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## HEURISTIC FACULTY COURSE TIMETABLING WITH STUDENT SECTIONING

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**ABSTRACT.** This paper studies a real faculty course timetabling problem of Faculty of Computer Science and Information Technology (FCSIT), Universiti Malaysia Sarawak (UNIMAS). FCSIT offers 5 four-year programmes. Each programme has own set of courses but some courses are required by more than one programme. List of courses for each semester of all programmes are planned and suggested by faculty as in course plan but students are free to select their own course registration. FCSIT has to come out with course timetable with no clashes before semester starts. Current curriculum-based timetabling method causes clashes and requires few rounds of adjustment. The aim of this study is to come out with better method than the current curriculum-based timetabling practice. A two-stage heuristic with student sectioning consideration method is proposed to solve the problem by student-based approach. A simulator is developed and tested with real datasets from FCSIT. It generates clash-free timetables in shorter time as adjustment is unnecessary. Results shown that simulator solution performs better in utilise venue resources by reduced 13.1% unnecessary allocation. On top of that, the simulator is proved to be efficient in solving problem for different semesters with changed problem size, different offering courses and different resources given.

**Keywords:** automated timetabling, two-stage heuristic, student sectioning

### INTRODUCTION

Timetabling problem is the problem of assign a number of events into a limited number of resources subject to list of constraints with the aim to satisfy a set of objectives to the highest possible extent [1]. As a well-known NP-complete problem, the degree of difficulty increases enormously with an increasing number of students and courses [2]. The constraints in timetabling can be classified into hard and soft constraints. Hard constraints must be satisfied under any circumstances. Soft constraints are those of their satisfaction is desirable but not mandatory. During the second International Timetabling Competition (ITC) in year 2007, the competition proposed to split university course timetabling problem into two formulations, namely *curriculum-based* [3] and *post-enrolment* (also known as *student-based*) [4]. The constraints and objectives in curriculum-based timetabling are based on the concept of curriculum, which is a set of courses particularly for a group of students (usually grouped by intake and programme). On the other hand, the constraints and objectives are based on the course registra-