Strategies to Build Green
Transforming Existing Buildings into High Performance Sustainable Buildings

While the environmental performance of new commercial buildings in the United States has been improving dramatically in recent years, most existing buildings constructed when energy was less expensive, technologies were less advanced, and environmental performance rarely a priority. Older, existing buildings generally use significantly more energy and water than new buildings of the same size and function. According to the Institute for Building Efficiency, existing buildings that are 20 years and older make up more than 70 percent of the built environment by square footage. Thus, existing buildings offer tremendous opportunities to conserve energy and water as well as provide healthier, more productive work environments. EPA

Class Project, UF Lacrosse Locker Room Facility
Course Description
This is an interactive multidisciplinary course, in which students introduced to green strategies and technologies for the design, construction and operation of high performance buildings. The course designed to equip students with the skills and knowledge needed to be effective communicators, critical thinkers, project managers, problem solvers, and team players. Students learn the strategies for greening facilities with green building rating systems in mind and a focus on the principles of Leadership in Energy and Environmental Design (LEED). Understand the alignment of the United Nations Sustainable Development Goals (UN SDGs) with LEED prerequisites and credits. This semester, a campus building is used for hands-on learning. In addition, successful course completion can prepare the student for LEED™ V4 Green Associate and Accredited Professional exams.

Learning Objectives
This course’s objectives to facilitate students’ learning and leadership in the green building industry. The objectives emphasize on building assessment, identify problems, and propose solutions to optimize building performance via at home preparation, in-class discussions, videos, online engagement, and individual and collaborative team assignments. Students will:

- Learn to assess existing buildings performance using tools needed for energy, water, IAQ, and lighting audit.
- Analyze consumption data and calculate ROI for energy, lighting and water reduction use.
- Assess and develop polices and techniques to improve building exteriors, site, water and energy consumption, remodeling, waste management, and purchasing and identify associated UN SDGs with each area.
- Apply LEED™ V4 for Existing Buildings: Operations and Maintenance (EB: O+M) process with the goal of certifying the facility and compare to LEED v4.1 for Existing Building.
- Understand the value of teamwork and each team members’ contribution to the success of the project.
- Learn the skills and tools needed in today’s green industry including Energy Star Portfolio Manager, Energy Star Target Finder, Arc, LEED online, Ecomedes, utility data analysis, and HelioScope: advanced solar design software.
- Prepare students for LEED™ V4 Green Associate (GA) and LEED™ V4 professional credential exams.

Student Learning Outcomes (SLO)
Upon completion of this course, successful students will be able to:

- Distinguish the similarities and differences between different green building rating systems.
- Understand how to manage, administer, and apply LEED v4.0 and 4.1 to projects.
- Formulate and deliver high quality verbal arguments and written reports and proposals.
- Demonstrate competency and professionalism in consulting and advising clients to optimize building performance.
- Interact effectively with confidence in a team setting and take initiative to lead.
- Communicate effectively and passionately the benefits of building green and the importance of the UN SDGs in the built environment.

Required Text/Reading:
- No text book required
- United Nations, Sustainable Development Goals (UN SDGs).
- Weekly readings posted under each module on Canvas e-Learning portal, https://ufl.instructure.com/courses/433978. Students expected to complete readings as advance preparation for class discussion and exercise.
In addition to the required reading, various supplemental, free publications identified for class discussion and/or Assignments supplied via the UF Canvas e-Learning portal (https://lss.at.ufl.edu/), such as the following:

