

<b>Module Code</b>	SB-4317		
<b>Module Title</b>	Climate Change Biology		
<b>Degree/Diploma</b>	Bachelor of Science (Biology)		
<b>Type of Module</b>	Major Option		
<b>Modular Credits</b>	4	<b>Total Student Workload</b>	8 hours/week
		<b>Contact Hours</b>	6 hours/week
<b>Prerequisites</b>	SB-2203 Animal Form and Function; SB-2208 Principles in Animal Physiology		
<b>Anti-requisite</b>	None		
<b>Aims</b>			
<p>The aim of this module is to study how natural ecological systems are likely to be impacted by climate change. The module will study climate change from the perspective of habitat, the behavioural and physiological responses of organisms to change in habitat conditions, and community level responses. The module will focus on environmental temperature (warming) but also consider acidification of marine ecosystems.</p>			
<b>Learning Outcomes</b>			
<i>On successful completion of this module, a student will be expected to be able to:</i>			
Lower order :	10%	<ul style="list-style-type: none"> <li>- Understand historical climates and mechanisms for global climate variation, global patterns of species distribution, habitat thermal variation, the factors affecting body temperature, and heat budget models</li> <li>- Understand organismal thermal limits, heat tolerance and the thermal energetics of ectotherms exposed to habitat warming</li> </ul>	
Middle order :	10%	<ul style="list-style-type: none"> <li>- Review morphological, behavioural and physiological thermoregulation of ectotherms, optimality of thermal performance, thermal generalists-specialists</li> <li>- Review climate vulnerability in terms of exposure, sensitivity and adaptation, including the application of warming tolerance metrics</li> <li>- Assess the consequences of elevated CO<sub>2</sub> on ocean water chemistry and life, and on agricultural production and forest ecosystems</li> </ul>	
Higher order:	80%	<ul style="list-style-type: none"> <li>- Perform field and laboratory works and interpret spatial and temporal variation in the temperature of an ectotherm's habitat</li> <li>- Conduct experiments to determine the physiological thermal performance and the lethal temperature of an ectotherm</li> <li>- Collect, organize and analyse data and make critical discussion; measure effects of ocean acidification on model organisms</li> <li>- Perform oral presentations on practical works, write reports</li> </ul>	
<b>Module Contents</b>			
<ul style="list-style-type: none"> <li>- Historical and global climatic variation</li> <li>- Habitat temperature, operative temperature, organismal temperature, heat budget models</li> <li>- Behavioural and physiological attributes for buffering thermal change</li> <li>- Factors influencing climate warming vulnerability</li> <li>- Thermal performance curves, thermal limits and energetics</li> <li>- Ocean acidification</li> <li>- Carbon capture, agricultural production and forest ecosystems</li> <li>- Experiments to determine the thermal limits of small ectothermic animals</li> <li>- Experiments on effects of coastal acidification exposure</li> </ul>			
<b>Assessment</b>	<b>Formative assessment</b>	Presentation by students and discussion among the students will be used to test the students' understanding.	
	<b>Summative assessment</b>	Examination: 0%	
		Coursework: 100% <ul style="list-style-type: none"> <li>- 3 individuals written reports (45%)</li> <li>- 2 class tests (40%)</li> <li>- 1 individual oral presentation (15%)</li> </ul>	