

## 68401 - Scientific method

### Información del Plan Docente

<b>Academic Year</b>	2018/19
<b>Subject</b>	68401 - Scientific method
<b>Faculty / School</b>	104 - Facultad de Medicina
<b>Degree</b>	530 - Master's in Introduction to Medical Research
<b>ECTS</b>	6.0
<b>Year</b>	1
<b>Semester</b>	Indeterminate
<b>Subject Type</b>	Compulsory
<b>Module</b>	---

### 1.General information

#### 1.1.Aims of the course

The subject and its expected results respond to the following approaches and objectives:

The main objective is to introduce graduates in the field of research. It is based on the assumption that the majority will not be devoted to basic or social research but to applied biomedical research or translational research and that it will reconcile clinical care work with research of health interest. With this general objective, activities have been programmed with the following specific objectives:

- 1.-To know the determining factors of the science and technology system.
- 2.-To understand the sociometric indicators of productivity and impact of research in Aragón.
- 3.-To locate the open research lines, responsible scientists and main publications of the scientific areas in which new researchers can be integrated.
- 4.-To know the differential characteristics of the types of research in Medicine.
- 5.-To perform a methodological, sociological and documentary analysis of a scientific article.
- 6.-To know the formal requirements and assessment criteria of the Resume Curriculum Vitae
- 7.-To Know the principles of the social and scientific justification of an investigation
- 8.-To know the differential characteristics of the bibliographic databases of medicine: PubMed, Embase, Cochrane, Science Citation Index, Journal Citation Reports.

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9.- To plan the search strategy for bibliographic information on a given subject in PubMed and analyze the results with the freely accessible bibliographic management programs: Ref Work and Ed Note.

10.- To know the general requirements of the Final Master's Project (TFM) and the methodological principles of the type "Systematic review" or "Applied bibliometric analysis"

11.- To write a first draft of the section "review of knowledge" for a research project or the Master's Final Project.

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

This first core subject of the master's degree 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 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 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.
- Scientifically substantiate a research project and understand the practical principles of systematic reviews for evidence-based medicine (EBM)
- To design a social science research project or a bibliometric study
- To improve the reading and writing habits of scientific reports (including the CV)

## 2.2. Learning goals

The student, to pass this subject, 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 or characterize the types of research, 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 to calls for projects or research staff.

To discover and analyze the medical literature published in the last 5 years on a subject

Write a research project according to the norms of the competitive calls and prepare a presentation for the oral communication of the results of an investigation.

## 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 through the exploration of the bibliographic background. 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.

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 can choose their work from a list of topics, according to their previous experience, evaluating both the level of difficulty and the quality of the learning made in the subject.

The simplest work consists of the "Development of a theme of the program", capable of showing the capacity to order, synthesize, exemplify or summarize the information provided. The second level is the "Work with problem approach and data collection and ordering", which implies the active and creative use of programmed methodological or conceptual resources. The highest level is the "Work with problem statement, control of the methodology and data management", which also implies a formal presentation in the style of research reports or journal articles.

The Final Written Report of the individual work will be evaluated and delivered in paper format on the last day of class of the Subject. In addition, the process of preparing the work and the oral and public presentation (10 minute communication) carried out on the last day of class can be assessed.

-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 30 questions, with 5 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 direction of work of different levels of complexity and difficulty, adaptable to the needs and previous experience of each one. Several sessions will take place in the computer room.

### **4.2.Learning tasks**

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### **4.3.Syllabus**

The course will address the following topics:

#### **Section I. Scientific research, development, and innovation (R+D+I)**

- Topic 1. Science & Technology Policy: a historical development
- Topic 2. Biomedical research programs in Aragon
- Topic 3. The curriculum vitae (CV) for research activities
- Topic 4. Research Methodology: Phases of the process
- Topic 5. Critical reading of a medical journal article
- Topic 6. Ethical and legal implications of medical research
- Topic 7. Types of research designs: quantitative and qualitative studies
- Topic 8. Scientific activities as indicators

#### **Section II. Medical documentation and information**

- Topic 9. Databases Information Retrieval System (SRI)
- Topic 10. Bibliometric analysis: methodology and results
- Topic 11. International databases: PubMed, Embase
- Topic 13. Hispanic databases: IME, ISOC IBECS, Latindex
- Topic 14. Cochrane for Evidence-Based Medicine (MBE)
- Topic 15. Databases of scientific impact indicators: WOS, JCR

### **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 through Thursday from 4 to 9 between October 15 and October 29. The relationship of the faculty responsible for the expository sessions, workshops and computer practices will be published on the Moodle 2 platform: Digital Teaching Ring.

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Subject of daily course, from Monday to Thursday: 16 h-20h, from October 15 to October 29, 2017. It is taught in a specific classroom of the Faculty of Medicine B and the Computer Classroom.

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**

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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