### Other Resources

- **USGBC Resources**, [https://www.usgbc.org/resources](https://www.usgbc.org/resources)
- Calculators, [https://www.usgbc.org/resources?LEED+Resources=%5B%22Calculators%22%5D](https://www.usgbc.org/resources?LEED+Resources=%5B%22Calculators%22%5D)
- Certification, [https://www.usgbc.org/resources?LEED+Resources=%5B%22Calculators%22%5D](https://www.usgbc.org/resources?LEED+Resources=%5B%22Calculators%22%5D)
- LEED Checklists, [https://www.usgbc.org/resources?LEED+Resources=%5B%22Checklists%22%5D](https://www.usgbc.org/resources?LEED+Resources=%5B%22Checklists%22%5D)
- Standards, [https://www.usgbc.org/resources?LEED+Resources=%5B%22Standards%22%5D](https://www.usgbc.org/resources?LEED+Resources=%5B%22Standards%22%5D)
- Tools, [https://www.usgbc.org/resources?Education+Resources=%5B%22Toolkit%22%5D](https://www.usgbc.org/resources?Education+Resources=%5B%22Toolkit%22%5D)
- LEED case studies, [https://www.usgbc.org/resources?Education+Resources=%5B%22LEED+Case+Studies%22%5D](https://www.usgbc.org/resources?Education+Resources=%5B%22LEED+Case+Studies%22%5D)
- LEED candidates handbook, [https://www.usgbc.org/resources?Credentialing+resources=%5B%22Candidate+Handbooks%22%5D](https://www.usgbc.org/resources?Credentialing+resources=%5B%22Candidate+Handbooks%22%5D)
- GSA, [https://sfpool.gov/](https://sfpool.gov/)
- BuildingGreen, **Homepage**, [https://www.buildinggreen.com/](https://www.buildinggreen.com/)
- Green Building Advisor, **Homepage**, [https://www.greenbuildingadvisor.com/](https://www.greenbuildingadvisor.com/)
  - Green Basics, [https://www.greenbuildingadvisor.com/green-basics](https://www.greenbuildingadvisor.com/green-basics)
- U.S. Green Building Council, **UF membership access**, [www.usgbc.org](http://www.usgbc.org)
- LEED User, **UF membership access**, [www.leaduser.buildinggreen.com](http://www.leaduser.buildinggreen.com)

### Course Modules

General course module main topics and sub-topics are summarized below. Course modules and topical content including readings, assignments, discussions, PowerPoints, and final project are expound on within Canvas and may be subject to change.

<table>
<thead>
<tr>
<th>Date</th>
<th>Modules</th>
<th>Module Main Topics</th>
<th>Module Sub-Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Week, 8/23</strong></td>
<td>0</td>
<td>Start Here</td>
<td>- Welcome to the course&lt;br&gt; - Course overview&lt;br&gt; - UF resources and policies&lt;br&gt; - Introduction to <strong>UN SDGs</strong> and LEED/sustainability</td>
</tr>
<tr>
<td><strong>Week, 8/30</strong></td>
<td>1</td>
<td>Introduction to Green Building rating systems, Benefits, and Goals</td>
<td>- Review green building rating systems including:&lt;br&gt;  - Green Globes&lt;br&gt;  - BREAM&lt;br&gt;  - ASHRAE 189</td>
</tr>
</tbody>
</table>
| Week, 9/6 | 2 | Where and how to start a project | - Project assessment and planning  
- FTE, MPR, boundary  
- Assess LEED™ V4.0 scorecard and compare to LEED V4.1  
- Access and manage LEED™ V4.0 and V4.1 online |
|---|---|---|---|
| Week, 9/13 | 3 | Project Administration | - Project history  
- Utility data analysis for the last 3-5 years  
- Building drawings; architectural and MEP |
| **Guest speaker:** Paul Shahriari, CEO, Ecomedes, Thursday, 9/16(1:00-2:00pm) |
| Week, 9/20 | 4 | Energy Audit and Energy Star Rating | - Energy conservation overview  
- Energy efficiency and conservation strategies overview  
- Building MEP drawings (Mechanical only)  
- Energy molding, ASHRAE 90.1  
- ASHRAE Level 1, energy audit process, approach, and equipment/tools |
| Week, 9/27 | 5 | Energy Conservation, Commissioning, Renewable Energy | - Renewable energy source, assessment, tools, cost and ROI  
- Specifying and sizing a system  
- Helioscope for renewable assessment |
| **Guest Speaker:** Barry Jacobson, President, CEO, Solar Impact, Thursday, 9/30(2:40-3:30pm) |
| Week, 10/4 | 6 | Lighting Audit with retrofit and ROI | - Energy efficiency best management practices  
- Optimize energy performance and energy modeling with lighting retrofit  
- Building MEP drawings (Electrical only)  
- Advanced energy metering or sub-metering strategies  
- Complete requirements for EA category credits for V4.0 & V4.1 |
| Week, 10/11 | 7 | Water conservation/audit | • Indoor and outdoor water conservation  
• Plumbing drawings  
• Water use assessment, reduce demand, and strategies to decrease consumption  
• Net zero water  
• Building MEP drawings (Plumbing only)  
• **Complete requirements for WE category credits for V4.0 & V4.1**  
• Use Ecomedes; https://uf.ecomedesstaging.com/  
• **Apply ARC for LEED V4.1 building performance** |

