Guía Docente 2016-17

Research Methodology and Management

Metodología y Gestión de la Investigación

Research Methodology

Blended Learning Mode
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Research Methodology and Management

Module: Research Methodology
Subject matter: Research Methodology and Management
Requisite: Mandatory
Nº of credits: 2
Academic term: 1st quarter
Professors:
- Dr. Linda H. Chung lhchung@ucam.edu
Office hours: by appointment via email
Coordinator: Dr. Mercedes Carmona

Brief Description

The main techniques and methodologies for scientific research are presented. The necessary knowledge for doing documental and experimental research is given to the student. The structure of the I+D+I system and the main funds for research are shown.

Breve descripción de la materia

Se exponen las técnicas y metodología de la investigación científica. Se proporciona al estudiante el conocimiento necesario para la realización de la investigación documentada y experimental. Se presenta la estructura del sistema I+D+I y de las principales ayudas a la investigación.

Pre-requisites

No se establecen requisitos previos

Objectives

- Establish the necessary bases so that the student is able to independently address all phases of scientific research.
- Present students with the knowledge of the main techniques used in research.
- Teach students how to develop projects and apply for grants.

The specific objectives are:

- Know the characteristics of the scientific method and its application.
- Know the phases and characteristics of scientific research.
- Analyze the characteristics of measurement and instrumentation in science.
- Know the I+D+I Spanish and European system.
• Develop a research project.
• Know the main existing financial support for research.
• Understand the main models of technology transfer.

**Competencies**

**MECES1:** Students will know how to apply the acquired knowledge and have the capacity to problem solve in new or unfamiliar settings within broader (or multidisciplinary) contexts related to their field of study.

**MECES2:** Students will be able to integrate knowledge and handle the complexity of formulating judgment based on information that may be incomplete or limited, including reflections on social and ethical responsibilities linked to the application of their knowledge and judgment.

**MECES3:** Students will know how to communicate their conclusions (and the knowledge and rationale underpinning them) to the public (specialists and non-specialists) in a clear and unambiguous manner.

**MECES4:** Students will possess learning skills that will allow them to continue studying in a way that is largely self-directed or autonomous.

**MECES5:** To have and understand knowledge that will provide them the foundation or opportunity to be original in the development and/or application of ideas, often within the research context.

**MGI.1:** Distinguish and interpret different experimental designs in the área, with respect for the ethics and intellectual integrity.

**MGI.2:** Know the I+D+I Spanish system and the different parts of a research project in the area.
## Methodology

<table>
<thead>
<tr>
<th>Methodology</th>
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### Syllabus

**Theoretical Teaching Program**

*Methodology and research techniques.*

**Topic 1 Nature of science: science and scientific**
- Analysis of the origin and social importance of science and its different forms of development.
- Analysis of the characteristics of science and scientists.

**Topic 2 Scientific method**
Students will learn the bases of the scientific method as a method of knowledge and its relation to other methods of knowledge.

**Topic 3 Research designs: Key parameters in the study design**
Students will learn the different types of taxonomic axes in the research design.
Topic 4 Research designs: Types of Studies
Students will learn the different types of design that can be used to answer a scientific question. Likewise, students will learn the characteristics of each of them and the conditions that indicate its use. Also, students will learn the appropriate protocol to follow in human research study.

Topic 5 Research Management
The Spanish system of science and technology: present situation, the agencies of the Spanish system of science and technology, innovation in Spain: technology transfer, fellowships and research grants, development of a research project.

Relationship with other subjects of the curriculum
This material is linked with the rest of the sections that complete the Research Methodology module.

Evaluation System
The evaluation system will have the following distribution
February/June Call:
- Exams: 30%
  Students will be tested on theoretical-practical questions and solving cases that come from covered class content.
- Realized coursework: 70%
  Student participation in the various training activities that make up the majority of the subjects will be evaluated through correcting exercises, assignments, case studies, problems and participation of discussion forums. The use of diverse information sources are specifically evaluated, in some cases, by work in which, following a formal scheme, develops further a current issue previously proposed by the teacher associated with the acquired knowledge.

