Fluid and Energy Transfer Operations Laboratory
(Unit Operations Lab 1)
ECH 4224L
Sections: 2775 (Wednesdays), 2G31 (Thursdays), and 6445 (Fridays)

Class Periods: 2 - 5 (8:30 am – 12:35 pm)
Location: Online class; meetings via Zoom
Academic Term: Fall 2020

Instructor:

Dr. Fernando Mérida
You can call me Prof./Dr. Mérida, or “Fernando” if you feel comfortable by doing it so. Remember that calling your instructors by their names must encompass the same level of professionalism and respect than using professional titles.

e-mail: fmerida@ufl.edu
Office: ChE Building, room # 217, Tel. (352) 294 7504
Office Hours: Mondays 10:00 – 11:00 and 2:00 – 3:00 pm
(see link below Course platform & meeting information)
< Edits to some dates and/or times may be posted on Canvas >

Course platform and meeting information:
This course will be 100% online for the ongoing term. Zoom meetings will be used for both class meetings and office hours. Links for class meetings and office hours are provided below. For technical issues regarding the use of Zoom and/or Canvas please visit the help desk website or call 352-392-4357. Zoom meetings will require the use of audio and video. Please check the section Student Privacy regarding recorded materials.

- Wednesday: https://ufl.zoom.us/j/93274444563
- Thursday: https://ufl.zoom.us/j/96606521292
- Friday: https://ufl.zoom.us/j/95162257648
- Office Hours: https://ufl.zoom.us/j/91608622662

Contacting Dr. Mérida:
- E-mail and Canvas messages are the communication platforms for this class. Please make sure the subject line of your e-mail has the label “ECH 4224L –Day- Question” (“day” refers to the day you take the class; you can use the first three letters of the day that corresponds to your section). You should expect a response within 36 hours (M-F) and within 48 hours (weekend).
- Office hours will be only during dates and times indicated in this Syllabus. Even though online office hours will be open to all students, priority will be given to students that have scheduled a time slot in advance.
- Announcements will be periodically posted on Canvas.

Peer-Tutors:
- Please use “peer-tutor” (or simply “tutor”) for the people that will assist you remotely during experiments. Avoid the use of “TA” since this title refers to a student in a completely different role.
- Please contact peer-tutors through the Canvas message or via e-mail (see Table 1). Modifications in the list below may be required and will be announced through Canvas if necessary.
Table 1. Peer-tutors for Unit Ops 1, Fall 2020

<table>
<thead>
<tr>
<th>Day/Section</th>
<th>Name</th>
<th>e-mail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wed</td>
<td>Jose Chang</td>
<td><a href="mailto:jose.chang@ufl.edu">jose.chang@ufl.edu</a></td>
</tr>
<tr>
<td></td>
<td>Chengbo Liang</td>
<td><a href="mailto:itsjohnman1000@ufl.edu">itsjohnman1000@ufl.edu</a></td>
</tr>
<tr>
<td></td>
<td>Sean Hatem</td>
<td><a href="mailto:shatem62@ufl.edu">shatem62@ufl.edu</a></td>
</tr>
<tr>
<td></td>
<td>Michael Fortner</td>
<td><a href="mailto:mfortner@ufl.edu">mfortner@ufl.edu</a></td>
</tr>
<tr>
<td>Thu</td>
<td>Sherlyn Wee</td>
<td><a href="mailto:sherlynwee@ufl.edu">sherlynwee@ufl.edu</a></td>
</tr>
<tr>
<td></td>
<td>Dirk Steyn</td>
<td><a href="mailto:dsteyn@ufl.edu">dsteyn@ufl.edu</a></td>
</tr>
<tr>
<td></td>
<td>Nishi Ravindran</td>
<td><a href="mailto:nishi.ravindr@ufl.edu">nishi.ravindr@ufl.edu</a></td>
</tr>
<tr>
<td>Fri</td>
<td>Ashley Taylor</td>
<td><a href="mailto:ashleytaylor@ufl.edu">ashleytaylor@ufl.edu</a></td>
</tr>
<tr>
<td></td>
<td>John Kocenko</td>
<td><a href="mailto:johnkocenko@ufl.edu">johnkocenko@ufl.edu</a></td>
</tr>
<tr>
<td></td>
<td>Dirk Steyn</td>
<td><a href="mailto:dsteyn@ufl.edu">dsteyn@ufl.edu</a></td>
</tr>
<tr>
<td></td>
<td>Maria Lozada</td>
<td><a href="mailto:mlozada@ufl.edu">mlozada@ufl.edu</a></td>
</tr>
</tbody>
</table>

