UNIVERSITI TEKNIKAL MALAYSIA MELAKA

FAKULTI KECERDASAN BUATAN DAN KESELAMATAN SIBER
FACULTY OF ARTIFICIAL INTELLIGENCE AND CYBER SECURITY

POSTGRADUATE ACADEMIC HANDBOOK 2024/2025

Master Degree Programmes

Faculty of Artificial Intelligence and Cyber Security (FAIX)


MAXL
Master of Technology in
Data Science and Analytics
(ODL mode)

MASTER OF TECHNOLOGY IN DATA SCIENCE AND ANALYTICS (MAXL)

Programme Details

The Master of Technology in Data Science and Analytics with ODL mode is aimed at recent graduates and industry practitioners from various academic disciplines with strong analytic and computing skills or experience. The programme is designed to equip the students with fundamental and applied knowledge, technical skills, and current technologies in the data science and analytics area. These include the fundamental principles of data science, the capability to analyse a diversity of big data, the skills of using data science tools and applying the data analytics techniques to various domain, as well as the capability to present the analytics results to the intended audience. The materials emphasise state-of-the-practice techniques, tools, and technology, and recognised methodology through university-industry collaborations. Graduates from this programme will have career opportunities as data scientists, data analysts and many more.

Programme Educational Objectives (PEO)

Programme Educational Objectives (PEO) are specific goals describing the expected achievement of graduates in their career and professional life after 3-5 years of graduation.

Below are the PEO for this programme:

PEO 1: Practice in-depth and specialist knowledge, technology and skills of Science and Analytics, and related disciplines in solving emerging challenges.

PEO 2: Demonstrate business acumen in solving complex problems and sustain intellectual curiosity through life-long learning.

PEO 3: Demonstrate effective leadership and communication to a wide variety of audiences or multi-disciplinary teams, tolerate and value different global perspectives and cultures.

PEO 4: Practice professional, ethical and societal responsibilities, and show adaptability in different roles and surroundings in contributing to the community.

Programme Outcomes (PO)

Programme Outcomes (PO) are statements describing what students are expected to know and be able to perform or attain by the time of graduation.

Below is the list of PO for this programme:

PO 1: Utilize data science and analytics knowledge for effective and excellent practice as a data scientist and data analyst.

PO 2: Conduct systematic investigations and apply critical and creative thinking to generate innovative solutions in data science and analytics.

PO 3: Apply knowledge, technology and skills of data science and analytics to discover potential yet hidden information, knowledge and insights for data-driven and well-informed decision making.

PO 4: Effectively interact with diverse peers, superiors, clients and experts.

PO 5: Display effective communication, both orally and in writing, for data science and analytics solutions, to a diverse audience, including peers, superiors, clients, and experts.

PO 6: Practise digital skills to acquire, interpret and extend knowledge in data science and analytics.

PO 7: Determine suitable numerical tools to manage and resolve data science and analytics problems.

PO 8: Operate effectively in community and multidisciplinary teams either as a leader or a group member, demonstrate respect for cultural diversity and contribute to their organization and society.

PO 9: Apply independent and lifelong learning skills to keep up with latest relevant knowledge and cutting edge technologies in Data Science and Analytics.

PO 10: Demonstrate entrepreneurial and managerial skills.

PO 11: Manage research and services by applying ethics, values, attitude, professionalism and sustainable practices in data science dan analytics.

Programme Structure - Full Time

September Intake:

Semester 1 (September)		
Course Code	Course	Credit
MPSW 5013	Research Methodology	3
MPSW 5063	Elective I - Entrepreneurship	3
MAXL 5113	Fundamental of Data Science	3
MAXL 5123	Big Data Management	3
MAXL 5133	Applied Statistical Methods	3
MAXL 5143	Applied Machine Learning	3
	Total credit	18
Semester 2 (February)		
Course Code	Course	Credit
MAXU 5214	Project I	4
MAXL 5153	Big Data Analytics and Visualization	3
MAXL 5163	Modelling and Decision Making	3
MAXL XXXX	Elective II	3
MAXL XXXX	Elective III	3
	Total credit	16
Semester 3 (Short Semester)		
Course Code	Course	Credit
MAXU 5226	Project II	6
	Total credit	6

