Elective Subject

(Academic Course 2024-2025)

Subject title: Technology and Innovation applied to health, nutrition and sport

Code:
Subject: Elective
Responsibility Center: Faculty of Nursing, Physiotherapy and Podiatry
Credits: 3 ECTS
Number of places offered: 30

	Total (30% attendance)	Theory	Practices	Others
Classroom activities	24	16	6	2

Course schedule: (semester, day and schedule): 2 semester. Tuesday from 1:30 p.m. to 2:30 p.m. Theoretical classes; Practical classes: Tuesday and/or Thursday morning and/or afternoon and Friday morning, depending on the availability of the Exercise Physiology Laboratory, School of Sports Medicine. Classroom I of the School of Sports Medicine (Faculty of Medicine, Pavilion VI – 5th Floor)

STUDENT PROFILE (University degrees for which they are offered, if applicable)

3rd year degree students in nursing; They will also be able to opt for other degrees such as Physiotherapy and Podiatry

BRIEF DESCRIPTOR

Technological development applied to health has undergone a spectacular boom in the 21st century, both due to the rise of digital knowledge and the development of technology.

The future of medicine is increasingly destined to be understood with technology. Tech companies know this and are making efforts to create health-related solutions. Patients are increasingly open to the use of technology to improve their lives and companies take advantage of this fact as a source of economic growth. In recent years we are seeing launches of wearables and apps aimed at measuring and diagnosing aspects related to people's health.

5G communication, artificial intelligence, big data or supercomputing are transforming healthcare systems. These technologies will allow us in the future to make diagnoses faster, more effective and with fewer side effects.

There are more and more companies dedicated to technological development in the health field, but it is necessary to know what the limitations of the treatment of patient data are, and with what security guarantees it is necessary to work with them.

The development of technology applied to health also requires the integration of activities such as research, analysis, synthesis and dissemination of the results of the evaluation and verification of their applicability.

OBJECTIVES

A) Emphasize the interdependence of knowledge, emphasizing the connection between research, development, practical application and development of health technology.
B) Achieve increased operational capacity at all levels for the development of the application of technology in the medical field.
C) Recognize and value the contributions of the guidelines of good clinical practice in the achievement of previous medical studies for the development of technologies applied to the health field.
D) Appreciate the importance of scientific training to adopt a critical attitude about the problems that arise about technology applied to health.
E) Value scientific knowledge as a process of continuous change that adapts to the needs of new technologies applied to health.

ACADEMIC SKILLS

KNOWLEDGE:

NURSING

 Know and assess the Health Sciences needs of healthy people and those with health problems throughout the life cycle, to promote and reinforce healthy behavior patterns.

 Know and value information technologies to improve adult health disorders. Identify care needs derived from health problems.

 Know and Innovation and Entrepreneurship, in Medical Devices and Diagnostic Technologies for health, apply the principles that support comprehensive nursing care.

 Know and apply Emerging Technologies to apply them to Health care in a comprehensive manner in nursing.

 Know the Regulation and Ethics in Digital Health, in Telemedicine and Digital Health, in Health Data Management for comprehensive patient care by nursing.

PHYSIOTHERAPY

 Understand the fundamental concepts of health and the function that the physiotherapist performs in the health system.

 Know and value information technologies to improve adult health disorders. Identify care needs derived from health problems in Physiotherapy.

 Know and Innovation and Entrepreneurship, in Medical Devices and Diagnostic Technologies for health to apply the principles that support comprehensive care and the problems related to Physiotherapy in the areas of Primary, Specialized and Occupational Health Care.

- Know and apply quality Emerging Technologies in the practice of Physiotherapy, adjusting to the criteria, indicators and quality standards recognized and validated for adequate professional practice.

 Know the Regulation and Ethics in Digital Health, in Telemedicine and Digital Health, in Health Data Management of the profession to carry it out within a social context.

CHIROPODY

 Understand the fundamental concepts of health and the function that the podiatrist performs in the health system.

 Know and value information technologies to improve adult health disorders. Identify care needs derived from health problems in Podiatry.

 Know and Innovation and Entrepreneurship, in Medical Devices and Diagnostic Technologies for health to apply the principles that support comprehensive care and problems related to Podiatry in the areas of Primary, Specialized Care and Occupational Health.

- Know and apply quality Emerging Technologies in the practice of Podiatry, adjusting to the criteria, indicators and quality standards recognized and validated for adequate professional practice.

 Know the Regulation and Ethics in Digital Health, in Telemedicine and Digital Health, in Health Data Management of the profession to carry it out within a social context.

- Know the fundamentals of biomechanics and kinesiology. Supporting theories. The human march. Structural alterations of the foot. Postural alterations of the musculoskeletal system with repercussions on the foot and vice versa. Biomechanical analysis instruments through new technologies.

SKILLS:

NURSING:

 Promote healthy lifestyles, self-care, supporting the maintenance of preventive and therapeutic behaviors.

- Protect the health and well-being of the people, family or groups served, guaranteeing their safety.

PHYSIOTHERAPY

 Capacity for analysis and synthesis.

- Problem solving.
- Decision making.
- Teamwork.
- Work in an interdisciplinary team.

 Critical reasoning.

- Autonomous learning.

 Creativity.

 Analyze, program and apply movement as a therapeutic measure, promoting the participation of the patient/user in their process.

CHIROPODY

- Design of prevention protocols and their practical application. Public health. Concept, method and use of epidemiology.

COMPETENCES:

NURSING:

- Establish effective communication with patients, family, social groups or groups served, guaranteeing their safety.