Additional point persons:
- Lab Engineer: Mr. Preston Towns, ptowns@che.ufl.edu
- Unit Ops Course Instructor: Dr. LiLu Funkenbusch, lilu.funkenbusch@ufl.edu

Course Description
(2 credits) Remotely-assisted experimental work in fundamentals of Unit Operations involving heat and momentum transfer.

Course Pre-Requisites
ECH 3101 (Process Thermodynamics), ECH 3203 (Fluid and Solid Operations), ECH 3223 (Energy Transfer Operations), ENC 3246 (Professional Communication for Engineers)

Course Co-Requisites
ECH 4714L (Safety and Experimental Evaluation)

Materials and Supply Fees: $100.00

Course Objectives
1. Reinforce classroom theory by the collection and use of data in practical experiments with all their inherent problems and limitations.
2. Gain proficiency in writing technical reports and/or oral presentations.
3. Gain experience in working in teams.
4. Create a sense of professional responsibility for the quality and integrity of engineering work.
5. Learn the importance of working under Safety guidelines thus promoting a safe environment for others.
6. Gain experience with bench-scale equipment and instrumentation and extend analysis and design concepts for equipment at a larger scale.
7. Learn and apply basic concepts of statistical analysis and Design of Experiments whenever is possible.

Professional Component (ABET):
This course is focused on experimental studies of heat and momentum transfer in the context of unit operations, using bench-scale experiments. Theoretical concepts learned in other courses are illustrated by experiments. Technical communications are emphasized.
Relation to Program Outcomes (ABET):

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. An ability to identify, formulate, and solve engineering problems by applying principles of engineering, science, and mathematics</td>
<td></td>
</tr>
<tr>
<td>2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors</td>
<td></td>
</tr>
<tr>
<td>3. An ability to communicate effectively with a range of audiences</td>
<td>✓</td>
</tr>
<tr>
<td>4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts</td>
<td></td>
</tr>
<tr>
<td>5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives</td>
<td>✓</td>
</tr>
<tr>
<td>6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions</td>
<td>✓</td>
</tr>
<tr>
<td>7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies</td>
<td></td>
</tr>
</tbody>
</table>

Course websites

- **Canvas website:** [http://elearning.ufl.edu/](http://elearning.ufl.edu/) *(It will be published by the moment classes start)*
  Canvas will be used as the main repository of information and other resources for preparation of experiments, submission of reports, projects, and other assignments. It will also be used for posting of grades, announcements, and general information for the class.

- **CATME**
  This software will be used for group formation (by the course instructor), group meeting times outside the class, peer-tutor evaluations, team evaluations, among other tasks.

Recommended Literature:

*There is no required textbook for this class.* The following titles are recommended to support fundamentals and theoretical background, physical constants, empirical correlations, and other concepts:


Course overview

- This course will be 100% online for the ongoing term.
- The course consists of four experimental modules as described in course schedule table. Each module lasts for up to three weeks.
- Experiments will be performed using devices and accessories (“kit”) that will be provided to students by the course instructor at the beginning of semester. Additional materials required for experiments should be provided by students as indicated in the list of materials for each kit (documents available in Canvas)
• Experiments will be carried out individually by students at home, assisted remotely by the course instructor and peer-tutors. However, students will be part of groups of four or less students, so individual results will be processed, analyzed, and discussed in a group report at the end of the module.
• The class schedule is summarized in Table 2 and it will also be accessible (and periodically updated if necessary) via Canvas website.
• Regardless of individual contributions, each team member is responsible for understanding all elements of each experiment, including theory, experimental design, system configuration, experimental protocol, etc.