The scoring system will be as follows, set by R.D. 1.125/2003 of September 5th: Fail: 0-4,9; Pass: 5-6,9; Notable: 7-8,9; Outstanding: 9-10. The honorable mention of Distinction (Matrícula de honor) will be awarded by the professor to the student. Based on the number of students enrolled, only 5% will be eligible for this honorable mention, except for when the enrollment is under 20 in which case only one student will be granted this honor.

September call:
The evaluation will be the same as indicated previously for the February/June call.

Bibliography

Basic Bibliography

Sanchez María, E. (2005), Análisis de situaciones sociales, Grupo Editorial Universitario, Madrid


María Jesús Uriz, Alberto Ballester, Juan Jesús Biscarret, Nicanor Ursua. [2006]. Metodología para la investigación. Eunate, Pamplona


Complementary Bibliography

Callejo, J., 2001, El grupo de discusión: introducción a una práctica de investigación. Ariel, Barcelona


Related websites

http://www.fundacion-seneca.org/ fundación séneca.

http://www.idi.mineco.gob.es/ secretaría de estado de investigación desarrollo e innovación.

http://www.csic.es/web/guest/home consejo superior de investigaciones científicas.

http://www.rediris.es/ la red académica y de investigación española.

http://www.ucam.edu/investigacion/apoyo-investigacion/plan-propio-fomento-investigacion/programa_de_potenciacion_de_recursos_humanos UCAM
Study Tips

A system of daily study is recommended by performing exercises and doing comprehensive reading.

Educational Materials

Independent study. Taking into account the Blended Learning Mode of the program, it is important for the student to have adequate computer equipment.

Tutorial

The academic tutorial will have the following objectives:

- Personally review the course contents, evaluation system, study methods and teaching methodology.

- Resolve all doubts and problems that the student has on the given agenda.

- Strengthen and provide the minimum knowledge needed to those students who require further understanding of the topic.

- Provide the student with extra activities that will enable him/her to complete and improve his/her training in the subject area.
Guía Docente 2015/16
Bibliographic Searching and Analysis
Búsqueda y análisis bibliográfico.
Research Methodology
Blended Learning Mode
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Bibliographic Searching and Analysis

Module: Research Methodology
Subject matter: Bibliographic Searching and Analysis
Requisite: Mandatory
Nº of credits: 2
Academic term: 1st semester
Professors:
- Dr. Beatriz Peña   bpena@ucam.edu
- Dr. Pedro Alcaraz   palcaraz@ucam.edu
Office hours: by appointment via email
Coordinator: Dr. Mercedes Carmona

Brief Description
The main objective of this course is that students acquire the skills to search, analyze and cite scientific information, in order to carry out their own scientific text. Thus, the main databases to acquire library materials are taught, as well as leading indexes to measure the quality impact score of such documents. In addition, students acquire the ability to cite their work in a scientific manner using normative standards such as Vancouver or Harvard citation, as well as database management to set these citations (EndNote and RefWorks).

Breve descripción del módulo
Esta materia tiene como principal objetivo que el alumno adquiera las habilidades para buscar, analizar y citar información científica y poder llevar acabo de manera autómata un trabajo de investigación de posgrado. Para ello, a la largo de la materia se enseñan las principales bases de datos para adquirir material bibliográfico, así como los principales índices de impacto para medir la calidad de dichos documentos. Además, el alumno podrá adquirir la habilidad de citar de manera científica sus trabajos utilizando normas de citación como Vancouver o Harvard, así como gestionar bases de datos para configurar las citas bibliográficas (EndNote y Refworks).

Pre-requisites
None.

Objectives
- Establish the necessary bases so that student is able to independently address all phases of scientific research. Specifically, special attention is given to enable students to search and analyze academic information, as well as acquire the ability to scientifically cite articles and research in their own research works.

