

GUIA DOCENTE DE LA ASIGNATURA
Mathematics and reality

Curso 2019 - 2020

CURSO	MATERIA	PERIODO	GRUPO	CRÉDITOS / HORAS	TIPO
CEH	Mathematics and reality	Spring 2020		45 horas	Optativa
HORARIO			AULA		
PROFESORES			INFORMACIÓN DE CONTACTO PARA TUTORÍAS (correo electrónico)		
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			HORARIO DE TUTORÍAS		
			(by appointment)		
CURSO EN EL QUE SE IMPARTE			OTROS CURSOS A LOS QUE SE PODRÍA OFERTAR		
Curso de Lengua y Cultura Españolas					
PRERREQUISITOS Y/O RECOMENDACIONES (si procede)					
<ul style="list-style-type: none"> Haber realizado la prueba de nivel de acceso al curso 					
BREVE DESCRIPCIÓN DE CONTENIDOS (SEGÚN EL CURRÍCULUM DEL CLM)					
<p>The aim is to provide the student with a theoretical and practical knowledge of some aspects of mathematics whose presence in pre-university teaching is usually scarce, null, or of a purely formal approach, but which contribute to improving not only the mathematical culture in general but also the capacity to understand and solve a great diversity of real problems and modern technical applications of mathematics. Emphasis will be made on a practical approach involving numerical computations and programming as means for exploring the proposed topics.</p>					
COMPETENCIAS GENERALES Y ESPECÍFICAS					
<p>General skills:</p> <ul style="list-style-type: none"> Knowledge of essential aspects of the formation of the mathematical corpus. Oral and written communication in English. Self-study and autonomous work. Ability to search for contents. Identification of the mathematical structure of problems in everyday life. 					

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Specific skills

- Ability to analyze from a mathematical point of view the problems of daily life.
- Ability to solve mathematical problems related to everyday life.
- Mathematical modelling of situations.
- Recognition of the role and importance of mathematics in human activity.
- Recognition of the relevance of mathematics in human activity.
- Knowledge of the role of relevant personalities of the mathematical world and their contribution.

OBJETIVOS (EXPRESADOS COMO RESULTADOS ESPERABLES DE LA ENSEÑANZA)

- To know the fundamental role of geometry as a support for mathematical development.
- To identify the contributions of great mathematicians with their historical context.
- To understand the importance of logical foundations and the inconsistency of any complex system.
- To understand the rudiments of encrypted message transmission.
- To understand basic techniques used in machine learning and artificial intelligence.
- To understand the advantages and difficulties of voting and allotment systems in democratic systems.
- To appreciate the connection of mathematics with artistic expression.
- To identify and learn to correct the most common errors in daily mathematics in the field of economics.
- To understand the flaws of common statistical and probabilistic language.
- To stimulate critical thinking, overall vision and the search for alternative solutions to problems of mental challenge.

TEMARIO DETALLADO DE LA ASIGNATURA

THEORETICAL TOPICS:

1. Numbers
 - History of numbers
 - Numbering systems
 - Real numbers
 - Complex numbers
 - Large numbers
 - Infinite
2. Introduction to numerical computation with free software
3. Geometry
 - Dimensions
 - Fractals
 - Other faunas
4. History
 - Historical figures
5. Logic and fundamentals



- Logic
 - Paradoxes
 - Nothingness and wholeness
6. Basics of machine learning
 7. Basic cryptography
 8. Art
 - Symmetries
 - Artists
 - Music
 9. Accounting
 - Trade
 - Financial
 - Calculating machines
 - Numerical methods
 10. Predictions
 - Combinatorics
 - Probability
 11. Challenges

PRACTICAL TOPICS:

Activity book

It will accompany the theoretical contents discussed in class.

Introductory Workshops

Elaboration of a work on a specific subject of the course (optionally, a subject not present in the contents, after agreement with the teacher), which will then be presented in class by means of a presentation.

BIBLIOGRAFÍA

BIBLIOGRAFÍA FUNDAMENTAL:

- Los números y el tiempo, Francisco Paniagua Bocanegra, Representaciones y servicios de ingeniería SA, México 1982
- Number systems, S.V. Fomín, Mir, Moscow 1975
- One, Two, Three...Infinity: Facts and Speculations of Science, Dover 1989
- Wheels, Life and Other Mathematical Amusements, Martin Gardner, W.H.Freeman & Co Ltd; 1985
- Ideas del infinito, Investigación y ciencia, Temas 23, 2001
- Aventuras matemáticas, Miguel de Guzmán, Labor, Barcelona 1986
- Mathematical Tourist: New and Updated Snapshots of Modern Mathematics, Ivars Peterson, W H Freeman & Co; 2nd edition (1998)
- Grandes matemáticos, Investigación y ciencia, Temas 1, 1995
- Gama simple, Shilov, Mir, Moscú 1978
- Mathematical Circus, Martin Gardner, The Mathematical Association of America (1996)
- Carnaval matemático, Martin Gardner, Alianza Editorial, Madrid, 1980
- AHA! Gotcha: Paradoxes to Puzzle and Delight, M. Gardner, W.H. Freeman & Company (1982)



