Information about the subject

Degree: Bachelor of Sciences of Physical Activity and Sport

Faculty: Faculty of Physical Activity and Sport Sciences

Code: 281202 **Name:** Physiology of Exercise

Credits: 6,00 **ECTS Year:** 2 **Semester:** 1

Module: 1) Basic Training Module

Subject Matter: Biological and Mechanical Foundations of Human Motor Skills **Type:** Basic Formation

Field of knowledge: Health Sciences

Department: Physical Preparation and Conditioning

Type of learning: Classroom-based learning

Languages in which it is taught: Spanish

Lecturer/-s:

1164DT	Carlos Sanchis Sanz **(Responsible Lecturer)**	carlos.sanchis@ucv.es
282A	Rafael Martínez Requena **(Profesor responsable)**	rafael.mrequena@ucv.es
282B	Carlos Sanchis Sanz **(Responsible Lecturer)**	carlos.sanchis@ucv.es
282C	Leandro Ferreira Moraes **(Responsible Lecturer)**	leandro.ferreira@ucv.es
282D	Carlos Sanchis Sanz **(Responsible Lecturer)**	carlos.sanchis@ucv.es
282X	Carlos Sanchis Sanz **(Responsible Lecturer)**	carlos.sanchis@ucv.es
CATR	Carlos Sanchis Sanz **(Responsible Lecturer)**	carlos.sanchis@ucv.es

Module organization

1) Basic Training Module

Subject Matter	ECTS	Subject	ECTS	Year/semester
Biological and Mechanical Foundations of Human Motor Skills	36,00	Biochemistry and Human Physiology	9,00	1/2
		Biomechanics of Physical Activity	6,00	2/1
		Human Anatomy	9,00	1/2
		Kinesiology	6,00	2/1
		Physiology of Exercise	6,00	2/1
Behavioral and social foundations of human motor skills.	24,00	History and Sociology of Physical Activity and Sport	6,00	1/2
		Sport Psychology	6,00	1/2
		Statitics and Data Processing	6,00	2/2
		Technology Applied to Physical Activity and Sport	6,00	1/1

Learning outcomes

At the end of the course, the student must be able to prove that he/she has acquired the following learning outcomes:

R1 Explain, identify, and apply theoretical-practical knowledge about different anatomical-physiological systems that enable any physical activity.

R2 Critically analyze, compare, and synthesize various documentary information sources in English related to physiological processes and adaptations that occur during physical activity. Additionally, present the outcome of this process.

R3 Resolve exercises or practical cases related to physiological responses during rest and/or physical exercise by experimenting and measuring responses across different variables .

Assessment system for the acquisition of competencies and grading system

Assessed learning outcomes	Granted percentage	Assessment method
R1, R3	60,00%	Written and/or practical tests.
R1, R2	20,00%	Individual or Group Work / Project.
R1, R2, R3	20,00%	Diary, Portfolio or Notebook.

Observations

This course is NOT eligible for a single assessment request in accordance with Article 10.3 of the GENERAL REGULATIONS FOR THE ASSESSMENT AND GRADING OF OFFICIAL COURSES AND UCV DEGREE PROGRAMS.
Students may retain the assessment instruments they have passed for three years after their initial enrollment.
It is necessary to obtain a 50% in the following evaluation instruments in order to pass the course:
·Written and/or practical tests
·Individual or Group Work / Project
Attendance at all practical sessions indicated in the schedule is compulsory. If students fail to attend 80% of these sessions, they will fail both exam sessions for the course and will have to retake all practical sessions in the following enrollment period.
The project requires attendance at two thirds of the group work sessions in the classroom, as part of the correct development of the group work. In these sessions each group and student must complete the proposed tasks in due time and form.

SPECIFICATIONS TO THE EVALUATION INSTRUMENTS

Written and/or practical tests

Test type test:
·40% of the grade of the course
·Theoretical questions, short
·25-40 questions
·3 answer options
·Penalty: 1 wrong answer subtracts 50%.
·There will be 1 partial exam + the final exam with cumulative evaluation type.
Written development test:
·20% of the grade of the subject. Answer to two out of three possible questions.

·Questions of practical/applied type, to develop in writing.
·It does not penalize.

