

**UNIVERSITI TEKNOLOGI MARA**

**EXAMINATION INVIGILATION  
TIMETABLE USING GENETIC  
ALGORITHM**

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## ABSTRACT

This report addresses the challenges faced by Hal Ehwal Akademik (HEA) at UiTM Kuala Terengganu in manually managing examination invigilation timetables. The current manual process is labor-intensive, error-prone, and time-consuming. To overcome these issues, a system utilizing a Genetic Algorithm (GA) was developed to automate and optimize the timetabling process. GA employs key steps, including population initialization, fitness evaluation, selection, crossover, and mutation, to iteratively improve solutions. The fitness function in this system minimizes constraints such as invigilator availability, equitable workload distribution, and adherence to examination rules. The study involves a comprehensive literature review on GA and timetabling methodologies, aiming to automate and optimize the invigilator timetabling process. By implementing GA, the project seeks to ensure equitable distribution of workload among invigilators, reduce administrative burden, and improve overall timetabling effectiveness. The research framework includes phases such as preliminary study, system design and development, and evaluation of GA performance in examination invigilation timetables. Through this project, the results demonstrate the effectiveness of GA in achieving a balanced and efficient timetable. The system reduced timetabling time significantly while ensuring fairness among invigilators and compliance with institutional requirements. Additionally, the optimized timetable led to a more streamlined and error-free timetabling process. For the future enhancements include integrating dynamic data updates for real-time timetabling adjustments, incorporating hybrid optimization techniques to further refine results, and expanding the system's application to other timetabling scenarios, such as lecture timetables and resource allocation.

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