A.3.1

Each class is a vertex.
One edge between two classes that shares a common student.
Time slots for the class is shown by colour of the vertex.
If the optimal graph in the graph-colouring problem can be achieved with 4 or less colours, it is possible to timetable all the classes with no conflicts within that day.

A.3.2

C1 - C2 - C3 - C5 - C4 - C6 - C7

A.3.3

{C1: 0, C2: 1, C3: 2, C4: 0, C5: 1, C6: 3, C7: 0}

A.3.4

Chromatic number of G is 4. Vertices C1, C2, C3 and C6 are a complete subgraph with 4 vertices
(i.e. every pair of distinct vertices in {C1, C2, C3, C6} is connected by a unique edge).
Therefore, at least 4 colours are required to colour these 4 vertices.
For the remaining vertices {C4, C5, C7}, none of them connects to all 4 of {C1, C2, C3, C6}.
Therefore a fifth colour is not needed.

Hence, only 4 colours are sufficient to produce a properly coloured graph.