February Intake:

Semester 1 (February)		
Course Code	Course	Credit
MPSW 5013	Research Methodology	3
MAXL 5113	Fundamental of Data Science	3
MAXL 5123	Big Data Management	3
MAXL 5133	Applied Statistical Methods	3
MAXL 5143	Applied Machine Learning	3
MAXL 5153	Big Data Analytics and Visualization	3
	Total credit	18
Semester 2 (Short Semester)		
Course Code	Course	Credit
MAXU 5214	Project I	4
MAXL XXXX	Elective I	3
	Total credit	7
Semester 3 (September)		
Course Code	Course	Credit
MAXU 5226	Project II	6
MAXL 5163	Modelling and Decision Making	3
MPSW 5063	Entrepreneurship	3
MAXL XXXX	Elective III	3
	Total credit	15

Elective courses - choose TWO (2) only:

Course Code	Course	Credit
MAXL 5223	Manufacturing Analytics	3
MAXL 5233	Social Media Analytics	3
MAXL 5253	Healthcare Analytics	3
MAXL 5273	Customer and Financial Analytics	3

Note: Total credit hours = 40 credits

Programme Structure - Part Time

September Intake:

Semester 1 (September)		
Course Code	Course	Credit
MPSW 5013	Research Methodology	3
MAXL 5113	Fundamental of Data Science	3
MAXL 5133	Applied Statistical Method	3
	Total credit	9
Semester 2 (February)		
Course Code	Course	Credit
MAXL 5153	Big Data Analytics and Visualization	3
MAXL 5143	Applied Machine Learning	3
MAXL 5123	Big Data Management	3
	Total credit	9
Semester 3 (Short Semester)		
Course Code	Course	Credit
MAXU 5214	Project I	4
	Total credit	4
Semester 4 (September)		
Course Code	Course	Credit
MAXL 5163	Modelling and Decision Making	3
MAXL XXXX	Elective I	3
MAXL XXXX	Elective II	3
	Total credit	9
Semester 5 (February)		
Course Code	Course	Credit
MAXU 5226	Project II	6
MPSW 5063	Elective III - Entrepreneurship	3
	Total credit	9

Programme Structure - Part Time

February Intake:

Semester 1 (February)		
Course Code	Course	Credit
MPSW 5013	Research Methodology	3
MAXL 5113	Fundamental of Data Science	3
MAXL 5133	Applied Statistical Method	3
	Total credit	9
Semester 2 (September)		
Course Code	Course	Credit
MAXL 5153	Big Data Analytics and Visualization	3
MAXL 5143	Applied Machine Learning	3
MAXL 5123	Big Data Management	3
	Total credit	9
Semester 3 (February)		
Course Code	Course	Credit
MAXL 5163	Modelling and Decision Making	3
MAXL XXXX	Elective I	3
MAXL XXXX	Elective II	3
	Total credit	9
Semester 4 (September)		
Course Code	Course	Credit
MAXU 5214	Project I	4
	Total credit	4
Semester 5 (Short Semester)		
Course Code	Course	Credit
MAXU 5226	Project II	6
MPSW 5063	Entrepreneurship	3
	Total credit	9

Elective courses - choose TWO (2) only:

Course Code	Course	Credit
MAXL 5223	Manufacturing Analytics	3
MAXL 5233	Social Media Analytics	3
MAXL 5253	Healthcare Analytics	3
MAXL 5273	Customer and Financial Analytics	3

Note: Total credit hours = 40 credits



MPSW 5013 Research Methodology

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Apply ethical research skills in constructing research questions, objectives and hypothesis (if any) relevant to the research problem.

CLO2: Synthesize relevant literature to address the knowledge gaps.

CLO3: Develop research proposal with an improvement of existing knowledge.

Synopsis:

The primary goal of this course is to provide students with the necessary knowledge and skills in preparing for their Master dissertation. In this course, students will be exposed to the important concepts of conducting scientific research and managing ethical research. The course is designed to introduce students to the principles and good practices of conducting research. Activities at each step of the research process will be elaborated in order to develop the skills and competencies required to facilitate a successful research project at postgraduate level. At the end of the course, students are expected to submit a research proposal relevant to their field of study.

