ANEXO I

Escuela Técnica Superior de Ingeniería

GENERAL SPECIFICATIONS

COURSE 25/26

Subject Data

Name:	
Ciencias del Medio Físico	
English name:	
Earth Sciences	

Code:	**Type:**
606510107	Foundational

Hours:			
	Total	**In class**	**Out class**
Time distribution	150	60	90

ECTS: 6

Standard group	**Small groups**			
	Classroom	**Lab**	**Practices**	**Computer classroom**
3.5		2.0	0.5	

Departments:	**Knowledge areas:**
Agroforestry Sciences	Environmental Technology
Year:	**Semester**
1st	2nd

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TEACHING STAFF		
Name:	**E-mail:**	**Telephone**
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Others Data (Tutoring, schedule...)		
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ANEXO I

SPECIFIC INFORMATION OF THE COURSE

1. Contents description:

1.1 In English:

The earth and its components. Earth dynamics. Geomorphology and external geological processes. Minerals and rocks important for soils. Applied meteorology and Climatology. Applied forest soils

1.2 In Spanish:

La tierra y sus materiales. Dinámica terrestre. Geomorfología y procesos geológicos externos. Minerales y rocas de importancia edafológica. Meteorología y Climatología aplicada. Edafología aplicada y suelos forestales

2. Background:

2.1 Situation within the Degree:

Earth Sciences is a subject destined to provide the basic knowledge about the soil and the climate of application in subjects that are developed in higher courses of the degree such as "Forest Ecology", "Forestry", "Forest botany, Dendrology" or " Hydrology and Hydrological Forest Restoration "among others

2.2 Recommendations

It is recommended that the students come from the scientific-technological baccalaureate or that they access from the more affinity Higher Level Training Cycles and have studied the subject of "Chemistry and Biochemistry" in the first semester of the course

3. Objectives (as result of teaching):

The general objective of the subject is that students acquire basic knowledge about the physical environment that will serve as application for later disciplines of the degree and for the performance of the profession of forest engineer.

The basic objectives of the subject are focused on:

1. That the student knows the elements, factors and basic processes that govern the conformation and functioning of the terrestrial system as well as the result of those processes.
2. That the student knows the importance, usefulness and applicability of the knowledge acquired about the physical environment in the development of the profession of forest engineer and in other disciplines that are developed in the studies.

At the end of the study of this subject the student must be able to (specific objectives):

1. Know the composition and terrestrial geomorphology.
2. Expose and analyze the elements of the terrestrial system, highlighting their interconnections and their functioning as a system.
3. Describe and analyze the role of different gases in the atmosphere on climate.
4. Describe and discuss the elements of the climate as an expression of the processes that take place in the lower layers of the atmosphere.
5. Expose and discuss the general distribution of climates on the earth and different classification systems, both globally and nationally and know how to use the different classifications with real data.
6. Define and expose the concept of soil, emphasizing its complex, permeable and dynamic nature. To relate it with the life possibilities of the different vegetal species and with the forestry activities.
7. Describe the components of the soil and its influence on the physical, chemical and biological properties.
8. Describe the factors involved in the formation and development of the soil and highlight the relationship between the spatial variations of these factors with the soil variability of a region.
9. To expose the processes that take place in the formation of the soil in relation to the different factors that occur in each site. Relate it to the characteristics of the soils to which they give rise.
10. Expose and discuss different soil classification systems. Carry out practical examples of classification with real data and discuss the possibilities of progressive evolution or degradation in each case.
11. Recognize the main minerals and rocks of edaphic importance.

4. Skills to be acquired

4.1 Specific Skills:

B06: Basic knowledge of geology and terrain morphology and its application in problems related to engineering. Climatology.

C03: Earth Sciences: Geology, Climatology and Edaphology.

4.2 General, Basic or Transversal Skills:

G01: Ability to solve problems

G05: Ability to work in a team

G11: Aptitude for oral and written communication of the native language

G16: Sensitivity for environmental issues

TC1: Be completely fluent in a second language, mastering the different styles and the specific languages required to develop and communicate the acquired knowledge in the scientific and academic environment.

TC3. Develop an attitude of inquiry that permanently enables to review and deepen in the knowledge.

TC4. Acquire Computer and Information Skills (CI2) and apply them working.

