**FOS 4321c - FOOD ANALYSIS** (4 credits, Fall 2023)

**Instructor:**
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Food & Environmental Toxicology Lab (FETL)  
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Email: Lgu@ufl.edu

**Laboratory Manager:**
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sharyn@ufl.edu  
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**Teaching assistants:**
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cmai1@ufl.edu  
Lab 12 in FETL

**Course Description and Objectives**
Students will learn chemical and instrumental methods to determine the content of various food components and nutrients important for food processing, nutritional value, and labeling.

- Gain a better understanding of analytical chemistry, instrumental analysis, and official methods in food science.
- Apply physical and chemical methods to analyze a variety of food matrices.
- Identify analytical problems associated with food analysis, giving a sample for evaluation.
- Apply established analytical methods to determine physical and chemical characteristics, given a sample for analysis.
- Quantify, report, and interpret analytical data.
- Gain problems solving skills applicable to the analysis of foods of various matrices.

**Lecture**
Weimer hall, room 1070  
M, W, F - Period 3 (9:35-10:25 am)

**Office hours**
Wednesday 1:00-3:00 pm (Room 2 in FETL). I have an open-door policy outside of office hours. You are welcome to call, email, or stop by our offices for questions or additional help. If you want to stop by, ensure we are there before going out – so call first.

**Course Prerequisites**
CHM 2200, CHM 2200L or CHM 2210, CHM 2211, CHM 2211L

**Lab**
Time: Friday 10:40-1:40 pm, FSHN building, room 310  
Format: The class will be divided into six groups (G1-G6), with four students per group.

**Requirement:**
1. You will be **expected to keep a laboratory notebook** and bring it to **every** lab meeting.
2. You will always be expected to wear a lab coat and safety glasses.
3. Appropriate dress is expected for the lab. This includes always wearing closed-toe shoes (no sandals, flip-flops, or other shoes that do not completely cover your feet).
4. You **will be dismissed** from the lab on days where your safety may be compromised due to your attire and yet you will remain responsible for the activities of the class.
### Lab Participation Points Scale

<table>
<thead>
<tr>
<th>Items</th>
<th>Pts</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attendance</td>
<td>1.0</td>
<td>Student present; made-up missed lab</td>
</tr>
<tr>
<td></td>
<td>0.5</td>
<td>Extremely late; left the lab too early.</td>
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<tr>
<td></td>
<td>0</td>
<td>Unexplained absence - <strong>Note:</strong> This will also result in a zero for the lab report.</td>
</tr>
<tr>
<td>Safety and equipment use</td>
<td>1.0</td>
<td>Practices good safety habits; handles equipment properly.</td>
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<tr>
<td></td>
<td>0.5</td>
<td>Poor safety habits; Needs improvement in handling equipment</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>Unsafe practices; misuse/abuse of equipment</td>
</tr>
<tr>
<td>Clean-up</td>
<td>1.0</td>
<td>Areas well cleaned; general use areas clean</td>
</tr>
<tr>
<td></td>
<td>0.5</td>
<td>Some areas are overlooked or not properly cleaned.</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>Areas left unclean and unorganized.</td>
</tr>
</tbody>
</table>

### Laboratory Notebooks (40 pts)

Notebooks must be some type of bound book, i.e., laboratory notebook, computation book, spiral bound notebook, etc. It does not have to be expensive but should contain at least 100 pages.

- Before the lab: experimental outline procedures. It is up to the individual how they wish to do this (outline form, flow chart, or numbered steps are all acceptable).
- During the lab: record visual or sensory observations; record results as tables; record procedure changes etc.
- Additional information sheets can be taped, stapled, or glued inside the notebook.
- Your lab notebook will be checked and signed at the beginning and after the lab. **It is the student's responsibility to make sure their lab notebook has been signed.**

### Laboratory report and format (245 pts, for a total of 7 Lab reports)

**Group components** (one copy is required for each group)

**Title/cover page:** include names of your group members, number, title, and the date of the lab session

**I. Introduction:** background, objectives, reaction mechanisms, etc.

**II. Materials and methods:** you are not expected to copy and paste everything. You can cite the lab handouts.

**III. Results:** your data, standard curves, calculation, etc.

**Individual components** (each group member will write their own)
Lab reports are due one and a half weeks after the laboratory exercise. They will be graded on aspects of accuracy of data, format, accuracy of data reporting, and originality/accuracy of discussion. Late reports will be deducted 5 points per day.

