Core Learning

Portfolio Projects

Flipped Learning

Enrichment

Technology

Wellbeing

Soft Skills

Employability

Data Academy HLT

Tasks	GLH
Core Learning - NumPy fundamentals	120 - 240 minutes
Portfolio Task - NumPy mini projects	60 - 120 minutes
Flipped Learning - Pandas	30 minutes
Enrichment - Data distribution and NumPy ufunc	60 minutes
Technology - HTML, CSS, and JavaScript	60 minutes
Wellbeing - Mindfulness	60 minutes
Soft Skills - Revising for an exam	60 minutes
Employability - Review and update CV	60 minutes

*Times are a rough guideline

TECH TALENT ACADEMY

Core Learning

Core Learning 1 – NumPy Fundamentals

20 – 40 mins

Don't forget to import the NumPy library

Complete the following short fundamental NumPy tasks.

1. Create a 1D array of numbers from 0 to 9
2. Convert a 1D array to a 2D array with 2 rows
3. Write a NumPy program to create an array of the integers from 30 to 70.
4. Write a NumPy program to append values to the end of an array.

REMINDER

Must check marking criteria

Use examples from lesson

Once complete, submit the ipynb file via Teams

Core Learning

Core Learning 1 – NumPy Fundamentals extension

20 – 40 mins

1. Write a NumPy program to find the number of rows and columns of a given matrix.
2. Write a NumPy program to create an array of all the even integers from 30 to 70.
3. Write a NumPy program to convert a list and tuple into arrays.
4. Write a NumPy program to create a structured array from given student name, height, class and their data types.

```
data_type = [('name', 'S15'), ('class', int), ('height', float)]
students_details = [('James', 5, 48.5), ('Nail', 6, 52.5),('Paul', 5, 42.10), ('Pit', 5, 40.11)]
```

Now sort the array on height

REMINDER

Must check marking criteria

Use examples from lesson

Once complete, submit the ipynb file via Teams

Core Learning

Marking Criteria – NumPy fundamentals

	Pass	Merit	Distinction
• **Syntax**	• Attempts to use Python syntax with some success	• Python syntax is largely accurate with some errors	• Python syntax is consistently accurate and appropriate to the task
• **Code**	• Attempts to complete some of the NumPy fundamental tasks	• Successfully completes all of the NumPy fundamental tasks	• Successfully completes the extension tasks which may require students to carry out own research

20 - 40 mins

Core Learning 2 - Mathematics

Complete the following short Mathematics tasks

1. Write a NumPy program to add, subtract, multiply, divide arguments elementwise.
2. Write a NumPy program to round elements of the array to the nearest integer.
3. Write a NumPy program to get true division of the element-wise array inputs.

Core Learning

20 - 40 mins

Core Learning 2 – Mathematics extension

1. Write a NumPy program to multiply a 5x3 matrix by a 3x2 matrix and create a real matrix product.
2. Write a NumPy program to create a random array with 1000 elements and compute the average, variance, standard deviation of the array elements.
3. Write a NumPy program to calculate round, floor, ceiling, truncated and round (to the given number of decimals) of the input, elementwise of a given array.
4. Write a Python program to find the maximum and minimum value of 1D array.

Core Learning

Marking Criteria – Mathematics

	Pass	Merit	Distinction
Syntax	• Attempts to use Python syntax with some success	• Python syntax is largely accurate with some errors	• Python syntax is consistently accurate and appropriate to the task
Code	• Attempts to complete some of the NumPy mathematics tasks	• Successfully completes all of the NumPy mathematics tasks	• Successfully completes the extension tasks which may require students to carry out own research

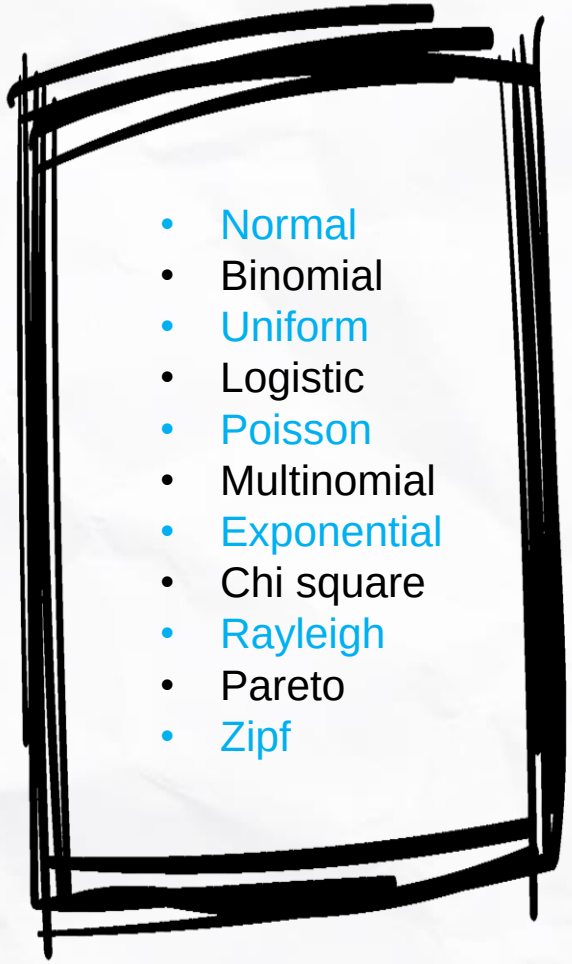
Core Learning

Core Learning 3 – Types of data distribution (optional)

20 – 40 mins

We the session we have looked at a couple of data distribution types.

