ANX-PR/CL/001-01

LEARNING GUIDE

SUBJECT

93000982 - Telemedicine Laboratory

DEGREE PROGRAMME

09AU - Master Universitario En Ingenieria Biomedica

ACADEMIC YEAR & SEMESTER

2023/24 - Semester 2

Index

Learning guide

1. Description

1.1. Subject details

Name of the subject	93000982 - Telemedicine Laboratory
No of credits	3 ECTS
Type	Optional
Academic year ot the programme	First year
Semester of tuition	Semester 2
Tuition period	February-June
Tuition languages	English
Degree programme	09AU - Master Universitario en Ingenieria Biomedica
Centre	09 - Escuela Tecnica Superior De Ingenieros De Telecomunicacion
Academic year	2023-24

2. Faculty

2.1. Faculty members with subject teaching role

Name and surname	Office/Room	Email	Tutoring hours *
Gema Garcia Saez (Subject coordinator)	B-303	gema.garcia.saez@upm.es	Tu - 10:00 - 12:00 W - 12:00 - 13:00 It is necessary first to schedule an appointment via email.
Maria Elena Hernando Perez	B-316	mariaelena.hernando@upm.es	Tu - 15:00 - 18:00 W - 12:00 - 15:00 It is necessary first to schedule an appointment via

			email.

* The tutoring schedule is indicative and subject to possible changes. Please check tutoring times with the faculty member in charge.

2.3. External faculty

Name and surname	Email	Institution
Jose Tapia Galisteo	jose.tapia.galisteo@upm.es	UPM

3. Prior knowledge recommended to take the subject

3.1. Recommended (passed) subjects

- Telemedicina

3.2. Other recommended learning outcomes

The subject - other recommended learning outcomes, are not defined.

4. Skills and learning outcomes *

4.1. Skills to be learned

CB06 - Poseer y comprender conocimientos que aporten una base u oportunidad de ser originales en el desarrollo y/o aplicación de ideas, a menudo en un contexto de investigación

CB07 - Que los estudiantes sepan aplicar los conocimientos adquiridos y su capacidad de resolución de problemas en entornos nuevos o poco conocidos dentro de contextos más amplios (o multidisciplinares) relacionados con su área de estudio

CB08 - Que los estudiantes sean capaces de integrar conocimientos y enfrentarse a la complejidad de formular juicios a partir de una información que, siendo incompleta o limitada, incluya reflexiones sobre las responsabilidades sociales y éticas vinculadas a la aplicación de sus conocimientos y juicios

CB09 - Que los estudiantes sepan comunicar sus conclusiones y los conocimientos y razones últimas que las sustentan a públicos especializados y no especializados de un modo claro y sin ambigüedades

CB10 - Que los estudiantes posean las habilidades de aprendizaje que les permitan continuar estudiando de un

modo que habrá de ser en gran medida autodirigido o autónomo.

CG-MIB01 - Resolver problemas e integrar conocimiento en temas nuevos o escasamente definidos y en entornos multidisciplinares del área de la Ingeniería Biomédica

CG-MIB02 - Analizar y aplicar la reglamentación correspondiente a la sensibilidad social y ética en los ámbitos de operación que pueden darse en Ingeniería Biomédica

CG-MIB03 - Utilizar la filosofía, el método científico y el método experimental para la búsqueda de innovación, la curiosidad científica y el desarrollo de actitudes creativas

CG-MIB04 - Utilizar las tecnologías de la información y la comunicación para la búsqueda de información, datos bibliográficos y adquisición de nuevo conocimiento para la formación permanente y el trabajo autónomo

CG-MIB05 - Utilizar técnicas de expresión oral y escrita para comunicar trabajos y conclusiones a comunidades de iguales o divulgación científica, elaboración de artículos, manuales de estilo y herramientas de edición para fomentar la capacidad de comunicación y diseminación de resultados

CG-MIB06 - Aplicar técnicas de trabajo colaborativo en equipos multidisciplinares internacionales y liderazgo, así como utilizar métodos para asumir la responsabilidad de orientar y dirigir trabajos científicos en el ámbito de la ingeniería Biomédica

CG-MIB07 - Utilizar la lengua inglesa como herramienta de trabajo

4.2. Learning outcomes

RA145 - Aplicación de conocimientos teóricos y habilidades prácticas en las metodologías más avanzadas y las tecnologías de la información y las comunicaciones para el modelado, desarrollo, integración y evaluación de servicios de inteligencia ambiental y tecnologías asistivas

* The Learning Guides should reflect the Skills and Learning Outcomes in the same way as indicated in the Degree Verification Memory. For this reason, they have not been translated into English and appear in Spanish.

