

## 68401 - Scientific method

### Syllabus Information

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**Academic Year:** 2022/23

**Subject:** 68401 - Scientific method

**Faculty / School:** 104 - Facultad de Medicina

**Degree:** 530 - Master's in Introduction to Medical Research

**ECTS:** 6.0

**Year:** 1

**Semester:** First semester

**Subject Type:** Compulsory

**Module:**

## 1. General information

### 1.1. Aims of the course

The main objective is to introduce graduates to the field of research. It is based on the assumption that the majority of students will carry out applied biomedical research that will make the clinical care work compatible with the research of health interest. With this general objective activities have been programmed with the following specific objectives:

1. To know the research in Biomedicine that is carried out in Aragon, its structure and the opportunities that represents for the new researcher, as well as open lines of research in scientific areas where new researchers can be integrated.
2. To know the resources and services of the Library of the University of Zaragoza.
3. To plan a bibliographic search strategy and know the main databases and other sources of scientific information (WOS, Medline, Pubmed, ... among others), as well as bibliographic managers.
4. To describe the evaluation criteria of the researcher Curriculum Vitae and the productivity indicators and research impact.
5. To understand the phases of the research process, the formal requirements for submitting a project competitive research and aspects related to research ethics.
6. To handle the different strategies of scientific communication: oral and written communication, the process of publication, article types, open access, repositories and researcher profiles.
7. To know the general requirements of the Final Master's Project (TFM): authorship and critical sense.

### 1.2. Context and importance of this course in the degree

This subject of the master introduces the student to the dynamics of the researcher to know the context and the basic requirements that allow to start an research in the short term. Research is proposed as an activity complementary and necessary to the healthcare activity, but which presents differences that must be known, such as methodological requirements, the phases of research as a process or the communication of results among others. Resources available to start an investigation are presented (library, institutes, groups, lines, etc) and the tools necessary to manage the bibliographic background, the selective recovery techniques, as well as analysis and information management.

This first subject is designed to train the future researcher in general aspects and facilitate their integration in research groups in the closest environment and within a year. It is structured in two modules or thematic blocks:

- 1) "Scientific research" refers to the political, methodological and personal context of relevant research production.
- 2) Information and Medical Documentation, refers to the training in the primary methodological resources that are bibliographic, either as a user or consumer, or as a producer (of review or research articles) .

### 1.3. Recommendations to take this course

English and spanish knowledge is required for reading scientific articles, bibliographic databases such as PubMed, and management of basic computer programs.

## 2. Learning goals

### 2.1. Competences

Upon passing the subject, the student will be more competent to:

- To choose the scope or theme of your research with principles of rationality and realism.
- To carry out bibliographic searches and evaluate the results found with criteria of completeness, pertinence and scientific relevance. To handle the necessary bibliographic references in the research tasks.
- To understand the legal, political, institutional and methodological conditions of the research activity of the scientific community in your area.
- To analyze the methodology and results of publications related to your topic of research interest.
- To improve the reading and writing habits of scientific reports (including the CV)

## 2.2. Learning goals

To pass this subject the student must demonstrate the following results:

To describe the basic principles of the research process and understand the bibliometric indicators of scientific production and consumption commonly used.

To identify the types of medical publications and the main international bibliographic resources.

To locate and assess the most related lines of research and prepare the curriculum vitae adapted for research projects. To know the aspects related to authorship, critical sense, ethics and the profile of the researcher.

## 2.3. Importance of learning goals

It provides intellectual tools to understand the general framework of current scientific production, as well as certain technical tools for the correct approach of a research problem. In this sense, it updates and broadens the general notions of documentation acquired in the first years of the Degree, but now requires greater autonomy, responsibility and efficiency. To train students to start research tasks and incorporates knowledge of the "rules of the game" of communication scientific. The learning results of this subject tend to improve progressively throughout the master's degree if the selection and bibliographic evaluation principles acquired here in the work of the elective subjects and in the Final Master's Thesis are applied.

## 3. Assessment (1st and 2nd call)

### 3.1. Assessment tasks (description of tasks, marking system and assessment criteria)

The student must demonstrate that he has achieved the expected learning outcomes through the following assessment activities

-Participation:

Attendance and participation in the discussions and guided discussions proposed in the expository sessions are evaluated, as well as the guided exercises of the practical workshops proposed.

-Directed work:

Students must carry out a paper in the form of communication to a congress (250 words) whose content must be related to a research project, with oral and public presentation (5 minutes) on the last day of class. The final written report of the work carried out and delivered in paper format on the last day of class of the Subject as well as the oral presentation will be evaluated.

-Evaluation / Objective final test. It will consist of a test-type exercise, on the conceptual, methodological or technical problems of the Program of the subject. It will be a questionnaire of 20 questions, with 4 answers of which only one is valid.

