MODULE OUTLINE

(1) GENERAL

SCHOOL	School of Humanities		
PROGRAM MODULE	Education		
LEVEL OF STUDIES	Postgraduate		
MODULE CODE	**EKP 63**	**YEAR**	**2nd**
MODULE TITLE	Science Education		
INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the module, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the module, give the weekly teaching hours and the total credits*		WEEKLY TEACHING HOURS	CREDITS
		560	20
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).			
MODULE TYPE *general background, special background, specialised general knowledge, skills development*	Compulsory Elective		
PREREQUISITE MODULES:	There are no prerequisite modules		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek		
IS THE MODULE OFFERED TO ERASMUS STUDENTS	No		
MODULE WEBSITE (URL)	https://www.eap.gr/en/educational-sciences/topics/#e63		

(2) LEARNING OUTCOMES

Learning outcomes

The module learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the module are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon completion of the module the student will be able to:

- identify the main problems that pupils face in understanding basic concepts and phenomena in science,
- understand and justify the necessity of teaching science,
- explains how knowledge of pupils' practical-experiential perceptions of science can help to improve the organisation of teaching,
- briefly describes the general characteristics of pupils' perceptions,
- indicates the main changes introduced in the role of the teacher by the new model of teaching in science,
- recognises and uses teaching tools such as cognitive conflict, analogical thinking and goal-obstacles,
- recognises the main features and differences between the different epistemological positions on the nature of scientific knowledge,
- describe and distinguish the different concepts that students use in order to

understand and explain concepts and phenomena in science,
- recognises the role and character of informal and non-formal forms of science education,
- recognise the changes that science knowledge undergoes when it is transformed into school knowledge and compare their characteristics,
- analyse and describe the constitution and organisation of the school version of science in different types of teaching material.
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General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the module aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

- Search, analysis and synthesis of data and information, using the necessary technologies
- Adapting to new situations
- Decision-making
- Autonomous work
- Teamwork
- Working in an interdisciplinary environment
- Generating new research ideas
- Respect for the natural environment
- Demonstrate social, professional and ethical responsibility and gender sensitivity
- Exercise of critical and self-critical thinking
- Promotion of free, creative and deductive thinking

(3) SYLLABUS

The module "Science Education" aims to familiarize the students of the Hellenic Open University with:

- the systematic examination of problems related to the understanding of natural science concepts,
- the use of existing research data - especially those related to students' misconceptions - in teaching,
- corrective intervention in the transformation of the content to be taught,
- the exploitation of existing learning tools so that they can be effectively integrated into teaching.

In particular, the module addresses the following central questions:

- What are the factors that determine and define School Science as an autonomous field of knowledge?
- What are the necessary skills, knowledge, attitudes and values that are deemed necessary for students to develop through the teaching of Science?

- What are the pupils' initial ideas regarding concepts and phenomena in science and how can these form the starting point for the construction of school science knowledge?

Cognitive Objects of the subject:

- Necessity of systematic examination of the teaching of science.
- Basic conceptual framework of science teaching.
- Modern methods of teaching science such as: general characteristics of teaching, criteria for selection of content, learning processes, pacing and assessment methods, design and development of teaching materials.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Distance learning by conducting at least five online Group Counselling Sessions (GSC) during the academic year on the weekends.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	In Group Counselling Meetings (GCMs) and/or in communication with students, the following are used: • remote meeting tools (webex, skype), • presentation software (powerpoint, prezi), • software specific to the subjects being taught (such as Phet Collorado simulations, Learning Objects for Science e.g. Photodendro). • Web browsers (web browsers) In addition, students use office automation tools, web browsers and e-readers for digital books.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other*	The assessment in the EKP63 is carried out through the preparation of four (4) written assignments during the academic year, the average of which contributes to the final grade of the subject by 30%, if it is eligible for the final or repeat examinations. The transcripts of the four (4) written assignments are posted progressively at least in the relevant area of the

