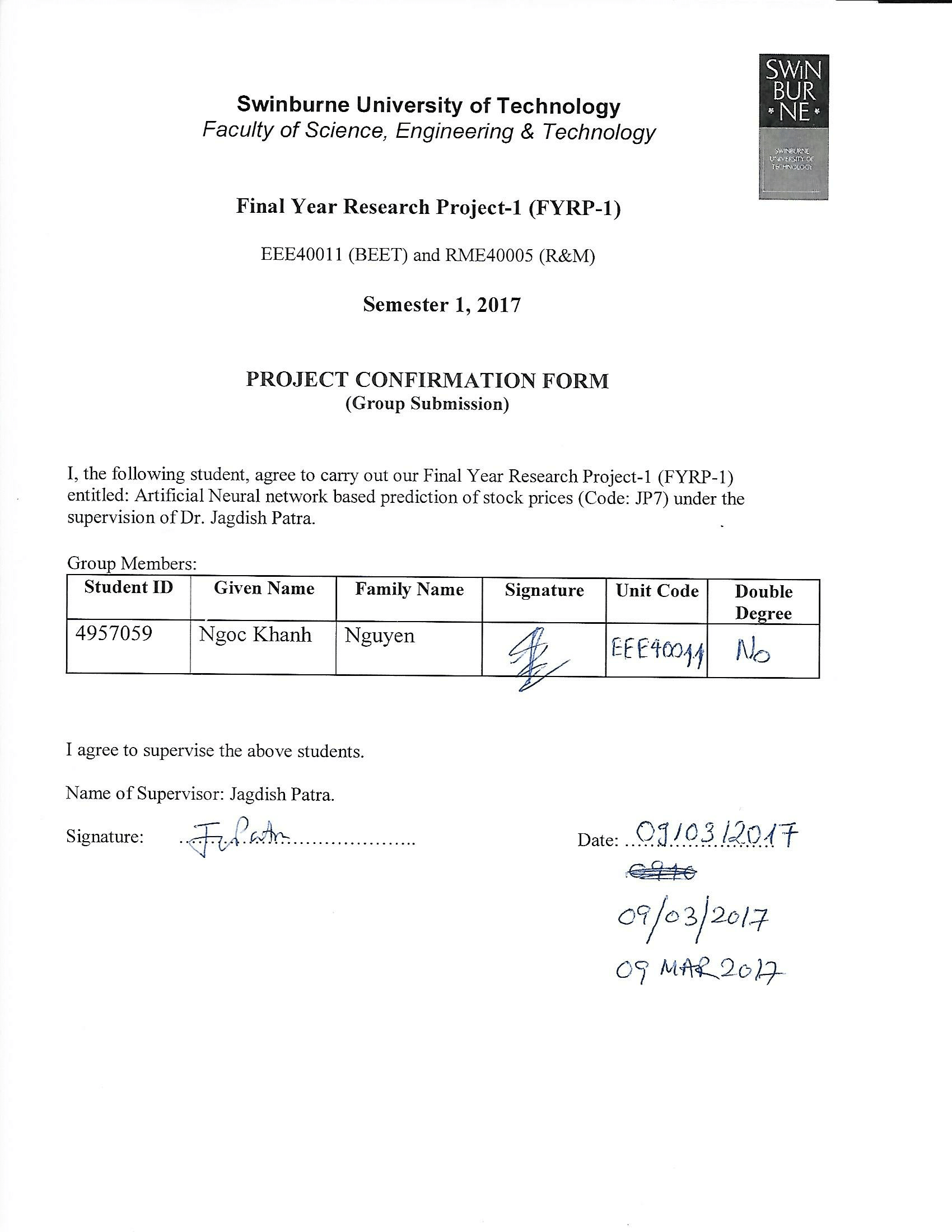
# Module 1 - Introduction to Engineering FYRP

## Project Approval form



## Student and Supervisor Expectation Survey

# Module 2: Planned research activities with 6 facets

### Project name: Artificial Neural network based prediction of stock prices

1. Embark & Clarify: Asking question and brainstorming ideas

* How does stock price data look like?
* Which factors can impact the stock price movement?
* Which business sectors and companies will be studied?
* What neural network architecture to use to predict stock price?
* How to evaluate the performance of the neural network?

1. Find & Generate

* Study other researches available on science and engineering databases such as IEEE, Science Direct, ACM, …
* Specify toolboxes, software and libraries to carry out the project such as Matlab, PyTorch and Tensorflow.
* Specify sources to collect data for the project such as Yahoo Finance, Google Finance and DatAnalysis.