References:

1. Kumar, R., Research methodology: A step-by-step guide for beginners. Sage Publications Limited, 2019.
2. Gray, D. E., Doing research in the business world. Sage Publications Limited, 2019.
3. Creswell, J. W., & Creswell, J. D., Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. In Research Design: Qualitative, Quantitative, and Mixed Methods Approaches, 2018.
4. Tang, H., Engineering Research: Design, Methods, and Publication. John Wiley & Sons, 2020.
5. Sidek, S., Kamalrudin, M. & Mat Deris, M., Research Survival Toolkit: Writing a winning fundamental research proposal, Melaka: University Publisher, UTeM, 2017.
6. Zobel, J., 3rd Edition, Writing for Computer Science, Springer-Verlag London, 2014.
7. Arkoudas, K., Musser, D., Fundamental Proof Methods in Computer Science: A Computer-Based Approach, MIT Press, 2017.
8. Creswell, J. W., & Poth, C. N., Qualitative inquiry and research design: Choosing

among five approaches. Sage publications, 2016.

MPSW 5063 Entrepreneurship

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Analyse entrepreneurial skills in identifying and exploiting entrepreneurial opportunities.

CLO2: Apply commercially viable ideas, projects, products prototypes for commercialization within the context of societal framework and to deliver business model canvassing and business value proposition.

CLO3: Develop creative and viable high tech business models and strategies.

Synopsis:

The objectives of this course are to provide students a robust foundation in theories relevant to the improvement of entrepreneurial behaviour and capabilities in the context of technology ventures and to stimulate them to think and behave like an entrepreneur. First, the course covers fundamental issues such as the influence of risk and uncertainty, the role of technology in entrepreneurship, opportunity recognition, business model creation, life cycle and key stages of the entrepreneurial business and the development of an operational and financial foundation of a technology venture. Second, the course provides students with actionable knowledge by familiarising them with the areas of entrepreneurial expertise necessary in order to found and/or grow a technology venture.

References:

1. Duening, Thomas N., Robert A. Hisrich, and Michael A. Lechter. Technology Entrepreneurship: Taking Innovation to the Marketplace. Academic Press, 2020.
2. Sergi, B. S., & Scanlon, C. C. (Eds.), Entrepreneurship and Development in the 21st Century. Emerald Publishing Limited, 2019.
3. Bianchi, C., Glavas, C., & Mathews, S., SME international performance in Latin America: The role of entrepreneurial and technological capabilities. Journal of Small Business and Enterprise Development, 24(1), 176-195, 2017.
4. Patrict Van Der Pjil, Justin Lokit□, Lisa Kay Solomon, Design a Better Business: New Tools, Skills, and Mindset for Strategy and Innovation. Wiley, 2016.
5. Baldock, R., North, D., & Ullah, F., New Technology-Based Firms in the New Millennium. New Technology Based Firms in the New Millennium, 11, 203-226, 2015.
6. Alexander Osterwalder & Yvnes Pigneur, Value Proposition Design: How to Create

Products and Services Customers Want. Wiley, 2015.
7. Alexander Osterwalder & Yvnes Pigneur, Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers, Wiley, 2010.

MAXL 5113 Fundamentals of Data Science

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Explain what Data Science is and analyze the skill sets needed to be a data scientist.
CLO2: Identify the Data Analytic Life-cycle and how its components interact.
CLO3: Construct computer program to carry out basic statistical modeling and analysis.

Synopsis:

The course provides an introduction to data science, which is the study of the generalizable extraction of knowledge from data. Being a data scientist requires an integrated skill set spanning mathematics, statistics, machine learning, databases and other branches of computer science along with a good understanding of the craft of problem formulation to engineer effective solutions. This course provides an overview of today's Big Data environment, the rationale and opportunity for a new approach to analytics, the roles required, including the Data Scientist, and representative examples of big data analytics in industry. This course introduces students to the fundamental principles of data science that underlie the algorithms, processes, methods, and data-analytic thinking. It also introduces students to algorithms and tools based on these principles, and frameworks to support problem-focused data-analytics thinking. The course ends by examining students understanding on integration and synthesis of concepts and their application to solving problems.

