PROJECT OUTLINE

QUALITY ENGINEERING COURSE, Second Semester, 2015

GOAL

The goal of the project consists of studying and developing a suitable control charting method to monitor the porosity of metal foam samples based on image analysis.
The developed method should be able to characterize the variability of the foam porosity, and to determine if the properties of different parts, inspected along the production lifecycle, are stable over time.
Assume you don't have external or additional information about the process and about the final usage of the metal foam part. Thus, you should rely just of provided image data. Anyway, a critical analysis of the chosen approach should be provided.
The project involves two consecutive steps:

- **STEP 1**: you receive a dataset that consists of 30 samples (high-contrast images) acquired at different heights of a metal foam cylindrical part; the part was produced under in-control conditions. You are asked to develop a suitable control charting method for these data.
  EXPECTED OUTPUT: source code or project files (e.g.: Matlab and/or Minitab), together with a short "readme" file with the instructions on how to run the code and test your proposed method.
- **STEP 2**: you will receive a new dataset, which consists of samples from another metal foam part. You are asked to apply the control charting method developed during STEP 1 to these new data in order to determine if the new observations are in control or not.
  EXPECTED OUTPUT: a report that describes the proposed approach, all the performed analysis, the assumptions and a discussion of achieved results (all the developed files must be delivered too, together with a short "readme" file with the instructions on how to test your proposed method).

You may apply any kind of approach studied during the course, but you can also perform a state of the art analysis and evaluate methods from the literature. There is no limit or constraint to the methodology you choose.

DUE DATES

- Dataset for STEP 1 was provided on 12/05/2015 (available on Beep)
- Communication of group members and reference person (see below) by 19/05/2015
- Preliminary report must be delivered by 11/06/2015
  - Files to be uploaded on Beep (a folder will be created)
- Dataset for SETP 2 will be provided on 12/06/2015
- The projects (final report + files to test the charts) must be closed and delivered by 23/06/2015
  - PDF (report) + other files to be uploaded on Beep (a folder will be created)
  - The printed report can be delivered during the recitation class or to the secretary's office of "Manufacturing and Production Systems" section at Dipartimento di Meccanica, Via La Masa 1, first floor.

GROUPS

You are asked to form small subgroups of size n<4 people. You need to communicate the names of all the group members and the name of a reference person for each group, together with the e-mail address of the reference person via e-mail to marcoluigi.grasso@polimi.it.

SOFTWARE

You are free to use the SW you want. By the way, for image processing you can use ImageJ, whereas for other analysis you may use Minitab and/or Matlab (an introduction about Matlab basics will be made during the next recitation class).