Education in Information and Communication Technologies

CODE (MFORPROF-1-082)
University of Oviedo, Spain

Introduction

Master Universitario en Formación del Profesorado de Educación Secundaria Obligatoria, Bachillerato y Formación Profesional

Facultad de Formación del Profesorado y Educación

1. Lecturers

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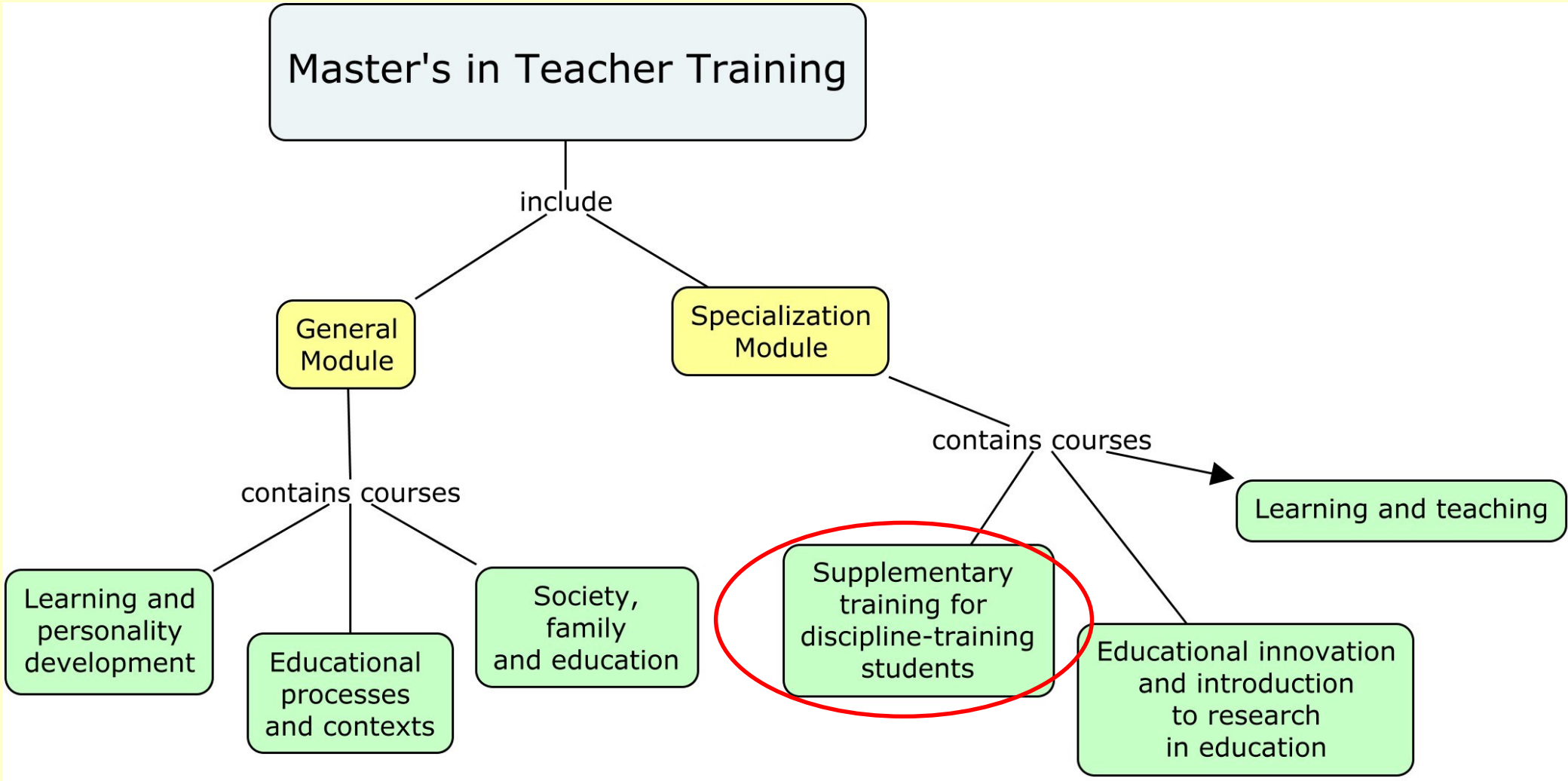
Department of Computing (Informatics), University of Oviedo

About the course

In-class work
- 14 Sessions
- 1.5 hours / session
- From February 4 to May 5
- On Thursday
- From 12:30 to 14:00

- Web for the course -> http://portaleslms.innova.uniovi.es/ouvmproject/

Course Context



Learning outcomes

Having successfully completed the course, you will be able to:

