

**COURSE DATA****Data Subject**

<b>Code</b>	34003
<b>Name</b>	Introduction to Research
<b>Cycle</b>	Grade
<b>ECTS Credits</b>	6.0
<b>Academic year</b>	2022 - 2023

**Study (s)**

<b>Degree</b>	<b>Center</b>	<b>Acad. year</b>	<b>Period</b>
1103 - Degree in Food Science and Technology	Faculty of Pharmacy	4	First term

**Subject-matter**

<b>Degree</b>	<b>Subject-matter</b>	<b>Character</b>
1103 - Degree in Food Science and Technology	31 - Introduction to research	Optional

**Coordination**

<b>Name</b>	<b>Department</b>
BOLUDA HERNANDEZ, RAFAEL	25 - Plant Biology
CARBO VALVERDE, ESTER	25 - Plant Biology
ROCA PEREZ, LUIS	25 - Plant Biology

**SUMMARY**

Introduction to Research Methods is a fourth year elective course in Bachelor's Degree in Food Science and Technology, which is taught in the Faculty of Pharmacy, University of Valencia. This course has a total of 6 ECTS credits to be given in the first semester.

The aim is focussed to provide the tools to start in the research and to understand and to properly use the various tools and resources currently available for research. For this reason, the student will learn the application of scientific method from the generation of working hypotheses, planning experiments, sampling and data generation, interpretation of results and reporting them to the scientific community and society. This will include management of the main sources of scientific information and databases, ethical issues and the ongoing development of a scientific career both nationally and internationally.



## PREVIOUS KNOWLEDGE

### Relationship to other subjects of the same degree

There are no specified enrollment restrictions with other subjects of the curriculum.

### Other requirements

## OUTCOMES

### 1103 - Degree in Food Science and Technology

- Capacidad de manejar el inglés como vehículo de comunicación científica.
- Adquirir habilidades básicas para buscar referencias científico-técnicas de calidad en las distintas fuentes de información.
- Know the main forums for scientific discussion and their usual operation.
- Be able to write, present and defend research outcomes.
- Understand what a doctoral thesis is and how to write it and present it.
- Be able to fill in an application form for a research project.
- Know the ethical constraints of research in health sciences.

- To understand the scientific method and its aplicación.
- To know the environment of scientific research and the main tools and resources used in the laboratory.
- To know the main sources of scientific information and how they are used to perform literature searches.
- To know formulate hypotheses and planning experiments to contrast.
- To know how to interpret and communicate the results of scientific research.
- To understand the current structure of the scientific career as developed in the public and private sectors.

## DESCRIPTION OF CONTENTS

### 1. Science and scientific method

1. Introduction to scientific research.

Definitions. Purposes of scientific research. Methods of scientific research. The confusion between science and technology.

2. The scientific method.

Origin of scientific questions. Application of scientific method. Boundaries between science and pseudoscience.



**2. The research process**

3. The literature review.

The state of affairs. Sources of bibliographic information. Management databases. Storage of information.

4. The research project.

Writing of a research project. Types of projects and funding sources. Project management. Monitoring and projectos.

5. The laboratory work.

Experimental design. The laboratory notebook. Safety in the laboratory. Good laboratory practice. Teamwork.

6. Analysis of experimental results.

Qualitative and quantitative studies. Statistical methods. Interpretation of results and drawing conclusions.

7. Scientific communication.

Types of scientific communications. Structure of the paper. Authorship. How to make tables and graphs. The popularization of science.

**3. The scientific career**

8. Basic and applied research.

Basic research. Applied research. Technology.

9. Public research and private research.

The public inquiry. Research in the company.

10. The scientific career and professional opportunities.

The graduate. The PhD. The postdoc. The scientific profession. University research.

**4. Computing Practices**

1) Search of references in bibliographic databases, storage in references manager software and introduction to the redaction of a scientific document.

2) Search and analysis of calls for scholarships and research grants. Search and analysis of research projects calls of national and international organizations. Search of national and international patents.

