



UNIVERSITY OF CONNECTICUT

Department of Physics
College of Liberal Arts & Sciences

PHYS 1025Q – Introductory Astronomy with Laboratory Course Syllabus, Spring 2020

Syllabus information is subject to change. The most up-to-date syllabus is located within the course in HuskyCT.

Course and Instructor Information

Instructors:

- ◆ **Professor / Dr. Cara Battersby**
 - **Office:** Gant South Building, GS113F
 - **Email:** cara.battersby@uconn.edu
- ◆ **Mr. (almost Dr!) H Perry Hatchfield**
 - **Office:** Gant South Building, GS113B
 - **Email:** h.hatchfield@uconn.edu

Office Hours: Tuesdays 3:00-4:00pm, Thursdays 11:00am-12:00pm or by appointment

Class Meeting: Tues/Thurs 9:30-10:45am

Class Location: (Biology/Physics Building) BPB 131

Why do we have two instructors for this course?

Prof. Battersby is expecting a baby (!) and will be starting maternity leave approximately mid-semester. Prof. Battersby prefers to spend most of her leave *after* the baby is born, so UConn has kindly granted her teaching relief for Fall 2020 (and the summer of course) and approved her request to co-teach Spring 2020 until her delivery or until doctors recommend rest.

While Prof. Battersby has taken the lead in developing the course structure and materials (to ensure a high standard quality for this course), Mr. H Perry Hatchfield is a highly qualified PhD candidate, with vast expertise in astrophysics as well as science communication, who will be completely co-managing the course. *****All course inquiries should go to both instructors.*****

Prof. Battersby will be teaching most of the lectures for the first half of the semester and Mr. Hatchfield will take over the course and its lectures about halfway through the semester. We understand that this is a bit unusual and ask for your patience and understanding. If you're not on board with this we encourage you to take this course at another time.

Changes to the Course Effective March 23, 2020 due to Online Coursework Change

Due to UConn's closure and move to online coursework for the remainder of the Spring 2020 semester, effective March 23, 2020, we have updated the policies enclosed herein.

Coursework, grading schemes, and policies prior to this date remain unchanged. This is a trying time and we encourage students to put their health (physical *and* mental) first. We have

implemented additional leniency for the second half of the semester. UConn has also updated its policy on pass/fail courses and dropping courses for the Spring semester. We understand if you'd like to consider these options under the circumstances.

The changes effective March 23, 2020 are:

- 1) **Lectures:** Lectures will be recorded bi-weekly by Mr. Hatchfield and the link to them will be posted on HuskyCT. We highly encourage you to watch these lectures, at a time that works for you. You will be expected to know what is covered in each lecture for the quizzes, homeworks, as well as other course updates that will be shared in the lectures.
- 2) **Participation Credit:** In lieu of your iClicker scores for the remainder of the semester, you will be able to earn "class participation" credit by completing "class worksheets." You are highly encouraged to work (remotely!) with groups for these, but each person will need to submit their own. There will be about 1-2 per week, based on the lecture materials that week. We encourage you to take time each week with your groups to work through the material in the lectures, ask questions, and generally just check in with each other. *The "class worksheets" will be due each week on Sundays at 11:59pm on HuskyCT.*
- 3) **Homeworks:** Online Sapling homeworks will continue as planned. Again, we encourage you to work with your group through the concepts and questions you have, but each person's work must be their own. The next homework is due March 30th at 11:59pm.
- 4) **Quizzes:** Quizzes will now take place on HuskyCT. They will be announced on HuskyCT and you will be given a time window (e.g. sometime Monday) in which to complete the quiz, then once you start the quiz on HuskyCT, you will have 15 minutes to complete it. While you are encouraged to study for quizzes with your group and to review the answers after everyone has completed the quiz, the quiz itself should be done in isolation – without your book, the internet, or help from anyone else. Due to the expectation of possible technical or other problems, we will now be dropping *your three lowest quiz scores* in the calculation of your final grades.
- 5) **Final Projects:** You will be expected to complete your final projects as planned, with your group, working remotely. *Final projects are due via HuskyCT by Friday April 24 11:59pm.* No late proposals can be accepted. The final project review panel, as well as all labs, will continue remotely (see more below).
- 6) **Extra Credit:** In lieu of the in-person extra credit we hoped to have for this semester (night observing and attending seminars), we will offer three opportunities for online extra credit on HuskyCT. These three optional extra credit assignments can be found under "Course Content" -> "Online Extra Credit Opportunities." Details for each are contained there. They are due by Friday May 1st at 11:59pm. For each one that is completed satisfactorily, you will receive an extra 0.5% extra credit on your final grade, for a total of up to 1.5% extra credit. (For those of you who have already attended an astronomy seminar and submitted an extra credit write-up, that will still count, and with this new extra credit opportunity you may earn an *additional* 0.5% per assignment or up to 1.5% more total, extra credit, in addition to the extra credit you already submitted.)

