Objective

To cover the principles and operation of surface spectroscopic techniques, with emphasis on

Auger electron spectroscopy (AES)

x-ray photoelectron spectroscopy (XPS)

Prerequisites

Structure, Composition, and Properties of Materials
http://matsci.uah.edu/Courses/CHEMAE294/

- crystal structures
- composition and bonding in **all** types of materials
- electronic configurations (and band structure)

Fundamentals of Electron and X-ray Optics

- electron lenses
- electron penetration in materials
- electron production in materials

A solid background in physical chemistry would also be helpful.

Textbooks

An Introduction to Surface Analysis by Electron Spectroscopy, J. F. Watts

Practical Surface Analysis, D. Briggs and M. P. Seah

Lab Objective

To provide experience in analyzing data from the techniques and in operating the instruments.

Part 1
Rigorous grounding in the fundamentals of data analysis and instrument operation using previously generated or model data.

Part 2
Hands-on operation of the instruments.

Lab Schedule

Part 1 can be done on your own time.

Part 2 meetings will be announced later.

The XPS labs will involve travel to UAH.

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Grading

Homeworks	10 %	once every other week
Exams	30 %	three planned
Lab Report	45 %	on Part I of the lab
Final Exam	15 %	may be an oral presentation

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Resources

Internet

http://matsci.uah.edu/Courses/MTS723/

Journals

Journal of Vacuum Science & Technology

Surface Science

Applied Surface Science

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Tentative Syllabus

wks	Topic
0.5	I. Introduction
1.0	II. Vacuum Technology
1.5	III. Data Analysis Methods
	IV. Laboratory Spectroscopic Techniques
1.0	A. Principles
3.5	B. XPS
3.5	C. AES
	.... others as interest dictates
	V. Synchrotron Radiation (as interest dictates)

may switch these two around

may expand these times

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