# AI 917: Evolutionary Algorithms

Since the publication of Darwin's magnum opus, The Origin of Species in 1859, and the ensuing coining of the term the survival of the fittest, the word evolution has pervaded different disciplines and AI is no exception. In fact it has been observed that certain kind of learning cannot take place within one generation and can only be done over many generations by evolving better and better individuals through the genetic processes. When the computer scientists got cognizant of the concept, a whole new field of evolutionary computation arose, and now many problems in CS are only seen in this context. Among our comparative cohort, only NUS Singapore does not offer it.

## *Recommended Books:*
1. Evolutionary Algorithms, Alain Petrowski, Sana Ben-Hamida, John Wiley & Sons, Inc., 2017.
2. Evolutionary Optimization Algorithms, Dan Simon, John Wiley & Sons, Inc., 2013.
3. Evolutionary Algorithms, Swarm Dynamics and Complex Networks: Methodology Perspectives and Implementation, Ivan Zelinka, Guanrong Chen (Editors), Springer, 2018.

**Credit Hours:** 3 (3, 0)

## *Course Objectives:*
- To formulate and represent a problem as an evolutionary computation problem.
- To implement and assess different evolutionary algorithms.
- To formulate single and multiple objectives functions.

| Topics / Contents | Allocated Periods |
|---|---|
| The topics include evolutionary computation, genetic algorithms, evolution strategies, evolutionary programming, genetic programming, constraint handling, evolutionary neural networks, co-evolution, and swarm intelligence. Other topics include genotypes and phenotypes, schema theorem, convergence velocity perspective, multi-objective functions, self-adaptation in genetic algorithms, and their optimization. | **45** |