The specific objectives to be acquired are:
Bibliographic Searching and Analysis

- Acquire the capacity to perform a search of scientific information.
- Acquire the capacity to interpret and analyze scientific documents.
- Analyze the characteristics of the measurements and instrumentation in science.
- Know the main catalogs and databases to find relevant information for research, including the doctoral thesis.
- Evaluate the quality of the bibliographical sources using quality criteria established by organizations in relevant institutions.
- Learn to cite bibliographic references following the standards of style set by the area of Social Sciences (Harvard Model).
- Learn and manage databases to configure citations (EndNote y Refworks).

Learning Outcomes

RA: Have the ability to search and analyze bibliography of relevant scientific bases in academia.

RA: Know and understand different impact scores to evaluate different materials collected.

RA: Be able to cite and reference correctly material derived from the literature search, according to citation standards established in academia (Harvard or Vancouver).

Competencies

MECES1: Students will know how to apply the acquired knowledge and have the capacity to problem solve in new or unfamiliar settings within broader (or multidisciplinary) contexts related to their field of study.

MECES2: Students will be able to integrate knowledge and handle the complexity of formulating judgment based on information that may be incomplete or limited, including reflections on social and ethical responsibilities linked to the application of their knowledge and judgment.

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MECES5: To have and understand knowledge that will provide them the foundation or opportunity to be original in the development and/or application of ideas, often within the research context.

BAB1: Manage scientific databases to review and conduct a literature search in the specific area of the Master's thesis.

BAB2: Cite and reference works correctly in the Master's thesis.
Methodology

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Syllabus

Theoretical Teaching Program

Topic 1. Bibliographic Searching and Analysis.
- Strategies for conducting a review and literature search. Types of literature sources. Key words and descriptors (thesaurus). Database of thesaurus: Medical Subject Headings (MeSH), HONselect. Descriptors in Health Sciences (DeCS).
- Application of logical operators: Boolean operators, proximity operators and truncation.

Topic 2. Access to sources of information and management of scientific databases.
Bibliographic Searching and Analysis

- Bibliographic web platforms: Scopus. Web of Knowledge. ISI Current Contents Connect. ISI Proceedings. Derwent Innovations Index. ISI Essencial Science Indicators. ISI Journal Citation Report on the web

The evaluation of scientific journals.

- ISI Journal Citation Report (JCR). Uses.
  - Concepts
  - JCR search

Quality parameters of the journal.
- Scientific nature
- Peer review
- Editorial board
- Frequency
- Time of existence and punctuality
- Summary, key words and title in English
- Standardization
- Author affiliation
- Referred citations
- Evaluation of process of journal
- Evaluation criteria for permanence

Quality Criteria of journals for ANECA
- List of journals in function of knowledge area
  - Journal impact via Web of Knowledge
- Criteria for selection of journals for publishing scientific articles
  - Where to publish?
  - Impact factor.
  - Scientific rigor and editorial efficiency.
  - Other important factors
  - Other indexing platforms (LATINDEX).
**Topic 4. Dissemination of results:**

a) Articles:
- Learn the basics of specific journals in each area (ISI, DICE, …)
- Select a possible journal to publish the article.
- The process to publish in journals

b) Libros:
- Editorial selection
- Process to publish in journals
- Journals to publish reviews

c) Congresos:
- Search conference and criteria for selection
- Process to publish in journals

**Topic 5. Bibliographic editing in scientific publications.**

Incorporation of citations in scientific text.

**Bibliographic references.**

- Formats and standard of referencing literature.
- Vancouver standards
- Use of database administrators and bibliography creators (Reference manager, EndNote y RefWorks)
- Value of the citation for the journal

**Relationship with other subjects of the curriculum**

This material is linked with the rest of the sections that complete the Research Methodology module.

**Evaluation System**

The evaluation system will have the following distribution

**February/June Call:**

1. **Exams: 30%**
   Students will be tested on theoretical-practical questions and solving cases that come from covered class content.