| Exam #1, Due October 14th at 11:59 pm |
| Week, 10/18 | Site/ Building visit for audit | • ASHRE energy level 1 audit  
• Water audit  
• IAQ audit  
• Gather data  
• Take photos of systems for documentation  
• Data organization and analysis  
• **Guest Speaker: John Chyz, AEI, Commissioning, Thursday 10/21 (2:30-3:30)** |

| Week, 10/25 | 8 | Location and Transportation Strategies | • Transportation assessment and survey  
• **Complete requirements for L&T category credits for V4.0 & V4.1**  
• **Apply ARC for LEED V4.1 building performance**  

**Guest Speaker: Kristy Walson, Principal, TLC Engineering Solution, Thursday, 10/28 (1:00-2:00pm)** |

| Week, 11/1 | 9 | Sustainable Site | • Project site assessment  
• Rainwater management  
• Heat island effect, roof and none roof |
| Week, 11/8 | 10 | Building Operation and Material Use | • Site lighting  
• Landscape  
• *Complete requirements for L&T category credits for V4.0 & V4.1*

**Guest Speaker: Steve Moore. Siemens Account Executive, Thursday 11/4 (1:00-2:00pm)** |
|---|---|---|---|
| Week, 11/15 | 11 | Indoor Environmental Quality and Health and Well-being | • Waste audit and management  
• Consumption and production  
• Eco building material  
• Recycling and purchasing policies  
• *Complete requirements for L&T category credits for V4.0 & V4.1*

**Week, 11/22; Thanksgiving** |
| Week, 11/29 | 12 | Innovation and Regional Priority LEED v4.0 Green Associate Exam | • Project Regional priority  
• LEED v4.0 exam review, registration and practice

**Exam #2, Due December 2nd at 11:59 pm** |
| Week, 12/6 | Final Project Presentation | • One presentation. Each team will present their assigned section.
Disclaimer: This syllabus represents my current plans and objectives. Throughout the semester, we may need to adjust with unforeseen events and conditions. Such adjustments are communicated clearly in class and via written announcements on Canvas. These adjustments are not unusual and are expected during a pandemic.

Class Project

This semester, the class will be working on Lacrosse Locker Room Facility, on campus building. The class divided into 4 teams each team will present their part at the final presentation. However, each team will work on all aspects of the project from start to finish.

Final Projects/Presentations: Team Delivery, each team to select two of the UN SDGs that relate to the team’s topic and report on its application to the class project or any building, make recommendation for UF buildings and campus.

- **Energy team**: ASHRAE Level 1 energy audit report including return on investment (ROI). In addition, complete Energy & Atmosphere credits submission with backup documentations. Prepare final presentation to the client and include comparing to LEED v4.1 and report of the SDGs that your team selected.
- **Indoor Environmental Quality and Site team**: Report on the ASHRAE 62.1, air ventilation including return on investment (ROI). In addition, complete IEQ and Site credits submission with backup documentations. Prepare final presentation to the client and include comparing to LEED v4.1 and report of the SDGs that your team selected.
- **Water Efficiency and Transportation team**: Report on procedures for water audit including return on investment (ROI). Also, complete Water Efficiency and Transportation submission with backup documentations. Prepare final presentation to the client and include comparing to LEED v4.1 and report of the SDGs that your team selected.
- **Lighting and Material & Resources team**: Report lighting audit including return on investment (ROI). Also, complete Material and Resources credits submission with backup documentations. Prepare final presentation to the client and include comparing to LEED v4.1 and report of the SDGs that your team selected.