Journal, Portfolio or Notebook

Assessment of the practical context applied, with delivery of practices or classroom exercises by platform as a portfolio. It is necessary to obtain a 5 out of 10 to make average. The portfolio on the platform will be composed of:

Practical laboratory sessions
·10% of the grade of the course
·It consists of participating and adequately answering the questions that will be asked in the practical laboratory sessions

Exercises/case studies
·10% of the grade of the course
··ndividual submission and defense of exercises and practical cases to be developed in writing, not mandatory.
·No penalty.
·Individual character

Individual or Group Work / Project

Group project, with different tasks and activities. Requirements:
·Obtain 5 points in the final exhibition.
·The project requires the attendance to two thirds of the group work sessions in the classroom, as part of the correct development of the group work. In these sessions each group must complete the proposed tasks.

The detailed explanation (procedure for the assignments) as well as the evaluation tools (worksheets or rubrics) for each section will be posted on each group's platform at the student's disposal.

Use of Artificial Intelligence Tools in the CAFD Degree Program

Use of Artificial Intelligence tools in the CAFD degree program In the Bachelor's Degree in Physical Activity and Sports Sciences (CAFD), the use of Artificial Intelligence (AI) tools is permitted in a complementary and responsible manner, as long as it contributes to active learning, the development of critical thinking, and the improvement of students' professional skills. Under no circumstances should AI replace personal effort, direct practice, or independent reflection, which are fundamental pillars of this degree program.

Permitted Uses of AI:
·Obtaining alternative explanations of theoretical or methodological concepts.
·Generating outlines, concept maps, or summaries to support study.
·Simulating interviews, questionnaires, or training sessions as part of methodological or research practices.
·Receiving feedback on report writing, provided that the original content is the student's own.
·Supporting the search for bibliography or scientific references, always contrasting with reliable and real academic sources, and respecting the CAFD regulations for the presentation of university work.

Prohibited Uses of AI:
·Writing complete sections of academic papers, classroom exercises and practices, internship reports, journals, or portfolios, as well as the Final Degree Project.
·Formulating hypotheses, objectives, or conclusions for academic work.
·Replacing qualitative or quantitative data analysis with automated tools without human validation.
·Creating videos, presentations, or avatars with AI as a substitute for the student's oral or practical presentation.
·Obtaining automatic answers to tests, rubrics, or assessable activities through the use of AI.

Citation and Attribution Guidelines:
·Any use of AI tools must be explicitly acknowledged in the submitted document (e.g., in a footnote or appendix).
·The name of the tool, the purpose of use (e.g., grammatical review, organization of ideas, interview simulation), and where it was used in the work must be indicated.
·Responsible use of AI will be evaluated within the framework of originality, academic honesty, and digital competence.

Additional recommendations:
Students are encouraged to combine the use of AI with traditional methods (manual problem solving, practical session design, direct observation, etc.) to ensure the comprehensive development of their skills.

If there are any doubts about the permitted use of AI in a specific activity, students should consult the faculty responsible for the course.

Learning activities

The following methodologies will be used so that the students can achieve the learning outcomes of the subject:

M1 Attendance at practices.

M2 Resolution of problems and cases.

M3 Discussion in small groups.

M4 Practical laboratories.

M5 Presentation of content by the teacher.

M6 Practical lesson.

M7 Group dynamics and activities.

IN-CLASS LEARNING ACTIVITIES

	LEARNING OUTCOMES	HOURS	ECTS
THEORETICAL CLASS: Presentation of contents by the teacher. Competency analysis. Demonstration of capabilities, skills and knowledge in the classroom. M5	R1, R2, R3	28,00	1,12
PRACTICAL CLASS / SEMINAR: Group dynamics and activities. Resolution of problems and cases. Practical laboratories. Data search, computer classroom, library, etc. Meaningful construction of knowledge through student interaction and activity. M3, M4, M6, M7	R1, R2, R3	24,00	0,96
EVALUATION: Set of oral and/or written tests used in the evaluation of the student, including the oral presentation of the final degree project. M2	R1, R2, R3	4,00	0,16
TUTORING: Supervision of learning, evolution. Discussion in small groups. Resolution of problems and cases. Presentation of results before the teacher. Presentation of diagrams and indexes of the proposed works. M5	R1, R2, R3	4,00	0,16
TOTAL		**60,00**	**2,40**

