# DIPLOMA IN BIG DATA & ANALYTICS (T60)

## Course Overview

Just how big is Big Data? It is massive! Did you know that Amazon uses big data to start the product delivery process even before the customer clicks on 'buy'? Or that top football clubs analyse opponent data to gain a competitive edge? That's just the tip of the iceberg.

Being a Big Data & Analytics (BDA) student gives you the competitive edge to harness the real power of data analytics and turn you into the go-to person organisations consult to unlock their true potential. You can look forward to an interesting curriculum that covers broad-based topics including: data science, data analysis, data visualisation and storytelling, big data programming and machine learning.

What's more, with Singapore's emergence as an international Data and Analytics hub, you will be in the best position to land a rewarding career as a big data professional. In fact, we offer elective subjects in *Advanced Manufacturing* and *Advanced Analytics* which students can take in their final year. This gives you a significant edge when you apply for jobs as you would be graduating with key in-demand skills.

## Entry Requirements

| Subject | Grade |
| --- | --- |
| English Language (EL1)* | 1-7 |
| Mathematics (E or A) | 1-6 |
| Any two other subjects | 1-6 |
| **2021 Planned Intake** | **50** |
| **Net ELR2B2 aggregate range (2021 JAE)** | **5 - 13** |

To be eligible for selection, applicants must also have sat for one of the following subjects: Additional Combined Science, Additional Science, Biology, Chemistry, Combined Science, Computer Studies, Creative 3-D Animation, Design & Technology, Engineering Science, Food & Nutrition, Fundamentals of Electronics, General Science, Human & Social Biology, Integrated Science, Physics, Physical Science, Science (Chemistry, Biology), Science (Physics, Biology), Science (Physics, Chemistry), Science (Physics, Chemistry, Biology).

* Sijil Pelajaran Malaysia (SPM)/ Uni ed Examination Chinese (UEC) holders must have a minimum of grade 6 for the relevant English Language subject (e.g. Bahasa Inggeris).

Note: *Applicants with complete colour vision de ciency are not eligible to apply for this course.*

See also the minimum entry requirements for:

- ITE Certificate Holders
- International Students

# What You'll Learn

YEAR 1

**Strong Foundation Skills**
Learn to develop your own mobile and web applications with the coding and user interface skills you acquire. Also, learn the fundamentals of networking, and discover how to create your own analytics dashboard.

| | TP Fundamentals (TPFun) Subjects | | — |
| --- | --- | --- | --- |
| **Subject Code** | **Subject** | **Credit Units** | |
| ⌃ **LEA1011** | **Leadership: Essential Attributes & Practice 1** | **1** | ⌃ |
| | LEAP 1, 2 and 3 are three fundamental subjects that seek to cultivate in you, the attitude, skills and knowledge for the development of your leadership competencies. This character-based leadership programme enables you to develop your life-skills through establishing personal core values, which will become the foundation for your leadership credibility and influence. | | |
| ⌃ **MCR1001** | **Career Readiness 1** | **1** | ⌃ |
| | This Career Readiness programme comprises three core subjects - Personal Management, Career Preparation and Career Management. It seeks to help you understand your career interests, values, personality and skills for career success. It also equips you with the necessary skills for seeking and securing jobs, and to develop professional work ethics. | | |
| ⌃ **CCS1006** | **Communication & Information Literacy** | **2** | ⌃ |
| | In this subject, you will learn how to conduct research for relevant information and validate information sources.. You will also learn to recognise and avoid plagiarism, and follow standard citation and referencing guidelines when presenting information. In the course of learning, you will be required to plan, prepare and present information appropriately in written and oral form. You will also be taught to consider the **M**essage, **A**udience, **P**urpose and **S**trategy (MAPS) when writing and delivering oral presentations. | | |
| ⌃ **LSW1002** | **Sports & Wellness** | **2** | ⌃ |
| | This subject will help you develop both the physical and technical skills in your chosen sports or fitness activities. Through a structured curriculum that facilitates group participation, practice sessions and mini competitions, you will learn to build lifelong skills such as resilience, leadership, communication and teamwork. Physical activity sessions will be supplemented by health-related topics to provide you with a holistic approach to healthy living. | | |

| | CCS1008 | **Persuasive Communication** | **2** | |
|---|---|---|---|---|

In this subject, you will be taught how to use persuasive language in written documents. You will be required to use information to your advantage to verbally communicate and convince an audience about your idea, product or service. Skills such as persuasive vocabulary, language features, graphical illustrations, tone and style would also be covered. The **M**essage, **A**udience, **P**urpose and **S**trategy (MAPS) will also be applied when engaging in verbal and written communication.

| | GCC1001 | **Current Issues & Critical Thinking** | **2** | |
|---|---|---|---|---|

This subject presents you with a panoramic view of current local and global issues, which may have long term implications for Singapore. You will learn to apply critical thinking tools to examine current issues, support your views with relevant research and up-to-date data, articulate an informed opinion and mature as civic-minded individuals.

| | CGS1002 | **Global Studies** | **3** | |
|---|---|---|---|---|

This subject provides essential skills and knowledge to prepare you for an overseas experience. You will examine the elements of culture and learn the key principles of cross-cultural communication. In addition, you will gain an appreciation and awareness of the political, economic, technological and social landscape to function effectively in a global environment.