- 7) **Labs:** Labs will continue, but will be modified for online, remote group work. You will hear from your TAs each week with details for that lab. The full details of the new lab policies will be sent by your TAs, Robert and Nikko. Notably, there will no longer be a lab make-up week, or a lab re-write option, but instead, the *lowest three lab scores* will be dropped in the calculation of your final grades. **Note that the final panel review happening the week of April 27-May 1 is worth 5% of your final grade for your final project and cannot be dropped.**
- 8) **Office Hours:** Mr. Hatchfield and the lab TAs, Robert and Nikko, will hold virtual office hours each week. They will announce the times and dates of, as well as post a link for how to join, these office hours on HuskyCT. As before, office hours by appointment are still available as well, though they will be virtual as well of course.
- 9) **Email:** Prof. Battersby has started her maternity leave, so all course questions should be directed to Co-Instructor H Perry Hatchfield (h.hatchfield@uconn.edu) or your course TAs, Robert (robert.mccutcheon@uconn.edu), and Nikko (nikko.cleri@uconn.edu).

We know that this is a very challenging time and transition. Know that we care about you and are here to help! Our goal for the rest of the semester is to have fun learning astronomy and using it as a break from the stressful realities of our world right now. Please keep learning, keep reaching out to each other, and keep having fun!

Lab Information

Lab Meeting Location: Gant South Building GS-321

Lab Sections:

Section 1025Q-001L – Tuesdays 1:25-3:25pm – **TA:** Nikko Cleri

Section 1025Q-002L – Tuesdays 3:35-5:35pm – **TA:** Nikko Cleri

Section 1025Q-003L – Wednesdays 1:25-3:25pm – **TA:** Robert McCutcheon

Section 1025Q-004L – Wednesdays 3:35-5:35pm – **TA:** Robert McCutcheon

Section 1025Q-005L – Thursdays 1:25-3:25pm – **TA:** Nikko Cleri

Section 1025Q-006L – Thursdays 3:35-5:35pm – **TA:** Robert McCutcheon

Lab TAs:

◆ **Nikko Cleri**

- nikko.cleri@uconn.edu
- **Office:** Office Hour Location: GS216 the Physics Learning Resource Center (regular office for other appointments: GS113E)
- **Office Hours:** Mondays 1-3pm, Tuesdays 11am-1pm, Wednesdays 1-2pm in GS216 or by appointment

◆ **Robert McCutcheon**

- robert.mccutcheon@uconn.edu
- **Office:** GS313E
- **Office Hours:** Fridays 11am-12pm or by appointment

Required Course Materials

- ◆ **OpenStax Astronomy textbook**, an open educational resource. *Available for free online*, in web-view and PDF format: <https://openstax.org/details/astronomy> (and on our HuskyCT page). If you prefer, a print version is available via the UConn Bookstore.
- ◆ **PHYS1025 Lab Manual** through UConn Bookstore, PDF version available on HuskyCT.
- ◆ **Sapling Learning** online homework system. Access codes available through the UConn Bookstore or it can be purchased directly from Sapling Learning (which may be less expensive). All homework assignments will be done through the Sapling Learning online system (linked through HuskyCT – follow instructions in Course Announcement). *You are responsible for having access by the time of the first assignment, due Jan. 29th.*
- ◆ **iClicker remote or mobile software.** We will be using iClickers in this course. You can use an iClicker that you already own, borrow one from a friend (as long as you can always use it during our class period and they are not also in this class), buy one at the bookstore (\$55 but also comes with the mobile software for 5 years), buy one used, or even use your mobile phone (but you need to pay for the software - \$15/semester). The frequency code for our classroom is CA.