2. **Realized coursework: 70%**
Student participation in the various training activities that make up the majority of the subjects will be evaluated through correcting exercises, assignments, case studies, problems and participation of discussion forums. The use of diverse information sources are specifically evaluated, in some cases, by work in which, following a formal scheme, develops further a current issue previously proposed by the teacher associated with the acquired knowledge.

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September call:

The evaluation will be the same as indicated previously for the February/June call.

**Bibliography**

**Basic Bibliography**

Manual de Estilo para la presentación de trabajos según las normas de la Asociación Americana de Psicología (APA, 2001).


José Manuel Estrada Lorenzo (2007)Capítulo 2. La Búsqueda bibliográfica y su aplicación en PubMed-MEDLINE Semergen: revista española de medicina de familia, ISSN 1138-3593, Nº. 4, , págs. 193-199


**Complementary bibliography**


**Related websites**

*Web of Knowledge* [http://www.accesowok.fecyt.es](http://www.accesowok.fecyt.es)


[http://www.crd.york.ac.uk/crdweb/](http://www.crd.york.ac.uk/crdweb/)

[http://www.hon.ch/HONselect/index_s_p.html](http://www.hon.ch/HONselect/index_s_p.html)

[http://decs.bvs.br/](http://decs.bvs.br/)

[http://www.ucam.edu/biblioteca/catalogos](http://www.ucam.edu/biblioteca/catalogos)


[https://www.educacion.es/teseo](https://www.educacion.es/teseo)

[http://www.recolecta.net/buscador/results.jsp](http://www.recolecta.net/buscador/results.jsp)


Study tips
Attend classes and actively participate in the classroom. Orient the effort and study on the argumentative reasoning of the course contents. Utilize office hours, Campus Virtual or email of the professor to help clarify or resolve any questions or doubts you may have regarding the course or course material. Review recommended reading to increase depth of knowledge and not limit oneself to the study of class notes.

Educational materials
The educational materials to facilitate competency in this module are:

- Presentations (PowerPoint) that the professor uses as a guide. The student should elaborate his/her own notes using all of the educational materials described here.

- Scientific articles that are posted in Campus Virtual and that are related to each educational unit. The forum and social networks will be used to share critical thinking and practical application of each of the articles.

- Supporting documents that can be posted on Campus Virtual or requested for the students to search via information and communication technology. Also, these should be related to each educational unit.
Guía Docente 2016/17

Preparation and publication of scientific work

Elaboración y publicación de un trabajo científico.

Research Methodology

Blended Learning Mode
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Educational materials.........................................................................................................11
Preparation and publication of scientific work

Module: Research Methodology
Material: Preparation and publication of scientific work
Requisite: Mandatory
Nº of credits: 3
Academic term: 1st semester
Professors:
- Dr. José Manuel Noguera: jmnoguera@ucam.edu
- Dr. Pablo Salvador Blesa Aledo: pblesa@ucam.edu
- Dr. Pedro Emilio Alcaraz Ramón: palcaraz@ucam.edu
Office hours: by appointment via email
Coordinador: Dr. Mercedes Carmona.

Brief Description

In this subject, included in the research methodology module, the student is able to transmit the results of scientific research. To obtain this objective, the student will learn the different types of scientific texts that exist, their structure, style and scientific writing.

Students will learn the process of publishing a scientific paper and its diffusion.

Another important aspect in this subject is the art of public speaking and computer programs that can help in the presentation of results.

Breve descripción de la materia

En esta asignatura, enmarcada dentro del módulo de metodología de la investigación, se pretende que el alumno sea capaz de transmitir los resultados obtenidos en una investigación científica. Para conseguir este objetivo, el alumno aprenderá los diferentes tipos de textos científicos que existen, su estructura y profundizará en el estilo y la redacción.

El alumno adquirirá importantes nociones acerca del proceso de publicación de un trabajo científico y también de su difusión.

