COURSE INFORMATION

SECP3133 – HIGH PERFORMANCE DATA PROCESSING

Synopsis:
High performance data processing employs high performance computing (HPC) to process data, which is then translated into information and knowledge. The advent of high-performance computing and data analytics enabled real-time interrogation of extremely large data sets. This course covers the fundamentals of high-performance computing, data processing, and high-performance data processing architecture. Students will also be exposed to case studies in industry and research that make use of high-performance data processing. Students will gain hands-on experience with Amazon Web Services (AWS) as a data processing platform.

Names of academic staff:

Name	E-mail	Telephone
Assoc Prof Dr Mohd Shahizan Othman	shahizan@utm.my	012-7363269

Semester and Year Offered Semester 1, 2022/2023
Credit Value 3
Pre Requisite
Course Learning Outcome (CLO)

CLO 1	Comprehend the concepts of cloud computing, high performance computing, and data processing.
CLO 2	Design a high-performance computing architecture that takes into account about infrastructure type, data, algorithm, design process, and results.
CLO 3	Develop the high perfomance data processing program and evaluate it over the equivalent sequential program.
CLO 4	Demonstrate high performance project on selected problem domains in writing and oral presentation.

Mapping of the CLOs to the Programme Leaning Outcomes (PLOs), Teaching Methods and Assessment.

CLO	PLO-Graduate Attributes										Teaching Methods	Assessment Methods
	KW	AP	PS	CS	TH	SC	TW	AD	GC	ES		
1	/										L, T	TE, FE
2		/			/						L, T, P	TE, FE, LA
3		/	/								L, T, P	FE, LA
4		/			/						P	PR, PD

L – Lecture, T – Tutorial, P – Practical, O - Others
LA – Lab; PR – Project Report, PD – Project Demo; TE – Test; FE – Final Exam

PLO 1	Knowledge (KW)
PLO 2	Applications (AP)
PLO 3	Practical Skills (PS)
PLO 4	Communication Skills (CS)
PLO 5	Thinking Skill (TH)

PLO 6	Scholarship (SC)
PLO 7	Teamworking & Leadership Skills (TW)
PLO 8	Adaptability (AD)
PLO 9	Global Citizen (GC)
PLO 10	Enterprising Skills (ES)

Transferable Skills (skills learned in course of study which can be useful and utilised in other settings)

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Student Learning Time (SLT) details

Week	CLO	Teaching and Learning Activities						TOTAL SLT
		Guided Learning					Independent Learning Non F2F	
		Face to Face (F2F)				Non F2F		
		L	T	P	O			
1	1	4	0	-	-		3	7
2	3	1	1	2	-		3	7
3	2	3	1	-	-		3	7
4	1,3	1	1	2	-		3	7
5	1,3	2	-	2	-		3	7
6	-	-	-	-	-		-	-
7	1,3	2	-	2	-		3	7
8	1,3	1	1	2	-		3	7
9	2,3	0	2	2	-		3	7
10	1,3	1	1	2	-		3	7
11	1	3	-	1	-		3	7
12	1, 3	0	1	3	-		3	7
13	1	2	2	-	-		3	7
14	3	0	2	2	-		3	7
15	4	0	0	2	2		3	7

No	Continuous Assessment	PLO	Percentage	Total SLT
1	Quizzes	1	9	1.5
2	Lab Programming Test	2,3,5	12	3
3	Assignment	2,3	10	8
4	Test	1,2	25	2
6	Project Report	2,5	10	8.5
7	Project Demo	2	4	1
	Final Assessment	**PLO**	**PLO**	**Total SLT**
1	Final Exam	1,2	30	3
Grand Total SLT				**120h**

Weekly Schedule

W 1	Module 1: Introduction to cloud computing, high performance computing, and data processing
W 2	Module 2: Amazon Web Services & HPC cloud technologies
W 3	Module 3: Cloud Computing & Architecture
W 4	Module 4: Data Processing & The Need for Advanced Databases
W 5	Module 6: Preparing Data for Analysis
W 6	Module 6: Big Data Storage & databases
W 7	Module 7: Case study 1: Artificial Intelligence- Text Analysis
MID-SEMESTER BREAK	
W 8	Module 8: Case study 2: Machine Learning: Reinforcement Learning with AWS DeepRacer
W 9	Module 9: Case study 3: Implementing a Machine Learning pipeline with Amazon SageMaker
W 10	Module 10: Case study 4: Amazon Forecasting
W 11	Module 11: Case study 5: Computer Vision
W 12	Module 12: Case study 6: Natural Language Processing
W 13	Group Project Presentation
W 14	Group Project Presentation
W 16 - 18	Revision Week And Final Exam

Main references:

Panda, D.K, Lu, X and Shankar, D. 2022. High-Performance Big Data Computing (Scientific and Engineering Computation).The MIT Press

Additional references:

1.

Course Website:
None

Academic honesty and plagiarism
Any form of plagiarisms is NOT ALLOWED. Students who are caught cheating during exams may FAIL the course. Students who copied other student's assignment/lab exercise will get zero mark.

Feedback for evaluations
ePPP, course survey

Percentages of CLO-PLO Mapping for SECP3113 HPPC:

No.	Assessment	PLO1 - knowledge	PLO2 – apply			PLO3 Practical	PLO5 – think		Total
		CLO1	CLO2	CLO3	CLO4	CLO3	CLO2	CLO4	
1	Asignment	10							10
2	Lab Exercise		5	5		5	5		20
4	Test	10	5	5					20
5	Final Exam	10	10	10					30
6	Project Report		4	4	6		3	3	20

Course Policy:

1. Attendance is compulsory and will be taken in every lecture session. Student with less than 80% of total attendance is not allowed to sit for final exam.
2. Students are required to behave and follow the University's dressing regulation and etiquette while in the class, lab, and exam hall.
3. Exercises and tutorial will be given in class, and some may be taken for assessment. Students who do not do the exercise will lose the coursework marks for the exercise.
4. Assignments must be submitted on the due dates. Some points will be deducted for the late submission.
5. Assignments that are hand over after three days from the due dates will not be accepted.
6. Make up exam will not be given, except to students who are sick and submit medical certificate which is confirmed by UTM panel doctors. Make up exam can only be given within one week from the initial date of exam.