The Physics of Life (Phys 171)
Spring 2019

Prof. Tristan Ursell
Office: 375 Willamette Hall
Email: tsu@uoregon.edu

Syllabus

Instructors and Logistical Information

Class Time
Mon/Weds 2:00 – 3:50 pm, Willamette 110

Instructor
Professor Tristan Ursell
Office: 375 Willamette Hall
Email: tsu@uoregon.edu

Assistant
This course has a graduate student teaching fellow (GTFs).
- Brian Veit  bveit@uoregon.edu

Email
We will try to respond to emails in a timely manner. Emails written in a disrespectful tone (e.g. starting with “Yo Prof Ursell”), with slang (e.g. “ur” instead of “your” or “you're”), or without full sentences will receive no response.

Office Hours
Pro. Ursell: Friday 2 – 3 pm, Willamette 375
Brian Veit: Tues. 4 – 5 pm, Binney Lounge (2nd Flr Willamette)

Please note that office hour times may change, both by request (if particular times are not good for many students) and due to scheduling conflicts that arise.

Make use of office hours! Even if you don’t have specific questions, feel free to drop by and chat about course topics.

Course Description and Materials

Course Description
What are you made of? This simple question both puzzles and fascinates scientists. It is easy to make a list of your “components” – cells, bones, muscles, etc. – but this is neither interesting nor illuminating. At the forefront of scientific thinking, we want to understand what is a living system, how does Evolution shape living systems, how do the molecules that make-up us (and everything else that is living) produce self-replicating and evolving systems, how does these systems of organisms work together, and where else in the Cosmos might we find such systems that we define as living?

This course will explore topics in biophysics. We will use readings, discussions, and hands-on exercises to study the physical aspects of biological materials and the constraints that physics places on living organisms. There are no scientific prerequisites, and mathematics will be at the level of basic algebra.
**LEARNING OUTCOMES**

This course is designed such that students who pass this course will be able to offer cogent answers to the following questions that are consistent with current scientific thinking and knowledge:

- What is Life?
- What is Evolution?
- Which are the basic molecules and processes that produce terrestrial Life?
- How do different life-forms produce simple ecosystems?
- How might we look for Life elsewhere in the Cosmos?

**MATERIALS**

- You may find it useful to have a ruler and pencils.
- In general, lectures will not be posted online, you will need to attend class to take notes.

**READINGS**

There is no textbook for the course. Articles and other documents will be distributed online, via the course website on canvas.uoregon.edu. Readings will largely be at the “Scientific American” level – i.e. having minimal mathematics. We will accompany readings from more technical sources with explanatory comments.

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**ASSIGNMENTS AND ASSESSMENTS**

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<tr>
<th>Reading Quizzes</th>
<th>Reading assignments will <strong>precede</strong> most classes and may be accompanied by in-class ‘reading quizzes’.</th>
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<tbody>
<tr>
<td>Article Commentaries</td>
<td>Throughout the term, I will assign various “popular” science articles and ask you to analyze and comment on them. This can (and should) be done in small groups. These assignments will be described further as the term progresses.</td>
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<tr>
<td>Homework</td>
<td>Homework assignments will cover topics discussed in class, and are intended to guide you in thinking further about the concepts we are exploring. Homeworks will typically be handed in on paper in class weekly on Wednesdays. You are encouraged to discuss homework assignments and readings with others, though your “final answers” should be your own – direct copying is not allowed, and evidence of such will result in a 0% score on the offending homework. Office hours are an excellent place to discuss homework!</td>
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<tr>
<td>Quizzes &amp; Exams</td>
<td>The course will be split up into five sections, and there will be an online quiz after each section. These quizzes will be reasonably challenging and are to be completed by yourself. There will be no final exam in this course.</td>
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<tr>
<td>Math Diagnostic</td>
<td>The mathematics in this course will be elementary, but it is important to be comfortable with basic numerical skills. Therefore there will be a diagnostic quiz to be taken on-line on basic mathematics (link on the class website). Retaking the quiz <strong>is</strong> allowed – you are encouraged to learn from your mistakes, and to see the GTFs and me for help. Scoring 75% or higher by the Thursday of Week 2 is <strong>required</strong> for continuing in the course. (A score of &lt;75% will automatically result in a failing grade for the course.)</td>
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### Grading
The various grade components and their weight toward the final grade are:
- Homework assignments and article commentaries (~8): 75% (in total)
- Section quizzes (~5): 25%

Prof. Ursell reserves the right to modify this grading scheme as necessary.