Otro aspecto importante en esta asignatura es la presentación y la exposición oral de los trabajos, para los que se les enseñará oratoria y también diferentes programas informáticos que le puedan ayudar en la edición y presentación de sus resultados.

Pre-requisites

None.
Objectives

To establish the necessary bases so that student is able to independently address all phases of scientific research, and specifically the writing, publication and dissemination of scientific papers.

The specific objectives to be acquired are:

- Know the different types of scientific texts.
- Learn the structure and style of writing in different scientific works.
- Start building the ability to present results and conclusions at the scientific level in oral and written form.
- Know the different stages that exist in publishing a scientific article.
- Know how to disseminate scientific work.

Learning outcomes

At the end of this course, the student will be able to:

- Know the different types of scientific texts that exist.
- Clearly differentiate different parts of scientific work.
- Know the distinctive features in the lexicon, syntax and writing in scientific texts.
- Understand different types of publications of scientific texts and the stages of publication.
- Know how to spread and increase the impact factor of scientific work.
- Make oral presentations.
- To manage different software programs that help with not only analyzing results but also presenting them.

Competencies

**MECES1:** Students will know how to apply the acquired knowledge and have the capacity to problem solve in new or unfamiliar settings within broader (or multidisciplinary) contexts related to their field of study.

**MECES2:** Students will be able to integrate knowledge and handle the complexity of formulating judgment based on information that may be incomplete or limited, including reflections on social and ethical responsibilities linked to the application of their knowledge and judgment.

**MECES3:** Students will know how to communicate their conclusions (and the knowledge and rationale underpinning them) to the public (specialists and non-specialists) in a clear and unambiguous manner.
MECES4: Students will possess learning skills that will allow them to continue studying in a way that is largely self-directed or autonomous.

MECES5: To have and understand knowledge that will provide them the foundation or opportunity to be original in the development and/or application of ideas, often within the research context.

EPTC1: Distinguish the structure and characteristics of different scientific publications, mainly the Master’s thesis.

EPTC2: Write and properly structure the Master’s thesis and do the oral presentation.

Methodology

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Syllabus

Theoretical Teaching Program

Topic 1. Structure of a scientific article
Preparation and publication of scientific work

- Types of scientific articles.
- Essential characteristics of a scientific article.
- Sections of a scientific article:
  - Title characteristics.
  - Uniform requirements that indicate who should be listed as authors in a research paper. Order of the authors. Author information that should appear in an article.
  - Abstract.
  - Definition of key words.
  - Parts of the introduction.
  - Developing material and methods section.
  - Results and Discussion section contents.
  - Conclusions and most common errors in its formulation.
  - Acknowledgement section.
  - References, common formats.
  - Examples of scientific articles in different disciplines.

Topic 2 Writing a scientific article

Writing method:
  - Method of successive approximations and context that justifies this method
  - Order in which the different parts of a scientific article should be written and why.

Scientific style:
  - Scientific article characteristics: Maximum of Gracie
  - Precautions with respect to style
  - Conditions and structuring strategies, syntax and vocabulary.
    o Syntactic characteristics.
    o Scientific lexicon characteristics.
  - Examples of scientific articles of different disciplines: analyzing the writing and scientific style.

Topic 3 Publication of a scientific article

- Criteria for judging scientific papers (M. Bobenrieth)
- Self-assessment of an article by the author before sending a scientific paper to a journal
- Stages in the publication of an article
  - Examples of the total process of a publication of articles: referee evaluation form, cover letter, letter of acceptance, letter of rejection, referees evaluation form, cover letter, proofs, copyright, ethics, guidelines for authors.
  - Example of following on-line an article sent to a specific journal.

- Review system of articles used in different journals:
  - Peer review system:
- Members of the editorial committee, editors, referees: designation, qualification, incentives and referee assignments.
- Reliability.
- Validity.
- Types of bias in the system.
- Detecting errors and frauds in research by the system –
- Double-blinded review system:
  - Advantages.
  - Disadvantages.
- Rejection rate of works. How to challenge the rejection of an article.
- Fraud detection in research: Responsible institution.