 Apply knowledge, skills and competencies in a global, multidisciplinary and integrative way in the practical and systematized development of a project, final degree project in the field of biomedicine.
 Ability to develop an R&D&I project in the field of biomedicine that contains the most appropriate methodology, that complies with current regulations and legislation and that complies with the principles of medical ethics.
 Ability to describe and distinguish the characteristics, advantages, and disadvantages, limitations and possibilities of medical devices and health technologies, in the context of patient care and monitoring of healthy athletes.

PHYSIOTHERAPY

 Promote healthy lifestyle habits through health education.
 Apply quality mechanisms in the practice of Physiotherapy, adjusting to the criteria, indicators and quality standards recognized and validated for adequate professional practice.
 Analyze the management processes of a Physiotherapy service or unit.
 Apply knowledge, skills and competencies in a global, multidisciplinary and integrative way in the practical and systematized development of a project, final degree project in the field of biomedicine.
 Ability to develop an R&D&I project in the field of biomedicine that contains the most appropriate methodology, that complies with current regulations and legislation and that complies with the principles of medical ethics.
 Ability to describe and distinguish the characteristics, advantages, and disadvantages, limitations and possibilities of medical devices and health technologies, in the context of patient care and monitoring of healthy athletes.

CHIROPODY

 Develop the factors that influence the health-disease phenomenon.
 Acquisition of the ability to perform a comprehensive evaluation of the foot and gait, ability to apply therapeutic techniques for podiatric conditions, competence in educating patients about preventive foot care, in educating patients about preventive foot care and application of ethical and legal principles in podiatric clinical practice.
 Apply knowledge, skills and competencies in a global, multidisciplinary and integrative way in the practical and systematized development of a project, final degree project in the field of biomedicine.
 Ability to develop an R&D&i project in the field of biomedicine that contains the most appropriate methodology, that complies with current regulations and legislation and that complies with the principles of medical ethics.
 Ability to describe and distinguish the characteristics, advantages, and disadvantages, limitations and possibilities of medical devices and health technologies, in the context of patient care and monitoring of healthy athletes.

LEARNING OUTCOMES

Provide knowledge about technology and its use in the health area and obtain skills in the field of technological entrepreneurship.
The knowledge and skills they achieve are the following: Knowledge in Health Sciences, in Information and Communication Technologies (ICT), in Innovation and Entrepreneurship, in Medical Devices and Diagnostic Technologies for health, in Emerging Technologies, in Regulation and Ethics in Digital Health, in Telemedicine and Digital Health, in Health Data Management and learning from interdisciplinary collaboration.

TEACHING ACTIVITIES (theoretical, practical, seminars, workshops, etc.)

1.- Theoretical classes
16 theoretical hours of development of the proposed syllabus.
2.- Practical classes:
6 practical hours in the Effort Physiology laboratory of the School of Medicine of Physical Education and Sports. 2 Hours of presentation of technological proposals applicable to health by each working group.
3.-Tutorials:
Those corresponding to each of the teachers with the schedules they have for tutorials

CONTENT TOPICS

Topic 1. The influence of technology and innovation in health. History of its development.
Topic 2. Applicability of technology to health care. Myths and realities. The health technology business market and its future evolution.
Topic 3. Technology Applied to Sport (1): Apps, Apps for health, sport and nutrition
Topic 4. Technology applied to sport (2): Wearables; application for registering biomedical variables.
Topic 5. Technology applied to sports (3): Other medical devices for recording biomedical variables used in health, sports and nutrition.
Topic 6. How should research and clinical trials with humans be. Biobanks. Data collection notebooks. Monitoring of clinical trials. Use of biological samples of human origin for research purposes.
Topic 7. Ethical and legal aspects in the development of clinical trials with medical technology. Ethics committees, where to request authorizations. Informed consent models for clinical trials in healthy individuals and patients.
Topic 8. Treatment of biomedical data, data hosting and security regulations according to the law. Statistical treatment of biomedical data.
Topic 9. How is the Protection of the results of R&D&i. Patents, Utility Models and Trademarks.
Topic 10. ETBS, Start-up; How is the creation of a technology-based company
Item 11. Future of technology applied to health, repercussions on patient care. Artificial intelligence and its usefulness in patient care.

EVALUATION

REGULAR CONVOCATION			
EVALUATION ACTIVITY	**WEIGHTING**	**REMARKS**	**MAXIMUM SCORE**
Test	40%		10
Presentation	40%		10
.**Practices class**	20%		10
EXTRAORDINARY CALL			
EVALUATION ACTIVITY	**WEIGHTING**	**REMARKS**	**MAXIMUM SCORE**

a) Multiple choice test of 30 questions on the theoretical and practical content of the subject (multiple answers and no negatives). The exam represents 40% of the grade.
b) Presentation, the presentation represents 40% of the grade.
c) Practices and class attendance: these represent 20% of the grade. Attendance to both classes and practices

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Resources

TEACHING STAFF *(It should be indicated whether teachers have completed all their teaching dedication or not)

Teacher Responsible (coordinator):
Responsible teacher (coordinator):
Name: Pilar Martín Escudero (pmartinescudero@med.ucm.es)
Department: Radiology, Rehabilitation and Physiotherapy Department:

Teachers:
1**.- Name**: Dr. Francisco Miguel Tobal (miguelto@ucm.es);
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Department: Radiology, Rehabilitation and Physiotherapy Department
4.- **Name:** Mr. Ricardo Bruña (ricardo.bruna@ucm.es)
Department: Radiology, Rehabilitation and Physiotherapy Department

GUEST PROFESSOR/S:
1.- Professors of the Polytechnic University of Madrid (Biomedical Engineering)
2- Professors of the Master of Medical Physics of the UCM