TC6. To promote, respect and safeguard human rights, democratic values, social equality and environmental sustainability, without discrimination on the basis of birth, race, sex, religion, opinion or other personal or social circumstances.

5. Training Activities and Teaching Methods

5.1 Training Activities:

- Theory sessions on the contents of the Program.
- Practical sessions in specialized laboratories or computer rooms.
- Field sessions to approach the industrial reality.
- Activities Academically Directed by the Faculty: seminars, conferences, work development, debates, collective tutorials, evaluation activities and self-evaluation.

5.2 Teaching Methods::

- Participatory Master Class.
- Development of Practices in Specialized Laboratories or Computer Classrooms in small groups.
- Development of Field Practices in small groups.
- Approach, Realization, Tutoring and Presentation of Works.
- Evaluations and Exams

5.3 Development and Justification:

Academic sessions of theory

Consist in 32 hours of lectures where the theoretical basis of the subject will be taught, interspersed examples that clarify the theoretical exposure. The board and computer slides will be used as support. During the exhibition questions will be asked to the students to encourage their participation, which will be valued and evaluated positively. In these sessions the specific competences B06 and C03 and the general competence G16 and the transversal competence TC1 are worked on.

Practical sessions in the laboratory

They will consist of 10 sessions of two hours each that will be carried out in the laboratory and in the fields of practices and consist in the recognition of minerals and rocks and the development and resolution of practical cases of the subject. The explanations will also be supported with the blackboard and computer slides. In these practical sessions, the B06, C03, G01, G16, TC1, TC3 and TC4 are worked on.

Working in small groups

Students will do two works in small groups:

Work for oral presentation

Students will make a group work throughout the course that will be presented in public and orally at the end of the course. The works will be related to theoretical and practical aspects of the subject. The works will be proposed by the teacher through a list that will be published at the beginning of the course. For the realization of the work the students will compulsorily realize at the beginning of the semester the "Basic Course of Training in Informational Competences", of 10 h of non-contact duration, given by the University Library of Huelva, in order that the students learn to look for, locate and the bibliographic information. The number of students per group will depend on the number of students enrolled. In this work the specific competences B06, C03 are worked in addition to the general competences G05, G11, G16 and the transversal ones TC1, TC3, TC4 and TC6.

Practical work

It will consist in the acquisition and elaboration of climatic data through a script proposed by the teacher. The works will be proposed by the teacher through a list that will be published at the beginning of the course. The number of students per group will depend on the number of students enrolled. In this work the specific competences B06, C03 are worked in addition to the general competencies G01, G05, G11 and the transversal ones TC1, TC3 and TC4.

Field practice

There will be a field trip (1 day) in which a journey will be made in which geological and geomorphological aspects of the landscape will be discussed and a soil sampling will be carried out in a locality in the province of Huelva. In this practice the specific competences B06 and C03, the general G16 and the transversal TC6 are worked.

6. Detailed Contents

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THEORY

Part I. Climatology

UNIT 1: CLIMATOLOGY: CONCEPTS AND ENVIRONMENTAL PROJECTION.

1.1. Concepts and definitions. 1.2. Historical introduction. 1.3. Importance for the development of plants.1.4.- Climatology in environmental sciences

UNIT 2: THE EARTH´S CLIMATIC SYSTEM.

2.1. Definition of the Earth's climatic system. 2.2. Elements of the Earth's climatic system. 2.3. Variability and changes in the Earth's climatic system.

UNIT 3: ELEMENTS OF CLIMATE.

3.1. Energy (light and temperature). 3.2. Water. 3.3. Atmospheric pressure. 3.4. Wind.

UNIT 4: ATMOSPHERIC DYNAMICS.

4.1. Air masses. Definition and classification. 4.2. Air masses movement. 4.3. General atmospheric circulation.4.4. Local winds.

UNIT 5: THE EARTH'S CLIMATES. CLIMATIC CLASSIFICATIONS.

