

**AN INTEGER PROGRAMMING APPROACH FOR UNIVERSITY  
TIMETABLING: A CASE STUDY IN WAYAMBA UNIVERSITY  
OF SRI LANKA**

**R.A.R. Prabodanie**

*Department of Industrial Management, Faculty of Applied Sciences,  
Wayamba University of Sri Lanka, Kuliyaipitiya, Sri Lanka  
ranga.prabodanie@yahoo.com*

A binary integer programming model is proposed in a case study of university timetabling in the Faculty of Applied Sciences, Wayamba University of Sri Lanka. Binary variables which are used as the building blocks of the model are defined with fewer dimensions to reduce the model size of a large problem. Some binary matrices are used to describe the relationships between the courses and students, and courses and teachers. Staff and student preferences and various types of relevant constraints such as completeness (required hours), uniqueness (absence of overlaps), consecutive sessions, and resource capacities are included in the model. The problem is formulated using MS Excel and solved using OpenSolver which is a free solver available as an Excel add-in. It was experienced that the modelling capabilities of Excel significantly contribute to the efficiency of the timetabling process.

The model was applied to produce faculty timetables for level-II and level-III courses simultaneously. The produced timetables highlighted some inefficiencies in the manually prepared timetables that are currently used. The results clearly showed that a currently used 49-hour timetable can be reduced to a 42-hour timetable without violating any applicable constraints. The IP model and the solver program were extremely capable of finding non-overlapping course combinations which can be scheduled in parallel. Thus the proposed IP model can be used to generate reliable timetables avoiding several difficulties faced by the students and staff owing to inefficient timetables.