Specialist Diploma in Internet of Things

School of Engineering
TEMASEK POLYTECHNIC

Engineering Analytics and Machine Learning

(ECSE202)

Students' Subject Guide Book

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1 About the Subject

Subject Synopsis

This subject provides coverage of the knowledge of concepts and skills in the tools and processes used in data analytics of large amounts of engineering data. It encompasses the various stages of data analytics, from gathering the data, asking the right questions, to analyzing and interpreting data, identifying patterns and trends and making use of machine learning and predictive models to make intelligent and actionable recommendations for improvement in engineering systems.

Subject Aims

This subject aims to equip students with the knowledge and skills to:

- Apply the processes needed to perform analysis on engineering data.
- Present results in the form of visualization.
- Apply machine learning algorithms on engineering data.

Intended Learning Outcomes

- Perform data gathering and pre-processing of data
- Conduct exploratory data analysis and visualization
- Perform machine learning by regression analysis
- Perform machine learning algorithms for predictive analysis

2 Teaching Schedule

Wk	Dates	Laboratory Activities	Assessment
1	18 Oct	• Subject Briefing and set ground rules • Seminar 1: Introduction to Engineering Analytic and Machine Learning • Lab 1: Introduction to Python	
2	25 Oct	• Seminar 2: Essential Statistic • Lab 2: Introduction to Python Data structure, Numpy and Panda	
3	11 Nov	• Seminar 3: Data Cleansing • Lab 3: Data Cleansing	
4*	8 Nov	• Seminar 4: Data Transformation • Lab 4: Data Transformation	
5	15 Nov	• Seminar 5: Data Visualization • Lab 5: Data Visualization	
6	22 Nov	• Seminar 6: Introduction to Linear Machine Learning method • Lab 6: Linear Machine Learning methods	
7	29 Nov	• **Practical Test 1**	Practical Test 1 (15%)
8	06 Dec	• Seminar 7: Introduction to Artificial Neural Network • Lab 7: Artificial Neural Network • **Written Test 1**	Written Test 1 (15%) Make-up Practical Test 1
9	13 Dec	• Seminar 8: Introduction to Deep Learning • Lab 8: Deep Learning • Project Briefing	Make-up Written Test 1
10/ 11*	17 Dec - 28 Dec	Term Break	
12*	3 Jan	• Project Development • Project Checkpoint	
13	10 Jan	• **Practical Test 2**	Practical Test 2 (15%)
14	17 Jan	• Project Development • Project Checkpoint	Make-up Practical Test 2

15	24 Jan	• Project Development	
16	31 Jan	• Final Project Assessment	Project (45%)

* Public Holidays:

6 November (Tue): Deepavali

25 December (Tue): Christmas Day

31 December (Mon) School not open

1 January (Tue): New Year

5 & 6 Feb (Tue & Wed) Chinese New Year

3 Assessment Matters

Engineering Analytics is a non-examination subject. The final subject grade is 100% coursework and comprises of the following components.

Component	Individual/Group	Weightage
Class Participation	Individual	10%
Written Test 1	Individual	15%
Practical Test 1	Individual	15%
Practical Test 2	Individual	15%
Project 1	Individual	45%
		Total: 100%

To obtain a pass in the subject, you are required to obtain 50% of the total marks.

4 Assessment Rubric

Class Participation

Category	Excellent	Good	Average	Poor
Max 5	**4.5 - 5**	**3.5 - 4**	**2.5 - 3**	**0 - 2**
Max 10	**9 - 10**	**7- 8**	**5 - 6**	**0 - 4**
Effort	Participates & contributes actively & willingly in class	Participates & contributes in class some of the time..	Participates & contributes actively in class after some encouragement.	Does not participate & contribute actively in class.
	Prepared with all materials. Manages time and produces best work.	Prepared with all materials. Work done on time.	Some missing materials. Work is sometimes turned in late.	Does not bring materials. Work turned in late.
Effective contribution to classroom learning	No disruptions. Supportive of others. Takes leadership role.	No disruptions. Polite to others. Regularly ready to work with others.	Occasionally disrupts. Occasionally makes unsupportive comments. Prodding needed to work with others.	Disrupts others. Unsupportive comments. Unwilling to work with others.