5.1. Climatic classifications and vegetation zones. 5.2. Austin-Miller classification. 5.3. Walter classification. 5.4. Climate in Spain. 5.5. Spanish classifications of interest to environment studies

Part II: Geology

UNIT 6: GEOLOGY: CONCEPTS AND ENVIRONMENTAL PROJECTION

6.1. Concepts and definitions. 6.2. Historical introduction. 6.3. The Earth's system. 6.4. Geology and environmental projection

UNIT 7: THE EARTH AND ITS COMPONENTS

7.1. The Earth in the universe and the Solar System. 7.2. Structure and composition. 7.3. Tectonic plates movement. 7.4. Geological scale

UNIT 8: INTERNAL GEOLOGICAL PROCESSES

8.1. Magmatism. 8.2. Metamorphism. 8.3. Tectonics

UNIT 9: EXTERNAL GEOLOGICAL PROCESSES.

9.1.- Geomorphology and external geological processes. 9.2. Weathering. 9.3. Erosion and Transport. 9.4. Sedimentation and sedimentary rocks

Part III. Soils

UNIT 10: SOIL SCIENCE: CONCEPTS AND ENVIRONMENTAL PROJECTION.

10.1. Concepts of soil, edaphology and pedology. 10.2. Historical introduction. 10.3.- Profile and horizons. 10.4. Dynamics and evolution of soils. 10.5. Importance for plant developments. 10.6. Soil science and environmental projection

UNIT 11: SOIL COMPONENTS.

11.1. Introduction. 11.2. Mineral fraction. 11.3. Organic matter. 11.4. Organic-minerals complex.11.5. Soil color. 11.6. Air. 11.7. Water. 11.8. Soil solution.

UNIT 12: FACTORS OF SOIL FORMATION.

12.1. Introduction. 12.2. Climate. 12.3. Organisms. 12.4. Humans. 12.5. Parent material. 12.6. Relief. 12.7. Vegetation. 12.8. Time

UNIT 13: PROCESSES OF SOIL FORMATION.

13.1. Introduction. 13.2. Preliminary note: climatic classification according to mean temperatures. 13.3. Calcimorfization. 13.4. Braunification. 13.5. Levigation. 13.6. Podzolization. 13.7. Fersiallitization. 13.8. Ferrallitization. 13.9. Tirsification. 13.10. Salinization. 13.11. Solodization. 13.12. Mottling

UNIT 14.- SOIL HORIZONS DESIGNATION AND FAO SOIL CLASSIFICATION

14.1. Soil horizon designation. 14.2. Introduction to FAO soil classification. 14.3. Principles of soil classification according to the FAO World Reference Base (WRB)

PRACTICAL PROGRAM

1. Criteria for choosing a weather station, calculation of mean values and climate diagrams. Explanation of practical work of climate characterization
2. Reference Evapotranspiration and water balance in soils.
3. Minerals and rocks important for soil formation (I)
4. Mineral and rocks important for soil formation (II)
5. Air mass movement

6. Climatic classifications
7. Granulometric curve in soils
8. Permeability and water retention capacity in soils
9. Soil identification and classification (I)
10. Soil identification and classification (II)

The relationship between the internship program and the specific competences and objectives of the subject is as follows:

- Practices 1 and 2 are related to the competences C03, G01, G05 and TC1, TC3, TC4, TC6 and with objective 2.
- Practices 3 and 4 are related with competencies B06, C03 and with objective 11.
- Practice 5 is related to competencies C03 and G01 and objective 2.
- Practice 6 is related to competencies C03, G01 and G05 and objective 5.
- Practices 7 and 8 are related to competences B06, C03, G01 and objective 7.
- Practices 9 and 10 are related to competencies B06, C03, G01, G16 and objectives 8, 9 and 10.

7. Bibliography

7.1 Basic Bibliography:

Part I. Climatology

Theory

AHRENS, C.D. 2001. Essentials of meteorology. An invitation to the atmosphere. Ed. Brooks/Cole. Tercera edición. USA.

CAPELL MOLINA, J.J. 2000. El clima de la Península Ibérica. Editorial Ariel S.A. Barcelona. 281 pp.

CUADRAT, J.M. Y PITA, M.F. 2006. Climatología. 4ª Edición. Ediciones Cátedra. Madrid. 496 pp.

FONT TULLOT, I. 2000. Climatología de España y Portugal. Segunda edición. Editorial Universidad de Salamanca. Salamanca. 422 pp.

GANDULLO, J.M. 1994. Climatología y Ciencias del Suelo. Fundación Conde del Valle de Salazar. ETSIM. Madrid.

Practice

ALLUE ANDRADE, J.L. 1990. Atlas fitoclimático de España. Taxonomías. Monografias INIA nº 69. MAPA-INIA. Madrid.