Activity	*Year workload*
5 GCMs (x 4 hours)	20 hours
Written Assignments (4 assignments x 40 hours)	160 hours
Examination	3 hours
Individual study	377 hours
Module total	560 hours

Specifically-defined evaluation criteria are given, and if and where they are accessible to students.	EKP63 thesis on the study platform (see https://study.eap.gr/course/view.php?id=193). The average of the written assignments contributes to the final grade by 30%, if a projectable grade is achieved in the final or re-examination. FINAL AND REPEAT EXAMINATIONS The mode of assessment in the final or repeat online written examinations is the distance development written examination, with open books and potential oral writing support. The grade of the final or repeat written examination contributes 70% to the final grade of the module.

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography

Suggested principal bibliography (student training package, in Greek):

• Bliss, J., Cooper, G., Koliopoulos, D., Koulaidis, V., Ravanis, K., Solomon, J. Tsatsaroni, A., Hatzinikita, B., Christidou, B., & Christidou, B. (2001). *Science Education (Vol. A),* Patra: EAP (in Greek).

• Koliopoulos, D., Koulaidis, V., Tsatsaroni, A., Hatzinikita, B., Christidou, B., & Ogborn, J. (2001). *Science Education (Vol. B),* Patra: EAP (in Greek).

• Dimopoulos, K. (2008). *Science teaching. Informal Forms of Science Education.* Patra: EAP (in Greek).

Additional texts (in Greek):

• Driver, R., Squires, A., Rushworth, P., & Wood-Robinson, V. (1998). *Building the Concepts of Science: A Global Synthesis of Student Ideas,* (transl. M. Hatzi). Athens: Tipothito – G. Dadradnos, p. 153-154, 160-162, 164-166, 167-170, 176-177, 268-273, 300-301.

• Hatzinikita, B., & Koulaidis, V. (2000). Primary school students' representations of changes in physicochemical systems: a classification system. In P. Kokkotas (Ed.). *Teaching Approaches in Science: Contemporary Considerations,* (pp. 85-100), Athens: Tipothito – G. Dadradnos.

- Suggested Additional Bibliography

Educational material is included in each study module:

• Pettrogiannis, K., & Andrianopoulou, P. (Eds.) (2022). *General guidelines for writing bibliographic references & citations based on the American Psychological Association bibliographic system, – APA (7th Edition).* Hellenic Open University.

• Proceedings of the National conferences of ENEFET (Association for Research on Science and Technology Education)
http://www.enephet.gr/index.php?page=proceedings-conferences

• Proceedings of the Panhellenic Conference of Science Education in Early Childhood Education
https://12sece.nured.uowm.gr/%cf%80%cf%81%ce%b1%ce%ba%cf%84%ce%b9%ce%ba%ce%ac-%cf%80%ce%b1%ce%bb%ce%b9%cf%8c%cf%84%ce%b5%cf%81%cf%89%ce%bd-%cf%83%cf%85%ce%bd%ce%b5%ce%b4%cf%81%ce%af%cf%89%ce%bd/

Relevant scientific journals (indicative):

Scientific Journals in Greek

• Science Education Reasearch and Praxis
http://pc204.lib.uoi.gr/serp/index.php/serp

• Research in Science & Technology Education Journal
https://ejournals.epublishing.ekt.gr/index.php/RiSTE

• Themes in Science and Technology Education
http://earthlab.uoi.gr/thete/index.php/thete

Foreign language scientific journals

• International Journal of Science Education, https://www.tandfonline.com/journals/tsed20

• Research in Science & Technological Education, https://www.tandfonline.com/journals/crst20

• Science & Education, https://link.springer.com/journal/11191

• School Science Review, https://www.ase.org.uk/resources/school-science-review

• Journal of Science Education and Technology, https://www.springer.com/journal/10956

• Journal of Science Teacher Education, https://www.tandfonline.com/journals/uste20