

## LEVEL 5 ASSESSMENT SPECIFICATION

|                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                 |                 |
|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|-----------------|
| <b>Student name:</b>                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Student ID number:</b>                                       |                 |
| <b>Programme:</b>                      | Motorcycle Engineering                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                 |                 |
| <b>Module:</b>                         | Motorcycle Dynamics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                 |                 |
| <b>Module code:</b>                    | M5X00402                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>Contribution to Overall Module Assessment (%):</b>           | 50%             |
| <b>Lecturer:</b>                       | Owen Williams                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>Internal Verifier:</b>                                       | Andrew Harrison |
| <b>Assignment Title:</b>               | Motorcycle Lap-Time Simulation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>Word count (or equivalent):</b>                              | 2500            |
| <b>Submission deadline:</b>            | 16/3/20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Return date of provisional marks &amp; written feedback:</b> | 20/4/20         |
| <b>Submission method:</b>              | <p>All written assessments, where practical and possible, must be submitted via Turnitin unless otherwise instructed by the Lecturer. (Please DO NOT put this assessment specification into Turnitin or it will match many similarities with other students' submissions.)</p> <p><b>Alternative submission method (if applicable):</b></p> <p><b>Late submission of the assessment will result in a late penalty mark.</b> Penalties for late submission: Up to one week late, maximum mark of 40%. Over one week late, 0%. Only the Extenuating Circumstances Panel may approve a change to submission dates.</p> |                                                                 |                 |
| <b>Academic honesty / referencing:</b> | <p>Academic honesty is required. In the main body of your submission you must give credit to authors on whose research and ideas your work is based. Append to your submission a reference list that indicates the books, articles, etc. that you have used, cited or quoted in order to complete this assessment.</p>                                                                                                                                                                                                                                                                                              |                                                                 |                 |

### Module Learning Outcomes (from module syllabus)

1. To understand the processes governing the dynamic behaviour of a motorcycle while in motion.
2. To utilise modern data acquisition systems to acquire dynamic data for a motorcycle and to use this data to develop basic vehicle simulation models.

## TASK DESCRIPTION

The aim of this assignment is to develop a lap-time simulator in MATLAB to predict the lap-time for your chosen motorcycle around a race circuit of your choice. It is your chance to show your expertise in motorcycle kinematics, MATLAB or Excel and the 2D software suite by analysing real data and using it to validate your model.



With the assistance of the 2D data acquisition software, lab measurements, satellite imagery and other technical information, determine the characteristics of both the bike and the circuit that will be used for your model. By dividing the circuit up into discrete sections, and using your understanding of acceleration, braking and cornering from the work we have done in the class, you should develop a model to predict the velocity and hence the time through each section and the associated dynamics during these sections (such as suspension travel). You should then combine your sectional analysis to give you an overall lap-time and average speed for the lap. Refine your model as appropriate to validate your model with the real data.

Warning:- This takes time!! Leave it until the last week and you WILL fail!