Course Objectives

Astronomy is the study of the Universe, with a particular focus on stuff outside the Earth. In this course, you will learn how we know what we know about the universe (including modern observations and theories describing our place in the cosmos), learn about what we don't know, and develop the skills to begin to unravel the mysteries of the universe for yourself (cool, right?). As part of this journey, you will learn the basics of “how to science:” hypothesis testing, controlled experiments and observations, plus the nitty-gritty of proposals and resource allocation in science. The focus of this course is *understanding the concepts of astronomy* rather than *memorizing facts*.

The main objectives for the course are:

- 1) Hone and develop your critical thinking skills (this is a Q course after all!)
- 2) Develop a broad understanding and appreciation for the field of astronomy and the basic nature of our Universe.
- 3) Have fun. Science is all about curiosity, exploring, and engaging. Enjoy it!

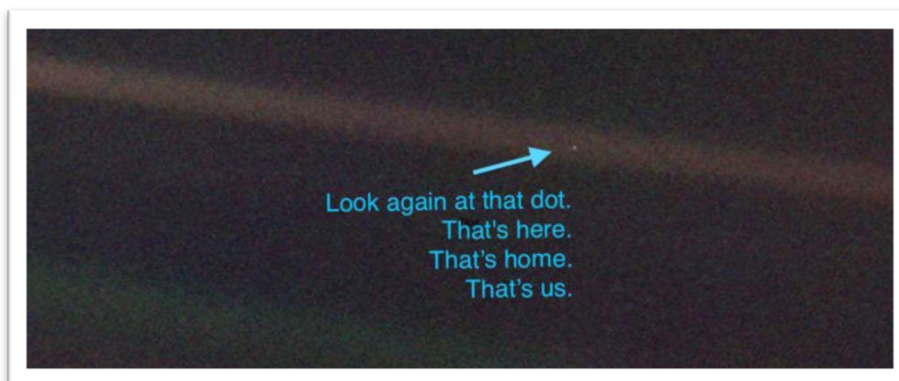
What to do if you need to miss a class?

Things happen, and we do not expect that you will be able to attend every class. Clicker questions and in-class quizzes **cannot** be made up, but there is plenty of flexibility built into those scores, that it should be no problem for you to miss a couple of classes. If you do need to miss a class, be sure to:

- 1) Check in with a colleague in the class to find what you missed,
- 2) Read over the content in the textbook, including the assigned pre-class reading,
- 3) Go over the lecture notes, posted on HuskyCT, and
- 4) Ask any questions you have about the content after you've completed the three steps.

You ***do not*** need to email the instructors if you will miss a lecture.

How to Succeed in this Course



A photograph of our tiny home world, Earth. This photo was taken by the Voyager spacecraft in 1990 from 3.7 billion miles away. The sun's bright rays caused reflections in the camera that you see as the lines across the image. The tiny pixel of light is our entire Earth. This photo was popularized by, and the quote is from, Carl Sagan in his book "Pale Blue Dot: A Vision of the Human Future in Space," and the image is from NASA.

Your success in this class is important to me. We will all need accommodations because we all learn differently. If there are aspects of this course that prevent you from learning or exclude you, please let me know as soon as possible. Together we'll develop strategies to meet both your needs and the requirements of the course. Mathematics is the language of science, and success in the course will require some basic proficiency in algebra and trigonometry. Here are some resources if you have questions, need a refresher, or are just feeling a bit overwhelmed:

- ◆ The **UConn Q Center** is an excellent resource (free of charge!) if you need help with math concepts in lab or homework assignments: <http://qcenter.uconn.edu>.
- ◆ The **Physics Learning Resource Center** (free of charge - located in room 302A of the physics building -- <https://physics.uconn.edu/academics/undergraduate-program/learning-resource-center/>) is *staffed by experienced physicists*
- ◆ And of course, your professor and TA's office hours!

Other suggestions for how to succeed in this course:

- ◆ **Come to class and lab!**
- ◆ **Read before class and lab!** The unannounced quizzes will include questions from assigned pre-class readings. Reading the lab manual before lab will help you to efficiently complete the activity within the allotted time.
- ◆ **Come to office hours!**
- ◆ **Plan, ahead**, especially with your final project observing proposal and any planned absences.

Grading and Course Work

This course is designed to reward hard work and in-class participation. Intelligence is fluid and learning to learn is an important component of this class.