References:

1. Chirag Shah, A Hands-On Introduction to Data Science, Cambridge University Press, 1st edition, April 2, 2020.
2. Jeffrey S. Salt and Jeffrey M. Stanton, An Introduction to Data Science, SAGE Publications, Inc, First edition, October 6, 2017.
3. Samuel Burns, Fundamentals of Data Science: Take the first Step to Become a Data Scientist (Step-by-Step Tutorial For Beginners), Independently published, September 17, 2019.
4. Joel Grus. Data Science from Scratch: First Principles with Python, O'Reilly

Media, 2n edition May 16, 2019.
5. Vlad Sazonov, The Fundamentals of Data Science: Big Data, Deep Learning, and Machine Learning: What you need to know about data science and why it matters, Data Science Case Study, November 20, 2019.

MAXL 5123 Big Data Management

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: To distinguish the requirements of traditional data management and big data management.

CLO2: To compare the characteristics of big data solutions in the market.

CLO3: To build a big data management application using selected big data solutions.

Synopsis:

Big data is the new norm for many organizations. Meaningful insights obtained from this huge amount of collected data help organizations remain competitive. Hence it is important that organizations manage their big data properly. In this course, the many challenges in managing big data such as data quality, data security, data privacy, data storage, data processing and data analytics are exposed. Ecosystem and future trends are elaborated to get better insight in managing big data. This course introduces NoSQL data storage like MongoDB, Cassandra, and Neo4J which stores non-relational data model easily. To deal with the huge amount data that need to be stored and processed, Hadoop which is the de-facto technology for big data management is explored by this course. HDFS which is Hadoop data storage component and MapReduce which is Hadoop data processing component are delved into. This course also discusses Hadoop ecosystem which provides added functionalities for managing big data such as Flume and Sqoop for data ingestion. For analyzing big data, this course introduces Spark and its ecosystem to provide different types of analytics. At the end of the course, students will have exposure and understanding in managing big data, what tools are appropriate and relevant to manipulate and to integrate in planning and designing comprehensive solution for big data management.

References:

1. Kuan-Ching Li, Hai Jiang, Albert Zomaya. Big Data Management and Processing. Chapman and Hall/CRC, 2017.
2. Viktor Mayer-Schonberger, Big Data: A Revolution That Will Transform How We Live, Work and Think, Eamon Dolan/Mariner Books, 2014.

3. Tom White, Hadoop: The Definitive Guide: Storage and Analysis at Internet Scale, 4th Edition, O'Reilly Media, 2015.
4. Edward Capriolo, Dean Wampler, Jason Rutherglen, Programming Hive: Data Warehouse and Query Language for Hadoop, O'Reilly Media Inc, 2017.

MAXL 5133 Applied Statistical Methods

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Find solutions for statistical problems using appropriate statistical techniques.
CLO2: Analyse solutions for real life statistical problems.
CLO3: Formulate solutions for statistical problems using statistical software.
CLO4: Integrate solution plan to application problems based on available data.

Synopsis:

Applied statistical methods covers the fundamental understanding of statistical methods necessary to deal with a wide variety of practical problems. The course offers a curriculum that provides a balanced approach towards learning of statistical theory and its applications. The core courses give a thorough grounding in advanced statistical methods. Topics covered in this course stresses clarity of understanding, interpretation, and method of application. Various qualitative and quantitative methods in research will be discussed in this course. This includes also on how to compute, evaluate and analyze qualitative and quantitative data. This course also covers the discovery and exploration of complex multivariate relationships among variables. Multivariate analysis is a set of statistical techniques used for analysis of data that contain more than one variable. The underlying theory required to understand the multivariate methods, as well as their applications in data analysis will be discussed. Methods in time series analysis also will be discussed where it comprises methods for analyzing time series data to extract meaningful statistics of the data as well as forecasting future values.