FAO (2006). Evapotranspiración del cultivo. Guía para la determinación de necesidades de agua de los cultivos. Estudio FAO riego y drenaje nº 56. Roma, Italia.

RIVAS-MARTÍNEZ, S. 1987. Memorias del mapa de series de vegetación de España. ICONA. Madrid.

Part II. Geology

Theory

ANGUITA, F. Y MORENO, F. 1991. Procesos geológicos internos. Editorial Rueda. Madrid. 232 pp.

ANGUITA, F. Y MORENO, F., 1993. Procesos geológicos externos y geología ambiental. Editorial Rueda. Madrid. 311 pp.

BASTIDA, F. 2005. Geología, una visión moderna de las ciencias de la tierra. Volumen 1. Ediciones Trea. Madrid. 973 pp.

GUTIÉRREZ ELORZA, M. 2008. Geomorfología. Pearson educación. Madrid. 898 pp.

MONROE, J.S., WICANDER R., POZO M. 2008. Geología: dinámica y evolución de la tierra. Paraninfo. Madrid.

STRAHLER, N. 1992. Geología física. Editorial Omega. Barcelona. 629 pp.

TARBUCK, E.J, Y LUTGENS, F.K. 2005. Ciencias de la Tierra. Una introducción a la Geología física. Octava Edición. Prentice Hall. 495 pp + CD.

Practice

GANDULLO, J.M., SÁNCHEZ PALOMARES, O., SERRADA, R. 1978. Prácticas de geología y edafología. Escuela Técnica Superior de Ingenieros de Montes. Madrid.

Part III. Soils

Theory

BRIDGES, E.M., 1997. World soils. 3rd edition. Cambridge University Press. UK.

GANDULLO, J.M. 1994. Climatología y ciencias del suelo. Fundación Conde del Valle de Salazar. Madrid.

PORTA, J; LÓPEZ-ACEVEDO, M. Y ROQUERO, C., 2003. Edafología para la agricultura y el medio ambiente. 3ª Edición.

Mundiprensa. Madrid.

PORTA, J; LÓPEZ-ACEVEDO, M. Y POCH, R.M. 2008. Introducción a la edafología: uso y protección del suelo. Mundiprensa. Madrid.

Practice

FAO, 2006. Guidelines for soil description. FAO, Rome.

GANDULLO, J.M. 1999. Climatología y ciencias del suelo. Addenda. Fundación Conde del Valle de Salazar. Madrid.

GANDULLO, J.M., SÁNCHEZ PALOMARES, O., SERRADA, R. 1978. Prácticas de geología y edafología. Escuela Técnica Superior de Ingenieros de Montes. Madrid.

SOIL SURVEY STAFF, 1999. Soil Taxonomy. A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Agricultural Handbook 436, Natural Resources Conservation Service, USDA, Washington DC, USA, 869 pp.

WRB, 2007. World Reference Base for Soil Resources 2006, first update 2007. World Soil Resources Reports No. 103. FAO, Rome.

7.2 Additional Bibliography:

Part I. Climatology

Theory

ELÍAS CASTILLO, F. Y CASTELLVÍ DENTÍS, F. (Coordinadores). 1996. Agrometeorología. MAPA y Mundiprensa (coeditores). Madrid. 516 pp.
MILLER, A. 1975. Climatología. Omega. Barcelona.
PAGNEY, P., 1982. Introducción a la climatología. Oikos-Tau. Barcelona.
PUIGCERVER, M., 1990. El clima. Prensa científica. Barcelona.
WALTER, H. 1981. Los sistemas ecológicos de los continentes: principios de su clasificación con ejemplos. Omega. Barcelona.

Practice

MANRIQUE, E. 1993. Informatizaciones CLIMOAL. Fundación Conde del Valle de Salazar. ETSIM. Madrid.
RIVAS-MARTÍNEZ, S. 1995. Clasificación bioclimática de la Tierra. Folia Botanica Matritensis. 16.

