



جامعة الإمارات العربية المتحدة  
United Arab Emirates University

The College of Graduate Studies and the College of Engineering Cordially  
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**Master Thesis Defense**

Entitled

*ARTIFICIAL INTELLIGENCE APPROACH FOR CLASSROOM SCHEDULING*

by

Farah MT Aiash

Faculty Advisor

Dr. Basem Yousef, Department of Mechanical

College of Engineering

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Abstract

Companies, factories, and academic institutes often rely on planning and controlling scheduling of production lines or classrooms to ensure efficient utilization of resources. Task scheduling is a complex nonlinear process, due to numerous constraints, parameters and frequent, sudden changes in the requirements. The aim of this project is to explore the utilization of artificial intelligent neural networks in the preparation of classroom scheduling by utilizing their adaptive attributes and learning ability to establish a procedure for classroom timetable preparation. A set of input vectors comprising five constraints are introduced to a Self-Organizing Feature Map (SOM) neural network for classroom sections classification and separation, using some cluster centers equal to the available rooms. The SOM demonstrated robust capability in clustering the sections into groups comprising courses with conflicts based on the defined constraints, hence identifying classes to be sequentially scheduled in one room. A second stage SOM is used to further split oversized clusters. Moreover, to fit newly created classrooms into the SOM generated timetable, the output from SOM is used to train a Feedforward Back Propagation (FFBP) neural network to extract the implicit course-classroom mapping as formulated by the SOM. The trained FFBP is used to accommodate the new courses without the need to re-cluster with SOM. The trained FFBP managed to prepare a conflict-free schedule successfully. The outputs of the integrated neural networks show that the proposed model can create an initial guess of a valid classroom schedule. It is envisaged that the procedure can be extended and implemented in fields other than academia such as factories, healthcare, and transportations.

**Keywords:** Classroom scheduling, artificial intelligent neural networks, Self-Organizing Feature Map neural network, Feedforward Back Propagation neural network.