## Class Schedule - Fall 2018

### Physics

**PHYS 498  **Special Topics in Physics  **credit: 1 TO 4 hours.**

Subject offerings of new and developing areas of knowledge in physics intended to augment the existing curriculum. See Class Schedule or departmental course information for topics and prerequisites. 1 to 4 undergraduate hours. 1 to 4 graduate hours. May be repeated in the same or separate terms if topics vary.

<table>
<thead>
<tr>
<th>CRN</th>
<th>Type</th>
<th>Section</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>68389</td>
<td>Lecture</td>
<td>CMP</td>
<td>10:00 AM - 11:20 AM</td>
<td>MW</td>
<td>158 - Loomis Laboratory</td>
<td>Clark, B</td>
</tr>
</tbody>
</table>

Credit Hours: 3 hours
Computation in Physics
Restricted to students with Junior or Senior class standing.
This is an immersive advanced computational physics course. The course is centered on six computational projects which students will program from scratch and simulate. The course will develop both computing skills as well as physics subject-knowledge in the project areas. Working on these projects will span much of class-time and all of the homework; occasional lecturing will be used to supplement the knowledge necessary to accomplish the projects. The projects include: building a quantum computing simulator, simulating the Ising model through Monte Carlo and RG approaches, machine learning and the brain, evolution, chemistry from physics, and condensed matter (topological insulators and superconductivity).

| 70540 | Lecture     | QB     | 10:00 AM - 11:20 AM | TR   | 276 - Loomis Laboratory   | Kuehn, S   |

Credit Hours: 4 hours
Restricted to students with Junior or Senior class standing.
QUANTATITIVE BIOLOGY: Course description: This course covers the emerging biological physics of living matter. Using recent literature, problem sets and numerical simulations students will explore biological systems at multiple levels of organization from gene regulation to single cells and multi-species ecosystems. With a focus on microbial systems, we will study how information is processed at the level of genes and signaling pathways through examples from gene regulation and bacterial chemotaxis. At the population level we will study examples of eco-evolutionary dynamics in microbial systems with an emphasis on quantitatively understanding these emergent biological phenomena. The course includes mathematical techniques from differential equations, linear algebra and basic statistics as well as computational aspects.