5. Brief description of the subject and syllabus

5.1. Brief description of the subject

The laboratory provides students with a set of methods and resources for their training in the design, development and evaluation of digital health systems and telemedicine applications.

The student will develop prototypes of final applications in which he will acquire knowledge about different technologies: the management of medical images with the DICOM standard, the design and management of relational databases, the graphical visualization of clinical data, remote access to databases through Web servers and communication protocols with medical devices.

The practices are sized to be carried out in full in the laboratory. Students must submit a brief report within one week after completing each practice.

The Telemedicine Laboratory includes the following practices with their respective contents:

1. Introduction to GUI design: Usability

- Usability principles

- Evaluation of usability parameters in different Telemedicine systems

2. Introduction to the development environment

- Development of applications using the proposed development environment and language

3. Mailbox for Medical images

- Creation of a tool to manage sending of medical images

4. Management and visualization of clinical databases

- Specification of the application

- Design and Management of relational databases

- Development of the tool to manage patient data, medical doctors data and clinical encounters

5. Tool to manage medical images

- Development of the application for viewing medical images

6. Web access to clinical databases for patients

- Introduction to web technologies

- Development of a website to access medical databases

- Improved usability of the developed application

- Deployment of a web server

5.2. Syllabus

1. Introduction to GUI design
2. Introduction to management of relational databases
3. Introduction to the development environment
4. Management of patients and visits
5. Management of medical images
6. Web access to clinical databases

6. Schedule

6.1. Subject schedule*

Week	Classroom activities	Laboratory activities	Distant / On-line	Assessment activities
1	**Introducción to the practical sessions** Duration: 01:30 Lecture	**Practical session 1** Duration: 02:30 Laboratory assignments		
2		**Practical session 2** Duration: 04:00 Laboratory assignments		**Deliverable: report practical session 1** Individual work Continuous assessment Not Presential Duration: 00:15
3		**Practical session 3** Duration: 04:00 Laboratory assignments		
4		**Practical session 4.1** Duration: 04:00 Laboratory assignments		**Deliverable: report practical session 2** Individual work Continuous assessment Not Presential Duration: 00:15
5		**Practical session 4.2** Duration: 04:00 Laboratory assignments		**Deliverable: report practical session 3** Individual work Continuous assessment Not Presential Duration: 00:15
6				
7		**Practical session 5** Duration: 04:00 Laboratory assignments		**Deliverable: report practical session 4** Individual work Continuous assessment Not Presential Duration: 00:15
8				
9				**Deliverable: report practical session 5** Individual work Continuous assessment Not Presential Duration: 00:15
10		**Practical session 6** Duration: 04:00 Laboratory assignments		
11				**Deliverable: report practical session 6** Individual work Continuous assessment Not Presential Duration: 00:15

12				**Oral presentation of practical sessions** Problem-solving test Continuous assessment Presential Duration: 04:00
13				
14				
15				
16				
17				**Reports of practical sessions** Individual presentation Final examination Presential Duration: 06:30 **Oral presentation of practical sessions 4,5, and 6** Individual presentation Final examination Presential Duration: 02:00

Depending on the programme study plan, total values will be calculated according to the ECTS credit unit as 26/27 hours of student face-to-face contact and independent study time.

* The schedule is based on an a priori planning of the subject; it might be modified during the academic year, especially considering the COVID19 evolution.