### Other Information

<table>
<thead>
<tr>
<th>Absences</th>
<th>You are responsible for your success in this course, which means attending class, taking notes, and digesting the material. Prof. Ursell and the GTF(s) are here to help you, in class and in office hours.</th>
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<tbody>
<tr>
<td>Laptop and Cellphone Policy</td>
<td>At no point are cell phones to be used in class, <strong>put them on airplane mode before coming into class</strong>. Students found using cell phones will be asked to leave class for the day, no exceptions. The use of laptop computers in class is not allowed. Why? Several studies, plus past experience, show that students using laptops in class spend a great deal of time on non-class-related activities (surfing the web, playing games, Facebook, etc) and that these distractions negatively impact both learning and grades. This alone isn’t a reason to ban laptops — you’re responsible for your own performance in class. In addition, however, studies have shown that non-class-related laptop use distracts and impacts the learning of other students nearby. (e.g. see Fried, C. B. <em>Computers &amp; Education</em> 50, 906-914 (2008).) Plus, students in this class have complained about the environment created by their classmates’ laptop usage. Incidentally, taking notes by hand is more effective at cementing concepts in your mind, than blithely following along on a screen. In summary, laptops are not allowed in class. The only exceptions will be for people with documented medical needs; please see me if this is the case.</td>
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<td>Necessary Caveats</td>
<td>Students are expected to abide by university policies on academic honesty, avoiding plagiarism, fabrication, cheating, and academic misconduct. The Student Conduct Code (<a href="http://conduct.uoregon.edu/">http://conduct.uoregon.edu/</a>) provides definitions of these terms and explanations of the university policy on the subject. The UO Library also provides a guide to avoiding plagiarism (<a href="http://libweb.uoregon.edu/guides/plagiarism/students/">http://libweb.uoregon.edu/guides/plagiarism/students/</a>). You are responsible for understanding these regulations and abiding by them. Students should be particularly careful to avoid plagiarism in out-of-class assignments, as well as projects and exams. Academic dishonesty will be dealt with severely, as it is disrespectful to your fellow students and your instructor, as well as being against both university regulations and state laws. If you are questioning the integrity of what you’re doing, it probably falls under the umbrella of academic dishonesty. If you have questions or concerns, come see me.</td>
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<td><strong>STUDENTS WITH DISABILITIES</strong></td>
<td>If there are aspects of the instruction or course design that result in barriers to your inclusion, please notify Prof. Ursell as soon as possible. You are also welcome to contact Disability Services in 164 Oregon Hall, 541-346-1155.</td>
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| **POLICY ON MISSED DEADLINES, SIGNIFICANT ABSENCES, INCOMPLETES, AND SNOW DAYS** | Only the following unforeseen and uncontrollable emergency situations are acceptable excuses for missed deadlines:  
- Documented serious illness/injury;  
- Documented death in the immediate family.  
All of the following are unacceptable – note that they include “personal” as well as “technological” excuses:  
- Special occasions (e.g. weddings, birthdays, anniversaries etc.)  
- Work and school conflicts: “I had to work extra hours,” “I have a huge midterm tomorrow in another class…”  
- Couldn’t get to campus (alarm didn’t ring; missed the bus; etc.)  
- Being generally “busy” or having “a lot going on right now…”  
- Forgot or “mixed up” the assignment or due date  
- No access to computer or printer; assignment completed on computer is “missing,” was accidentally erased, or is inaccessible  
If a class is canceled due to external factors (e.g. inclement weather), we will have a makeup class at a suitable date and time. |
| **SUCCEEDING IN THIS COURSE** | **Plan ahead and start early!** The reading assignments are a vital part of this course, and it is important to start reading them early not only to understand the subject matter but also to be able to articulate what you don’t understand – in class lectures and discussions will build on your reading experiences. Note that the reading assignments must be done before the days at which their topics are discussed in lecture. In general, it will be crucial to keep up with the course and not fall behind; later topics will build on earlier ones.  

**Make use of resources.** If you have questions about lectures, assignments, readings, or other matters, please visit Prof. Ursell during office hours, or communicate by email. Individual appointments can be arranged to accommodate schedule conflicts with the regular office hours.  
The University’s Tutoring and Academic Engagement Center provides a variety of workshops, individual consultations, writing assistance labs, tutoring, and more to assist UO students; see [http://engage.uoregon.edu/](http://engage.uoregon.edu/)|