Team/Project Manager’s responsibilities:

- Lead the discussion in the breakout room
- Compile the PowerPoint presentation for the class project for each module
- Ensure the PowerPoint is uploaded to the team's Canvas page and under assignment per due date
- Manage the LEED credits and prerequisites documents and upload to Canvas
- Update LEED checklist and upload to Canvas
- Ensure the SDGs are addressed in each module presentation

See Canvas for Additional Course Information

Additional information about the course is available on Canvas, including; instructional methods, tips for success, personal conduct policies, mobile communications and computing policies, and/or other relevant student
Assignments and Grading
Assignment details, deliverables, due dates, and grades are published on Canvas and may be subject to change.

<table>
<thead>
<tr>
<th>Grading Category</th>
<th>Additional Details</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attendance &amp; Punctuality</td>
<td>Required</td>
<td>5</td>
</tr>
<tr>
<td>Readings (Individual)</td>
<td>Readings, and checklist assessment (points vary) (0-15)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Weekly &amp; Module-Based</td>
<td></td>
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<tr>
<td>Discussion (Individual)</td>
<td>Discussions (points vary) (0-15)</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Weekly &amp; Module-Based</td>
<td></td>
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<tr>
<td>Presentations (Team)</td>
<td>PowerPoint presentation (points vary) (0-15)</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Weekly &amp; Module-Based</td>
<td></td>
</tr>
<tr>
<td>Exams</td>
<td>Mid-term (15)</td>
<td>30</td>
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<tr>
<td></td>
<td>Final (15)</td>
<td></td>
</tr>
<tr>
<td>Final Project</td>
<td>Final Class Presentation including UN SDGs</td>
<td>20</td>
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<tr>
<td>Total</td>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

Grade and Grading Policy:

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>A</th>
<th>A-</th>
<th>B+</th>
<th>B</th>
<th>B-</th>
<th>C+</th>
<th>C</th>
<th>C-</th>
<th>D+</th>
<th>D</th>
<th>D-</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Numeric Grade</td>
<td>93-100</td>
<td>90-92</td>
<td>87-89</td>
<td>83-86</td>
<td>80-82</td>
<td>77-79</td>
<td>73-76</td>
<td>70-72</td>
<td>67-69</td>
<td>63-66</td>
<td>60-62</td>
<td>0-59</td>
</tr>
<tr>
<td>Quality Points</td>
<td>4.0</td>
<td>3.67</td>
<td>3.33</td>
<td>3.0</td>
<td>2.67</td>
<td>2.33</td>
<td>2.0</td>
<td>1.67</td>
<td>1.33</td>
<td>1.0</td>
<td>0.67</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Final student grades will follow University of Florida grades and grading policies.
- Undergraduate Students: https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/

Attendance Policy, Class Expectations, and Make-Up Policy
- Attendance is mandatory and participation is graded based on each class period (i.e., missing a multi-period day of class will count as multiple absences in accordance with the number of periods).
- Students should expect to participate via live video with dress and demeanor befitting an online workplace.
- Do not post Zoom meeting screen shot on your social media.
- Students may miss up to the equivalent number of class periods as the course credits (e.g., 3 credits = 3 periods @ 50 minutes/each in Spring/Fall & 2 periods @ 75 minutes/each in Summer A) without penalty and with no need for an excuse. Beyond those “waived” absences, students must provide a valid, and properly documented, excuse.
- Otherwise, unexcused points will be deducted proportional to the total number of periods where attendance was taken. Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with University policies as found at: https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/
- Follow UF Netiquette – Communication Courtesy:
All members of the class are expected to follow rules of common courtesy in all email messages, threaded discussions and chats. Please refer to:
http://biostat.ufl.edu/resources/e-learning-resources/e-learning-basics/etiquette-online/ (Links to an external site.)

Note: it is an honor code violation to share the link video recording link to people outside of your course. If students appear in the video, this may also be a Family Educational Rights and Privacy Act (FERPA) violation.
<table>
<thead>
<tr>
<th>Expectations</th>
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<tbody>
<tr>
<td>• Be Present. This will allow you to get the most out of class time as well as for your classmates to get the most out of their collaborations with you.</td>
</tr>
<tr>
<td>• Put your cell phone away unless you are actively using it to further the class activities.</td>
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<tr>
<td>• Be prepared. The readings and videos have been carefully chosen to support the class activities.</td>
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<tr>
<td>• Listen carefully and do not interrupt others.</td>
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<td>• Give quality feedback. What constitutes “quality” will be discussed in class.</td>
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<tr>
<td>• Respect the opinions of others, even when you do not agree.</td>
</tr>
<tr>
<td>• Keep an open-mind; embrace the opportunity to learn something new.</td>
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<tr>
<td>• Avoid monopolizing the discussion. Give others a chance to contribute and be heard.</td>
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<td>• Do not be afraid to revise your ideas as you gather more information.</td>
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<tr>
<td>• Try to look at issues from more than one perspective.</td>
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<tr>
<td>• Respect others by learning and using the name and pronoun they prefer.</td>
</tr>
<tr>
<td>• Do not use offensive language.</td>
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</tbody>
</table>