**WORKLOAD**

ACTIVITY	Hours	% To be attended
Theory classes	45,00	100
Computer classroom practice	8,00	100
Seminars	2,00	100
Tutorials	2,00	100
Development of group work	10,00	0
Development of individual work	30,00	0
Study and independent work	20,00	0
Readings supplementary material	5,00	0
Preparation of evaluation activities	15,00	0
Preparing lectures	5,00	0
Preparation of practical classes and problem	5,00	0



TOTAL	147,00
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## TEACHING METHODOLOGY

Teaching is based on the individual study of the topics that will be reinforced with the organization of **tutoring**. Prior to the date of tutoring, the student must have prepared the proposed activities to reinforce the learning of specific aspects of the program. **Classes** are taught using audio-visual equipment. The student will have this material available in the virtual classroom.

The **computer work** will favor the relationship between knowledge and its application to practice.

Will be conducted **seminars** on topics suggested by the teacher and related to the subject. The preparation of the seminar will be supervised by the teacher. The work shall be in writing and will be presented by students.

## EVALUATION

- Conducting Coordinated Seminars, consisting of the presentation and defence of reports related to the contents explained and discussed in the classroom. Written work will be valued, as well as the level of understanding of the contents and the skills for its exposition, defence and discussion (10%).
- Performing a written test to ensure knowledge and understanding of the theoretical minimum contents established for the subject (40%).
- Evaluation of the work of computer practices, through supervision of the work done, the ability to solve the experimental problems raised and the ability to make detailed and well-organized reports of experimental results. A report of practices should be elaborated (10%).
- Preparation and presentation of a document with structure of scientific article (30%).
- Completion of the specific tasks proposed during the development of the course (10%).

The attendance to practices and tutorials is mandatory to pass the subject. Students who request an advanced exam must have completed the computer practices, coordinated seminar and have attended the tutorials. The students of second registration and successive, if they wish, will keep the marks obtained in sections a) c) d) and e) the practices and coordinated seminar, although they must attend the tutorials. They will be allowed to repeat computer practices, perform the new specific tasks proposed and prepare and present the document with the structure of a scientific article (not the coordinated seminar) to improve their qualification



## REFERENCES

### Basic

- Chalmers A.F. (2000). ¿Qué es esa cosa llamada ciencia? 3ª edición. Siglo XXI de España, editores.
- Echeverría J. (1999). Introducción a la metodología de la ciencia. La filosofía de la ciencia en el siglo XX. Ediciones Cátedra.
- Ebel, Hans F. (2004) The art of scientific writing. Wiley-VCH: Weinheim (Alemania).
- Primo-Yúfera E. (1994). Introducción a la investigación científica y tecnológica. Alianza Editorial.
- Quinn G. P. and Keough M. J. (2002). Experimental design and data analysis for Biologists. Cambridge University Press.
- Ramón y Cajal S. (1999). Reglas y consejos sobre investigación científica. Los tónicos de la voluntad. Colección Austral 232. Espasa Calpe.
- Radnitzky G. y Andersson G. (1982). Progreso y racionalidad en la ciencia. Alianza Universidad Textos, 46. Alianza editorial.

### Additional

- Bernabeu i Mestre, J. (2008). Investigación e innovación tecnológica en la ciencia de la nutrición: el abordaje de la malnutrición en el contexto de la cultura científica. ECU Editorial: San Vicent: España
- Contento, I. R. (2007). Nutrition education: linking research, theory, and practice. Jones and Bartlett Publishers: EEUU
- Ireton-Jones C.S., Gottschlich, M.M., Bell, S. J. (1999). Practice-Oriented Nutrition Research: An Outcomes Measurement Approach. Jones and Bartlett Publishers: EEUU
- Koh, E.T. (2000). Introduction to Nutrition and Health Research. Springer: Alemania
- Miján de la Torre, A. (2002). Técnicas y métodos de investigación en nutrición humana. Glosa Editorial: España.
- Barnard, C. Gilbert F. y McGregor P. (1993). Asking questions in biology. Design, analysis and presentation in practical work. Longman group UK limited.
- Brown D. y Rothery P. (1993). Models in biology: mathematics, statistics and computing. John Wiley and sons.
- di Trocchio F. (1998). Las mentiras de la ciencia. Libro de bolsillo CT2500. Alianza Editorial.