References:

1. Black, K. Business Statistics for Contemporary Decision Making. 10th Edition, Wiley, 2020.
2. Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L., Multivariate Data Analysis. 8th edition. Pearson New International Edition, 2018.
3. Denis D.J., Univariate, Bivariate and Multivariate Statistics Using R - Quantitative Tools for Data Analysis and

Data Science, Wiley, 2020.
4. Krispin, R., Hands-On Time Series Analysis with R: Perform time series analysis and forecasting using R., Packt Publishing, 2019.
5. Kabacoff, R.I., R in action: Data Analysis and Graphics with R, Second Edition, Manning Pub. Co., 2015.
6. Schumacker, E. R., Using R with Multivariate Statistics. Sage Publications, Inc., 2016.

MAXL 5143 Applied Machine Learning

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Explain the concepts and principles of machine learning.

CLO2: Evaluate different machine learning techniques in terms of their applicability to different Machine Learning problems.

CLO3: Manipulate appropriate tools to apply suitable machine learning techniques to the data set given to solve the problem.

CLO4: Formulate a systematic approach to conduct scientific experimental investigations.

Synopsis:

Machine learning is a rapidly growing field at the intersection of computer science and statistics, which concerns about finding patterns in real data. The learning evolved from the study of pattern recognition and computational learning theory in artificial intelligence to explore the construction of algorithms for making prediction on data. This course aims to provide practical skills in applying machine learning algorithms on real applications. It emphases on the implementation and evaluation of machine learning systems. n The main focus will be placed on applying machine learning model for problem solving more than the fundamental understanding of learning algorithm. Students will be exposed to the tasks on design, implementation, training and evaluation of a machine learning systems. Topics of discussion include: introduction to machine learning; real-world data; feature engineering; classification techniques; predicting continuous target variables; model evaluation, parameter tuning; clustering analysis; association analysis; ensemble learning; reinforcement learning; deep learning; and scaling machine learning workflows.

References:

1. Kelleher, John D., Brian Mac Namee, Aoife D'Arcy, Fundamentals of machine learning for predictive data analytics: algorithms, worked examples, and case studies, MIT Press, 2015.
2. Patternson, Josh, & Gibson, Adam. Deep Learning: A Practitioner'sapproach, O'Reilly, Inc., 2017.
3. Brink, Henrik, J. Richards, Mark Fetherolf, Real-world machine learning, Manning, 2017.
4. Goodfellow, Ian, Yoshua Bengio, Aaron Courville, Deep learning, MIT Press, 2016.
5. Witten, Ian H., et al., Data Mining: Practical machine learning tools and techniques, Morgan Kaufmann, 2016.
6. Alpaydin, Ethem, Machine Learning: The new AI, MIT Press, 2016.

MAXL 5153 Big Data Analytics and Visualization

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Identify the concepts, fundamentals and methodologies of big data analytics.

CLO2: Interpret massive volumes of unstructured data using data analytics software.

CLO3: Construct big data analytics and visualization strategy in a proper and meaningful way using appropriate techniques.

Synopsis:

This course consists of two parts: Big Data Analytics and Data Visualization. In the first part, the course brings together several key information technologies used in manipulating, storing, and analyzing big data especially unstructured data. The unstructured data are text, images, videos, audio/speech. R or Python or other tools will be used as the tool for analysing the unstructured data. In the second part of this course, data visualization is covered to enables multi-level analysis of data. The fundamental concepts in data visualization will be covered, including the various types of data visualization according to input types, different approaches in determining good data visualization techniques and methods, good practices for amplifying cognition, revealing better insights and unveiling underlying structure. Students will also learn how to develop interactive visualization and applications, use various data exploratory functions and how to present the data.

