VNIVERSITAT Ö ID VALÈNCIA

COURSE DATA

Data Subject	
Code	34173
Name	Functional analysis
Cycle	Grade
ECTS Credits	6.0
Academic year	2020 - 2021

Study (s)			
Degree	**Center**	**Acad. year**	**Period**
1107 - Degree in Mathematics	Faculty of Mathematics	4	First term

Subject-matter		
Degree	**Subject-matter**	**Character**
1107 - Degree in Mathematics	15 - Seminar on Mathematical analysis	Optional

Coordination	
Name	**Department**
GALBIS VERDU, ANTONIO	15 - Mathematical Analysis

SUMMARY

We will see mathematical structures that enable us to study properties of linear mappings between normed vector spaces not necessarily of finite dimension whose elements are generally functions.

Particular emphasis will be paid to integral equations and compact operators.

PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

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

Other requirements

Linear Algebra and Geometry I, Mathematical Analysis I, II and III.

OUTCOMES

1107 - Degree in Mathematics

- Capacity for analysis and synthesis.

- Capacity for criticism.

- Solve problems that require the use of mathematical tools.

- Ability to work in teams.

- Learn autonomously.

- Possess and understand the mathematical knowledge.

- Expressing mathematically in a rigorous and clear manner.

- Capacity of abstraction and modeling.

- Knowing the time and the historical context in which occurred the great contributions of women and men in the development of mathematics.

- Visualize and interpret the solutions obtained.

LEARNING OUTCOMES

Learming how to apply the structures of functiond and sequence spaces.

Becoming acquainted with the techniques of Functional Analysis and studying the rigorous proves of some of their results.

Understanding the importance of completeness in the proof of some relevant results.

Learning the essentials of spectral theory of operators acting on Hilbert spaces.

Applying concepts of Functional Anallysis to solve integral equations.

DESCRIPTION OF CONTENTS

1. Normed spaces. Completeness.

2. Linear and continuous mappings. Duality.

3. Compact operators.

4. Integral equations.

5. Spectral analysis of operators.

WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	37,50	100
Classroom practices	15,00	100
Other activities	7,50	100
Development of group work	10,00	0
Development of individual work	10,00	0
Study and independent work	25,00	0
Readings supplementary material	5,00	0
Preparation of evaluation activities	20,00	0
Preparation of practical classes and problem	5,00	0
Resolution of case studies	15,00	0
TOTAL	**150,00**	

TEACHING METHODOLOGY

a. The theoretical and practical content of each topic and the relevant tools to solve problems will be gradually developed.

b. In the practical sessions we will apply the concepts presented in lectures to solve problems.

EVALUATION

Students will have to prove their knowledge of basic concepts, skills and competences of the subject by means of theoretical and practical examinations. It will also be evaluated its capacity to address issues or to solve problems posed by the professor.

Evaluation proceed by means of

1) Written theoretical and practical exams that will measure both the acquisition of knowledge, skill to present rigorous proofs, resolution of questions, problems and exercises. (80% of the score)

2) Theoretical and practical controls of continuous evaluation. (10% of the score)

3) Participation in the seminars of continuous evaluation (10% of the score).

The marks corresponding to the continuous evaluations (paragraphs 2) and 3)) will be kept during the two exams of the academic year in which they have been done, since its evaluation it is only possible within the semester, and they will never be kept for any extraordinary exam.

REFERENCES

Basic

- Referència b1: E. Kreyszig, Introductory Functional Analysis with aplications, Ed. Wiley and Sons, 1978.
  Referència b2: J. B. Conway, A Course of Functional Analysis. Second Edition. Ed. Springer, 1990
  Referència b3: G.J.O. Jameson,Topology and Normed Spaces. Ed. Chapman and Hall, 1982

Additional

-
  Referencia c1: L. Lusternik & V. Sobolev, Elements of Functional Analysis. John Wiley & Sons. 1989
  Referencia c2: L. V. Kantorovich, G. P. Akilov, Functional Analysis, 2nd Edition, Ed. Elsevier, 1982.
  Referencia c3: Saxe, C. Beginning Functional Analysis, E. Springer, 2002.

VNIVERSITAT Ï ID VALÈNCIA

ADDENDUM COVID-19

This addendum will only be activated if the health situation requires so and with the prior agreement of the Governing Council

English version is not available

En caso de que se produzca un cierre de las instalaciones por causas sanitarias que afecto total o parcialmente las clases de la asignatura, estas serán sustituidas por sesiones no presenciales siguiendo los horarios establecidos. Si el cierre afectara alguna prueba de evaluación presencial de la asignatura, esta será sustituida por una prueba de naturaleza similar que se realizará en modalidad virtual a través de las herramientas informáticas soportadas por la Universitat de València. Los porcentajes de cada prueba de evaluación permanecerán invariables, según aquello establecido por esta guía.