LEARNING ACTIVITIES OF AUTONOMOUS WORK

	LEARNING OUTCOMES	HOURS	ECTS
GROUP WORK: Problem solving. Preparation of exercises, memoirs, to present or deliver in classes and/or in tutoring. M3, M7	R1, R2, R3	37,50	1,50
SELF-EMPLOYED WORK: Study, Individual preparation of exercises, assignments, reports, to present or deliver in classes and/or in tutoring. Activities in platform or other virtual spaces. M2	R1, R2, R3	52,50	2,10
TOTAL		**90,00**	**3,60**

Description of the contents

Description of the necessary contents to acquire the learning outcomes.

Theoretical contents:

Content block	Contents
1. Skeletal muscle: Responses and adaptations to physical exercise.	Skeletal muscle: Responses and adaptations to physical exercise.
2. Energy metabolism: Responses and adaptations to physical exercise.	Energy metabolism: Responses and adaptations to physical exercise.
3. Responses and adaptations of the cardiovascular system to physical exercise.	Responses and adaptations of the cardiovascular system to physical exercise.
4. Responses and adaptations of the respiratory system to physical exercise.	Responses and adaptations of the respiratory system to physical exercise.
5. Responses and adaptations of the endocrine system to exercise.	Responses and adaptations of the endocrine system to exercise.
6. Aerobic-anaerobic transition. Concept and assessment of anaerobic threshold.	Aerobic-anaerobic transition. Concept and assessment of anaerobic threshold.
7. Physiological aspects in different populations: sportswomen, childhood, adolescence and the elderly.	Physiological aspects in different populations: sportswomen, childhood, adolescence and the elderly.

Temporary organization of learning:

Block of content	Number of sessions	Hours
1. Skeletal muscle: Responses and adaptations to physical exercise.	5,00	10,00
2. Energy metabolism: Responses and adaptations to physical exercise.	6,00	12,00
3. Responses and adaptations of the cardiovascular system to physical exercise.	4,00	8,00
4. Responses and adaptations of the respiratory system to physical exercise.	4,00	8,00
5. Responses and adaptations of the endocrine system to exercise.	2,00	4,00
6. Aerobic-anaerobic transition. Concept and assessment of anaerobic threshold.	5,00	10,00
7. Physiological aspects in different populations: sportswomen, childhood, adolescence and the elderly.	4,00	8,00

References

BASIC BIBLIOGRAPHY:

Astrand, P. O. y Rodahl, K. (2010). *Fisiología del Trabajo Físico*. Médica Panamericana.
Barbany, J.R. (1990). *Fundamentos de fisiología del ejercicio y del entrenamiento*. Barcanova.
Brooks, G. A. (2018). The Science and Translation of Lactate Shuttle Theory. *Cell Metabolism*, *27*(4), 757–785. https://doi.org/10.1016/j.cmet.2018.03.008
Calderón, F.J. y Teijón, J.M. (2001). *Fisiología aplicada al deporte*. Tébar.
Carroll, T. J., Taylor, J. L., & Gandevia, S. C. (2017). Recovery of central and peripheral neuromuscular fatigue after exercise. *Journal of Applied Physiology (Bethesda, Md.: 1985)*, *122*(5), 1068 1076. https://doi.org/10.1152/japplphysiol.00775.2016
Charlot, K., Faure, C., & Antoine-Jonville, S. (2017). Influence of Hot and Cold Environments on the Regulation of Energy Balance Following a Single Exercise Session: A Mini-Review. *Nutrients*, *9*(6), 592. https://doi.org/10.3390/nu9060592
Cheung, S. S., & Ainslie, P. N. (2021). *Advanced environmental exercise physiology*. Human Kinetics.
Córdova A. y Navas F. (2000) *Fisiología Deportiva*.
Gymnos. Fox, E. L. (1995). *Fisiología del Deporte*. Médica Panamericana.
Guyton, H. (2001). *Tratado de Fisiología Médica*. McGraw–Hill Interamericana.
Hearris, M. A., Hammond, K. M., Fell, J. M., & Morton, J. P. (2018). Regulation of Muscle Glycogen Metabolism during Exercise: Implications for Endurance Performance and Training Adaptations. *Nutrients*, *10*(3), 298. https://doi.org/10.3390/nu10030298
Kenney, W. L., Wilmore, J., & Costill, D. (2015). *Physiology of Sport and Exercise.* 6th Edition. Human Kinetics.
Kent, J. A., Ørtenblad, N., Hogan, M. C., Poole, D. C., & Musch, T. I. (2016). No Muscle Is an Island: Integrative Perspectives on Muscle Fatigue. *Medicine and Science in Sports and Exercise*, *48*(11), 2281 2293. https://doi.org/10.1249/mss.0000000000001052 Incluye fatiga por carbohidratos
López Chicharro, J. y Fernández Vaquero, A. (4Ed.)(20062023). *Fisiología del ejercicio*. Médica Panamericana.
Lundby, C., & Jacobs, R. A. (2016). Adaptations of skeletal muscle mitochondria to exercise training. *Experimental Physiology*, *101*(1), 17 22. https://doi.org/10.1113/ep085319
Lundby, C., Montero, D., & Joyner, M. (2016). Biology of VO2max: looking under the physiology lamp. *Acta Physiologica*, *220*(2), 218–228. https://doi.org/10.1111/apha.12827
MacDougall, J., Wenger, H. y Green, H. (2005). *Evaluación fisiológica del deportista*. Paidotribo.
McArdle W. D., Katch F. I. y Katch V. L. (2004). *Fundamentos de Fisiología del Ejercicio.*
McArdle, W. D., Katch, F. I., & Katch, V. L. (2014). *Exercise Physiology: Nutrition, Energy and Human Performance*. Lippincott Williams & Wilkins.
McGraw-Hill. Interamericana.
Meri, A. (2005). *Fundamentos de Fisiología de la Actividad Física y el Deporte*. Medica

Panamericana.
Montero, D., Diaz-Castañero, C., & Lundby, C. (2015). Endurance Training and V?O2max: Role of Maximal Cardiac Output and Oxygen Extraction. *Medicine and Science in Sports and Exercise*, *47*(10), 2024 2033. https://doi.org/10.1249/mss.0000000000000640
Mooren, F., & Völker, K. (Eds.). (2005). *Molecular and cellular exercise physiology.* Human Kinetics.
Mora-Rodríguez, R., Pallarés, J. y Ortega, J. (2020). *Fisiología del deporte y el ejercicio Prácticas de campo y laboratorio*. Médica Panamericana.
Racinais, S., Cocking, S., & Périard, J. D. (2017). Sports and environmental temperature: from warming-up to heating-up. *Temperature*, *4*(3), 00–00. https://doi.org/10.1080/23328940.2017.1356427
Schoenfeld, B. J., Grgic, J., Ogborn, D., & Krieger, J. W. (2017). Strength and Hypertrophy Adaptations Between Low- vs. High-Load Resistance Training. *Journal of Strength and Conditioning Research*, *31*(12), 3508–3523. https://doi.org/10.1519/jsc.0000000000002200
Silbernagl, S. y Despopolous, A. (2009). *Fisiología: Texto y Atlas*. Médica Panamericana.
Terreros J.L. y Navas F. (2003). *Valoración funcional (Aplicaciones al entrenamiento deportivo).* Gymnos.
Tyler, C. J., Reeve, T., Hodges, G. J., & Cheung, S. S. (2016). The Effects of Heat Adaptation on Physiology, Perception and Exercise Performance in the Heat: A Meta-Analysis. *Sports Medicine*, *46*(11), 1699–1724. https://doi.org/10.1007/s40279-016-0538-5
Wilmore, J.H. y Costill, D.L. (2007). *Fisiología del esfuerzo y del deporte*. Paidotribo.
Wilson, M. G., Ellison, G. M., & Cable, N. T. (2015). Basic science behind the cardiovascular benefits of exercise. *Heart*, *101*(10), 758. https://doi.org/10.1136/heartjnl-2014-306596

SCIENTIFIC JOURNALS:

Medicine and Science in Sports and Exercise
International Journal of Sport Nutrition and Exercise Metabolism
Exercise and Sport Sciences Reviews
Journal of Sport & Exercise Psychology
Journal of Applied Physiology
European Journal of Applied Physiology