.
- System thinking
- Learning as linking links
- Interdisciplinary problem solving and problem posing.
- The school unit and the school class as learning organisations.
- Signs and significations in the everyday teaching and learning: inter-/intra-disciplinary investigations.
- Mathematics and mathematics notation in in the everyday teaching and learning: inter-/intra-disciplinary investigations.
- Textbooks and curriculum: interdisciplinary perspectives.
- Norms of social interactions in the complex mathematics class.
- Social systems in education.
- Familial relationships in the complex primary school mathematics school class.
- Development of mathematical argumentation in the complex classroom.

(4) TEACHING AND LEARNING METHODS - ASSESSMENT

DELIVERY	Face-to-face	
USE OF ICT	Use of ICT in the teaching process and the communication with the students	
TEACHING ORGANISATION	<i>Activity</i>	<i>Semester Workload</i>
	Lectures	40
	Reflecting laboratories and design	10
	Study & Analyse Literature	10
	Essay writing	20
	In-class presentations	10
	Course Total	90
STUDNETS' ASSESSEMENT	Assessment in English Formative & Summative	

	<p>Written assignment (up to 45%)</p> <p>Oral Examinations (up to 45%)</p> <p>In-class presentations (up to 10%)</p> <p>The description of the assessment process and the assessment criteria are posted in the e-class of the course.</p>
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(5) RECOMMENDED BIBLIOGRAPHY

- Recommended Bibliography:

Bertalanffy, L. V. (1968). *General System Theory: Foundations, Development, Applications*. George Braziller.

Davis, B., & Sumara, D. J. (2006). *Complexity and education: Inquiries into learning, teaching, and research*. Psychology Press.

Davis, B., Sumara, D., & Luce-Kapler, R. (2008). *Engaging minds: Changing teaching in a complex world*. Routledge.

Davis, B., Francis, K., & Friesen, S. (2019). *STEM education by design: Opening horizons of possibility*. Routledge.

Hager, P., & Beckett, D. (2019). *The emergence of complexity: Rethinking education as a social science*. Springer Nature.

MacDonald, A., Danaia, L., & Murphy, S. (2020). *STEM Education Across the Learning Continuum*. Springer.

Pepin, B., & Roesken-Winter, B. (Eds.). (2014). *From beliefs to dynamic affect systems in mathematics education: Exploring a mosaic of relationships and interactions*. Springer.

Stylianides, G. J., & Hino, K. (2018). *Research advances in the mathematical education of pre-service elementary teachers*. Springer.

Watzlawick, P., Beavin, J., & Jackson, D. D. (1967). *Pragmatics of Human Communication. A study of interactional patterns, pathologies, and paradoxes*. Norton.

Williams, J., Roth, W.M., Swanson, D., Doig, B., Groves, S., Omuvwie, M., Borromeo Ferri, R., & Mousoulides, N., (2016). *Interdisciplinary mathematics education*. Springer Nature.

Wittmann, E. C. (2021). *Connecting Mathematics and Mathematics Education: Collected Papers on Mathematics Education as a Design Science*. Springer Nature.

- Relevant scientific journals (alphabetically):

Canadian Journal of Science, Mathematics and Technology Education

Educational Studies in Mathematics (ESM)

For the learning of mathematics (FLM)

International Electronic Journal of Mathematics Education (IEJME)

International Journal for Mathematics in Education (HMS i-JME)

International Journal of Mathematical Education in Science and Technology

International Journal of Science and Mathematics Education (IJMA)

Journal of mathematical behavior (JMB)

Journal of Mathematics Teacher Education (JMTE)

Journal of Research in Mathematics Education (REDIMAT)

Journal for Research in Mathematics Education (JRME)

Mathematics education research journal (MERJ)

Mathematical thinking and learning (MLT)

The Montana Math Enthusiast

ZDM Mathematics Education (ZDM)

7) Theory of Literature and Literary Criticism. An Introduction.
(Professor Tzina Kalogirou) **SPRING SEMESTER**

Description:

The course offers an introduction to the complex yet crucial area of literary theory. It presents a wide range of positions and movements in contemporary literary theory. It organizes the theories into clearly defined sections and aims in providing an overview in the different literary theories and approaches of interpreting literary texts. Goals: Participants will learn how to apply sophisticated literary terms to a given text. They will familiarize themselves with the challenges of performing such an analysis on a literary text/work they don't actually know, or they read for the very first time. Participants will also be equipped with the language and ideas necessary to have constructive conversations about literature. After the end of the course the participants will be able to analyze literature in a variety of different interpretative angles.

What is literary criticism?

Trends in literary theory. Methodologies of approaching and interpreting literary texts.

Examples.

New Criticism and Russian Formalism.

The Bakhtin School and the theory of the Carnival in literature.

Structuralism and Post-Structuralism.

Psychoanalytic Criticism.

Reader-oriented theories.

Gender Theories, Feminist and Post-Feminist theories, Queer theories.

Post-colonialist theories.

Postmodernism.

Activities:

Participants will read a selection of literary texts in English and answer some discussion questions. Then they will write a brief interpretative analysis of a literary text of their own choice.

Bibliography /required texts for the course:

-RAMAN SELDEN, PETER WIDDOWSON, and PETER BROOKER

A Reader's Guide to Contemporary Literary Theory, London: Pearson ⁵2005. [the electronic version of the book will be provided to the students].

-A selection of articles, papers, and written material (provided)

8) Literature Teaching :Theory and Practice. (Professor Tzina Kalogirou)
WINTER SEMESTER

The course offers an introduction to the field of Literature Teaching/Literary Education. It presents a whole gamut of theoretical and practical matters that circulate Literature as a subject matter in Education. After the end of the course participants will be able to design teaching plans and apply teaching strategies and activities aimed to the productive, creative, and critical instruction of Literature in Education.

What is Literature Teaching and why Literature is important for our lives?

Reading, Responding to Literature, and Teaching the text.

A brief introduction to poetry and its teaching.

A brief introduction to narrative (either short story or novel) and its teaching.

Protocols of Reading. Examples and Activities.

Reader- response theories and their implications in the teaching of literature.

Playful activities in the teaching of literature . Creative writing activities.

A workshop in creative writing [optional]

Bibliography /required texts for the course:

-A selection of articles, papers, and written material mostly from the open access international academic *Journal of Literary Education*