Groups
Group formation will be performed via CATME’s team building algorithms according to instructor-determined criteria, aiming to form teams that optimize the student team composition thus making groups more diverse and heterogenous. Groups will be comprised of up to 4 students.

Course schedule
Modules are summarized in Table 2 along with the schedule for the Fall semester. Modifications to the schedule may be required depending on the progress of experiments which could be affected by performance of equipment/instrumentation, class cancellation due to atmospheric phenomena (e.g. hurricane season), or other reasons not listed in this document. Announcements will be posted in Canvas regarding any modification of the course schedule.

Table 2. Course schedule for ECH 4224L, Fall 2020

<table>
<thead>
<tr>
<th>Module</th>
<th>General description</th>
<th>Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orientation</td>
<td>Initial orientation and class overview (no experiments)</td>
<td>08/31 – 09/04</td>
</tr>
<tr>
<td>Fluid Flow (FLU)</td>
<td>Study of fluid flow in pipes and the inherent friction losses characterized by pressure drop.</td>
<td>09/07 – 09/11</td>
</tr>
<tr>
<td></td>
<td></td>
<td>09/14 – 09/18</td>
</tr>
<tr>
<td></td>
<td></td>
<td>09/21 – 09/25</td>
</tr>
<tr>
<td>Flow Characteristic Curves (CUR)</td>
<td>Investigation of pump, valve, and system curves in a flow system</td>
<td>09/28 – 10/02</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10/05 – 10/09</td>
</tr>
<tr>
<td>Packed Bed Column (BED)</td>
<td>Investigation of flow of incompressible fluids through porous materials</td>
<td>10/12 – 10/16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10/19 – 10/23</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10/26 – 10/30</td>
</tr>
<tr>
<td>Heat Exchangers (HEX)</td>
<td>Study of thermal energy transfer in heat exchangers with various flow configurations</td>
<td>11/02 – 11/06</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11/09 – 11/13</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11/16 – 11/20</td>
</tr>
<tr>
<td>Class make up</td>
<td>Make up on 11/23 &amp; 11/24; no class meeting 11/25 – 11/27</td>
<td>11/23 – 11/27</td>
</tr>
<tr>
<td>Presentations</td>
<td>Presentation of term project</td>
<td>12/07 – 12/09</td>
</tr>
</tbody>
</table>

Special Notes for Fall 2020 due to COVID-19
• Some classes can be recorded and posted to the Canvas page. They may be used for troubleshooting or optimization of experiments. Please be aware of this especially when sharing your image via webcam or
when speaking during classes. For more details check the section Student Privacy in regards to recorded materials.

- Attendance will be monitored via Zoom. Be sure to set your name in Zoom to the one listed in the roster to avoid confusion and being penalized for an absence. It will also be required to indicate your group number after your name by the time groups are assigned. An example would be Daenerys Targaryen (Wed#3). Just replace your name, the first three letters of your day/section, and the number of your group.

**Attendance Policy, Class Expectations, Tardiness, and Make-Up Policy**

*COVID-19 is an obvious factor in the attendance policy, but arrangements can be made if you are ill. However, since this class has been moved entirely online to perform experiments remotely, it is expected that COVID-19 will not have a significant impact on the course.*

- Class attendance is **mandatory for all modules**, no exceptions (unless it's an excused absence)
- In case of foreseeing an absence due to justifiable reasons that can be planned in advance (i.e. job interview, medical appointments, etc.) the student must notify the course instructor with copy to the peer-tutor the day before the class. In case of situations which cannot be planned in advance or emergencies, the student still must notify the course instructor and peer-tutor no later than 10:00 am the day of the corresponding class.
- All missed classes **due to justifiable reasons** must be made up. To make up class, the students will be required to perform the missed class with a group in another day-section. **Students not making up a missed class will receive a failing grade in the class.**
- Tardiness: Students joining classes after the starting time will be penalized with grade deductions on Pre-Lab Homework submitted for the ongoing module. Grade deductions will be 10% for each five-minute delay with a maximum of deduction of 30% (15 minutes late). If the student joins 15 minute after the class starting time, he/she won't be allowed to perform the experiment and the class has to be made up. The only exceptions are excused absences as explained below.
- Excused absences must be consistent with university policies in the undergraduate catalog ([https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx](https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx)) and require appropriate documentation.

