# Lecture #0

## Competency Overview and Assessment

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# Welcome to
# SEC-101: Data and Information Fundamentals

# Competency Information

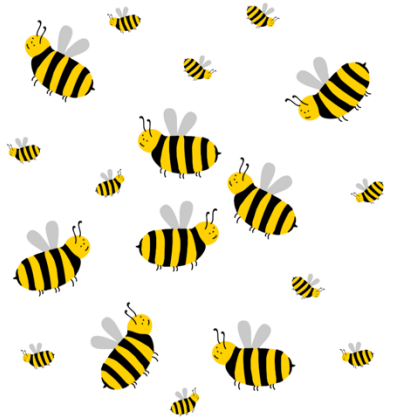
- **Competency Code:** AIC-305
- **Competency Title:** Bio-Inspired AI
- **Competency Credit:** **4** ( = **52 Hours** of work throughout an entire semester)
- **Class Timetable:**
  - **Lecture:** Every Wednesday, from 15:00 – 16:00 @ Room 607, CMKL University
  - **Lab/Practical Session:** Every Wednesday, from 16:00 – 17:00 @ Room 607, CMKL University
  - **Office Hours:** Every Tuesday, from 09:00 – 10:00 @ Office 706, CMKL University
- **Class Material and Channels:**
  - Lecture Material: https://cmkl.instructure.com/courses/740/modules
  - Lab Instruction and Submission: https://cmkl.instructure.com/courses/740/assignments
  - Assessment Submission: https://cmkl.instructure.com/courses/740/assignments
  - Announcement: https://cmkl.instructure.com/courses/740/announcements
  - Discussion and Communication: https://cmkl.instructure.com/courses/740/discussion_topics

# Bio-Inspired Artificial Intelligence

## Evolutionary Computation

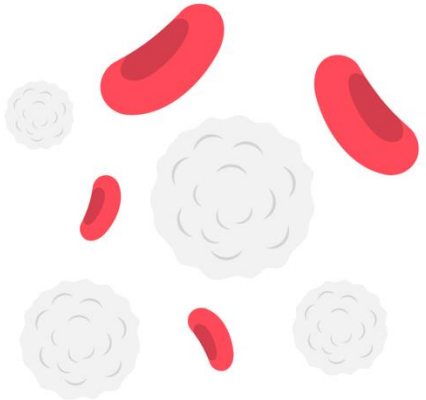
You will learn the basic concept of evolutionary computation, such as genetic algorithms and their variants.

## Swarm Intelligence



You will learn about the core idea how agents are working together intelligently using the concept of swarm intelligence, such as particle swarm intelligence, or ant colony

## Arificial Immune System



You will learn about how AI and computational systems could imitate the human immune system and make it possible to solve complex problems.

# Skills and Assessment

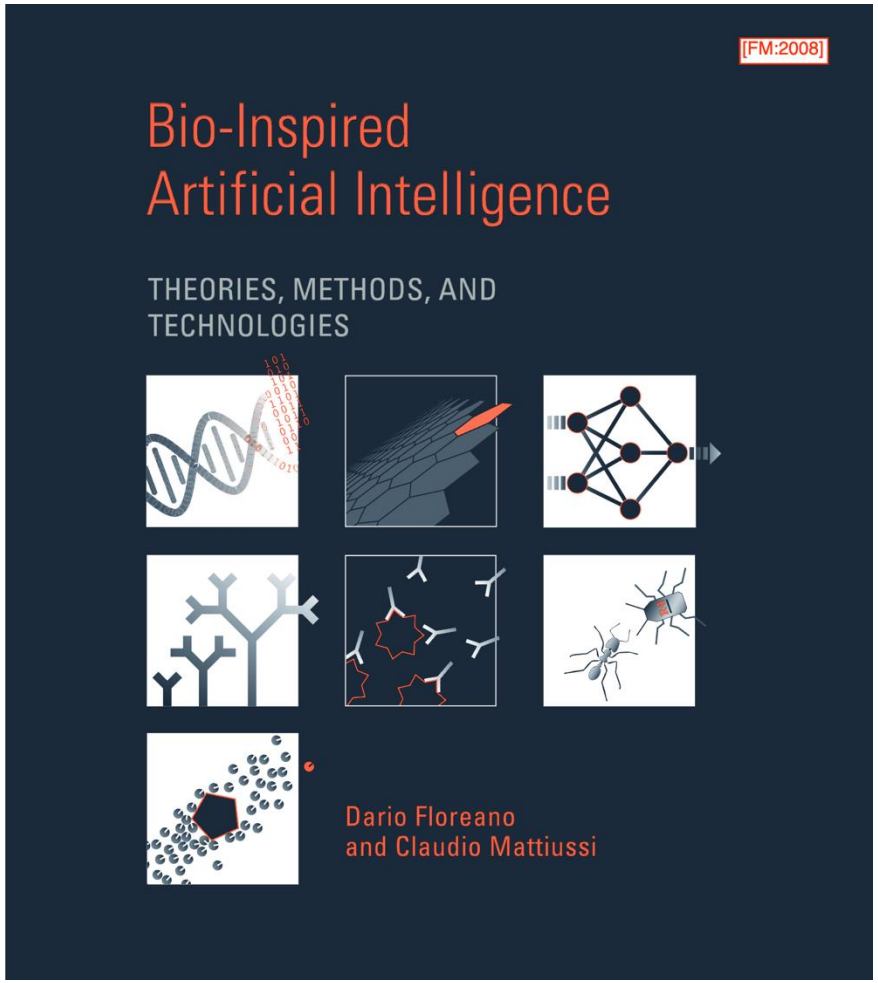
- **AIC-305:00010** – Explain the core ideas that underlie bio-inspired AI.
- **AIC-305:00020** – Create a simple GA system to solve a problem.
- **AIC-305:00030** – Create a simple system that uses a swarm intelligence method to solve a problem.

