

## **An effective hybrid local search approach for the post enrolment course timetabling problem**

### **ABSTRACT**

We address the post enrolment course timetabling (PE-CTT) problem in this paper. PE-CTT is known as an NP-hard problem that focuses on finding an efficient allocation of courses onto a finite number of time slots and rooms. It is one of the most challenging resources allocation problems faced by universities around the world. This work proposes a two-phase hybrid local search algorithm to address the PE-CTT problem. The first phase focuses on finding a feasible solution, while the second phase tries to minimize the soft constraint violations of the generated feasible solution. For the first phase, we propose a hybrid of Tabu Search with Sampling and Perturbation with Iterated Local Search. We test the proposed methodology on the hardest cases of PE-CTT benchmarks. The hybrid algorithm performs well and our results are superior compared to the recent methods in finding feasible solutions. For the second phase, we propose an algorithm called Simulated Annealing with Reheating (SAR) with two preliminary runs (SAR-2P). The SAR algorithm is used to minimize the soft constraint violations by exploiting information collected from the preliminary runs. We test the proposed methodology on three publicly available datasets. Our algorithm is competitive with the standards set by the recent methods. In total, the algorithm attains new best results for 3 cases and new best mean results for 7 cases. Furthermore, it is scalable when the execution time is extended.