Final Projects: Observing Proposals

There are no exams in this course. Instead, 25% of your final grade will be comprised of the final project, a telescope observing proposal (and the associated abstract and panel review), which will be completed in groups formed within your lab sections. These should be your

standard lab groups and should generally be 3 people (4 maximum). The final projects will be evaluated in the final week of lab during a panel review, so the deadline (to be announced) is hard, and late projects cannot be accepted.

Many facilities in the US are “open-skies” – this means that the telescopes do not belong to anyone – the best projects are selected by a panel review. Many of the lectures and labs throughout the semester are designed to prepare you to write your own telescope observing proposals; in fact, in one lab, you will practice doing a peer panel review of observing proposals to choose the best projects for the telescope. A proposal abstract will be due midway through the course (*March 6th*), this is designed to give you early feedback on your project, so you have time to adjust as needed. More details about the final proposal and panel review will be given later in the course, but for now, get those gears turning about new observations to explore the Universe!

Labs

Labs are conducted during your specified lab section according to the course schedule. Participation is required for labs. Your score will be based on a set of questions handed in during the lab. There is a worksheet you will need to print and complete each week.

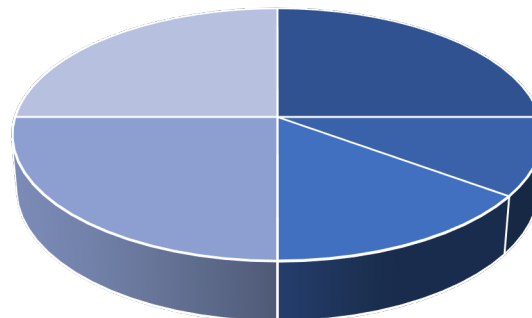
Homework

This course will include approximately 10-12 online homework assignments, through the online Sapling Learning system through HuskyCT. Detailed instructions on how to register will be given on HuskyCT. **You are responsible for making sure you are registered by the time your first homework is due, Jan. 29th.** *We all have lives and things happen, therefore, the lowest two homework scores will be dropped, no questions asked.* **Late homework assignments will not be accepted for credit and cannot be made up after their due date.**

In-Class Quizzes

There will be approximately 12 short in-class unannounced quizzes throughout this course, about 1 per week. The quiz questions will be a mix of short-answer and multiple-choice and will cover material from the lectures and from the assigned readings. *The two lowest quiz scores will be dropped.* We will go over quiz answers right away, so **it is not possible to make up any missed quizzes.**

Grade Component	Weight
Sapling Online Homework	25%
Clickers	10%
In-class Quizzes	15%
Lab Activities	25%
Final Project: Abstract	5%
Final Project: Proposal	15%
Final Project: Panel Review	5%



Grading Scale (%)				
93-100 A	83-86 B	73-76 C	63-66 D	
90-92 A-	80-82 B-	70-72 C-	60-62 D-	
87-89 B+	77-79 C+	67-69 D+	0-59 F	

- Homework
- Clickers
- Quizzes
- Lab
- Final Project

iClickers

We will be using iClickers for this course. The main reason is that education research demonstrates that by *actively engaging* you will learn more (yay!), and hopefully have more fun. You will receive credit for your iClicker use (see distribution above), for both participation (3 pts per question) and for correct answers (1pt per question). Any final clicker score of 75% or higher will earn an “A” (100%), and all scores will be similarly scaled up by 25%.

Here are a few example situations to help understand the clicker grading scheme:

- ◆ If you answer every clicker question, but never get one right, your raw score will be 75%, then will be scaled up to 100%.
- ◆ If we have 20 classes with clicker questions and 4 questions per day (this will vary!), and you miss 3 classes and get only ½ of the questions correct for the ones you answer, your raw score will be 74%, then will be scaled up to 99%.
- ◆ If we have 20 classes with clicker questions and 4 questions per day (as above), and you miss 5 classes, but get every question correct, your raw score will be 75%, then will be scaled up to 100%.

This means that if you need to miss a few classes, forget your clicker, or get some answers wrong– don't sweat it – just consider it one of your many freebies.

The first three classes (Jan. 21, 23, and 28) will not count for credit with the iClicker, to give us ample time to get everything set up and tested. You are responsible for making sure you are ready to go with your clicker from our fourth class (Jan. 30th) forward. You can check that everything has worked by tracking your daily clicker grades on HuskyCT, these will generally be posted by the morning of the day after class.

