Faculty:	Computing	**Page:**	1 of 4
Program name:	Bachelor of Computer Science (Data Engineering)		
Course code:	SECP3133	**Academic Session/Semester:**	2024/25/ 2
Course name:	High Performance Data Processing	**Pre/co requisite (course name and code, if applicable):**	
Credit hours:	3		

Course 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.			
Course coordinator	A.P. Dr. Mohd Shahizan Othman			
Course lecturer(s)	**Name**	**Office**	**Contact no.**	**E-mail**
	A.P. Dr. Mohd Shahizan Othman	N28A	0127363269	shahizan@utm.my
	Dr Aryati Bakri	N28	01159277750	aryati@utm.my

Mapping of the Course Learning Outcomes (CLO) to the Programme Learning Outcomes (PLO), Teaching & Learning (T&L) methods and Assessment methods:

No.	CLO	PLO (Code)	*Taxonomies and **generic skills	T&L methods	***Assessment methods
CLO1	Comprehend the concepts of cloud computing, high performance computing, and data processing.	PLO1	C2	Lecture, active learning	Q, Asg
CLO2	Design a high-performance computing architecture that takes into account about infrastructure type, data, algorithm, design process, and results.	PO2, PO5	C3	Project-based learning	FE, LA, Q, Asg
CLO3	Develop the high perfomance data processing program and evaluate it over the equivalent sequential program.	PO2, PO3	C3	Lecture, Project-based learning	FE, LA
CLO4	Demonstrate high performance project on selected problem domains in writing and oral presentation.	PO2, PO5	C3	Lecture, active learning	PR, Pr

Refer
*Taxonomies of Learning and
**UTM's Graduate Attributes, where applicable for measurement of outcomes achievement
***T – Test; Q – Quiz; HW – Homework; Asg – Assignment; PR – Project; Pr – Presentation; F – Final Exam etc.

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Details on Innovative T&L practices:

No.	Type	Implementation
1.	Active learning	Conducted through in-class activities
2.	Project-based learning	Conducted through design assignments. Students in an individual projects that require advanced computer system and architecture solutions involving the design. Compliance to the design specifications need to be given in the form of written reports.

Weekly Schedule:

Week 1	Introduction to cloud computing, high performance computing, and data processing
Week 2	The High-Performance Technologies for Big and Fast Data Analytics
Week 3	Project 1: Optimizing High-Performance Data Processing for Large-Scale Web Crawlers
Week 4	Big and Fast Data Analytics Yearning for High-Performance Computing
Week 5	Network Infrastructure for High-Performance Big Data Analytics
Week 6	Storage Infrastructures for High-Performance Big Data Analytics
Week 7	Real-Time Analytics Using High-Performance Computing
Week 8	Mid-Semester Break
Week 9	Project 2: Handling Large-Scale Sentiment Data with High-Performance Computing
Week 10	High-Performance Computing (HPC) Paradigms
Week 11	In-Database Processing and In-Memory Analytics
Week 12	High-Performance Integrated Systems, Databases, and Warehouses for Big and Fast Data Analytics
Week 13	High-Performance Grids and Clusters
Week 14	Visualization Dimensions for High-Performance Big Data Analytics
Week 15	Project presentation

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

Team working
Written communication

Student learning time (SLT) details:

Distribution		Teaching and Learning Activities	TOTAL

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of student Learning Time (SLT) Course content outline	**Guided Learning (Face to Face)**				**Guided Learning Non-Face to Face**	**Independent Learning Non-Face to face**	**SLT**
CLO	**L**	**T**	**P**	**O**			
CLO 1	8h			2h	2h	21h	33h
CLO 2	8h			3h	3h	21h	35h
CLO 3	8h			2h	2h	11h	23h
CLO 4	8h			3h	2h	10h	23h
Total SLT	**32h**			**10h**	**9h**	**63h**	**114h**

Continuous Assessment		**Info**	**Percentage**	**Total SLT**
1	Assignment	Academic paper	10	5h30m
2	Quiz	2	10	1h
3	Lab Exercise	AWS, Apache	20	2h
4	Project	Crawler, Sentiment analysis	30	7h30m
Final Assessment			**Percentage**	**Total SLT**
6	Final Examination		30	2h 30m
Grand Total			**100**	**120h**

L: Lecture, T: Tutorial, P: Practical, O: Others

Special requirement to deliver the course (e.g: software, nursery, computer lab, simulation room):

Learning resources:

Text book

Wang, C. (Ed.). (2017). *High-performance computing for big data: Methodologies and applications.* Chapman and Hall/CRC. https://doi.org/10.1201/9781315155524

Raj, P., Raman, A., Nagaraj, D., & Duggirala, S. (2015). *High-performance big-data analytics: Computing systems and approaches.* Springer. https://doi.org/10.1007/978-3-319-20744-5

Academic honesty and plagiarism: *(Below is just a sample)*

Assignments are individual tasks and NOT group activities (UNLESS EXPLICITLY INDICATED AS GROUP ACTIVITIES) Copying of work (texts, simulation results etc.) from other students/groups or from other sources is not allowed. Brief quotations are allowed and then only if indicated as such. Existing texts should be reformulated with your own words used to explain what you have read. It is not acceptable to retype existing texts and just acknowledge the source as a reference. Be warned: students who submit copied work will obtain a mark of **zero** for the assignment and disciplinary steps may be taken by the Faculty. It is also unacceptable to do somebody else's work, to lend your work to them or to make your work available to them to copy.

Prepared by:	Certified by:
Name:	Name:
Signature:	Signature:
Date:	Date:

Other additional information (Course policy, any specific instruction etc.):
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