**Topic 4 Writing, publishing and its relation with the impact score**

What you need to know to increase the impact of the articles?
What can you do to write an article to increase future impact?
What can you do when publishing an article to increase their impact?
How can you spread the articles themselves?
How can you increase and control the spread of the articles themselves?

**Topic 5. Other types of research works**

- Short report.
- Presentation.
- Conference communication.
- Scientific monograph. Diffusion.
- Research project.
- Master’s thesis:
  - Structure, contents, language, writing, text organization, timeline
  - Master’s thesis defense

**Topic 6. Doctoral Thesis:**

- Structure of a Doctoral thesis project
- Thesis by compendium. Structure and formal requirements and style.
- Rules by the Vice-Rector of Research in UCAM (http://www.ucam.edu/estudios/doctorado/normativa/propia)
- Structure, contents, language and writing, text organization, timeline.
- Goals to be achieved by the student in the development of a Doctoral Thesis.
- Diffusion of results obtained in the Doctoral Thesis: articles, conference communications, etc.
Tema 7. Presentation of research works.

- Basic rules for presenting scientific work.
- Advice about the use of tables and figures.
- Management software:
  - Sigma Plot 9: Graph editing program. Doing exercises for designing graphs to adjust for linear regression, non-linear, etc.
  - EndNote: Insertion of citations within text.
- Power point. Slides and poster designs.


- General recommendations for communicating work. Introduction to public speaking.
- Oral expression. Techniques in transmitting messages and diverse contents to a particular audience.
- Speech:
  - The thesis.
  - The body of the speech.
  - The introduction: 3 fundamental principles.
  - Ending the speech: the principles of a conclusion.
- The style of the speaker:
  - The wit and humor in the speech.
  - Intentional repetitions.
  - Self-adulation and brevity.
  - Nervous habits.
  -Appearances do matter.
  - Body language.
  - Voice projection.
  - The magic of pauses/breaks.
  - Other interruptions.
  - Time control.
- The audience:
  - Do not bore them.
  - Public awareness.
  - Adequate or correct speech.
  - Honors and accolades.
  - Public speaking.
Relationship with other subjects of the curriculum

This material is linked with the rest of the sections that complete the Research Methodology module.

Evaluation System

The evaluation system will have the following distribution

February/June Call:

1. Exams: 30%
   Students will be tested on theoretical-practical questions and solving cases that come from covered class content.

2. Realized coursework: 70%
   Student participation in the various training activities that make up the majority of the subjects will be evaluated through correcting exercises, assignments, case studies, problems and participation of discussion forums. The use of diverse information sources are specifically evaluated, in some cases, by work in which, following a formal scheme, develops further a current issue previously proposed by the teacher associated with the acquired knowledge.

The scoring system will be as follows, set by R.D. 1.125/2003 of September 5th: Fail: 0-4,9; Pass: 5-6,9; Notable: 7-8,9; Outstanding: 9-10. The honorable mention of Distinction (Matrícula de honor) will be awarded by the professor to the student. Based on the number of students enrolled, only 5% will be eligible for this honorable mention, except for when the enrollment is under 20 in which case only one student will be granted this honor.

September call:

The evaluation will be the same as indicated previously for the February/June call.

Bibliography

Basic Bibliography


Esposito, J.. (2005). *In the Spotlight, overcome fear of public Speaking and Performing*. In the Spotlight, LLC.


Janner, G.. (1986). *Janner's Complete Speechmaker*. Publisher: Guild, United Kingdom.