References:

1. Dipanjan Sarkar, Text Analytics with Python (2nd edition), 2019, Apress.

(QA76.9.D343.S27 2019)
2. Lawrence Rabiner and Ronald Schafer. Theory and Applications of Digital Speech Processing (1st. ed.). Prentice Hall Press, USA, 2010.
3. Daniel Jurafsky and James H Martin, Speech and Language Processing, Prentice Hall, 2009.
4. Rafael C. Gonzalez, Richard E. Woods, Digital Image Processing (2nd Edition) 2002, Pearson. (TA1637 G66 2002) - to buy new edition (4th edition), 2018.
5. Alexandru C. Telea, Data Visuali□ation: Principles and Practice, 2nd Edition, CRC Press, 2015.
6. Jan Erik Solem, Programming Computer Vision with Python, O'Reily, 2012.
7. Ben Jones, Communicating Data with Tableau: Designing, Developing, and Delivering Data Visualization, O'reilly, 2014.
8. Cole Nussbaumer Knaflic, Storytelling with Data: A Data Visualization Guide for Business Professionals, John Wiley & Sons, 2017.

MAXL 5163 Modelling and Decision Making

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Interpret knowledge of modelling and prescriptive analytics with data science for data-driven and evidence-based decision making.

CLO2: Choose appropriate and relevant modelling and prescriptive analytics technique using Big data input to solve complex decision problems.

CLO3: Propose prescriptive models and solutions using appropriate software tools and analysis of Big data, and communicate the results.

Synopsis:

In Data Science, prescriptive analytics is the final frontier of analytics, which entails the application of mathematical modelling, simulation, optimization and computational intelligence to suggest decision options, taking advantage of the results from the earlier analytic stages of descriptive and predictive analytics. Prescriptive analytics optimizes decision making and able to suggest or prescribe what actions to take in order to maximize output, given constraints and key objectives, and shows the implication of each decision option. In this course, students are exposed to operations research modelling, and meta-heuristics and soft computing based optimization, and showed how to exploit them to solve real-world decision problems. The course covers the arts of decision making, decision making

and modelling process, decision analysis and method of decision science which involves the application of selected operations research and optimization (hard and soft) techniques, to strategic and managerial decision problems. The focus is to impart analytical systems level thinking and problem solving skills in complex decision making contexts. At the end of the course students will have exposure and deep understanding on how organizational decisions are made in the present of Big data, what appropriate and relevant modelling and analytics solutions should be provided to support well-informed, in-time and effective decision making.

References:

1. Rudolf Grunig and Richard Kuhn, Successful Decision-Making: A Systematic Approach to Complex Problems, Springer, 2013.
2. H. Paul Williams, Model Building in Mathematical Programming. 5th Edition. Wiley, 2013.
3. Frederick S. Hillier, Mark S, Hillier, Introduction to Management Science: A Modelling and Case Studies Approach, McGraw Hill, 2014.
4. Hamdy A. Taha, Operations Research: An Introduction. 10th Edition. Pearson, 2017.
5. John D. Sterman, Business Dynamics System Thinking and Modeling for a Complex World. McGraw-Hill Education, 2000.

MAXL 5223 Manufacturing Analytics

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Illustrate analytics use cases in manufacturing systems.
CLO2: Formulate analytics models for manufacturing systems.
CLO3: Accommodate appropriate tools to implement analytics model for manufacturing use cases.

Synopsis:

Manufacturing analytics aims to analyse the production data to generate added value. The analytics models are purpose-built to improve decision-making and boost production performance. Manufacturers take advantage of the actionable insights to reduce process flaws, increase performance, save time and cost. This course aims to provide a general overview of implementing analytics in manufacturing domain. It emphases on practical issues and application of advanced analytics on manufacturing challenges. The main focus will be placed on designing the manufacturing use cases

using analytics tools toward actionable intelligence. Topics of discussion include: introduction to manufacturing analytics; the return of investments in manufacturing analytics; product design analysis; the manufacturing process; automation and computer-aided manufacturing; IoT-enabled manufacturing system; manufacturing performance management, performances analysis method, and production scheduling system; and the human side of analytics in manufacturing industry.