## Diploma Subjects - Core Subjects

| | **Subject Code** | **Subject** | **Credit Units** | |
|---|---|---|---|---|
| | CIA1C07 | **Logic and Mathematics** | **3** | |

This subject covers logic, sets, functions, recursion and graphs. It covers mathematical processes for developing algorithms in computing and other real-life applications. Topics covered include the fundamental mathematical concepts needed for computing.

| | CIT1C19 | **User Experience and Interface Design** | **3** | |
|---|---|---|---|---|

This subject introduces the concept of Human-Centered Design, and its practice to create useful digital products and interfaces that offer an enriching user experience (UX). The topics covered include deisgning interfaces, need findings, sketching and prototyping for interactive experiences, and usability testing.

| | CIT1C18 | **Computational Thinking** | **4** | |
|---|---|---|---|---|

This subject introduces students to the fundamentals of computational thinking and their application in developing programming solutions for problems. Topics covered include programming concepts, simple data structures and programming techniques.

| | **CIT1C20** | **Coding and Development Project** | **4** | |
|---|---|---|---|---|
| | | This subject introduces students to coding principles and practices using an object-oriented approach. The subject also introduces the development of an IT application using the latest technologies. Topics covered include object and classes, composition, simple data structures, application architecture, design and development. | | |

| | **CIA1C11** | **Data Visualisation and Analytics** | **4** | |
|---|---|---|---|---|
| | | This subject covers the data analytics lifecycle, including gathering, cleaning, processing and visualising of data. Exploratory data analysis methods, descriptive and predictive analytics and the presentation of insights will also be covered. | | |

| | **CIA1C06** | **Database Application Development** | **4** | |
|---|---|---|---|---|
| | | This subject introduces the fundamental concepts of relational database systems, the design methods specific to relational database, database manipulation using a database query language, and the techniques of implementing relational databases. It will also cover implementation of simple applications to access relational database. | | |

| | **CIT1C14** | **Data Structures and Algorithms** | **4** | |
|---|---|---|---|---|
| | | This subject introduces students to the fundamentals of recursion and data structures in solving problems using a programming language. Topics covered include stacks, queues, linked lists and trees. Searching techniques and sorting algorithms will also be covered. | | |

| | **CCF1C02** | **IT Systems Security Essentials** | **4** | |
|---|---|---|---|---|
| | | This subject introduces students to the key principles of information security namely confidentiality, integrity and availability and their application in various real world scenarios. Topics covered include IT law, international standards, security policies, procedures, processes to protect IT systems against cyber-attacks and information breaches and the architecture and organisation of the digital components of a computer system. | | |

| | **CMC1C08** | **Network Technology** | **4** | |
|---|---|---|---|---|
| | | This subject covers the theoretical and practical aspects of networking and its related technologies. Topics covered include network protocols and communications, Ethernet networks, TCP/IP networking model, IP addressing, virtual local area networks (VLANs), routing and switching concepts and static and dynamic routing. | | |

**Provide Business Insights**

You will learn how to manage Big Data, such as those that Facebook and Google collect and store. This critical skill will be useful for you in your future careers to analyse how a business or an organisation is doing, and advise them on smarter business decisions.

