Lecture 1 - Data Science and ICT fundamentals for engineers

Data science and ICT is a very complex and wide topic covering various fields.

Data science combines multiple fields including statistics, scientific methods, and data analysis to extract value from data. Nowadays, any simple decision should be based on information. The information is extracted from data, after the data is processed using various existing methods. At this stage, the Australian job market needs a modern engineer who is able to process the data and obtain the necessary information, in order to make informed decisions.

There is also the concept of data engineering jobs. It refers to engineers able to find the necessary tools to produce data for analyses. Data engineers have to clean and refine the data as well.

How is the data analysed? Because there is usually a big quantity of data, the analyses are made using software applications. The most utilised software application and very easy to use for analysis and visualisation is Microsoft Excel, which is part of the Microsoft Office pack.
There are also very many other applications, some of them free, but most of them require programming skills, that's why Excel is seen as the most convenient. Plus, the majority of people use Microsoft Word as a word processing program, and Excel is part of the Office pack anyway. Excel offers many tools for analysing the data and for visualisation.

Information and Communication Technology (ICT) capability is compulsory for engineers in order to access, create and communicate information and ideas, solve problems and work collaboratively.
As an engineer, nowadays, you need to use the computer, and you need to understand the hardware requirements for various software applications that you might need to use in your work. A modern engineer should have basic knowledge about the computer hardware and software systems, in order to organise, store and communicate information electronically.
Also, some basic programming skills would be beneficial for engineers, increasing for them the job opportunities, as nowadays more and more engineering jobs require process automation, but also other duties that can be done using some basic coding.

Considering all these facts, I would like to encourage you to attend free online courses that can be found on various learning platforms, including:
Coursera: https://www.coursera.org/
Udacity: https://www.udacity.com/
Udemy: www.udemy.com
You need to create a free account, and then you will be able to search for courses using appropriate filters, such as "free course", "English language" and the topic of the course. You can also choose other options such as the level (beginner, intermediate, advanced). Don't forget to select "FREE COURSES", because there are also paid courses on these websites.

Also, a very good option is LinkedIn Learning: https://www.linkedin.com/learning/ - you need to use the student email address to access the resources, or, if you are not a student anymore, some universities allow you to apply for alumni access to the library resources, for example La Trobe University:
https://www.latrobe.edu.au/news/announcements/2013/free-library-membership-for-alumni2
Your request is assessed by the university, and you will receive an email with details necessary to access the library.
Then login into the online library and search for "LinkedIn Learning" or "Lynda.com" (Lynda.com was transformed in LinkedIn Learning, so basically it is the same resource).
Alternatively, you can access LinkedIn Learning for free for one month, if you activate the "free premium trial" on LinkedIn.

You will find thousands of free courses on various topics. After you complete a course and pass all the quizzes, you have the option to automatically put the course certificate on your LinkedIn profile.

For example, to find courses that teach you the fundamentals of coding, just search for "pseudocode", and you will be able to find courses that can help you understand and learn how computers "think". This is the fundamental part for any programming language.

If you want to search for programming languages, IEEE Computer Society recommends 7 programming languages for 2020 and beyond, and you can find them here: Python, Kotlin, Java, JavaScript/ NodeJS, TypeScript, Go and Swift (https://www.computer.org/publications/tech-news/trends/programming-languages-you-should-learn-in-2020)
 You don't need to learn them all, see what is most relevant for the companies where you would like to work.

Surprisingly, YouTube is another platform where you can find great free resources, but people are generally more skeptical to use YouTube because anyone can post content there, and most of the times, it is not verified for technical accuracy. Nevertheless, YouTube does contain some really good resources, especially tutorials on how to use various tools.

In the future, when you will have a job in your field and good income, and you will not be able to access LinkedIn Learning as a student or graduate, an option is to get LinkedIn Premium, which means that you have to pay a monthly fee of at least $39.99, and you have access to free courses, but also to various other LinkedIn features (it depends what type of premium you choose):
The paid options can be found here:
https://www.linkedin.com/premium/products/?family=jss&indexFamily=jss&indexIntentType=explore&indexUpsellOrderOrigin=help_answer_71&intentType=explore&upsellOrderOrigin=help_answer_71