1. *Recognize the current **state and evolution of Computing Technology**, and the economical, social, and cultural implications*

2. *Analyze and **handle the main areas of application of computing technology** in order to the personal and professional developing of citizens in modern society.*

Learning outcomes

Having successfully completed the course, you will be able to:

1. *Recognize the current **state and evolution of Computing Technology**, and the economical, social, and cultural implications*
   - 1.1 Analyze the role of Computing Technology in its different aspects: economical, social, cultural, etc. Distinguish between the main lines of development, and the supporting technologies. Analyze and classify the application areas, and its relation with the types of technologies applied.
   - 1.2 Locate the main milestones in Computing Technology history.
   - 1.3 Analyze the different professional profiles related to computing, and its main competences. Analyze its evolution, current state, and assess future job contexts.

Learning outcomes

Having successfully completed the course, you will be able to:

2. *Analyze and **handle the main areas of application of computing technology** in order to the personal and professional developing of citizens in modern society.*
   - 2.1 Develop the **computational thinking** competence, and other digital competences such as **collaborative work**, **social cyber-interaction**, and **awareness of ethical and security issues**

Contents

1: The Computing Discipline in nowadays society

1. Computing Engineering in context within engineering disciplines
2. Technological evolution of the discipline
3. Technological, economical, social, and cultural consequences of the development of the computing technology
   - Implications for society.
   - Implications for everyday life.
   - Implications of the rapid pace of change of the discipline.
4. The importance of developing discipline competences in secondary education..

Contents

2: The Computing Discipline as a subject in a secondary curricula

1. Courses, itineraries, and teaching specialties related to the computing technology subject in the curricula.

2. Analysis of the curricula contents of Computing Technology courses.

3. Theoretical foundations and activities for modules in the curricula
    1. Computational Thinking
    2. Publishing and dissemination of contents
    3. Multimedia contents edition
    4. Internet and Social Networks
    5. Collaborative work environments
    6. Security, ethics and aesthetics in the use of technology

Methodology

- **In-class activities**

  -> Attendance to online lectures needed
- **In-class activities combined with work at home**

  -> Weekly tasks
- **Group work**

  -> Collaborative work, creating documentation, common sharing, presentations, etc.
- **Different methodological techniques and tools**
  - **Concept Maps**
  - **Brainstorming**
  - **Jigsaw puzzle method**
  - **Timeline**
  - **Collaborative tools: GoogleDocs, Wiki, Virtual Campus**
- **Different computing tools**
- **Oral presentations**

Methodology

- 14 sessions, 1 each week.
- 1.5 hours/session videoconference using *Adobe Connect* tool.
- It is mandatory to participate in the sessions.
  - In order to develop in-class activities (videoconference) (individual or team activities).
- It is mandatory to develop "Out-of-class" activities.
  - Delivered for the next session
- All activities will be part of the grading.

Activity Schedule

Content (topics)	Study week	Meetings/ lectures	Assignments
First topic: Computing in the actual society	Learning outcomes: Recognize the current state and evolution of Computing Technology, and the economical, social, and cultural implications		
Presentation **What to expect from Virtual Mobility**	Week 1	4 February 12:30 -14:00	
Introduction to concept maps as a learning and working group tool.	Week 2	11 February 12:30 -14:00	Act. 1 Using concept maps to learn about Asturias Act. 2 Using concept maps to learn about Oviedo Act. 3 Using concept maps to learn about the Spanish education system
Using rubrics to assess the concept maps activities from section 1 **Presentation of the Education System structure using concept maps.** **Tools in the cloud (Google Drive)** • **Creating a portfolio** • **Using an advanced references repository**	Week 3	18 February 12:30 -14:00	Act. 4 Individual essay about the technological evolution of the discipline (assigned subtopic)
Technological evolution of the discipline 1. **Group work activity: Experts meeting (jigsaw puzzle method)** 2. **Introduction to wikis** 3. **Act. 5. Wiki collaboration by publishing developed work**	Week 4	25 February 12:30 -14:00	Act. 5 (groups) Continuation of the in-class activity Act.6 (individual) Develop the synthesis and conclusions of the topic, and include them in a wiki linking to a page suitably generated