You will need to **register your iClicker/phone** for our class: For an iClicker: On our HuskyCT page, go to “iClicker Registration” on the left panel, enter your clickers personalized number (on the back of the clicker), and submit. You can check that this has worked by tracking your daily clicker grades on HuskyCT.

For a mobile phone: (more complicated, still in Beta testing phase) Make an account on www.iclicker.com, pay for and download the “iClicker Reef (REEF POLLING)” app. In the app profile, enter your netID. You can check that this has worked by tracking your daily clicker grades on HuskyCT.

If you have questions about the use of iClickers or how to register it for this class, please check out this webpage: <https://cetl.uconn.edu/educational-technologies/clickers/> or contact CETL Education Technology at: (860) 486-5052 or edtech@uconn.edu

Policy on Lab Attendance

The general policy of the Department of Physics is that satisfactory completion of the lab is required as part of your course grade. **Missing more than two lab sessions will result in an automatic grade of F for the entire course.** A single unfinished laboratory will be graded as a zero. Late lab assignments must be emailed directly to the TA after the posted deadline and will only be graded for partial credit at the discretion of the instructors.

Students can **make up one and only one lab** the week of April 21-23 during the regular lab time. If students inform the instructors at least *one week in advance*, accommodations can be made for planned absences due to religious observances or extracurricular activities with written notice. Excused absences will nominally be made up by attending a different lab session in that *same week*, **so please plan ahead**. As the solar lab is weather dependent, we cannot guarantee our ability to accommodate this lab make-up.

Any questions pertaining laboratory policies or procedures should be directed to your lab instructor (Nikko Cleri or Robert McCutcheon) or the physics teaching lab staff: James Jaconetta (james.jaconetta@uconn.edu) – Lab Technician, Diego Valente (diego.valente@uconn.edu) – Director of Physics Teaching Labs

Night Observing, Astronomy Seminar, and Colloquia Write-up Extra Credit

There will be occasional opportunities for night observing with the UConn Astronomy Association (they are the best!) and also a handful or special astronomy seminar and colloquia throughout the semester.

- **Night Observing** will be held at the discretion of the UConn Astronomy Association. **Night observing opportunities will be announced in class.** On HuskyCT announcements, we will post a link to a googledoc sign-up sheet with all the details (time and location) of the night observing and this is also where any announcement of cancellation (e.g. due to poor weather) will be made, usually a few hours ahead of time. There will be extra credit night observing sheets handed out at the session that you can turn in for extra credit (within one week of the night observing session).
- **Astronomy Seminars and Colloquia for extra credit will be announced in class** and are on some Wednesdays from 2-3pm and some Fridays at 3:30pm, respectively. **Astronomy seminars and colloquia will be announced in class.** If you attend an astronomy seminar or colloquia, write a short summary of the talk (2 paragraphs), and submit it to the instructors within one week of the talk, you can receive extra credit.

If you attend and do the extra credit write up for these special events (night observing, an astronomy seminar or colloquia), you can receive 0.5% extra credit toward your final grade for each event, for a MAXIMUM of 1.5% extra credit (3 events total, any combination) toward your final grade.

Other Extra Credit

The activity during the final class on Thursday, April 30th will provide students with the chance to earn points back to improve their in-class quiz scores. Additionally, the winners of the panel review for each lab section will earn back 10% towards their final project abstract grade.

Lecture and Lab Schedule

Subject to change – daily reading assignments will be given in class.

Dates	Lecture Topics	Reading Chapters	Lab Activity
Jan 21 – 23	Introduction, Scale of the Universe	Syllabus, Ch. 1	<i>no lab</i>
Jan 28 – 30	The Sky Above, Seasons	2, 4	Impacts
Feb 4– 6	Phases of the Moon, Planetary Motion	3	Light and Seasons
Feb 11 – 13	Gravity, the Nature of Light	5	The Sun
Feb 18 – 20	EM Radiation, Spectra	5, 6	Spectroscopy
Feb 25 – 27	Telescopes	6	Telescopes
March 3 – 5	Solar System, Stars	7, 16	Scaling the Solar System
March 10 – 12	Stars (cont'd)	17,18	Judging Science
March 16 – 20	Spring Break		
March 24 – 26	Stars, Gas and Dust, Star Formation	19, 20	Cosmic Photoshoot
Mar. 31 - April 2	Search for Planets, Life in the Universe	21,30	Exoplanets
April 7 – 9	Stellar Evolution	22	make up the Sun lab
April 14 – 16	Stellar Death, Black Holes, relativity	23, 24	Weighing Black Holes
April 21 – 23	Milky Way, Galaxies, Galaxy Evolution	25, 28	<i>no lab / make-up labs</i>
April 28 – 30	Dark Matter, Big Bang Model	28, 29	Final Project Panel Review