**Evaluation of Grades**

*Table 3. Grade distribution*

<table>
<thead>
<tr>
<th>Assignment</th>
<th>% Final Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Lab Homework (4)</td>
<td>10%</td>
</tr>
<tr>
<td>Progress Report (4)</td>
<td>10%</td>
</tr>
<tr>
<td>Final Reports (4)</td>
<td>50%</td>
</tr>
<tr>
<td>Term Project (1)</td>
<td>20%</td>
</tr>
<tr>
<td>Special Assessments/Module Evaluations</td>
<td>5%</td>
</tr>
<tr>
<td>Participation &amp; Team Evaluations*</td>
<td>5%</td>
</tr>
<tr>
<td><strong>Final Grade</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

* Participation grade will be based on the peer-tutor feedback and course instructor’s observations. It will also include the submission of peer-tutor evaluation forms. Team evaluations will be based on evaluations provided by the group members along with self-evaluation, specifically related to contribution in group activities (data sharing & analysis, preparation of reports, involvement in term project, etc.)

**Participation less than 2.5% will result in a failing course grade.**
Grading Policy

Table 4. Grading policy

<table>
<thead>
<tr>
<th>Percent</th>
<th>Grade</th>
<th>Grade points</th>
</tr>
</thead>
<tbody>
<tr>
<td>93.4 - 100</td>
<td>A</td>
<td>4.00</td>
</tr>
<tr>
<td>90.0 - 93.3</td>
<td>A-</td>
<td>3.67</td>
</tr>
<tr>
<td>86.7 - 89.9</td>
<td>B+</td>
<td>3.33</td>
</tr>
<tr>
<td>83.4 - 86.6</td>
<td>B</td>
<td>3.00</td>
</tr>
<tr>
<td>80.0 - 83.3</td>
<td>B-</td>
<td>2.67</td>
</tr>
<tr>
<td>76.7 - 79.9</td>
<td>C+</td>
<td>2.33</td>
</tr>
<tr>
<td>73.4 - 76.6</td>
<td>C</td>
<td>2.00</td>
</tr>
<tr>
<td>70.0 - 73.3</td>
<td>C-</td>
<td>1.67</td>
</tr>
<tr>
<td>66.7 - 69.9</td>
<td>D+</td>
<td>1.33</td>
</tr>
<tr>
<td>63.4 - 66.6</td>
<td>D</td>
<td>1.00</td>
</tr>
<tr>
<td>60.0 - 63.3</td>
<td>D-</td>
<td>0.67</td>
</tr>
<tr>
<td>0 - 59.9</td>
<td>E</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Important: Grades for assignments and class activities as described in Table 3 will be posted in Canvas. However, the final grade will be computed outside Canvas to avoid incorrect weighing frequently observed in Canvas gradebooks.

More information on UF grading policy may be found at: https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

Safety

Even though experiments will be conducted at home by students and involving non-hazardous materials, students are expected to know and follow safe operating procedures. The students are required to attend an orientation session at the beginning of the semester that will include general safety guidelines. This orientation meeting is strictly mandatory. There will be a special assignment on Safety in Unit Operations Lab to compensate the lack of access to the lab in the current semester. This assignment will be of utmost importance in preparation for Unit Operations 2 and to provide students with elements of industrial safety. Failure to complete the safety assignment will lead to a failing grade in the class.