Activity Planning

Content (topics)	Study week	Meetings/lectures	Assignments
First topic: Computing in the actual society	Learning outcomes: Recognize the current state and evolution of Computing Technology, and the economical, social, and cultural implications		
Technological evolution of the discipline **Experts group meeting (iigsaw puzzle method) to review the topic** **Developing a timeline: "the 40 most important milestones of computing technology"**	Week 5	3 March 12:30 -14:00	Act.7 (groups) Develop a timeline with the main milestones of the discipline. Include the important figures in ICT that have been awarded the "Prince of Asturias Awards"
Technological evolution of the discipline **Presenting the timeline** **Technological, economic, social, and cultural implications of the developing of the computing technology** **Brainstorming** **Implications in society** **Implications in everyday life** **Developing a concept map**	Week6	10 March 12:30 -14:00	Act 8 (groups) Develop a conceptual map : poster: Technological, economic, social, and cultural implications of the developing of the computing technology
Technological, economic, social, and cultural implications of the developing of the computing technology **1. Presenting the concept map** **2. Preparing the dissemination and popularization essay about "impact of Computing on society"**	Week 7	17 March 12:30 -14:00	Act. 9 (Individual) Essay about the impact of Computing on society

Content (topics)	Study week	Meetings/ lectures	Assignments
SECOND TOPIC: Main Computing abilities needed for XXI century citizens	Learning outcomes: Analyse and handle the main areas of application of computing technology in order to the personal and professional developing of citizens in modern society.		
Main areas of the digital era to be skilled at: **1- Computational thinking** **2- Publishing and dissemination of contents** **3- Developing of multimedia contents** **4- Internet and social networks** **5- Collaborative work tools** **6- Security, ethics, and aesthetics in the use of technology**	Week 8	24 March 12:30 -14:00	Act. 10 (groups) Work on one of these modules: Theoretical foundations Design of activities
Modulo I: Computational Thinking **1. Theoretical foundations** • **Benefits of learning programming** **2. Activities** • **Introduction to the Scratch language activities** • **Developing a labyrinth game program**	Week 9	31 March 12:30 -14:00	Act. 11 (individual) Expanding the labyrinth game Act. 12 (individual) Designing a question and answer game about Spanish and Asturian culture
Module II. Publishing and dissemination of Contents **1. Theoretical foundations:** • **Classifying and describing technical means of publishing on the internet** **2. Activities** • **Creating a personal blog: first steps**	Week 10	7 April 12:30 -14:00	Act. 13 (individual) Develop a blog as the student portfolio, including the activities developed so far, and adding an essay about Spanish culture
Module III. Editing multimedia contents **1. Theoretical foundations** • **Classifying and describing types of tools for creating contents** **2. Activities** • **Creating a videotutorial: first steps**	Week 11	14 April 12:30 -14:00	Act. 14 (individual) Choose from Develop a video about a specific topic (Spain/Asturias), and publish it in YouTube Create a videotutorial about a tool, and publish it in YouTube Create and audio podcast and publish it

Content (topics)	Study week	Meetings/ lectures	Assignments
SECOND TOPIC: Main Computing abilities needed for XXI century citizens	Learning outcomes: Analyse and handle the main areas of application of computing technology in order to the personal and professional developing of citizens in modern society.		
Module IV. Internet and Social Networks **1. Theoretical foundations** • **Advanced search of information on the internet** • **Specialized repositories** • **Social Networks, classification** **2. Activities** • **Introduction to the Edmodo learning tool and social network.**	Week 12	21 April 12:30 -14:00	Act. 15 (individual) Choose from • Advanced search • Using a repository for learning resources
Module V: Collaborative work tools **1. Theoretical foundations** • **Classifying and describing collaborative work tools on the net** **2. Activities** • **Introducing a project management tool**	Week 13	28 April 12:30 -14:00	Act 16 (Individual) Expand the project management activity Using a shared calendar activity
Module VI: Security, Ethics, and Aesthetics in the use of technology **1. Theoretical foundations** • **Security and ethics habits when using software and data** • **Security and ethics habits when sharing and exchanging information** • **Security and ethics habits when using the net for communication** **2. Activities** • **Using repositories of Creative Commons licensed resources**	Week 14	5 May 12:30 -14:00	Act: 17 (Individual) Create a license for own material Activity about raising awareness on good security and ethics habits

Assessment

Aspects	%
Attendance and participation in online class activities	10%
Developing proposed individual tasks	55%
Developing proposed group activities	35%
Voluntary activities	10%

	Individual	Group	TOTAL
Topic 1			4.5 points
	2	1.5	
Topic 2			4.5 points
Creating a topic		2 points	
Developing a topic	1.5 points		
Individual tasks	2 points		
Class participation			1 point
Challenges			1 point
TOTAL			11 points

Approach subject to changes

Summary

Additional goal

Techniques and tools for active learning used in the course can be used as an example to be applied with secondary or vocational education students.

- *Brainstorming*
- *Concept maps*
- *Jigsaw method*
- *Rubrics*
- *Wikis*
- *Shared documents*
- *Posters*
- *Timeline*
- *Oral presentations*
- *Peer asessment*