### Grading Criteria for Lab Report (25 pts)

<table>
<thead>
<tr>
<th>Category</th>
<th>Reasons for points deductions</th>
<th>Points deducted</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Title/ Cover Page (1 pt)</strong></td>
<td>Names of participants missing</td>
<td>-1.0</td>
</tr>
<tr>
<td></td>
<td>Signatures missing</td>
<td></td>
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<tr>
<td></td>
<td>Report title and lab number missing</td>
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</tr>
<tr>
<td>I. Introduction (2 pts)</td>
<td>a) Omitted purpose or objectives</td>
<td>-0.5 each</td>
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<tr>
<td></td>
<td>b) Copied handout without any creative thoughts</td>
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</tr>
<tr>
<td></td>
<td>c) No introduction</td>
<td>-2.0</td>
</tr>
<tr>
<td>II. Materials and Methods (2 pts)</td>
<td>a) Omitted procedural changes</td>
<td>-1.0</td>
</tr>
<tr>
<td></td>
<td>b) Omitted reference of textbook or lab handout</td>
<td>-1.0</td>
</tr>
<tr>
<td></td>
<td>c) No material &amp; method section</td>
<td>-2.0</td>
</tr>
<tr>
<td>III. Results (8 pts)</td>
<td>a) Omitted data, tables, or figures when necessary</td>
<td>-1.0 each</td>
</tr>
<tr>
<td></td>
<td>b) Omitted calculations or statistics where necessary</td>
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<tr>
<td></td>
<td>c) Tables of data overlap, confusing</td>
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<td></td>
<td>d) Tables or Figures not numbered or incorrectly numbered</td>
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<td></td>
<td>e) Arrangement of data is confusing</td>
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<td></td>
<td>g) No result section</td>
<td>-8.0</td>
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<tr>
<td>IV. Discussion (7pts)</td>
<td>a) No discussion of the actual data accumulated</td>
<td>-1.0</td>
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<tr>
<td></td>
<td>b) Did not refer to which data was being discussed (i.e., which figure, table, etc.)</td>
<td>-1.0</td>
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<tr>
<td></td>
<td>c) Did not answer required questions in lab handout; did not bold answers in text; discussion of results are confusing or incorrect</td>
<td>-1.0 each</td>
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<td></td>
<td>d) Did not cite references to information used in the discussions</td>
<td>-1.0</td>
</tr>
<tr>
<td></td>
<td>e) Omitted discussion of statistics when necessary</td>
<td>-1.0</td>
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<tr>
<td></td>
<td>f) No recognizable conclusion statements</td>
<td>-2.0</td>
</tr>
<tr>
<td></td>
<td>g) No discussion section</td>
<td>-7.0</td>
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<tr>
<td></td>
<td>h) No conclusion section</td>
<td>-3.0</td>
</tr>
<tr>
<td>V. Conclusions (3 pts)</td>
<td>a) References cited in text not listed here or vice versa</td>
<td>-0.5 each</td>
</tr>
<tr>
<td></td>
<td>b) Reference incomplete or not in required format (for example, lack of page numbers or author names for cited journal articles or book chapters)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>c) No references used other than class texts and handout; misplaced reference section (for example, having reference section between results and discussion)</td>
<td>-2.0</td>
</tr>
<tr>
<td></td>
<td>d) No references section</td>
<td></td>
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</tbody>
</table>

- References should be in the style and format of your *Food Analysis* textbook.
- The class text (Nielsen) and lab handout shall be cited as references.
• There must also be at least one source from journal articles or sources other than the class text.
• NO internet references other than official governmental or university sites.

