G54LDO – Linear and Discrete Optimization
Coursework – Semester 1, Session 2017-2018

INSTRUCTIONS

This coursework is **worth 25%** of the overall module assessment. The electronic submission via Moodle consists of the following files (please upload 3 separate files, not a compressed file):

1. One Excel file for the spreadsheet model, please name the file *cw-lbd-ID* replacing ID with your own 7-digit student ID.
2. One LP-solve file for the algebraic model, please name the file *cw-lbd-ID* replacing ID with you own 7-digit student ID.
3. One demonstration video for the presentation of your spreadsheet model, please name the file *cw-lbd-ID* replacing ID with you own 7-digit student ID.

The **normal submission deadline is 13 December 2017, 23:55 hrs**. If submitting after this date, a penalty of 5 marks (the standard 5% absolute) out of the 100 marks available will be applied for each late working day.

The **late submission deadline is 22 December 2017 at 23:55 hrs**. Submissions after this date will only be accepted if a justification is provided and supported by a valid extenuating circumstances form (ECF).

Students are reminded of the **Policy on Plagiarism** and must ensure that all material from other sources is clearly quoted and acknowledged. Please refer to: https://workspace.nottingham.ac.uk/display/CompSci/Policy+on+Plagiarism

COURSEWORK DESCRIPTION

Refer to the **Lost Baggage Distribution** optimization problem described in section 12.27 of the following book in the reading list (available online from the library):

Model Building in Mathematical Programming. H.P. Williams, Wiley, 5th edition, 2013.

The optimization model for this problem is given in section 13.27 and the optimal solution is described in section 14.27. Study the description, optimization model and optimal solution for this problem to make sure you understand them well.

Develop an **Excel spreadsheet model** to solve the above optimization problem. The spreadsheet model should execute with no errors. Make sure to include appropriate comments in the spreadsheet model to clarify the approach and relate it to the algebraic model. Good principles of spreadsheet modelling should be followed whenever possible.

Develop an **LP-Solve model** to solve the above optimization problem. The LP-Solve model should execute with no errors. Make sure to include appropriate comments in the LP-Solve model to clarify the algebraic formulation.

Develop a short **demonstration video** of maximum 5 minutes duration that describes the design and use of your Excel spreadsheet model as well as its correspondence to the algebraic LP-Solve model. This demonstration video should focus on explaining how the spreadsheet model was designed (layout, calculations, solver settings, etc.) and how it can be used to understand the solution found. It may also describe any issues, additional insights, reflexions and clarifications about your work. There is no need to describe the given optimization problem but references to it and the LP-Solve algebraic model might be needed. Any appropriate software may be used for producing the video, but please make sure the video file can be played in standard media players and/or Internet browsers. Also, please aim to keep the size of the file as small as possible while still ensuring good viewing quality. The maximum file size allowed for the video is 100MB.

MARKING CRITERIA

The purpose of this coursework is to assess your ability to understand and interpret an optimization problem and to implement the corresponding optimization models. If there is any element of the problem that is not entirely clear to you, please attempt to interpret such element in the best way you can and explain your rationale. The given algebraic model for the problem might not be described in full detail and hence you have to achieve an understanding of the model. If your optimization models do not follow the given algebraic formulation please explain. Although you should endeavour to provide the correct models, this does not mean that all marks will be lost because of your model not finding the correct optimal solution. The Excel spreadsheet and LP-Solve models should both implement the same formulation of the problem.

Marks are awarded for correctness but also for quality of the work as follows:

Correct Spreadsheet Model (30 marks): this refers to the spreadsheet model being fully correct in terms of modelling and solving the optimization problem.

Quality of Spreadsheet Model (20 marks): this refers to layout and presentation of the spreadsheet model for clarity and usability.

Correct and Clear LP-Solve Model (30 marks): this refers to the LP-solve being fully correct and clear in terms of modelling and solving the optimization problem.

Quality of Demonstration Video (20 marks): this refers to the effectiveness and the visual quality of the video in explaining the spreadsheet model.