Use, care, and return of experimental kits:

- Each student is responsible for the good use of elements included in the experimental kit. Instructions will be clearly stated in lab manuals and other documents to avoid damage to kit components. Unintentional damage or malfunctioning of kit components might occur so student must notify peer-tutors and course instructor if this happens.
- Students must return some of the kit components at the end of the semester. Instructions will be given on what are the specific components to be returned and the logistics for kit return.
- Failure to return kit materials will result in a failing grade in the course.

Homework, due dates, format, and policies:

Instructions to prepare all assignments will be available in the Canvas website. Due dates are specified below and students must check the course schedule available in the Canvas Home Page for specific dates during throughout the semester. Additional instructions will be given via announcements in Canvas or via e-mail.

Reports and assessments:

- Pre-Lab Homework (PL): Format: Typed, PDF file; individual assignment submitted via Canvas. Each student must prepare an assignment dealing with fundamentals/theory behind the experiment, potential experimental scenarios, Engineering assumptions, etc. Materials required for the preparation of PL are included but not restricted to lab manuals. Pre-lab homework may be discussed during the class time with peer-tutors and course instructor via questions to students. Students will not be allowed to start
• **Progress Report (PR):** Format: Typed, PDF file and Excel spreadsheet; group assignment submitted via Canvas. Students must work on a Progress Report summarizing the work done so far, preliminary results, and sample calculations. Specific details and guidelines will be available in Canvas. The sample calculations portion can be handwritten using any of the apps available for taking notes in tables/laptops or by scanning the handwritten pages. All of the other sections must be typed. This assignment will be discussed with peer-tutors and/or course instructor during class, and it is due before the beginning of week 2 of each module (until 11:59 pm) except by FLU module which will be due before the beginning of week 3. Have in mind that discussion of progress reports may require to check your electronic calculations thus submission of Excel file is of utmost importance. No late submissions will be allowed.

• **Final Reports (FR):** Format: Typed, Word file along with updated Excel spreadsheet; group assignment submitted via Canvas. All modules require submitting a final report for the work conducted and results obtained from experiments. Final Reports will include data collected by all the members of the group presented in an organized, clear fashion so you must coordinate with team members in a timely manner. Late Report submissions will be penalized by a 20% grade reduction for each day the report is overdue, with a maximum deduction of 60% (e.g. no late submissions will be allowed three days after the original deadline). General details for report preparation and requirements for results to be presented in each specific module will be provided in Canvas. This assignment is one week after experiments have been finished (for example, if you are in the Wednesday section your group will have until next Wednesday at 11:59 pm to submit the assignment)

• **Special Assessments/Module Evaluations:** PDF file; individual assignment submitted via Canvas. Assessments will be run to evaluate student understanding of class contents/syllabus and other specific topics (safety, design of experiments, and report preparation). In addition, each student should provide evaluation after finishing experiments for each module by filling a form along with feedback and comments. Materials and forms required for these assessments/evaluations will be available in Canvas and/or discussed in class. The specific dates will be announced in the Orientation Meeting.

**Participation & Team Evaluations:**

• **Participation:** students will be evaluated in an individual basis for participation in the class. Participation includes answers to questions, experimental skills, initiative, suggestions/ideas during experiments, etc. Elements affecting participation grade include tardiness, lack of preparation, disrespectful behavior, inappropriate use of kit components, not submitting peer-tutor and/or module evaluations, and others. Participation grade will be assigned based on observations made by peer-tutors and course instructor.

  ➢ At the end of each module, students must submit an evaluation for peer-tutors and for the module itself via CATME (additional instructions will be provided).

• **Team Evaluations:** each member in a group will evaluate the performance of individual members along with a self-evaluation. The evaluation will must be conducted in an unbiased, objective fashion allowing to rate commitment, involvement, and responsibility in all group assignments of the class including reports and term project. Evaluations will be conducted via CATME. Two team evaluations will be performed: a mid-term evaluation (Oct 19 – 23), and an end-of-term evaluation (due to the last day of classes for all sections, Dec. 9)

A combined grade of Participation/Team Evaluation will be given by Dec. 14th.

