

## **Meta-heuristic approaches for the University Course Timetabling Problem**

### **ABSTRACT**

Course timetabling is an ongoing challenge that universities face all around the world. This combinatorial optimization task involves allocating a set of events into finite time slots and rooms while attempting to satisfy a set of predefined constraints. Given the high number of constraints and the large solution space to be explored, the University Course Timetabling Problem (UCTP) is classified as an NP-hard problem. Meta-heuristic approaches have been commonly applied to this problem in the literature and have achieved high performance on benchmark datasets. This survey paper provides a comprehensive and systematic review of these approaches in the UCTP. It reviews, summarizes, and categorizes the approaches, and introduces a classification for hybrid meta-heuristic methods. Furthermore, it critically analyzes the benefits and limitations of the methods. It also presents challenges, gaps, and possible future work.