**Required Text**

**Course content**
Lectures contain food analysis, data handling, and interpretation principles. Laboratory exercises will be introduced during weekly discussion sections and will detail the principles of each lab exercise. There will be **three** 50-minute lectures and **one** 2.5-hour lab experience per week. Plan on spending at least **6** hours a week with your class! All course content is available at [http://elearning.ufl.edu](http://elearning.ufl.edu).

- **Session I - Foundational Knowledge and Chemical/Physical Methods (I)**
  - Chapter 1-3 READ on your OWN!!!
  - Ch. 13 pH and Titratable Acidity
  - Ch. 4 Evaluation of Analytical Data
  - Ch. 5 Sampling and Sample Preparation
  - Ch. 6 Moisture and Total Solids
  - Ch. 7 Ash Analysis
- **Session II - Spectroscopic & Chromatographic Methods**
  - Ch. 21 Basic principle of spectroscopy
  - Ch. 22 UV, VIS, Fluorescence Spectroscopy
  - Ch. 27 Chromatography
  - Ch. 28 High-Performance Liquid Chromatography (HPLC)
  - Ch. 29 Gas Chromatography (GC)
- **Session III - Chemical/Physical Methods (II)**
  - Ch. 10 Carbohydrate and Fiber Analysis
  - Ch. 8 Crude Fat Analysis
  - Ch. 14 Fat Characterization
  - Ch. 9 Protein Analysis
  - Ch. 15 Protein Characterization
  - Ch. 26 Mass spectrometry

**Grading**
1. Exams will be a combination of multiple choice, short answers, essays, and problems.
2. Three non-cumulative examinations will be given on the following dates - 09/20/2023, 10/25/2023, 12/06/2023.
3. Content review in class and a study guide will be provided before each exam.
4. Makeup will only be given with the advance permission of the instructor.

**NOTE:** Late materials will be deducted 5 points per day. Any dispute on the grade should be sent to Dr. Gu within five days after a grade is released on e-learning. A late dispute will not be considered. Final grades will be assigned according to cumulative averages. Grades will be assigned according to UF grading policy.
Classroom Policies and Attendance
Students must attend all lectures and lab sessions. Justified absence and the UF attendance policy are available at https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx. Non-justified absence for the lab will result in a ZERO for the lab participation and lab report. Special circumstances need to be addressed with the instructor and will be assessed on a case-by-case basis. Cellular phones are disruptive and must be turned off in the classroom and laboratory.

Academic Honesty
In 1995 the UF student body enacted an honor code and voluntarily committed itself to the highest standards of honesty and integrity. When students enroll at the university, they commit themselves to the standard drafted and enacted by students.

The Honor Pledge: We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity

On all work submitted for credit by students at the university, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment."

Students should report any condition that facilitates dishonesty to the instructor, department chair, college dean, Student Honor Council, or Student Conduct and Conflict Resolution in the Dean of Students Office.

(Source: 2012-2013 Undergraduate Catalogs)

It is assumed all work will be completed independently unless the assignment is defined as a group project, in writing by the instructor.

This policy will be vigorously upheld at all times in this course.

Software Use:
All faculty, staff and students of the university are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against university policies and rules, disciplinary action will be taken as appropriate.

Campus Helping Resources
Students experiencing crises or personal problems that interfere with their general well-being are encouraged to utilize the university’s counseling resources. The Counseling & Wellness Center provides confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance.

- University Counseling & Wellness Center, 3190 Radio Road, 352-392-1575, www.counseling.ufl.edu/cwc/
Counseling Services
Groups and Workshops
Outreach and Consultation
Self-Help Library
Training Programs
Community Provider Database

- Career Resource Center, First Floor JWRU, 392-1601, [www.crc.ufl.edu/](http://www.crc.ufl.edu/)

**Services for Students with Disabilities**
The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues.
Reid Hall, 352-392-8565, [www.dso.ufl.edu/drc/](http://www.dso.ufl.edu/drc/)