References:

1. Kalpakjian, Serope, Steven R. Schmid, Manufacturing Engineering and Technology, Person Education, 2018.
2. Zhang, Yingfeng, Fei Tao, Optimization of Manufacturing Systems Using the Internet of Things, Academic Press, 2016.
3. Diego Galar Pascual, Pasquale Daponte, Uday Kumar. Handbook of Industry 4.0 and SMART Systems, CRC Press, 2019.
4. Isak Karabegovi, Ahmed Kovaevi, Lejla Banjanovi-Mehmedovi, Predrag Dai. Handbook of Research on Integrating Industry 4.0 in Business and Manufacturing, IGI Global, 2020.
5. Seider, Warren D., Junior D. Seader, Daniel R. Lewin, Product and Process Design Principles: Synthesis, Analysis And Evaluation, John Wiley & Sons, 2016.
6. Felix Liao, Smart Data Discovery Using SAS Viya: Powerful Techniques for Deeper Insights, SAS Institute, 2020.

MAXL 5233 Social Media Analytics

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Analyze the fundamentals and concepts of social media data mining.

CLO2: Prepare appropriate solution steps for social media data analysis based on text mining methods.

CLO3: Build computer program based on appropriate text mining methods for practical uses in social media analytics.

Synopsis:

This course will introduce social media content analytics. Text data mining, especially data from social media has been gaining attention as the available volume of online social media information grows at a rate that is by far higher than our human capacity to handle and process such a huge volume of data from the web. Topics that will be covered in this course includes overview of social media data mining, mining social media data, mining blog pages and other social web analysis.

References:

1. Matthew A. Russell, Mining the Social Web: Data Mining Facebook, Twitter, LinkedIn, Google+, GitHub, and More, 3rd Edition, 2019.
2. Thushan Ganegedara, Natural Language Processing with TensorFlow. Packt Publishing, 2018.
3. Marco Bonzanini, Mastering Social Media Mining with Python. Packt Publishing, 2016.
4. Helen Kennedy, Post, Mine, Repeat: Social Media Data Mining Becomes Ordinary, Palgrave Macmillan, Springer Nature, 2016.
5. Siddhartha Chatterjee, Michal Krystyanczuk, Python Social Media, 2017.

MAXL 5253 Healthcare Analytics

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Construct solution in healthcare analytics through simple modelling and simulation.

CLO2: Evaluate a concept of healthcare analytics to support the data sciences analysis and design.

CLO3: Formulate the healthcare analytics in solving problems data science problems.

Synopsis:

This course covers the transformation of big data by creating enormous opportunities for companies, researchers and other related area in healthcare to improve patient outcomes. Healthcare analytics powers data-driven transformations that combine strategy, big data and advanced analytics, and implementation processes to change the way healthcare companies especially think, decide, and act. The four areas within healthcare are considered as a case study; claims and cost data (retail purchases e.g. data captured in running stores), pharmaceutical and research and development (R & D) data, clinical data (collected from electronic medical records (EHRs)), and patient behaviour and sentiment data (patient behaviours and preferences). By the end of this course, students are able to design, analyse and implement the healthcare analytics concepts in data sciences.

References:

1. J. Burke, Health Analytics: Gaining the Insights to Transform Health Care, Wiley, 2013.
2. J. Schrom, Machine Learning for Healthcare: Case Studies and Algorithms for Working with Data, 1st Edition, O'Reilly, 2016.
3. S. Dua, U. R. Acharya, P. Dua, Machine Learning in Healthcare Informatics

(Intelligent Systems Reference Library), Springer, 2014.
4. K. Marconi, H. Lehmann, Big Data and Health Analytics, 1st Edition, CRC Press, 2015.
5. L. B. Madsen, Data-Driven Healthcare: How Analytics and BI are Transforming the Industry, Wiley, 2014.

MAXL 5273 Customer and Financial Analytics

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Analyze analytics use cases in customer behaviour and financial systems.

CLO2: Propose appropriate solution steps for customer behaviour and financial systems.

CLO3: Build computer program based on appropriate methods for practical uses in customer and financial analytics.

Synopsis:

Customer analytics is a process by which data from customer behaviour is used to help make key business decisions via market segmentation and predictive analytics. This information is used by businesses for direct marketing, site selection, and customer relationship management. Marketing provides services in order to satisfy customers. With that, the productive system is considered from its beginning at the production level, to the end of the cycle at the consumer. Customer analytics plays a very important role in the prediction of customer behaviour today. Financial analytics explores how financial statement data and non-financial metrics can be linked to financial performance. In this course, students will learn how data is used to assess what drives financial performance and to forecast future financial scenarios.