**Term Project:**

Groups will work in a term project involving the conceptualization and proposal of a new experiment for Unit Operations that can be carried out as a kit-based experiment. The experiment can involve topics of Fluid Mechanics, Heat Transfer, Thermodynamics, Mass Transfer, Separations, Chemical Kinetics, or any other operation relevant to Chemical Engineering (“pure” Chemistry experiments are not allowed). Specific guidelines will be provided in
Canvas for the completion of the three phases of this project which are briefly described in Table 5. Each phase of the project must be submitted/presented as one per group

Table 5. Term project

<table>
<thead>
<tr>
<th>PHASE</th>
<th>DUE DATE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROPOSAL</td>
<td>Oct 26 - 30</td>
<td>Submit a proposal for the experiment of your choice. Guidelines and suggested sections will be available in Canvas. List of materials, required resources, links to suppliers, etc. should be included along with a diagram for graphical explanation of the experiment. Format: Word, submitted via Canvas.</td>
</tr>
<tr>
<td>PRESENTATION</td>
<td>Dec 7 - 9</td>
<td>Each group will present their project by means of ~20-min presentations via Zoom. All the members of the group must present; therefore sections of the presentation must be distributed even among team members (suggested sections and more details for the presentations will be available in Canvas). The group will use a PowerPoint file for the presentation and the .ppt file must be submitted via Canvas no later than 8:00 am of the day scheduled for the presentation.</td>
</tr>
</tbody>
</table>

Additional details on schedule for online experiments:

a) Before each class:

- Review the lab manual, especially sections such as Theory and System Configuration. This will be helpful for preparation of PL but also to understand the execution of experiments. Watch the videos available for each module. Links to these videos will be posted in Canvas.
- Coordinate with your team members to analyze results and to prepare the continuation of experiments in the same module (e.g. weeks 2 and 3).
- If necessary, meet with the instructor or the peer-tutor to discuss the ongoing experiment.
- Check the list of materials available in the lab manual, and make sure you have everything you need for experiments, including materials that were not provided in the kit.
- Check video/audio settings for the device used to connect to Zoom. This will avoid/minimize delays or technical issues during classes.

b) During the experiment:

- Get acquainted with equipment. If something it not entirely clear after watching the videos or reading the lab manual, ask your peer-tutor and/or course instructor.
- Learn proper start-up and shutdown procedures.
- Learn about limits of the system. If they are not clearly stated in the lab manual, ask your peer-tutor or course instructor.
- Experiment with the system under various conditions; coordinate with your team members.
- Perform basic checks of your data (e.g., mass and energy balances) during the experiment. Avoid a situation in which you collect data just to discover that it does not satisfy the mass or energy balance after you are out of the lab and writing your report. It is necessary to perform the basic checks during the lab and repeat an experiment, if necessary.
- Your preliminary analysis during discussion of Progress Reports will be reviewed by the peer-tutors and will contribute to your lab participation grade.
- Use your camera to show your experimental setup whenever you have a question related to system configuration or measurements. Keep your microphone muted whenever you don’t need to talk. Try to minimize background noise as much as you can.
c) **After the experiment:**

- Coordinate with your team members for logistics to share, analyze, and process data. Groups will have different roles for each module, so make sure that you work on responsibilities associated to your role.
- Progress and Final Reports are group assignments thus tasks required for the preparation and completion of the report must be assigned evenly among the members of the group.

**Guidelines for the Lab Reports**

1. Detailed guidelines and grading rubrics will be posted in Canvas under “Files”. Reports will be graded on both technical content and communication effectiveness.
2. Reports should be written using complete sentences, with correct spelling and grammar. All symbols should be defined on their first use. Clarity and brevity will be rewarded; sloppy thinking and writing will be penalized.
3. Do not copy theoretical derivations from a textbook or a website. Instead, clearly state assumptions behind a derivation, provide relevant derivation results, and cite your sources.
4. In addition to a report file, your submission should contain all supporting information, such as spreadsheet files with your data and files with computer codes (if applies). However, reports should be self-contained (e.g. one should be able to understand your work by reading your report without referring to supporting materials).

