

Academic Year: ( 2019 / 2020 )

Review date: 22-04-2018

Department assigned to the subject:

Coordinating teacher:

Type: Electives ECTS Credits : 3.0

Year : 2 Semester :

**REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)**

Basic knowledge of plasma kinetics, atomic physics, fluid mechanics and particle- material interaction.

**OBJECTIVES**

The course intends to show the students that the plasma is reactive medium which can be applied to various sectors of the productive fabric, assisting in solving some of the problems that come up in industry and not just for basic physics studies. The course includes a description of different types of plasmas (ICP, glow discharges, microwave plasmas, etc.) and their applications to surface treatment, synthesis and chemical analysis of samples, sterilization by plasmas.

The course will provide the student with appropriate knowledge about the some practice applications of the plasmas to the industrial sector.

**DESCRIPTION OF CONTENTS: PROGRAMME**

1. Laboratory and industrial plasmas
2. Synthesis of materials: thin film growth by plasma assisted techniques
3. Inductively Coupled Plasmas (ICP)
4. Plasma surface treatment
5. Plasmas produced by a surface wave
6. Other plasma applications
7. Transfer of results from the laboratory to business.

**LEARNING ACTIVITIES AND METHODOLOGY**

\* Teaching Methods:

Classroom lectures and short practical course on synthesis of materials (thin films).

\* Course Material:

Transparencies about the program contents. The students will have this material before each session in order to facilitate their attention in class and their active participation.

**ASSESSMENT SYSTEM**

Evaluation shall take into account class attendance and the interest shown by the students through his/her comments and participation in class. The students will present a report on the information on some of the theoretical program contents or the laboratory works, with the orientation of professors. Later each report will be given in an oral presentation to the rest of the class (50% of the final mark).

A written-closed book exam will take place at the end of the semester (50% of the final mark).

**% end-of-term-examination:** 50

**% of continuous assessment (assignments, laboratory, practicals...):** 50

**BASIC BIBLIOGRAPHY**

- Edited by Mario Capitelli and Claudine Gorse PLASMA TECHNOLOGY: FUNDAMENTALS AND APPLICATIONS, Plenum New York, 1992

- M.A. Lieberman and A.J. Lichtenberg PRINCIPLES OF PLASMA DISCHARGES AND MATERIALS PROCESSING, John Wiley & Sons, Inc. New York, 1994

#### ADDITIONAL BIBLIOGRAPHY

- Edited by Akbar Montaser INDUCTIVELY COUPLED PLASMA MASS SPECTROMETRY, Wiley-VCH, 1998
- Edited by Akbar Montaser and D.W. Golightly INDUCTIVELY COUPLED PLASMAS IN ANALYTICAL ATOMIC SPECTROSCOPIC, VCH Publishers, 1987
- Edited by Carlos M. Ferreira and Michel Moisan MICROWAVE DISCHARGES: FUNDAMENTAL AND APPLICATIONS, (Nato ASI Series), Serie B:302, Plenum, 1993
- Edited by H. Schlüter and A. Shivarova ADVANCED TECHNOLOGIES BASED ON WAVE AND BEAM-GENERATED PLASMAS, Kluwer Academic Publishers, 1999
- Edited by J.L.Voseen and W.Kern THIN FILM PROCESSES, Academic Press, New York, 1978
- Hugh O. Pierson HANDBOOK OF CHEMICAL VAPOR DEPOSITION. Principles, Technology and Applications, Noyes Publications, New Jersey, 1992