## TP Fundamentals (TPFun) Subjects —

| | Subject Code | Subject | Credit Units | |
|---|---|---|---|---|
| ∧ | MCR1002 | **Career Readiness 2** | 1 | ∧ |
| | | This Career Readiness programme comprises three core subjects – Personal Management, Career Preparation and Career Management. It seeks to help you understand your career interests, values, personality and skills for career success. It also equips you with the necessary skills for seeking and securing jobs, and to develop professional work ethics. | | |
| ∧ | LEA1012 | **Leadership: Essential Attributes & Practice 2** | 1 | ∧ |
| | | LEAP 1, 2 and 3 are three fundamental subjects that seek to cultivate in you, the attitude, skills and knowledge for the development of your leadership competencies. This character-based leadership programme enables you to develop your life-skills through establishing personal core values, which will become the foundation for your leadership credibility and influence. | | |
| ∧ | LEA1013 | **Leadership: Essential Attributes & Practice 3** | 1 | ∧ |
| | | LEAP 1, 2 and 3 are three fundamental subjects that seek to cultivate in you, the attitude, skills and knowledge for the development of your leadership competencies. This character-based leadership programme enables you to develop your life-skills through establishing personal core values, which will become the foundation for your leadership credibility and influence. | | |
| ∧ | CCS1007 | **Workplace Communication** | 2 | ∧ |
| | | In this subject, you will be taught how to conduct effective meetings while applying team communication strategies and the skills for documenting meeting notes. You will be required to write clear emails, using the appropriate format, language, tone and style for an audience. You will also be taught to communicate appropriately in and for an organisation while using various platforms. In all aspects, the principles of applying **M**essage, **A**udience, **P**urpose and **S**trategy (MAPS) will be covered. | | |
| ∧ | CGS1003 | **Managing Diversity at Work*** | 3 | ∧ |
| | | This subject explores the concepts of identity, diversity and inclusion at the workplace. It examines the relationship between identity and diversity, the benefits and challenges of diversity and the strategies that promote inclusion and inspire collaboration in a diverse workplace. Examples of the elements of diversity covered in this subject include nationality, generation, ethnicity and gender. A one week residential stay is mandatory for this subject. | | |

| | CGS1004 | Global Citizenship & Community Development* | 3 | ⌃ |
|---|---|---|---|---|
| | | Students will examine the meaning and responsibilities of being a Global Citizen, in order to contribute towards a more equitable and sustainable world. In addition, students will learn how sustainable solutions can support community development, and, execute and critique a community action plan that addresses the needs of a specific community/cause. | | |

| | CGS1005 | Expressions of Culture* | 3 | ⌃ |
|---|---|---|---|---|
| | | This subject provides a platform for an understanding of culture and heritage through modes of expression. Students will be introduced to global and local cultures via everyday objects, places and human behaviour seen through time and space. Students will explore issues and challenges in culture and heritage sustainabiltiy in community, national and global contexts. | | |

| | TGL1001 | Guided Learning | 3 | ⌃ |
|---|---|---|---|---|
| | | The subject introduces students to the concepts and process of self-directed learning in a chosen area of inquiry. The process focusses on four stages: planning, performing, monitoring and reflecting. Students get to plan their individual learning project, refine and execute the learning plan, as well as monitor and reflect on their learning progress and project. The learning will be captured and showcased through a curated portfolio. The self-directed learning project will broaden and/or deepen a student's knowledge and skills. | | |

| | CIN1001 | Innovation & Entrepreneurship | 2 | ⌃ |
|---|---|---|---|---|
| | | The Innovation & Entrepreneurship subject is designed for learners from all disciplines to embrace innovation in either their specialised fields or beyond. You will first learn the Design Thinking framework, where you will develop problem statements and ideate solutions. Next, you will discover the tools for prototyping and innovation, such as 3D printing and laser cutting, at TP's Makerspace+ facility. Finally, you will acquire commercial awareness through the LEAN Startup framework of idea crystallisation, prototype building, customer testing and validation, refinement of business model canvas, and crowdfunding or crowdsourcing avenues. | | |

*Students must choose to take either one of these subjects or TGL1001 Guided Learning*

## Diploma Subjects - Core Subjects —

| | Subject Code | Subject | Credit Units | |
|---|---|---|---|---|
| | CDA2C02 | Data Mining and Business Analytics | 4 | ⌃ |
| | | This subject introduces the fundamental concepts of machine learning. Topics covered include supervised and unsupervised learning and classification. | | |

| | **CIA2C14** | **Data Science Essentials** | **4** | |
|---|---|---|---|---|

This subject equips students with knowledge and skills in the emerging field of data science. It covers the data science life-cycle, history and context, as well as its landscape. Topics covered include data exploration and analysis techniques to discover new knowledge from data to aid data-driven decisions in an intelligent and informed way.

| | **CDA2C04** | **Data Storytelling** | **4** | |
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This subject covers graphing fundamentals, graphing properties and building dashboards for reporting purposes using relevant statistical modelling and analysis techniques. The subject also introduces the knowledge and skills to apply the data storytelling framework and principles of data visualisation to enable business users to communicate and narrate findings relevant to business contexts.

| | **CDA2C01** | **Data Warehousing and Business Intelligence** | **4** | |
|---|---|---|---|---|

This subject covers the fundamental concepts and techniques of setting up the data warehouse, its model design and implementation, and how data warehousing enables business intelligence capabilities and effective decision making across many industries. It also covers Business Intelligence (BI) concepts and the techniques of integrating data into useful information, and implementing BI applications to help companies manage their business performance.

| | **CDA2C06** | **Data Engineering in the Cloud** | **4** | |
|---|---|---|---|---|

