

### Study Scheme for Master in Data Science

SEMESTER 1			
Course Code	Course Name	Credit Hour	Course Status
CCS5094	Research Methods in Data Science	3 (3+0)	CORE (YW)
CCS5102	Scientific Approaches for Data Science	3 (3+0)	CORE (YW)
CCS5202	Big Data Technology	3 (3+0)	CORE (YW)
CCS5208	Data Analysis and Statistical Inference	3 (3+0)	CORE (YW)
CCS5600	Machine Learning	3 (3+0)	CORE (YW)
<b>TOTAL CREDIT HOURS</b>		<b>15</b>	
SEMESTER 2			
CCS5404	Data Governance	3 (3+0)	CORE (YW)
CCS5408	Business Intelligence and Analytics	3 (3+0)	CORE (YW)
CCS5602	Massive Data Mining	3 (3+0)	CORE (YW)
CCS5994	Project	2 (0+2)	CORE (YW)
	Elective 1	3 (3+0)	ELECTIVE (ELF)
	Elective 2	3 (3+0)	ELECTIVE (ELF)
<b>TOTAL CREDIT HOURS</b>		<b>15</b>	
SEMESTER 3			
CCS5994	Project	7 (0+7)	CORE (YW)
	Elective 3	3 (3+0)	ELECTIVE (ELF)
<b>TOTAL CREDIT HOURS</b>		<b>12</b>	
<b>TOTAL CREDIT</b>		<b>42</b>	

**List of Courses and Study Scheme**  
**Master in Data Science**  
**Faculty of Computer Science and Information Technology**  
**Universiti Putra Malaysia**

<b>No</b>	<b>Course Code</b>	<b>Course Name</b>	<b>Credit</b>	<b>Course Synopsis</b>
1.	CCS5094	Research Methods in Data Science (Core - YW)	3(3+0)	This course covers research methods and data science methodology. It includes the main cores in data science methodology namely, project management, team management, and data and information management. Ethics in carrying out research is also emphasized.
2.	CCS5102	Scientific Approach for Data Science (Core - YW)	3(3+0)	This course covers the concepts and principles of data science. The scientific approach in data processing, analysis and visualization is discussed. The development of data science applications using the data science life cycle is emphasized.
3.	CCS5202	Big Data Technology (Core - YW)	3(3+0)	This course includes big data technology to improve the efficiency of data management in organizations. The planning and implementation of various types of technology for the management and processing of big data is emphasized. Big data technology in several application domains is also discussed
4.	CCS5208	Data Analysis and Statistical Inference (Core - YW)	3(3+0)	This course covers statistical methods and inference. Methods of effective data usage, collection, analysis and inference for real world application are discussed.
5.	CCS5600	Machine Learning (Core - YW)	3(3+0)	This course covers the concepts and types of machine learning namely supervised, unsupervised and reinforcement learning.

				Algorithms for pattern recognition, classification, optimization and complex neural network architecture are emphasized
6.	CCS5404	Data Governance (Core - YW)	3(3+0)	This course covers the concept, component and managing data governance. It includes strategy, architecture, framework and implementation of good data governance for organizations.
7.	CCS5408	Business Intelligence and Analytics (Core - YW)	3(3+0)	This course includes framework for turning data into strategic business planning. Statistical modeling, optimization, simulation modeling and types of business reporting to optimize business performance are emphasized. Sentiment analysis, flow analytics, customer analytics and human resource analytics are discussed.
8.	CCS5602	Massive Data Mining (Core - YW)	3(3+0)	The course covers knowledge discovery techniques for analyzing complex and massive data. Applications in mining various domain and data format are discussed
9.	CCS5994	Project (Core - YW)	9(0+9)	This course includes a detailed study for the planning and implementation of data science projects. Emphasis is placed on comprehensive research planning by producing literature-based and ethical solutions. Apart from that, the use of the latest tools and technology in the project is also given focus to produce systematic and professional writing
10.	CCS5402	Data Visualization (Elective - ELF)	3(3+0)	This course covers the concept and process of designing data visualization. Static and interactive visualization using appropriate techniques and tools for designing and building data visualization report to support decision-making are discussed.

11.	CCS5406	Data Engineering (Elective - ELF)	3(3+0)	This course emphasizes data engineering and its application in data science. Processes and techniques in the data engineering life cycle are discussed. Parallel data processing on computer cluster data is emphasized
12.	CCS5604	Data-Driven Decision Making (Elective - ELF)	3(3+0)	This course covers the data-driven decision-making process in making insightful decisions. Various data analytics techniques are emphasized. Data-driven systems and applications are discussed.
13.	SKM5606	Deep Learning (Elective - ELF)	3(3+0)	This course covers the mathematical techniques underlying deep learning architectures where focus is given to the use of artificial neural networks with multiple layers to learn patterns in data. Supervised and unsupervised deep network design strategies will be identified in several fields including computer vision, speech recognition, and/or natural language processing
14.	SKR5406	Cloud Computing Architecture (Elective - ELF)	3(3+0)	This course covers Cloud architecture and data management in computing. Description on virtualization and relation between distributed models, Cloud computing services, and concept c loud programming are also included.
15.	SKR5408	Big Data Distributed System Architecture (Elective - ELF)	3(3+0)	This course covers the architecture of big data distributed system and implementation on programming model. Applications that usable to big data is emphasized.
16.	STS5410	Survival Analysis (Elective - ELF)	3(3+0)	This course covers various parametric and nonparametric methods for studying censored and truncated data such as life tables, regression models and Cox proportional hazard model. In addition,

				Akaike information criteria, goodness of fit tests and extended Cox model are also discussed.
17.	STS5411	Applied Statistical Modelling (Elective - ELF)	3(3+0)	This course covers the construction of various discrete and continuous statistical models including a few selected regression and progression models. Emphasis on several model validation and parameter estimation methods are also discussed.