Part II. Geology

Theory

AGUEDA, J., ANGUITA, F., ARAÑA, V., LÓPEZ RUIZ, J., SÁNCHEZ DE LA TORRE, L. 1983. Geología. Segunda edición. Editorial Rueda. Madrid. 528 pp.
MELÉNDEZ HEVIA, A. Y MELÉNDEZ HEVIA, F. 1991. Geología. Paraninfo. 991 pp.
PEDRAZA, J. Y CARRASCO, R.M. 1996. Geomorfología: principios, métodos y aplicaciones. Editorial Rueda. Madrid. 414 pp.
STRAHLER, A.N., Y STRAHLER, A.H. 1989. Geografía física. Editorial Omega. Barcelona. 550 pp

Part III. Soils

Theory

DUCHAUFOUR, P. 1984. Edafología I: Edafogénesis y clasificación. Masson. Barcelona.
DUCHAUFOUR, P. 1987. Manual de edafología. Masson. Barcelona.
FISHER, R.F. Y BINKLEY, D. 2000. Ecology and management of forest soils. 3rd edition. John Wiley & Sons, USA. 489 pp.

Practice

MAPA, 1993. Métodos oficiales de análisis. Tomo III. MAPA Secretaría General Técnica. Madrid

ANEXO I

8. Systems and Assessment Criteria

8.1 System for Assessment:

- Theory / problems exam
- Examination of practices
- Defense of Written Works and Reports

8.2 Assessment Criteria and Marks:

8.2.1 Examinations Convocatory I

Students can choose between being qualified through continuous assessment or through a final single evaluation. Students wishing to apply for the second option must inform the professor by writing an email within a maximum of two weeks from the beginning of the semester.

1. Continuous evaluation in the Ordinary Call I

It will consist of the following three activities:

Theory / problems exam

The theory / problems exam will constitute 70% of the grade of the subject. It will consist of a theoretical part with short questions or test type of maximum duration of 1 h. in which the student will not be able to make use of notes, calculator or any type of additional information, with a weight of 50% in the exam note, and a practical part of resolution of problems of maximum duration of 1h 30 min in the that the student will be able to make use of notes, computer and any other type of additional information that he/she considers appropriate, with a weight of 50% of the exam grade. To pass the subject the student cannot get a grade lower than 4 points out of 10 in this exam. This part evaluates the competences B06, C03, G01, G16 and G11

Practice exam

It will consist in the recognition of minerals or / and rocks corresponding to those shown in practices 3 and 4 and will constitute 2% of the grade of the subject. To pass the subject you cannot get a grade lower than 8 out of 10 in this exam. This part evaluates the B06 and C03 competences.

Defense of works and written reports

The student will perform two written works that will deal with different theoretical and practical aspects of the subject. One of the works will be exposed orally. Each of the two works will constitute 14% of the grade of the subject. Each work will be scored from 0 to 10 and you cannot obtain a grade lower than 4 points in each work to pass the subject. This part evaluates the competences B06, C03, G01, G05, G11, G16 and TC1, TC3, TC4 and TC6.

2. Final single evaluation

It will consist of the realization of the 3 activities indicated in the previous point with the exception that, in this case, the student will send the written works to the teacher, the deadline being the date of the written exam, and in this case there will be no oral presentation of one of the works. The student can therefore obtain the 100% of the grade of the subject.

8.2.2 Examinations Convocatory II

Students who have passed the minimum mark required in any of the activities included in the qualification of the Convocatory I do not have the obligation to perform them again for this call, accounting for the qualification already obtained in the parts that they have passed. Students wishing to apply for 100% of the grade will be evaluated according to the Final single evaluation scheme (Convocatory I).

8.2.3 Examinations Convocatory III

Students who have passed the minimum mark required in any of the activities included in the qualification of the Convocatory I do not have the obligation to perform them again for this call, accounting for the qualification already obtained in the parts that they have passed. Students wishing to apply for 100% of the grade will be evaluated according to the Final single evaluation scheme (Convocatory I).

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8.2.4 Extraordinary Convocatory
Students who have passed the minimum mark required in any of the activities included in the qualification of the Convocatory I do not have the obligation to perform them again for this call, accounting for the qualification already obtained in the parts that they have passed. Students wishing to apply for 100% of the grade will be evaluated according to the Final single evaluation scheme (Convocatory I).
8.3 Single Final Evaluation:
It will consist of the realization of the 3 activities indicated in the Convocatory I with the exception that, in this case, the student will send the written works to the teacher, the deadline being the date of the written exam, and in this case there will be no oral presentation of one of the works. The student can therefore obtain the 100% of the grade of the subject.