**Complementary Bibliography**


Related websites

http://science.thomsonreuters.com/
Web de ISI (Thomson Reuters)

http://garfield.library.upenn.edu
Webpage founder of ISI, Dr. Eugene Garfield.

http://www.garfield.library.upenn.edu/impactfactor.html
All written articles by Eugene Garfield about the impact factor

http://www.fisterra.com/recursos_web/mbe/escritu_cientifica.htm
Guidelines about how to obtain scientific documentation and how to write and publish academic works, including Doctoral thesis.

http://www2.caes.hku.hk/kenhyland/
Professor Ken Hyland’s webpage, a linguistic pioneer in the study of scientific style.

http://francisthemulenews.wordpress.com/2011/07/30/videos-de-la-acs-que-explican-como-escribir-un-articulo-cientifico/
Link to videos from the American Chemical Association that explain how to write an scientific article

http://www.endnote.com/
EndNote program

http://www.nlm.nih.gov/bsd/uniform_requirements.html

Study tips

Attend classes and actively participate in the classroom. Orient the effort and study on the argumentative reasoning of the course contents. Utilize office hours, Campus Virtual or email of the professor to help clarify or resolve any questions or doubts you may have regarding the course or course material. Review recommended reading to increase depth of knowledge and not limit oneself to the study of class notes.

Educational materials

The educational materials to facilitate competency in this module are:
- Presentations (PowerPoint) that the professor uses as a guide. The student should elaborate his/her own notes using all of the educational materials described here.

- Scientific articles that are posted in Campus Virtual and that are related to each educational unit. The forum and social networks will be used to share critical thinking and practical application of each of the articles.

- Supporting documents that can be posted on Campus Virtual or requested for the students to search via information and communication technology. Also, these should be related to each educational unit.
Guía Docente 2016/17

Statistics and analysis of results.

Estadística y análisis de resultados.

Research Methodology

Blended Learning Mode
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Statistics and analysis of results

Module: Research Methodology
Materia: Statistics and analysis of results
Requisite: Mandatory
Nº de credits: 3
Academic Term: 1st semester
Professors:
  − Dr. María Mercedes Carmona Martínez  mcarmona@ucam.edu
  − Dr. Laura Cortés Selva  lcortes@ucam.edu
Office hours: by appointment via email
Coordinator: Dr. Mercedes Carmona

Brief Description
An introductory in statistical concepts and methods, emphasizing exploratory data analysis for univariate and bivariate data, sampling and experimental designs, basic probability models, estimation and tests of hypothesis in one-sample and comparative two-sample studies. Practices be conducted using SPSS.

Breve descripción de la materia
Introducción a conceptos y métodos estadísticos, haciendo hincapié en el análisis exploratorio de datos para datos univariados y bivariados, muestreo y diseños experimentales, modelos básicos de probabilidad, estimación y pruebas de hipótesis en una muestra y estudios comparativos de dos muestras. Las prácticas se realizarán con el programa SPSS.

Pre-requisites
None.

Objectives
To establish the necessary bases so that student is able to independently address all phases of scientific research. To understand the theoretical foundation that underlies the application of statistics.

The specific objectives to be acquired are:

- Acquire the ability to design, conduct and analyze data from a scientific study;
- Learn how to utilize statistical software for data analysis;
- Be able to read and interpret statistical books;
- Establish basic concepts in Descriptive Statistics and the different techniques of Multivariate Data Analysis.
  - Train students on how to analyze descriptive data, which is central to any statistical work in research.
Learning outcomes:

- Know the main simple statistics and sampling distribution.
- Calculate and interpret statistical measures associated with a data set.
- Check Independence of random variables.
- Calculate and apply simple linear regression models.
- Make statistical decisions on population parameters.
- Understand and calculate Descriptive Statistics concepts.
- Understand the relationship between 2 statistical variables after determining the correlation between them.
- Utilize statistical software to manipulate, analyze and model different data sets.

Competencies

**MECES1**: Students will know how to apply the acquired knowledge and have the capacity to problem solve in new or unfamiliar settings within broader (or multidisciplinary) contexts related to their field of study.

**MECES2**: Students will be able to integrate knowledge and handle the complexity of formulating judgment based on information that may be incomplete or limited, including reflections on social and ethical responsibilities linked to the application of their knowledge and judgment.