This subject covers the data engineering technologies to build a scalable data pipeline on the cloud to meet business requirements. It includes topics such as data ingestion, data transformation, data processing, data storage, data governance and protection.

| | **CDA2C05** | **Machine Learning for Decision Making** | **4** | |
|---|---|---|---|---|

This subject covers the techniques for data driven decision making through a hands-on approach. It includes topics such as the framing of the business problem into a machine learning problem, feature engineering, machine learning model building, model results explanation and application.

| | **CIA2C12** | **Quantitative Analysis** | **4** | |
|---|---|---|---|---|

The subject covers linear regression, correlation between a dependent variable and independent variable, analysis of variance, chi-squared tests, two-way analysis of variance (ANOVA) and multivariate analysis.

**Sparking Transformation**

Discover how to 'mine' Big Data for better business insights. Also, undertake more significant and complex projects that equip you with real-world work experience. You can also look forward to meaningful internships in either a local company or an overseas organisation.

## TP Fundamentals (TPFun) Subjects —

| | Subject Code | Subject | Credit Units | |
|---|---|---|---|---|
| ∧ | MCR1003 | **Career Readiness 3** | **1** | ∧ |
| | | This Career Readiness programme comprises three core subjects – Personal Management, Career Preparation and Career Management. It seeks to help you understand your career interests, values, personality and skills for career success. It also equips you with the necessary skills for seeking and securing jobs, and to develop professional work ethics. | | |
| ∧ | CSI3004 | **Student Internship Programme** | **16** | ∧ |
| | | This structured programme is designed to link your learning with the real work environment. You will be placed in organisation(s) with opportunities to apply the concepts and skills acquired in the course of your study. Besides reinforcing technical concepts and mastering of skills in areas that you have been trained, the practical training will enable you to build important skills such as problem-solving, communication, teamwork, and to cultivate good attitude and a strong work ethic. | | |

## Diploma Subjects - Core Subjects —

| | Subject Code | Subject | Credit Units | |
|---|---|---|---|---|
| ∧ | CMP3101 | **Major Project** | **10** | ∧ |
| | | This subject involves the integration of knowledge and skills acquired from the various subjects in the course. It helps students develop a practical understanding of the products, methodlogies, processes, systems, project management and presentation skills needed for AI related application projects. Students will develop, present and demonstrate solutions to a problem. | | |

# Diploma Subjects - Elective Cluster Subjects

## Advanced Analytics —

| | Subject Code | Subject | Credit Units | |
|---|---|---|---|---|
| ⌃ | CIA2E01 | **Text & Social Media Analytics** | **4** | ⌃ |
| | | This subject equips you with the knowledge and skills to process textual data and social media for analytical insight. It covers topics such as social media analytics concepts and techniques, text analytics process and techniques such as information extraction, text categorisation, cluster analysis and sentiment analysis. | | |
| ⌃ | CAI2C03 | **Deep Learning and Object Recognition** | **4** | ⌃ |
| | | This subject introduces students to the fundamental principles of deep learning and how it is applied to a collection of computer vision tasks to implement object recognition. It covers the concepts and architecture of convolutional neural networks such as the various layers within, and the hyperparameters involved, using available tools and libraries. | | |

## Advanced Manufacturing Technology —

| | Subject Code | Subject | Credit Units | |
|---|---|---|---|---|
| ⌃ | BLO2010 | **Distribution Centre Management** | **4** | ⌃ |
| | | This subject provides an overview of the role of a Distribution Centre (DC) in the supply chain. It also covers the various activities performed within a DC and the significance of these activities on customer service and total logistics costs. It focuses on the major resources to be applied in a DC and explains how they interact with one another in contributing to the DC's effectiveness and efficiency. It will also cover the significance of providing DC services to the Third-Party Logistics industry. | | |
| ⌃ | ECC2014 | **Industrial IoT Analytics** | **4** | ⌃ |
| | | This subject covers the essential concepts and skills needed for implementing digital transformation in smart manufacturing plants. It covers the application of industrial software platforms to wirelessly interconnect sensors, Internet of Things (IoT) devices and equipment. Students will learn to develop dashboard for acquiring, analysing and displaying data that is commonly found in Advanced Manufacturing. Modern approaches in activation of hardware and software responses when interventions are required for process improvement or corrective actions are also covered in detail. | | |

## GRADUATION REQUIREMENTS

| | |
|---|---|
| Cumulative Grade Point Average | min 1.0 |
| TP Fundamental Subjects | 40 credit units |
| Diploma Subjects - Core Subjects | 72 credit units |
| Diploma Subjects - Elective Subjects | min 8 credit units |
| **Total Credit Units Completed** | min 120 credit units |