General Rules of Conduct

Silence all cell phones when entering class. People sometimes forget that their instructors are people, not TV screens. If you're texting, yes we can see it, and yes, it is rude. You may be asked to leave class for repeated distractions caused by electronic devices. You are welcome to use a laptop to take notes during lecture. However, **all laptop users will be asked to sit in the front three rows.**

In all your efforts, we expect that you will work to foster a respectful, welcoming, and inclusive environment. We expect every member of our class to embrace the diversity (including age, background, gender identity and expression, ethnicity, national origin, religious affiliation, sexual orientation, and other visible and non-visible categories) of this classroom as we pursue our shared study of astrophysics. We will be working closely throughout the semester and we expect all students to contribute to a respectful, welcoming, and inclusive environment.

Academic Integrity

Group work is accepted and encouraged for most lab assignments and the final project. Clearly label the names of everyone who contributed to collaborative assignments. **Don't cheat. Not even once, not even a little bit.** Copying someone else's work, letting someone copy yours, seeking or using homework solutions (found online, from a friend, *anywhere*) is cheating. If you are found to be cheating in any way, Prof. Battersby and Mr. Hatchfield will report the incident to Academic Misconduct and recommend failure of the course.

Take responsibility for your learning process and be a part of the community of scholars at UConn. Similarly, plagiarism in any form, meaning the failure to adequately document the source(s) of one's work, is wrong. Both copying and plagiarism violate the UConn Student Code. See Appendix A: Academic Integrity in Undergraduate Education and Research: <http://community.uconn.edu/the-student-code-appendix-a/> Instances of copying or plagiarism will be handled under the guidelines specified in the Student Code (<http://community.uconn.edu/the-student-code-preamble/>). You are responsible for acting in accordance with this code. "I didn't know" is not an excuse.

UConn policies

Policy Against Discrimination, Harassment and Related Interpersonal Violence

The University is committed to maintaining an environment free of discrimination or discriminatory harassment directed toward any person or group within its community – students, employees, or visitors. Academic and professional excellence can flourish only when each member of our community is assured an atmosphere of mutual respect. All members of the University community are responsible for the maintenance of an academic and work environment in which people are free to learn and work without fear of discrimination or discriminatory harassment. In addition, inappropriate amorous relationships can undermine the University's mission when those in positions of authority abuse or appear to abuse their authority. To that end, and in accordance with federal and state law, the University prohibits discrimination and discriminatory harassment, as well as inappropriate amorous relationships, and such behavior will be met with appropriate disciplinary action, up to and including dismissal from the University. Additionally, to protect the campus community, *all non-confidential University employees (including faculty) are required to report sexual assaults,*

intimate partner violence, and/or stalking involving a student that they witness or are told about to the Office of Institutional Equity. The University takes all reports with the utmost seriousness. Please be aware that while the information you provide will remain private, it will not be confidential and will be shared with University officials who can help. More information is available at equity.uconn.edu and titleix.uconn.edu.

Students with Disabilities

The University of Connecticut is committed to protecting the rights of individuals with disabilities and assuring that the learning environment is accessible. If you anticipate or experience physical or academic barriers based on disability or pregnancy, please let me know *immediately* so that we can discuss options. Students who require accommodations should contact the Center for Students with Disabilities, Wilbur Cross Building Room 204, (860) 486-2020 or <http://csd.uconn.edu/>

Inclement weather and emergency preparedness

In case of inclement weather, a natural disaster, or a campus emergency, the University communicates through email and text message. Students are encouraged to sign up for alerts through <http://alert.uconn.edu>. Students should be aware of emergency procedures, and further information is available through the Office of Emergency Management at <http://publicsafety.uconn.edu/emergency/>