



ECE 673 - Thin film and nanostructures: growth and

characterization *Spring 2014*

Instructor: Carmen Menoni, Department of Electrical and Computer Engineering, Colorado State University

(Carmen.Menoni@colostate.edu)

Course objective: This course introduces students to methodologies employed in the growth of thin films and nanostructures, and to the chemical and physical mechanisms associated with the growth process and their effect in the material's characteristics.

Course description: This course will cover fundamentals of thin film growth. The breath of the class will be such to attract graduate students from Physics, Chemistry and Materials Science.

Credits: 3

Text: Notes provided by instructor

Class Schedule: Lectures 9 -13, Recitation: 14.30 – 18, Monday through Friday

Class 1 - Thin Film growth	Fundamentals of condensation, nucleation and growth.
Class 2 - Thin film growth methods	Sputtering Evaporation Chemical Vapor Deposition (CVD) Molecular Beam Epitaxy Chemical
Class 3 – Thin film growth diagnostics	Characterization and monitoring Impact of process conditions on film morphology Methods of assessment
Class 4 – Photonic structures as interference devices	Fundamental of light propagation Design of interference coatings for operation from the infrared to the soft x-ray
Class 5 – Semiconductor, and metal nanostructures and their applications	

Grading: Homework – 50 %; Project: 50%

Homework will consist of a combination of critique of papers; calculations, and conceptual problems. The homework will be carried out during the recitation session, in an interactive session with the instructor. An important component of this course will be a research project where students will investigate synthesis and characterization of thin film and nano-structures. Simple modeling or simulations will be required. The student project will be discussed in a written report and a in-class 15 minute presentation.