

Tunis 01/04/2021

**Doctoral Course TSP/ VRP**  
**24-28 May, Tunis Business School, University of Tunis**  
**By Professor Mehdi Mrad**

**Overview-** This course includes a detailed description of different variants of the Travelling Salesman Problem (TSP) and the Vehicle Routing Problem (VRP). A collection of constructive heuristics, improvement heuristic, and metaheuristics of the two problems will be addressed. A selection of mathematical formulations will be discussed and advanced. Solution methods as column generation and constraint generation will be applied.

**Content:**

**Day 1**

- Definition and complexity of the basic version of TSP.
- Combinatorial Branch and Bound of the TSP.
- Other versions of the TSP (TSP with time window, TSP with Pickup and delivery,...)

**Day 2**

- Constructive heuristics of the TSP ( insertion heuristics, saving algorithm)
- Improvement heuristics of the TSP
- Genetic Algorithm for the TSP

**Day 3**

- Mathematical formulations of the TSP
- Constraint generation Algorithm ( Sub-tour elimination constraints)

**Day 4**

- Definition and description of different variants of the VRP problem
- Constructive heuristics of the VRP
- Improvement Heuristics of the VRP
- Metaheuristics of the VRP

**Day 5**

- Mathematical formulations of the VRP
- Column generation algorithm to solve the VRP.