**MECES3**: Students will know how to communicate their conclusions (and the knowledge and rationale underpinning them) to the public (specialists and non-specialists) in a clear and unambiguous manner.

**MECES4**: Students will possess learning skills that will allow them to continue studying in a way that is largely self-directed or autonomous.

**MECES5**: To have and understand knowledge that will provide them the foundation or opportunity to be original in the development and/or application of ideas, often within the research context.

**EAR1**: Apply the main statistical techniques using specialized software to analyze the study results.
Methodology

<table>
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<th>Work hours No attendance</th>
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<td>Tutorial</td>
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<td>Personal study</td>
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<td><strong>TOTAL</strong></td>
<td><strong>75</strong></td>
<td><strong>12.5</strong></td>
<td><strong>37.5</strong></td>
</tr>
</tbody>
</table>

Syllabus

Theoretical Teaching Program

**Topic 1. The research process**

1.1.1 Topic definition and research objective

1.1.2 Literature review

1.1.3 Formulating a research hypothesis

1.1.4 Variable selection

1.1.5 Research design: Quantitative analysis (secondary, observation or survey) versus qualitative analysis

1.1.6 Data collection.
1.1.7 Technical and practical difficulties
1.1.8 Data analysis.
1.1.9 Data collection

**Topic 2. Basic definitions**

1.2.1 Population and parameters versus simple and statistics
1.2.2 Why choose a sample
1.2.3 Sampling probability versus non-probability
1.2.4 Sample size
1.2.5 Types of variables

**Topic 3. Descriptive statistics. Analysis with SPSS**

1.3.1 Introduction and data preparation
1.3.2 Frequency tables
1.3.3 Graphs
1.3.4 Measures of location and measures of variability
1.3.5 Bivariate datas:
   1.3.5.1 Contingency tables
   1.3.5.2 Scatter plots
   1.3.5.3 Covariance and correlation
   1.3.5.4 Measures of association
   1.3.5.5 Causality

**Topic 4. Inferential statistics. Analysis with SPSS**

1.4.1 Techniques to analyze the relationships between variables.
   1.4.1.1 Correlation (Chi square test of independence)
   1.4.1.2 Regression (multiple, logistics)
   1.4.1.3 Factor Analysis
1.4.2 Techniques to compare groups.

1.4.2.1 T-test (and alternative non-parametric tests).

**Relationship with other subjects of the curriculum**

This material is linked with the rest of the sections that complete the Research Methodology module.

**Evaluation System**

The evaluation system will have the following distribution

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**Bibliography**

**Basic Bibliography**

- Estadística aplicada a las ciencias de la salud, Rafael Álvarez Cáceres, Ediciones Díaz de Santos, 2007
• Tratamiento estadístico de datos con SPSS, Quintín Martín Martín, Thomson, 2008

Complementary Bibliography

• Estadística, Ciencias Sociales, Del Comportamiento Y de la Salud, Arnolod Elorza Perez Tejada, CengageLearning Editores, 2008
• Estadística aplicada: una visión instrumental : teoría y más de 500 problemas resueltos o propuestos con solución, Alberto Pérez de Vargas Luque, Ediciones Díaz de Santos, 2009

Related websites

Official website for the statistical application SPSS: (http://www.spss.es)
National Institute of Statistics: (http://www.ine.es)
Free SPSS course: (http://www.spssfree.com/indice.html)

Study tips

It is recommended that study of material and comprehensive lectura be done on a daily basis.

Educational materials

Independent study. Taking into account the Blended Learning Mode of the program, it is important for the student to have adequate computer equipment.

Tutorials

The academic tutorial will have the following objectives:

- Personally review the course contents, evaluation system, study methods and teaching methodology.
- Resolve all doubts and problems that the student has on the given agenda.
- Strengthen and provide the minimum knowledge needed to those students who require further understanding of the topic.

- Provide the student with extra activities that will enable him/her to complete and improve his/her training in the subject area.