- **Assessment: Group Assignment:**
  - You will be asked to formulate a complex problem (i.e., searching or optimization problems).
  - You will be asked to find one research paper for each topic (1 for GA, 1 for Swarm Intelligence, 1 for AIS).
  - You must read the paper and use the algorithm proposed in the paper **to implement a simple program** to solve the problem.
  - You will be asked to present your result one week after each lecture. (20 Minutes per group + 10 Minute Q&A)
  - Your score will be from **GA Presentation (40%)**, **Swarm Intelligence Presentation (40%)**, and **AIS presentation (20%)**

# Competency Schedule

| Week | Date | Lecture Topic | Lab Topic |
|---|---|---|---|
| 1 | 18 August 2025 | **Lecture 0:** Competency Overview<br>**Lecture 1:** An Introduction to Bio-Inspired AI | **Lecture 2:** Problem Formulation |
| 2 | 3 September 2025 | **No Class**<br>**Please join the special talk from Prof. Toshiaki Aoki.** | |
| 3 | 10 September 2025 | **Lecture 3:** Evolutionary Computation | |
| 4 | 17 September 2025 | **Group Discussion and Preparation** | **Presentation 1: Genetic Algorithm** |
| 5 | 24 September 2025 | **Lecture 4:** Swarm Intelligence | |
| 6 | 1 October 2025 | **Group Discussion and Preparation** | **Presentation 2: Swarm Intelligence** |
| 7 | 8 October 2025 | **Lecture 5:** Artificial Immune System | |
| 8 | 15 October 2025 | **Group Discussion and Preparation** | **Presentation 3: Artificial Immune System** |

# Textbooks and Readings




- Dario Floreano, and Claudio Mattiussi, "**Bio-Inspired Artificial Intelligence – Theories, Methods, and Technologies**," *MIT Press*, 2008.

- Andries P. Engelbrecht, "**Computational Intelligence: An Introduction**", 2nd Edition, *John Wiley & Sons*, 2007

- Russell C. Eberhart and Yuhui Shi, "**Computational intelligence: concepts to implementations**", Morgan Kaufman, 2007

# Class Discipline

Discussion and Engagement are highly expected

Please do not disturb others with noisy chit chat

Please focus on the study


The more you tried, the more you gain. Please do not copy others' work

Be on time. You must not miss any funny stuff

# Academic Integrity

- "In any manner of *presentation*, it is the responsibility of each student to **produce her/his own original academic work**."
- "In all academic work to be graded, **the citation of all sources is required**. When collaboration or assistance is permitted by the course instructor(s) [...], the *acknowledgement* of *any collaboration or assistance* is likewise required. This citation and acknowledgement must be incorporated into the work submitted and not separately or at a later point in time."
- "**Cheating** occurs when a student avails her/himself of an unfair or disallowed advantage [...]"
- "**Plagiarism** is defined as the use of work or concepts contributed by other individuals without proper attribution or citation. Unique ideas or materials taken from another source for either written or oral use must be fully acknowledged in academic work to be graded."

# End of the Lecture

Please don’t hesitate to raise your hand and ask questions if you're curious about anything!