



**TURKISH REPUBLIC**  
**FIRAT UNIVERSITY**  
**COLLEGE OF TECHNOLOGY**  
**DEPARTMENT OF SOFTWARE**  
**ENGINEERING**

**COURSE SYLLABUS**  
**YMT 566**  
**Swarm Intelligence based Algorithms**

**Fall 2015**

**Location:** TBD

**Class meeting times**  
Friday 09:15 – 12:00

**Instructor**  
Dr. Bilal Alatas

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**Phone:**  
(424)-2370000-4303

**Course description:** Swarm intelligence is the discipline that deals with natural and artificial systems composed of many individuals that coordinate using decentralized control and self-organization. In particular, the discipline focuses on the collective behaviors that result from the local interactions of the individuals with each other and with their environment. Examples of systems studied by swarm intelligence are colonies of ants and termites, schools of fish, flocks of birds, herds of land animals. Some human artifacts also fall into the domain of swarm intelligence, notably some multi-robot systems, and also certain computer programs that are written to tackle optimization and data analysis problems.

**Course objectives:** The main objective of this course is to apply swarm based optimization algorithms on numerical and combinatorial optimization problems. However, the main objective can be subdivided to the followings:

- a) to learn the differences between classical and metaheuristic optimization;
- b) to learn the advantages and disadvantages of classical and metaheuristic optimization;
- c) to learn the current general purposed swarm intelligence based algorithms and their applications.

In particular, this course is concerned with:

- a) particle swam optimization
- b) ant colony optimization



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- c) cat swarm optimization
- d) bee-based optimization algorithms
- e) wolf colony algorithms
- f) fish based optimization algorithms
- g) bacteria based algorithms
- h) plant intelligence based algorithms

**Prerequisite:** No

**Textbook:** Yuhui Shi, Meng Hiot Lim, Bijaya Ketan Panigrahi; Handbook of Swarm Intelligence: Concepts, Principles and Applications; Springer, 2011.

**Course requirements:**

**Assignments:** Students will be required to complete two search and programming assignments. Students will be given 6 weeks to complete each assignment.

**Exams:** Two exams, including the final exam, will be given. Students will be given at least one week's notice of the exam dates. All examinations are written examinations. There are no make-up examinations available for any student. If a student has an excused absence exam, the University Regulation will be applied.

**Grading plan:**

Assignments	20%
First exam	20%
Final exam	60%

$\geq 90$	$\Rightarrow$	A
$\geq 80$ but $< 90$	$\Rightarrow$	B
$\geq 70$ but $< 80$	$\Rightarrow$	C
$\geq 60$ but $< 70$	$\Rightarrow$	D
$< 60$	$\Rightarrow$	F

**Class participation:** In accordance with the university policy, regular attendance is required; however, no points will be awarded or subtracted based on your attendance. You are responsible for all material covered in every class, regardless of whether you attended or not. It is your responsibility to obtain notes, assignments, etc., from fellow class members if you miss the class.



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**Academic dishonesty:** All students are expected to engage in all academic pursuits in a manner that is above reproach. Students are expected to maintain complete honesty and integrity in the academic experiences both in and out of the classroom. Any student found guilty of dishonesty in any phase of academic work will be subject to disciplinary action. The university and its official representatives may initiate disciplinary proceedings against a student accused of any form of academic dishonesty including, but not limited to, cheating on an examination or other academic work which is to be submitted, plagiarism, collusion and the abuse of resource materials. No cheating on an examination or assignments is allowed; a score of zero will be given to the student if such a case occurred.

**Rules of conduct:** Students will refrain from behavior in the classroom that intentionally or unintentionally disrupts the learning process and, thus, impedes the mission of the university. Please turn off or mute your cellular phone and/or pager before class begins. Students are prohibited from eating in class, using tobacco products, making offensive remarks, reading newspapers, sleeping, talking among each other at inappropriate times, wearing inappropriate clothing, or engaging in any other form of distraction. Inappropriate behavior in the classroom shall result in a, minimally, a directive to leave class or being reported to the Dean of Students for disciplinary action in accordance with university policy.