CURSOS DE LENGUA Y CULTURA EN INGLÉS

SCIENCE AND TECHNOLOGY

MATHEMATICS AND REALITY

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GENERAL DESCRIPTION

The aim is to provide the student with a theoretical-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 their conditioning factors. Most of the classes will have an expository part, a space for debate and discussion, and a stimulating proposal of problems of ingenuity.

CONTENTS

1. Numbers
   - History of numbers
   - Numbering systems
   - Real numbers
   - Complex numbers
   - Large numbers
   - Infinite

2. Geometry
   - Dimensions
   - Fractals
   - Other faunas

3. History
   - Historical figures

4. Logic and fundamentals
   - Logic

CONTENTS

- Paradoxes
- Nothingness and wholeness

5. Security and Politics

- Cryptography
- Allotments and elections

6. Art
   - Symmetries
   - Artists
   - Music

7. Accounting
   - Trade
   - Financial
   - Calculating machines
   - Numerical methods

8. Predictions
   - Combinatorics
   - Probability

9. Challenges

PRACTICAL TOPICS:

Activity book
It will accompany the theoretical contents that will be dealt with 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.

Resolution of challenges
Before the end of each class, the teacher will propose a mathematical challenge that will have to be solved individually and delivered within a pre-determined

CONTENTS

time frame. At the beginning of the next class, the solution(s) will be presented and discussed.

TEACHING METHODOLOGY

- 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: Near the end of each class, the teacher will 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

TEACHING METHODOLOGY

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.

ASSESSMENT

- 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 %.

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