# COURSE DETAILS

**Course Code:** F21BC  
**Full Course Title:** Biologically Inspired Computation  
**SCQF Level:** 11  
**SCAF Credits:** 15  
**Available as Elective:** No

## DELIVERY LEVEL

<table>
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<th>Undergraduate:</th>
<th>Yes</th>
<th>Postgraduate Taught:</th>
<th>Yes</th>
<th>Postgraduate Research:</th>
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Additional Information:

## COURSE 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 be fruitfully be applied.

## 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.

## LEARNING OUTCOMES – 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 (courseworks) (PDP)
- Demonstrate critical reflection (courseworks) (PDP).

## 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)
F21BC Biologically Inspired Computation

- neural computation (perceptrons, multilayer perceptrons, associative networks)
- cellular automata

Reassessment for Postgraduate students only

**COURSE RELATIONSHIPS**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Level</th>
<th>Title</th>
<th>School</th>
<th>Type</th>
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<tbody>
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<td>F29AI</td>
<td>9</td>
<td>Artificial Intelligence and Intelligent Agents</td>
<td>School of Math and Comp Sci.</td>
<td>Pre-Requisite</td>
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**LOCATION AND ASSESSMENT METHODS**

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<th>Edinburg</th>
<th>SBC</th>
<th>Orkney</th>
<th>Dublin</th>
<th>Malay</th>
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<th>COLL</th>
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