Course descriptor F21BC

Course code	**F21BC**
Course title	Biologically Inspired Computation
Credits	15
School	Mathematics and Computer Sciences
SCQF Level	11
Semester	1
Aims	Traditional computation finds it either difficult or impossible to perform a certain key range of tasks associated with pattern recognition, problem solving and autonomous intelligence. Great progress towards designing software for such tasks has emerged by taking inspiration from a range of natural, mainly biological, systems. The aims of this course are to: • introduce an appreciation of the former • introduce the main biologically-inspired algorithms and techniques which are now commonly researched and applied • Establish a practical understanding of the real-world problems to which these techniques may fruitfully be applied.
Syllabus	• classical vs. biologically-inspired computation, • evolutionary algorithms (basic EA design, and how they are applied to a wide range of problems) • swarm intelligence (ant colony methods, particle swarm optimisation) • neural computation (perceptrons, multilayer perceptrons, associative networks) • cellular automata

Learning Outcomes	
Subject Mastery	• Understanding of limitations of traditional computation. • A critical understanding of a range of biologically inspired computation methods, their limitations and areas of applicability. • Ability to apply one or more biologically inspired techniques in solving a practical problem.
Personal Abilities	• Identify and define approaches that can be used to apply bio-inspired methods to existing problems in optimisation and machine learning. • Exercise substantial autonomy and initiative (coursework) (PDP)

	• Demonstrate critical reflection (coursework) (PDP).

Assessment method	50% written examination, 50% coursework