-Evaluation system

The qualification will be carried out on a numerical scale from 0 to 10, with expression of a decimal, to which may be added the corresponding qualitative qualification: 0-4,9: Suspense (SS); 5,0-6,9 Approved (AP); 7.0-8.9: Notable (NT). 9.0-10: Outstanding (SB)

The qualification will be obtained from the result of combining the following parameters: Active face-to-face participation (30%); Directed Work (30%); Final objective test (40%).

## 4. Methodology, learning tasks, syllabus and resources

### 4.1. Methodological overview

The learning process that has been designed for this subject is based on the following:

It combines the traditional expository methodology, to inform the context and general methodology of the research, with more personalized action techniques to help each student to define the research profile of their professional career and acquire specific skills in bibliographic information management techniques. Especially useful is the realization of the practical exercises that are proposed.

### 4.2. Learning tasks

The program offered to the student to help to achieve the expected results includes the following activities:

Classes: The thematic content and objectives of this subject require three types of activities of different duration that they combine according to the program: a) teacher presentations and tutorial or guided presentations of bibliographic data; b) debates, questionnaires or problem solving exercises in pairs or small groups.

Directed works: Each student must carry out and present a supervised work.

Digital Teaching Ring (ADD / Moodle). This resource will be used for general communication and notices, consultation of didactic materials elaborated by the teaching staff and tutorials. Also for the delivery of assessment exercises continuous, but not for the delivery of the directed work or for the final test.

Individual tutoring. The responsible teaching staff will attend a specific group of students, in a personal interview (by appointment in any case or in a pre-established time), by phone or email.

### 4.3. Syllabus

The course will address the following topics:

- I. Scientific research
  1. Biomedical research lines and projects in Aragon.
  2. Research methodology. Phases of the process
  3. Ethical and legal implications of medical research
  4. The research Curriculum Vitae
  5. Communication about results of research
  6. Scientific publication, types of articles, authorship.
  7. The peer review process
- II. Information and medical documentation
  8. UNIZAR resources for research staff
  9. Bibliographic searches
  10. Databases and other sources of scientific information
  11. Bibliographic management programs
  12. Open access
  13. Creative commons licenses
  14. Investigator profiles

### 4.4. Course planning and calendar

Calendar of face-to-face sessions and presentation of works.

The face-to-face sessions will take place from Monday to Thursday. Start: September 29, October 3, 4, 5, 6, 17, 18, 19 and 20, 2022\*. The list of teachers responsible for the lecture sessions, workshops and computer practices will be made public on the Moodle 2 platform: Digital Teaching Ring.

Teaching staff: Coordinator: Isabel Nerin, Prof. PhD, Department of Medicine, Psychiatry and Dermatology, Faculty of Medicine, building B, ground floor. [isabelne@unizar.es](mailto:isabelne@unizar.es)

-Javier Martínez, Prof. PhD, Department of Documentation Sciences and History of Science, Faculty of Medicine, Building B, ground floor. [javier\\_martinez@unizar.es](mailto:javier_martinez@unizar.es)

Isabel Gomez. Director of the Biomedical Library of the University of Zaragoza. [dbimediz@unizar.es](mailto:dbimediz@unizar.es)

Daily course subject, from Monday to Thursday\*: 16:00 to 20:00 p.m. It is taught in the specific classroom of the Faculty of Medicine (building B) as long as the epidemiological conditions allow it.

\* Depending on the epidemiological conditions due to the coronavirus pandemic, face-to-face sessions may be reduced and replaced by other non-face-to-face activities.

FINAL EVALUATION: October 20, 2022: 17h-18h

Further information concerning the timetable, classroom, assessment dates and other details regarding this course, will be provided on the first day of class or please refer to the Faculty of Medicine <https://medicina.unizar.es/>.

### 4.5. Bibliography and recommended resources

During the course there will be other references that will be discussed previously in class.

In addition to:

-Los tónicos de la voluntad. Ramon y Cajal S. Editorial: Gadir

-La doble hélice. Watson JD. Editorial: Alianza Editorial

-Rosalind Franklin y su contribución al descubrimiento del ADN. Sayre A. Editorial: Horas y horas

-Bernard S. Bloom. Controlled studies in measuring the efficacy of medical care: A historical perspective. International Journal of Technology Assessment in Health Care, 2 (1986), 299-310.

-Harry M. Marks. The Progress of Experiment: Science and Therapeutic Reform in the United States, 1900?1990. Cambridge, Cambridge University Press, 2009.

-Mark Honigsbaum. The pandemic century. A history of global contagion from the Spanish flu to Covid 19. London, Penguin, 2020.