Your task is to research the key characterises of each data distribution and what insights it gives us bout the data.



- Normal
- Binomial
- Uniform
- Logistic
- Poisson
- Multinomial
- Exponential
- Chi square
- Rayleigh
- Pareto
- Zipf

60 - 120 mins

Portfolio Projects

Portfolio Tasks –

Masked arrays

https://numpy.org/numpy-tutorials/content/tutorial-ma.html#what-are-masked-arrays

NumPy mini project using linear regression

https://www.youtube.com/watch?v=QUT1VHiLmmI

Simulating COVID-19 using Python, NumPy & Matplotlib

https://www.youtube.com/watch?v=KAmZe5D3v5I

Remember to upload to GitHub

GitHub

30 mins

Flipped Learning

Flipped Learning

Use the following resources to support you ahead of next weeks session on the following concepts:

- What is the Pandas library?
- How to import data
- Data manipulation
- How to combine data
- How to work with JSON data
- How to import data from APIS

Visit the w3schools website to the learn the basics of the Pandas Library
https://www.w3schools.com/python/pandas/default.asp

60 mins

Enrichment

Use the following resources to explain concepts in more detail:

Data distribution - https://www.w3schools.com/python/numpy/numpy_random_distribution.asp

NumPy ufunc - https://www.w3schools.com/python/numpy/numpy_ufunc.asp

Statistics - https://thecrashcourse.com/topic/statistics/

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120 mins

Technology

This week, our focus is on **HTML, CSS, and JavaScript.**

HTML overview:
HTML is a HyperText Markup Language commonly used to make Web pages. A webpage is made up of several elements named tags used to build the structure of a webpage.
In Data Science, the tags elements of a webpage can be retrieved (web scrapping) using a Python library named Beautiful soup.
CSS overview:
CSS (Cascading Style Sheets) is a language used to style elements of a webpage. It will have its own specific syntax to style HTML tags.
JavaScript overview:
JavaScript a programming language used to add interactivity to web pages. With JavaScript you can create functions similarly to the one you created in Python to perform some actions on HTML tags.

Website providing HTML tutorials:
https://www.w3schools.com/html/
Website providing more info on CSS:
https://developer.mozilla.org/en-US/docs/Web/CSS
Website providing JavaScript tutorials:
https://www.w3schools.com/js/default.asp
Website to do web scrapping with Python:
https://realpython.com/beautiful-soup-web-scraper-python/

60 mins

Wellbeing

This week, our focus is on **Mindfulness Meditation**:

Mindfulness meditation is a mental training practice that teaches you to slow down racing thoughts, let go of negativity, and calm both your mind and body. It combines meditation with the practice of mindfulness, which can be defined as a mental state that involves being fully focused on "the now" so you can acknowledge and accept your thoughts, feelings, and sensations without judgment.

Techniques can vary, but in general, mindfulness meditation involves deep breathing and awareness of body and mind. Practicing mindfulness meditation doesn't require props or preparation (no need for candles, essential oils, or mantras, unless you enjoy them). To get started, all you need is a comfortable place to sit, three to five minutes of free time, and a judgment-free mindset.

If you've never tried it before, it may seem a little odd however studies have shown that done correctly and a few times a week, it can reduce stress, lower heart rate, improved immunity and better sleep. Bets of all, you don't need any equipment or purchase anything - it's absolutely free!

Use the following links to explore mindfulness meditation:
https://www.nhs.uk/mental-health/self-help/tips-and-support/mindfulness/
https://www.verywellmind.com/mindfulness-meditation-88369#toc-how-to-practice-mindfulness-meditation
https://www.nytimes.com/guides/well/how-to-meditate

60 mins

Soft Skills

This week, our focus is **Revising for an Exam.**

When was the last time you revised for an exam?

For many, school may have been the last time you sat an exam (which may have been many years ago). At school, you may have had lots of support from teachers, friends or even family and were provided with resources (books, support notes, website links) and an exam schedule to follow over a number of weeks/months.

When we have to plan for an exam ourselves, sometimes it can be a little overwhelming. Luckily, you have the help and support from your tutor but you may want to revisit some of the tired and tested methods which can help you plan ahead to achieve a positive outcome.

Below are some weblinks which you may find helpful:

Tried and tested methods: https://www.youtube.com/watch?v=xTkpr5bkzPw&t=4s

Tips:

- Plan for time to be set aside each week to revise (sounds simple but we all have something more important to do).
- Learn in short bursts (around 30 minutes at a time)
- Active learning whilst revising e.g. making flash cards, mind maps, tables of advantages and disadvantages
- Test yourself regularly (either daily or weekly); ideally using the resources you created.

60 mins

Employability

Congratulations - you are halfway through your course!!

You have covered many new topics and technologies, including building a portfolio for a perspective employer.

It's time to go back to your CV created earlier in the course and reference all the new knowledge and skills gained so far.

Continue to check the employability channel in Teams and attend any workshops provided.