References:

1. Art Weinstein, Superior Customer Value: Strategies for Winning and Retaining Customers, 3rd Edition, CRC Press, 2016.
2. Michael Munson,Customer Analysis, Mc Graw Hill, 2014.
3. Ron S. Kenett, Silvia Salini, Modern Analysis of Customer Surveys: with Applications using R, 1st Edition, Wiley, 2012.
4. John C Lee, Cheng F Lee, Financial Analysis, Planning & Forecasting: Theory and Application, 3rd Edition, World Scientific, 2016.
5. Stephen Bloomfield, Understanding and Interpreting Company Accounts: A practical guide to published accounts for non-specialists, Robinson, 2016.

6. Clifford S. Ang, Analyzing Financial Data and Implementing Financial Models Using R, Springer, 2016.
7. Tableau Support, https://www.tableau.com/support/help/
8. SAS Documentation, https://support.sas.com/documentation/

MAXU 5214 Project I

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Identify the problems, objectives and scope based on current trends of technologies.
CLO2: Perform a comprehensive literature review and appropriate procedures to complete the project.
CLO3: Justify the suitable key answers to clarify the contribution in application domain.

Synopsis:

This course is the first part of project that contains the results based on the theories and techniques of current technologies learnt previously. Besides writing the proposal, student is required to write four chapters of dissertation i.e. Chapter 1: Introduction, Chapter 2: Literature Review, Chapter 3: Research Methodology and Chapter 4: Analysis & Design. In addition, student must accomplish the project design and justify the proposed solution during presentation.

References:

1. Project Guidelines for Master by Taught Course Version 2022, FTMK, UTeM.
2. Rubin, K.S., Essential Scrum: A Practical Guide to the Most Popular Agile Process, Addison-Wesley Profesional, 2012.
3. O'Brien, H., Agile: Agile Project Management, A QuickStart Beginners' Guide To Mastering Agile Project Management, 3rd Edition, Addison-Wesley, 2016.
4. Cresswell, J.W., Research Design: Qualitative, Quantitative, and Mixed Methods Approaches, 4th Edition, California: SAGE Publications, Incorporated, 2014.
5. Kirill Dubovikov, Managing Data Science: Effective strategies to manage data science projects and build a sustainable team, Packt Publishing; 1st Edition, November 12, 2019.

MAXU 5226 Project II

Learning Outcomes:

At the end of the course, students should be able to:

CLO1: Demonstrate the solutions with significance contribution to the application domain.

CLO2: Verify the proposed solutions to understand the strengths, weaknesses and limitations of the study.

CLO3: Defend the proposed solution by articulating the series of processes to achieve the end results of the domain business requirements.

Synopsis:

This course is the second part of project that show the ability of student in applying the theories and techniques of knowledge and technologies learnt previously. Student must write the second fold of dissertation which consists of three chapters of dissertation i.e. Chapter 5: Implementation, Chapter 6: Evaluation and Chapter 7: Conclusion & Future Works. These chapters must align with the proposed solutions developed as the end product of this project. Student is required to justify the contribution of the proposed solutions throughout the presentation and demonstration sessions.

References:

1. Project Guidelines for Master by Taught Course Version 2022, FTMK, UTeM.
2. Rubin, K.S., Essential Scrum: A Practical Guide to the Most Popular Agile Process, Addison-Wesley Profesional, 2012.
3. O'Brien, H., Agile: Agile Project Management, A QuickStart Beginners' Guide To Mastering Agile Project Management, 3rd Edition, Addison-Wesley, 2016.
4. Cresswell, J. W., Research Design: Qualitative, Quantitative, and Mixed Methods Approaches, 4th Edition. California: SAGE Publications, Incorporated, 2014.
5. Kirill Dubovikov, Managing Data Science: Effective strategies to manage data science projects and build a sustainable team, Packt Publishing; 1st Edition, November 12, 2019.