- Festival mágico-matemático, Martin Gardner, Alianza Editorial, Madrid 1984
- Contar bien para vivir mejor, C. Alsina, Rubes, Barcelona 1998.
- The lady or the tiger?, R. Smullyan, Knopf; 1st edition (May 12, 1982)
- What Is the Name of This Book? The Riddle of Dracula and Other Logical Puzzles. R. Smullyan, Prentice-Hall, 1978

ENLACES RECOMENDADOS

- The documents and links will be published on the SWAD teaching platform <http://swad.ugr.es>

METODOLOGÍA DOCENTE

Face-to-face training activities. These include:

- Theoretical classes: Presentation of contents by the teacher that will be discussed in class. They will be accompanied by appropriate teaching materials to facilitate learning (especially graphic presentations, photographs and videos). These classes are intended to be interactive, so it is recommended the participation of attendees, as they serve to acquire knowledge, consolidate the fundamental contents of each thematic unit, resolve doubts and expand some questions that may arise in the classroom.
- Introductory workshops: The teacher will propose to a small group (two or three students at most) in advance to prepare an introduction to the topic of the day and its presentation in class as a motivation prior to the explanations of the teacher. Such workshops will promote the exchange of ideas and the sharing of knowledge and experiences, always in relation to the contents and objectives of the subject.
- Practices: Sometimes a computer room will be required to the centre to experiment and simulate some situations.
- Resolution of challenges: the teacher will often propose a mathematical challenge in the form of a problem of ingenuity that requires logical deduction, which must be solved individually and delivered on time. At the beginning of the next class, the solution will be presented and discussed. This methodology is highly motivating and contributes to maintain the interest on the subject and to eliminate a potential passive attitude.
- Commitment and implication for the individual plan of tutorial attention: space of formative character in which student and teacher generate an interactive process that includes, among other factors, the methodology of study of the subject, the search for the best academic results or the formative orientation favoring autonomous learning and teamwork. It must include the maximum use of the potentialities offered by all the useful technologies for the formative process. Certain classroom sessions will be reserved for collective tutorials, but the student is encouraged to regularly attend the individualized tutorials, since they are decisive for the resolution of doubts or the follow-up of the activities and tasks carried out during the course.
- Evaluation of knowledge as described in the corresponding section.
- Activities not requiring attendance. They include:
 1. Autonomous learning activities. Their general purpose is to make the student responsible for his/her own learning. They must facilitate the acquisition of skills, seeking the appropriate use of communication skills, both oral and written, not forgetting training for the interpretation of the contents of the subject. They must relate to the academic and professional profile most appropriate to the subject.



- 2. Activities of individual practical works: They will serve to establish with the practice the acquired knowledge.
- 3. Practical teamwork activities in the classroom: They will try to create and develop teamwork dynamics applied to the contents of the subject. They must be coordinated, supported by the complementarity, trust and commitment of the members of the teams and be the object of continuous and close monitoring by the teacher. They may consist of or be translated into presentations, seminar debates, simulation of cases or projects.

EVALUACIÓN (INSTRUMENTOS DE EVALUACIÓN, CRITERIOS DE EVALUACIÓN Y PORCENTAJE SOBRE LA CALIFICACIÓN FINAL, ETC.)

- 80% attendance to classes is required in order to be assessed.
- CONTINUOUS ASSESSMENT: 60 %.
 - Activities. They represent 20% of the final grade. They will be delivered on the last day of class in the form of a booklet.
 - Oral presentation of introductory workshops (20%). The presentation and the depth of treatment of the subject will be valued.
 - Resolution of challenges (20%). Not only the correct solution but also the quality of the argumentation provided to justify will be valued.
- PARTIAL AND FINAL EXAMINATIONS: 40 %.
 - Partial written examination: 20 %.
 - Final written examination: 20 %.

SISTEMA ESPAÑOL DE CALIFICACIONES

Sobresaliente Honor: 10

Sobresaliente: 9.99 - 9.0

Notable: 8.99 - 7.0

Aprobado: 6.99 – 5.0

Suspense: 4.99 – 0

No presentado: si el estudiante no hace los exámenes

Asistencia Insuficiente: si el estudiante no asiste al menos al 80% de las clases

(para consultar equivalencias con el sistema de los Estados Unidos: http://www.clm-granada.com/html/n_estudiantes/esp/cursos_calificaciones.htm)

INFORMACIÓN ADICIONAL

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