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|  |  |  | UNIVERSITY OF CAPE TOWN  Department of Electrical Engineering  EEE4022F/S - Final Year Project  Graduate Attribute Tracking Form |
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| Student name: | Md Shaihan Islam |  | DP Awarded? [Y/N] |  |
| Student no: | ISLMDS002 |  | Supervisor name: |  |
| Date: | 29/09/2024 |  | Date: |  |
| Student signature: | A close-up of a signature  Description automatically generated |  | Supervisor signature: |  |

**VERY IMPORTANT: Receiving DP for the course does NOT imply that all GA’s have been met in the course. Assessment of GA’s only happen in the final marking of the project report.**

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| **GA 1: Problem Solving** |
| Student Response:  This project aims to solve two problems:   * The technical complexities of individuals researching V2X (Vehicle-to-Everything) * The increasing number of road safety-related accidents and fatalities   This project will therefore involve using current V2X technologies to design and test a V2X simulation tool that will allow researchers in this field to test their designs, algorithms and network configurations in a simple manner. The simulation tool will also enable them to record result data from their simulations and will also be able to graph the data, allowing the researchers to recognise and/or predict patterns within their test results. |
| Supervisor Response: |

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| **GA 4: Investigations, Experiments, and Data Analysis** |
| Student Response:  A great deal of investigation is required to gain knowledge about the details of V2X technologies, as well as to analyse current uses of V2X via related research in this particular field. The literature will be assessed in great detail as to gain knowledge, form new ideas and even criticise current solutions in the literature.  The simulation tool will be tested in various different ways in order to record the performance, validity and feasibility of the tool. Before each testing round has started, a number of user acceptance tests will be written to use as a benchmark for testing. |
| Supervisor Response: |

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| **GA 5: Use of Engineering Tools** |
| Student Response:  This project relies on the use of a number of engineering tools designed specifically for the use of V2X applications. These tools include   * OMNeT++, an open-source network simulation program * SUMO (Simulation of Urban Mobility), an open-source traffic simulator * Veins (Vehicle in Network Simulation), an intermediary program to make communication possible between the network and traffic simulators * INET, which provides wireless communications models, mobility models as well as V2X specific internet protocols |
| Supervisor Response: |

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| **GA 6: Professional and Technical Communication** |
| Student Response:  Weekly in-person meetings are scheduled with my supervisor to not only assess my progress at that particular point in time, but to also receive any form of feedback from my supervisor, as well as to discuss further improvements in the project. My supervisor also has access to both my LaTeX report, as well as my GitHub repository in which my code and other simulation files are contained. Furthermore, my report, detailing everything about the project will also be written in a professional manner. |
| Supervisor Response: |

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| **GA 8: Individual Working** |
| Student Response:  The entire project has been initiated and worked on by myself, I have not received assistance from other persons. The gathering of information, learning of new skills and technologies, design considerations, testing and analysis of results will all be performed by myself. |
| Supervisor Response: |

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| **GA 9: Independent Learning Ability** |
| Student Response:  I have always been open to constructive feedback, advice and ideas from my supervisor. I had also become aware of my own limitations, especially because the initial project topic had a very large scope and range of approaches to choose from when undertaking this research (such as autonomous driving simulations, racing simulations, etc. I also constantly re-evaluate my decisions and design choices, not only by myself but also with my supervisor in order to validate what has been covered, and whether it meets the requirements in the context of the project. |
| Supervisor Response: |

**Instructions:**

Students must explain in this document what they **have already done** and what they **plan to do** to satisfy each Graduate Attribute. Descriptions of each GA is provided below. Supervisors respond to the student's plans and current progress, providing additional comments or advice as they see fit. Once the student's progress is deemed sufficient (a few weeks before submission at the due date for this form), supervisors indicate that DP can be awarded.

**GA 1: Problem Solving**

Identify, formulate, research literature and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences with holistic considerations for sustainable development.

* A systematic, theory-based understanding of the natural sciences applicable to the discipline and awareness of relevant social sciences.
* Conceptually based mathematics, numerical analysis, data analysis, statistics and formal aspects of computer and information science to support detailed analysis and modelling applicable to the discipline.
* A systematic, theory-based formulation of engineering fundamentals required in the engineering discipline.
* Engineering specialist knowledge that provides theoretical frameworks and bodies of knowledge for the accepted practice areas in the engineering discipline, much of which is at the forefront of the discipline.

**GA 4: Investigations, Experiments and Data Analysis**

Demonstrate competence to conduct investigations of complex engineering problems using research methods, including research-based knowledge, design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.

Engagement with selected knowledge in the current research literature of the discipline, awareness of the power of critical thinking and creative approaches to evaluate emerging issues.

The balance of investigation and experiment should be appropriate to the discipline. Research methodology to be applied in research or investigation where the student engages with selected knowledge in the research literature of the discipline.

Note: An investigation differs from a design in that the objective is to produce knowledge and understanding of a phenomenon and a recommended course of action rather than specifying how an artefact could be produced.

**GA 5: Use of engineering tools**

Demonstrate competence to create, select and apply and recognise limitations of appropriate techniques, resources and modern engineering and IT tools, including prediction and modelling, to complex engineering problems.

* Conceptually based mathematics, numerical analysis, data analysis, statistics and formal aspects of computer and information science to support detailed analysis and modelling applicable to the discipline.
* Knowledge of engineering practice (technology) in the practice areas in the engineering discipline

A range of techniques, resources and modern engineering and IT tools appropriate to the disciplinary designation of the programme.

**GA 6: Professional and Technical Communication**

Demonstrate competence to communicate effectively, both orally and in writing, with engineering audiences and the community at large, taking into account cultural, language, and learning differences.

This course evaluates the long report component of this outcome at exit level. Material to be communicated is in an academic or simulated professional context. Audiences range from engineering peers, management and lay persons, using appropriate academic or professional discourse. Written reports (10 000 to 15 000 words plus tables, diagrams and appendices) should cover material at exit-level. Methods of providing information include the conventional methods of the discipline, for example engineering drawings, as well as subject-specific methods.

**GA 8: Individual, Team and Multidisciplinary Working**

Demonstrate competence to work effectively as an individual, in teams and in multidisciplinary environments. This course evaluates the **individual** working component of this learning outcome at exit level.

Knowledge of professional ethics, responsibilities and norms of engineering practice.

**GA 9: Independent Learning Ability**

Demonstrate competence to engage in independent learning through well developed learning skills.

Engagement with selected knowledge in the current research literature of the discipline, awareness of the power of critical thinking and creative approaches to evaluate emerging issues.

Operate independently in complex, ill-defined contexts requiring personal responsibility and initiative, accurately self-evaluate and take responsibility for learning requirements; be aware of social and ethical implications of applying knowledge in particular contexts.

* Openness to constructive feedback, awareness of own limitations, ability to cope with the discomfort of uncertainty and having access to a range of approaches, reflective selfevaluation, curiosity and proactive engagement, resilience, confidence to ask for help and draw from a broad range of stakeholders.
* Reflection of self-learning to begin to recognise if what has been covered meets the needs of the activity or task.