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<thead>
<tr>
<th>Getting Help</th>
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</thead>
<tbody>
<tr>
<td><strong>Health and Wellness</strong></td>
</tr>
<tr>
<td><strong>U Matter, We Care:</strong></td>
</tr>
<tr>
<td>If you or a friend is in distress, please contact <a href="mailto:umatter@ufl.edu">umatter@ufl.edu</a>/ or 352 392-1575 so that a team member can reach out to the student.</td>
</tr>
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</table>

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

**Sexual Assault Recovery Services (SARS)** |
**Student Health Care Center, 392-1161.** |
**University Police Department, 392-1111 (or 9-1-1 for emergencies).** 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/
# Other Campus Resources

<table>
<thead>
<tr>
<th>Service</th>
<th>Location/Contact Information</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Career Resource Center</strong></td>
<td>Reitz Union, 392-1601.</td>
<td>Career assistance and counseling.</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.crc.ufl.edu/">http://www.crc.ufl.edu/</a></td>
<td></td>
</tr>
<tr>
<td><strong>Library Support</strong></td>
<td><a href="http://cms.uflib.ufl.edu/ask/">http://cms.uflib.ufl.edu/ask/</a></td>
<td>Various ways to receive assistance with respect to using the libraries or finding resources.</td>
</tr>
<tr>
<td><strong>Teaching Center</strong></td>
<td>Broward Hall, 392-2010 or 392-6420.</td>
<td>General study skills and tutoring.</td>
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<tr>
<td></td>
<td><a href="http://teachingcenter.ufl.edu/">http://teachingcenter.ufl.edu/</a></td>
<td></td>
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<tr>
<td><strong>Writing Studio</strong></td>
<td>302 Tigert Hall, 846-1138.</td>
<td>Help brainstorming, formatting, and writing papers.</td>
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<td></td>
<td><a href="http://writing.ufl.edu/writing-studio/">http://writing.ufl.edu/writing-studio/</a></td>
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<tr>
<td><strong>Student Complaints Campus</strong></td>
<td><a href="https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf/">https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf/</a></td>
<td></td>
</tr>
</tbody>
</table>
University Policies

**Online course evaluation**
Students expected to provide feedback on the quality of instruction in this course by completing online evaluations at [https://gatorevals.aa.ufl.edu/students/](https://gatorevals.aa.ufl.edu/students/). Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. 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/).

**Students with Disabilities:**
Students requesting accommodation for disabilities must first register with the Disability Resource Center (DRC). The DRC 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.

Upon registering, the DRC will provide documentation to the student who must then provide this documentation to the instructor when requesting accommodation. You must submit this documentation prior to submitting assignments or taking quizzes or exams. Accommodations are not retroactive, therefore, students should contact the office as soon as possible in the term for which they are seeking accommodations. Contact DRC at 352-392-8565, or viewing, [www.dso.ufl.edu/drc/](http://www.dso.ufl.edu/drc/).

**Student Honor Code and Academic Honesty**
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 ([http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/](http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/)) specifies a number of behaviors that are in violation of this code and the possible sanctions.

**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. As such, violations are also against university policies and rules, disciplinary action will be taken as appropriate.

**Religious Observances:**
Please inform the instructor of any religious holidays or other days of special religious significance that may interfere with your participation in this class so that appropriate accommodations can be made.

**Sexual Harassment:**
Sexual harassment is reprehensible and will not be tolerated by the University. It subverts our academic mission and threatens the careers, educational experience, and well-being of students, faculty, and staff. The University will not tolerate behavior between, nor among, members of this community that creates an unacceptable working environment.