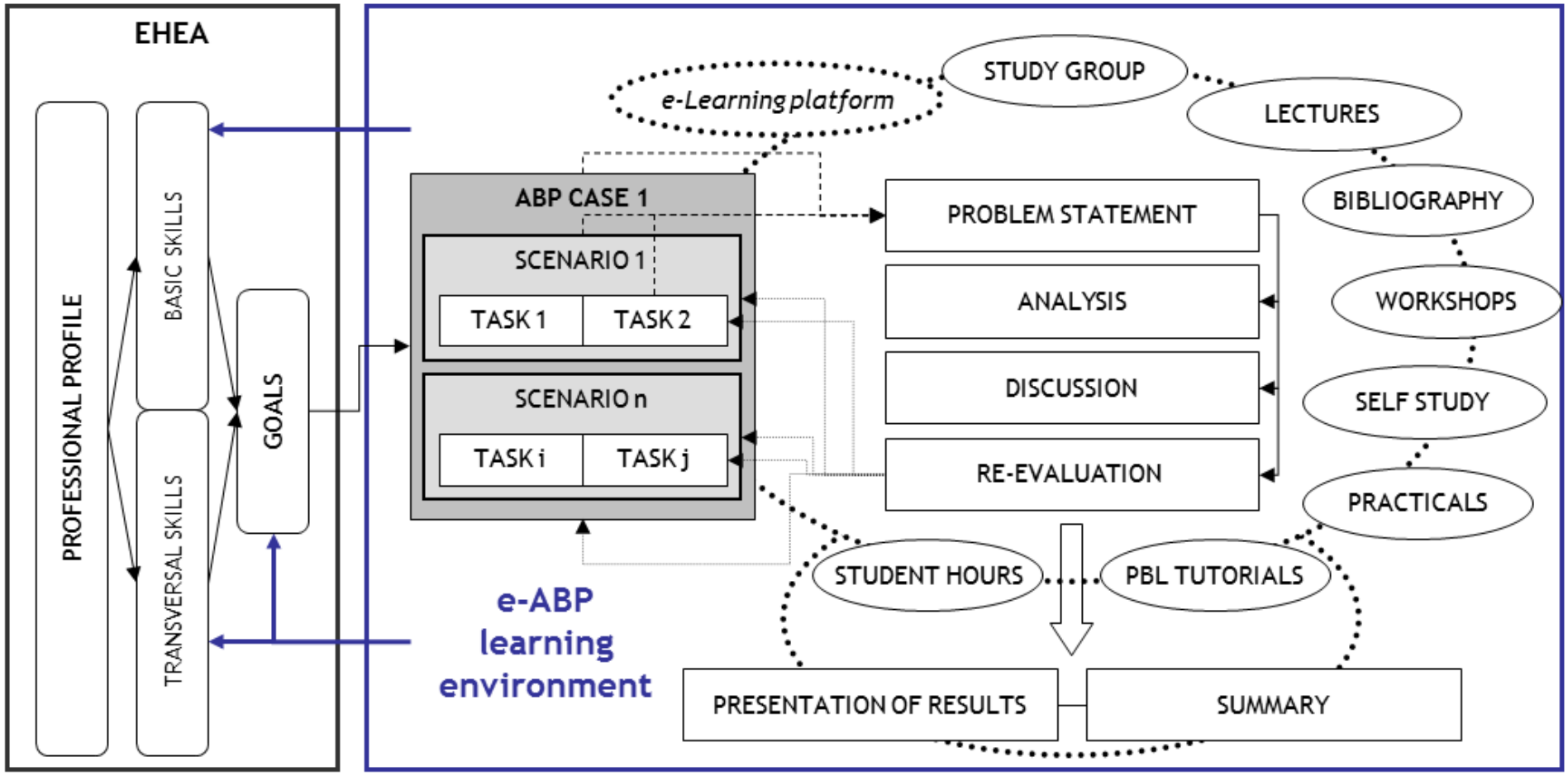
Course descriptions

	GIS*	Cartography*	Remote sensing I
Semester	2nd	4th	5th
ECTS	4.5	4.5	6.0
Students	57	21	15
Objectives	GIS concepts, techniques and methods. GIS software. Data processing general strategies.	Workflow for mapping. Thematic mapping. Map element analysis and layout.	Image processing and information extraction (remote sensors). Validation.
Evaluation criteria (% final mark)	Test (30%)	Test (20%)	Computer Lab test (40%)
	Computer lab test (40%)	PBL (Maps) (60%)	PBL (final): 30%
	PBL tasks (30%)	Assigned tasks (20%)	PBL Tasks: 30%

e-PBL implementation



EXAMPLE 1

Cartography Case: “How do I make maps?