**Guidelines for Experiments and Data Analysis**

1. Check energy and material balances and fundamental laws.
2. Investigate effects of all control parameters on the experimental results.
3. Most of the experiments can be performed by studying the influence of various controllable factors. Make sure you choose an experimental design that is logical, feasible, and relevant.
4. Some experiments involve measurements that must be performed after reaching steady state.
5. Clearly identify and justify all assumptions in your calculations.
6. Whenever is possible, compare experimentally determined values with predicted or reference values (commonly called “theoretical” values)
7. Check reproducibility of your data. The current class platform will allow for comparison of results within (yourself) and between (you and your team members) experimenters at the same experimental conditions (replicates). This is an important component of final reports and will be graded accordingly.
8. Note that in order to perform statistical analysis and check for reproducibility, at least three runs under the same experimental conditions must be performed. This will allow to obtain error estimates by computing standard deviations based on these runs.
9. Report any anomalous results and discuss their possible sources.
10. Use spreadsheets (e.g., Excel) to store your data. Spreadsheets must be organized and easy to follow since calculations might be checked not only by group members but also by peer-tutors and course instructor.
11. Make sure that your objectives can be met with your operating conditions. It is easy to choose conditions that are outside of the performance limits of the apparatus or produce results with no measurable difference. Carefully study the limitations of the existing experimental apparatus as a part of the planning process. If you don’t know this information, ask your peer-tutor or course instructor.

**Students Requiring Accommodations**

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, [https://www.dso.ufl.edu/drc](https://www.dso.ufl.edu/drc)) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

**Course Evaluation**

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at [https://gatorevals.aa.ufl.edu/students/](https://gatorevals.aa.ufl.edu/students/). Students will be notified when the
evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via [https://ufl.bluera.com/ufl/](https://ufl.bluera.com/ufl/). Summaries of course evaluation results are available to students at [https://gatorevals.aa.ufl.edu/public-results/](https://gatorevals.aa.ufl.edu/public-results/).

**University Honesty Policy**

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code ([https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/](https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/)) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

**Commitment to a Safe and Inclusive Learning Environment**

The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:

- Your academic advisor or Graduate Program Coordinator
- Robin Bielling, Director of Human Resources, 352-392-0903, rbielling@eng.ufl.edu
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, taylor@eng.ufl.edu
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, nishida@eng.ufl.edu

**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. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

**Student Privacy**

- There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: [https://registrar.ufl.edu/ferpa.html](https://registrar.ufl.edu/ferpa.html)
- Our class sessions may be audio visually recorded for students in the class to refer back and for enrolled students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.
Campus Resources:

Health and Wellness

**U Matter, We Care:**
Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

**Counseling and Wellness Center:** [http://www.counseling.ufl.edu/cwc](http://www.counseling.ufl.edu/cwc), and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

**Sexual Discrimination, Harassment, Assault, or Violence**
If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the [Office of Title IX Compliance](mailto:title-ix@ufl.edu), located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, title-ix@ufl.edu

**Sexual Assault Recovery Services (SARS)**
Student Health Care Center, 392-1161.

**University Police Department** at 392-1111 (or 9-1-1 for emergencies), or [http://www.police.ufl.edu/](http://www.police.ufl.edu/).

Academic Resources

**E-learning technical support**, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. [https://lss.at.ufl.edu/help.shtml](https://lss.at.ufl.edu/help.shtml).

**Career Resource Center**, Reitz Union, 392-1601. Career assistance and counseling. [https://www.crc.ufl.edu/](https://www.crc.ufl.edu/).

**Library Support**, [http://cms.uflib.ufl.edu/ask](http://cms.uflib.ufl.edu/ask). Various ways to receive assistance with respect to using the libraries or finding resources.

**Teaching Center**, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. [https://teachingcenter.ufl.edu/](https://teachingcenter.ufl.edu/).