1. Evaluate & Reflect

* Reflect from existing researches:
  + What techniques and method were applied?
  + How well their approaches and solutions work?
  + Are there any room for improvements?
* Evaluate current approaches:
  + Ensure the collected data is original and correct
  + Compare the intended approaches with existing approach from other researches
  + Different input features and data preprocessing scheme must be considered
  + Different neural network architectures must be studied.

1. Organize & Manage

* Divide and break down the whole project into smaller tasks.
* Each task must be planned and allocated to an appropriate time slot in order to complete research objectives.
* Create a Gantt chart to keep track of the research progress.
* Recording the content of the meetings with supervisors.
* Use a workbook to record the progress and have an overview about both ongoing and completed task in order to improve the quality of research continuously.

1. Analyze & Synthesis

* Analyze stocks and companies’ data
  + History and development of companies
  + Impact of different factors on stock price
* Analyze network architecture:
  + Number of input units in the input layer of the neural network
  + Number of hidden layers and hidden units
  + Activation function at each layer
  + Learning rate

1. Communicate & Apply

* Weekly meeting with supervisor for advices and feedbacks.

# Module 3 - Engaging with Literature

## 5 peer-reviewed journal articles

* N. L. D. Khoa, K. Sakakibara, and I. Nishikawa, "Stock Price Forecasting using Back Propagation Neural Networks with Time and Profit Based Adjusted Weight Factors," in *2006 SICE-ICASE International Joint Conference*, 2006, pp. 5484-5488.
* G. Tingwei, L. Xiu, C. Yueting, and T. Youhua, "Deep learning with stock indicators and two-dimensional principal component analysis for closing price prediction system," in *2016 7th IEEE International Conference on Software Engineering and Service Science (ICSESS)*, 2016, pp. 166-169.
* J. C. Patra, N. C. Thanh, and P. K. Meher, "Computationally efficient FLANN-based intelligent stock price prediction system," in *2009 International Joint Conference on Neural Networks*, 2009, pp. 2431-2438.
* F. A. d. Oliveira, L. E. Zárate, M. d. A. Reis, and C. N. Nobre, "The use of artificial neural networks in the analysis and prediction of stock prices," in *2011 IEEE International Conference on Systems, Man, and Cybernetics*, 2011, pp. 2151-2155.
* M. Qiu, Y. Song, and F. Akagi, "Application of artificial neural network for the prediction of stock market returns: The case of the Japanese stock market," *Chaos, Solitons & Fractals,* vol. 85, pp. 1-7, 4// 2016.

# [Module 4 - Applying Literature Findings to Research Design](https://ilearn.swin.edu.au/webapps/blackboard/execute/displayLearningUnit?course_id=_160058_1&content_id=_4946100_1)

## Techniques to investigate research problem

* Generate the research questions
  + Why is this research important?
  + What is the scope of the research topics?
  + What is the expected the outcome of the project?
* Study the background knowledge required for the project
  + Study the target of interest of the research
  + Review recent researches and studies of the similar problems
  + Review potential techniques which may help to form solutions for the research
* Observe and analyze results as the research progress
  + Justify outcomes resulted from the research process
  + Adapt to new methodologies and techniques to fit the development of the research

## Justification of techniques:

These techniques help solve research problem because of two reasons. Firstly, understanding the problem and the background knowledge behind it provides a guideline to what need to be carried out in order find the solution. Lastly, as the research develops, validating the results along the way help keep the research on correct track.

# [Module 5 - Communicating Research Findings](https://ilearn.swin.edu.au/webapps/blackboard/execute/displayLearningUnit?course_id=_160058_1&content_id=_4946104_1)

## Cross-referencing between assessment criteria/requirements in the rubric and workbook content

|  |  |  |
| --- | --- | --- |
| Criteria | Description | Workbook content |
| ULO 1 | Undertake a research project within constraints using previous knowledge | Information about the target stocks and description of its potential driven forces  Artificial neural network architectures notes |
| ULO 3 | Professional communication | Planning a clear structure for the research plan. |
| ULO 4 | Apply problem solving methodologies to generate, evaluate and justify solutions | Literature reviews  Advices and feedback of supervisor |
| ULO 6 | Reflect on professional engineering practice  Reflect on professional issues within the project | Observation and analyzes of research progress |
| ULO 7 | Reflect on personal professionalism, integrity, ethical conduct and professional accountability in project work  Demonstrate professionalism to supervisor and other stakeholders | Record of meeting with supervisor |