7 scenarios + 16 tasks

- Scenario 1: “How can I decide which type of mapping technique is the most suitable?”
- Scenario 2: “How can I extract thematic information from the data?
- Scenario 3: “How can I set groups and classes in a map?”
- Scenario4: “Reference systems and generalization: how do I use them?”
- Scenario 5: “Choropleth mapping. Making maps 1, 2, 3: population density in León, by province and municipality”
- Scenario 6: “Isoline mapping. Making maps 4, 5, 6: temperature, precipitation, lightning”
- Scenario 7: “Maps with points, and proportional symbols. Making maps 1, 6: population density, lightning”

Week	Content	Hours		
		Lecture	PBL	Practical in the lab
1ª	Topic 1. Introduction to Thematic Mapping	2		
	Session 1 PBL: Presentation of the study case "How do I make maps" (MM)		1	
2ª	Session 2 PBL: Presentation of the study case "How do I make maps" (MM)		1	
	Session 3 PBL: Presentation of Scenario 1 (S1): "How can I decide which type of mapping technique is the most suitable?" Task 1 assignment Work in S1 (Initial stage)		2	
3ª	Session 4 PBL: Work in S1. Review of Task 1 Task 2 assignment		1	
	Tutoría	0,5		
	Session 5 PBL: Correction of Task 2.		0,5	
	Topic 2. Principles of using symbols for mapping (BY THE STUDENTS)	1		
4ª	Session 6 PBL: Presentation del Scenario 2 (S2): "¿How can I extract thematic information from the data?" Task 3 assignment Work on task 3		1,5	
	Session 7 PBL: Review of Task 3. Task 4 assignment.		0,5	
	LAB 1: Computing statistics and graphs using SPSS. Discussion of results. Data filtering.			1

Week	Content	Hours		
		Lecture	PBL	Practical in the lab
5ª	LAB 1: Computing statistics and graphs using SPSS. Discussion of results. Data filtering.			1
	Session 8 PBL: Work on Task 4 Task 5 Assignment		1,5	
	Student hour for questions	0,5		
6ª	Session 9 PBL: Review Task 4		0,5	
	Session 10 PBL: Correction of task 5		0,5	
	Topic 3. Basics of statistics and graphical representation (BY THE STUDENTS)	1		
	Session 11 PBL: Presentation of Scenario 3: How can I set groups and classes in a map" Task 6 assignment		1	
7ª-15	--- Following SC and Tasks			
		16	27	2
	TOTAL (Hours)		**45**	

Table 1. Evaluation (marking)

Item	% Mark
Case Study (Report, materials)	30
Scenario 1	6
Scenario 2	6
Scenario 3	6
Task 10	8
Scenario 4	8
Scenario 5	12
Scenario 6	12
Scenario 7	12
TOTAL Study case (Equals 60% of the final mark of the course)	100

EXAMPLE 2

Remote sensing cases (1/group)

Scenario 1.
Identification and quantification of the burnt areas (caused by wildfires) in the province of León (Spain) in 2014 (from March to October, both inclusive). Required outcome: 1:50.000 map. Comparison with the extent and location of burnt areas in 2000. Write a 10 pages scientific paper with the findings.

Scenario 2.
Identification and quantification of urban growth in Dubai from 1994 until 2014 (5-year update). Required outcome: 1:50.000 map. Comparison between dates. Write a 10 pages scientific paper with the findings.

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Remote sensing: planning (4-5 students)

Tutorial 1: Presentation of the study case. Clarification. Problem statement.
Tutorial 2: Review. Work plan (NEW).
Tutorial 3: Review. Task: Image requirements. State of the art: previous works.
Seminar about sensors: poster making (relevant characteristics, price…).
Tutorial 4: Review. Task: Data base building (prior knowledge + poster info).
Tutorial 5: Review. Task: Pre-processing (prior knowledge).
Tutorial 6: Review. Task: Information extraction (classification) (NEW)
Tutorial 7: Review and update of the work plan
Lecture about the main classification methods (2 hours)
Computer lab: practical about classification (2 hours)
Tutorial 8: Review. Task: Validation (NEW)
Lecture about validation (2 hours)
Computer lab: practical about validation (2 hours)
Tutorial 9: Review. Task: Change detection (NEW)
Seminar: Discussion about the main classification methods (2 hours)
Computer lab: practical about change detection (2 hours)
Tutorial 10: Review and update of the work plan
Tutorial 11: Review
Tutorial 12: Final review
Seminar: Presentation skills
Seminar: Final presentation/video.