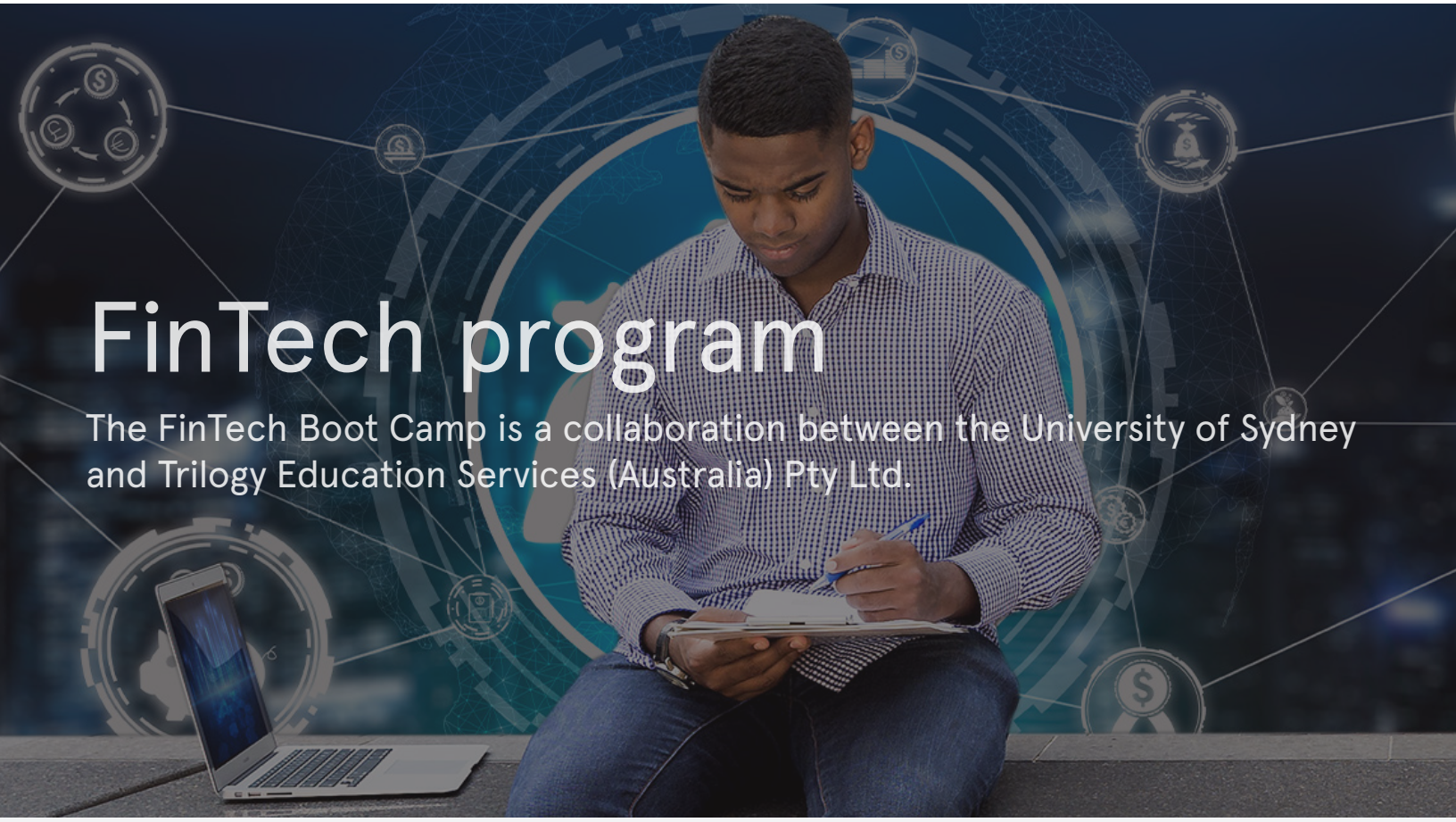
A collaboration between

THE UNIVERSITY OF SYDNEY

TRILOGY EDUCATION SERVICES



FinTech program

The FinTech Boot Camp is a collaboration between the University of Sydney and Trilogy Education Services (Australia) Pty Ltd.

Curriculum overview

"Banks are technology firms in disguise." - Chris Skinner

Source: https://thefinanser.com/2008/11/banks-are-techn.html/

The field of finance is evolving. Financial services firms, insurance agencies and investment banks are increasingly at the intersection of data and technology, harnessing programming, machine learning, big data and blockchain to conduct business.

The 24-week FinTech Boot Camp is a challenging, part-time program that teaches you how to automate and improve financial services using cutting-edge technology.

Throughout the course, you will gain experience with a host of popular tools and methods such as Python programming, financial libraries, machine learning algorithms, Solidity smart contracts, Ethereum and blockchain. You will learn how these concepts are leveraged within financial fields from insurance to investment banking, as well as best practices for using these skills to add value to your organisation.

Why enrol?

Are you looking to advance your existing finance career or interested in breaking into fintech? If any of the following describes you, enrolling in this boot camp could help put you on the path to achieving your goals:

You are a financial professional who wants to develop technical skills in the wake of your organisation's digital transformation.

You are a technical professional, such as a developer or data analyst, who wants to transition into the financial sector and apply technology to financial products and services.

You are a technology enthusiast who wants a career in the high-growth, exciting world of fintech.

The skills you'll gain

You will complete the program with a foundation in Financial Technology and Analysis, including*:

Financial fundamentals

- Time-series analysis
- Financial ratios
- Financial analysis
- Financial modeling

Programming and financial libraries

- Python
- Pandas
- PyViz
- APIs
- Amazon web services
- SQL
- Numpy
- SciPy

Machine learning applications in finance

- Algorithmic trading
- Random forests
- k-Nearest neighbors (kNN)
- Support vector machines (SVM)
- Linear regression
- Scikit-learn
- Forecasting
- Logistic regression
- Deep learning
- Recurrent neural networks
- TensorFlow
- Keras
- AWS SageMaker

Blockchain and cryptocurrency

- Solidity
- Ethereum
- Smart contracts
- Consensus algorithms
- Transactions
- Validation
- Distributed ledger
- Cryptocurrency
- Truffle suite
- Ganach

*The material covered in this course is subject to change due to market demand.

Building on the basics

Financial institutions are increasingly becoming technology institutions that require not only financial knowledge but deep technical knowledge.

That's why our curriculum is designed to provide you with a deep foundation on the core technical skills needed to succeed in the field. Throughout the program, expect to learn brand new skills and be challenged in completing difficult real-world problems to demonstrate your new abilities. By the end of the program, you will have a strong professional portfolio showcasing your work.

Real-world application, real jobs

Those who complete the FinTech Boot Camp will learn critical skills relevant to the following careers:

- Financial Analyst
- Risk Analyst
- Investment Data Analyst
- Financial Manager
- Quantitative Trader
- Technology Consultant
- Financial Applications Developer
- FinTech Product Manager
- Smart Contracts Developer
- Blockchain Project Manager
- Blockchain Developer
- Research Analyst
- Software Engineer

What you will learn

By the time you complete the program, you can expect to be able to:

- Apply modern financial technologies within the context of working at an investment bank, insurance agency or any player in the financial industry
- