

Bio-inspired Robotics			
Credits: 4		Semester 3 (ECN) Compulsory: No	
Format	Lectures 20h	Examples 12h	Private study 68 h
Lecturers: F. Boyer			
<p>Objectives: This module aims at introducing some of the recent advances in bio-inspired robotics. This concerns locomotion and perception and their interactions. Starting from animals, the physical principles involved in their working principles are discussed and modeled through mathematic tools, some of them being news. Finally, the implementation of these principles on mechatronics artifacts is illustrated on a few examples as snake-like robots, fish-like robots, flying drones, fly-inspired artificial eyes or electric sense inspired from fish.</p>			
<p>Contents:</p> <p>The following subjects will be discussed:</p> <ul style="list-style-type: none"> - Principles of animal locomotion with illustrations from swimming, creeping, flying... - Introduction to the mathematics of locomotion dynamics - Illustration on several bio-inspired robots (snake, fish, moth...). - Principles of animal perceptions with illustrations from insect vision, fish lateral line, bats sonar... - Illustration to a few examples (electric sense, vision...). - Sensori-motricity integration and control 			
<p>Examples:</p> <ul style="list-style-type: none"> - Fish-like robots, snake-like robots, electric fish-like robots, artificial vision inspired from flies. 			
<p>Abilities: After completing this course, the students:</p> <ul style="list-style-type: none"> - Will be initiated to the solutions discovered by nature for autonomy - Will be able to go deeper into a specific bio-inspired locomotion or perception modality 			
<p>Assessment: 30% continuous assessment, 70% from end of semester examination.</p>			
<p>Recommended texts:</p> <ul style="list-style-type: none"> - Principles of Animal locomotion, R.M. Alexander, 2006. - Ecology of sensing, F. Barth, A. Schmid, Springer, Berlin, Heidelberg, New York, London (2001). 			
<p>Further readings:</p> <ul style="list-style-type: none"> - will be provided by lecturers 			