

Dissertation beginning

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Aims and objectives

This course intends to provide deeper understanding about the epistemological and the educational importance of the links between research and teaching, which characterize the theoretical production and the pedagogical innovation of the Didactics of Mathematics, Science and ICT in education, as well as to highlight the scientific theoretical focus shifts.

In order to comprehend these links, the analyses concentrate in the meanings and the techniques employed to identify the multiple aspects, roles and actions of a didactical situation, as well as in their involvement rate and interaction during the construction of the scientific concepts and the representations of the scientific activity and of the interdisciplinary links.

Within this context, the importance of the systemic perspective is analysed and the significance of constructing diagnostic-evaluation tools that crucially include the links and the aspects, the roles and the actions in the design, synthesis and reporting of a dissertation and of a didactical proposal in accordance with the standards of the contemporary scientific community is highlighted.

Content

The course concentrate in the multifaceted development of methodological skills, including:

- epistemological and psychological tools to diagnose/evaluate erroneous paths, expressions and uses of scientific knowledge.
- techniques of data searching, collecting, analysing and synthesising with the purpose to utilise them in the design of didactical situations of mathematics and Science with an Interdisciplinary approach along with the appropriate employment of ICT.
- techniques of data searching, collecting, analysing and synthesising with the purpose to utilise them in the design of Educational software, environments and applications of ICT to establish an interdisciplinary constitution of scientific knowledge.

Learning outcomes

The students are expected:

- to identify and characterise the aspects, the roles, the actions and the interactions that constitute the learning and construction of the scientific knowledge in mathematics, science and ICT in the contemporary world

- to develop skills with respect to the design and conducting of qualitative and quantitative investigations of scientifically documented research questions, including:
 - search and functional utilization of scientific sources
 - collection-analysis and digital processing of real data and utilization of internet resources in order to adapt the didactical aims and objectives
 - specific techniques (for example, observation, interview, questionnaire design and analysis)
 - interdisciplinary framing within specific educational settings and teaching practices
- to construct diagnostic-evaluation tools and to utilise them within the Instructional Engineering perspective
- to synthesise the results, to orally present this synthesis and to write a report in the form of a scientific announcement in accordance with the international standards of the contemporary scientific community.

Teaching and learning methods:

The teaching-learning methods include

- Theoretical lectures
- Guided activities
- Teamwork presentation-negotiation of various topics
- Teamwork teaching in order to obtain skills with respect to the methodology of observing didactical situations and of the creation of multiple representations with the employment of educational materials and ICT as elements that expand and provide feedback to the *Design of Educational Software for an interdisciplinarily constituted scientific knowledge*.

Assessment/grading:

The assessment combines formative and summative characteristics at both the individual and the team level with respect to

- participation in lectures and guided activities
- oral presentations
- written report of the teamwork project to produce a diagnostic-evaluation tool

Teaching language:

Greek

Recommended sites for scientific documentation and browsing

Except for the announced bibliographical groundwork, the literature cited in the seminars and the papers used in the teamwork projects, we recommended the following sources for the students' systematic browsing and updating.

- <http://www.socialresearchmethods.net>
- <http://www.apa.org/index.aspx>
- <http://owl.english.purdue.edu/owl/resource/560/01/>
- <http://www.ats.ucla.edu/stat/>
- <http://scholar.google.gr/>
- <http://eric.ed.gov/>

Dissertation

Dissertation completion

The Master's Dissertation is a 30 ECTS module and leads to the completion of the Degree. The intention of the Dissertation is for the students to understand the meanings and the techniques of scientific collaboration and involvement in the theoretical and empirical validation and the development of innovative research results or (and) in the investigation of new areas of application of innovative research results.

The completion of the Dissertation implies the acknowledgement of, on the one hand, of the individual ability of each student to for epistemological synthesis, technological integration and pedagogical adaptation of research results and of, on the other hand, the ability to scientifically collaborate, write and orally support the dissertation in accordance with the standards of a scientific announcement.

The Dissertation consists of two phases, which include a tri-staged written synthesis and oral support:

1. Validation of aims and objectives, theoretical documentation of empirical and experimental methodology
2. Search for sources, construction of tools, material processing
3. Design of synthesis/research/experiment.

The first phase (summer term) includes the investigation of questions-aims with regards to research methodologies, to the criteria posed by the epistemological, interdisciplinary and educational validation, to the potential of researching-documenting relevant educational materials and ICT environments.

In the second phase (winter term) the aims and objectives are clearly stated and the Supervisor is assigned, the dissertation design is planned: the theoretical validation, the empirical methodology, the educational tools, the educational scenario, the pedagogical method, the educational materials and the assessment/evaluation process.

Conducting and completing the Dissertation may be realised by teams of up to 3 students with differentiated assessment of the members as proposed by the Supervisor and approved by the Coordinating Committee of the Master's Programme.

The Dissertation should be submitted in writing at least 20 days before the oral presentation and defense.

The final assessment of the Dissertation examines the comprehensiveness of the oral defense, the written report in accordance with the standards of a scientific announcement and the ability for scientific collaboration and effective coordination.