7. Activities and assessment criteria

7.1. Assessment activities

7.1.1. Assessment

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
2	Deliverable: report practical session 1	Individual work	No Presential	00:15	10%	0 / 10	CB06 CB07 CB09 CB08 CG-MIB04 CG-MIB05 CG-MIB01
4	Deliverable: report practical session 2	Individual work	No Presential	00:15	10%	0 / 10	CB06 CB07 CB09 CB08 CG-MIB04 CG-MIB01 CG-MIB02
5	Deliverable: report practical session 3	Individual work	No Presential	00:15	5%	0 / 10	CB06 CB07 CB09 CB08 CB10 CG-MIB04 CG-MIB05
7	Deliverable: report practical session 4	Individual work	No Presential	00:15	20%	0 / 10	CB06 CB07 CB09 CB08 CB10 CG-MIB03 CG-MIB04 CG-MIB05 CG-MIB01 CG-MIB02
9	Deliverable: report practical session 5	Individual work	No Presential	00:15	20%	0 / 10	CB06 CB07 CB09 CB08 CB10 CG-MIB03 CG-MIB04 CG-MIB05

							CG-MIB01 CG-MIB02
11	Deliverable: report practical session 6	Individual work	No Presential	00:15	20%	0 / 10	CB06 CB07 CB09 CB08 CB10 CG-MIB03 CG-MIB04 CG-MIB05 CG-MIB06 CG-MIB01 CG-MIB02
12	Oral presentation of practical sessions	Problem-solving test	Face-to-face	04:00	15%	5 / 10	CB07 CG-MIB04 CG-MIB05 CG-MIB06 CG-MIB01 CG-MIB02

7.1.2. Global examination

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
17	Reports of practical sessions	Individual presentation	Face-to-face	06:30	50%	5 / 10	CB06 CB07 CB09 CB08 CB10 CG-MIB03 CG-MIB04 CG-MIB05 CG-MIB06 CG-MIB01 CG-MIB02
17	Oral presentation of practical sessions 4,5, and 6	Individual presentation	Face-to-face	02:00	30%	5 / 10	CB09 CB08 CB10 CG-MIB05 CG-MIB06 CG-MIB02

7.1.3. Referred (re-sit) examination

Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
Reports of practical sessions	Individual work	Face-to-face	15:00	70%	5 / 10	CB06 CB07 CB09 CB08 CB10 CG-MIB03 CG-MIB04 CG-MIB05 CG-MIB06 CG-MIB01 CG-MIB02
Oral presentation of practical works	Individual presentation	Face-to-face	02:00	30%	5 / 10	CB06 CB09 CB08 CB10 CG-MIB05 CG-MIB06 CG-MIB02

7.2. Assessment criteria

Evaluation will assess if students have acquired all the competences of the subject. All the deliverables that are requested must be the result of the student's personal work. Copy detection in an activity will mean failing the activity.

The students will be assessed following the progressive evaluation by default.

-------Progressive assessment

The final score will be calculated according to:

85% Report and coding associated to each practical session

15% Oral Presentation of practical works. A minimum score of 5 points out of 10 is required to calculate the final score.

Delays handing in of practical works will be penalized with a 20% in the final score.

---------Global Assessment

Students who want to be assessed at the global evaluation need to deliver the practical sessions (reports and coding) one week before the ordinary exam date assigned by Junta de Escuela, and present the practical works delivered. The maximum score that can be obtained at the global evaluation is 80%. A minimum score of 5 points out of 10 needs to be obtained in each practical session and in the oral presentation of practical works in order to get a final score.

---------Extraordinary Assessment

The extraordinary evaluation will consider the following:

FINAL SCORE = 70% reports and associated coding about practical sessions + 30% oral presentation.

A minimum score of 5 points out of 10 needs to be obtained in each practical session and in the oral presentation of practical works in order to get a final score. The practical sessions (reports and coding) must be delivered one week before the extraordinary exam date assigned by Junta de Escuela.

8. Teaching resources

8.1. Teaching resources for the subject

Name	Type	Notes
Statements about practical sessions	Others	Statements describing the tasks to be performed by the student and the report to deliver as a result of the work
Files and other resources to perform the practical sessions	Others	All the resources required for the practical sessions will be provided through the Moodle
Tutorials	Web resource	Tutorials about software and development tools

9. Other information

9.1. Other information about the subject

The Sustainable Development Goals are the blueprint to achieve a better and more sustainable future for all. This course is related to SDG 3 and 4, specifically to points:

- 3.D Strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks.

- 4.4 By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship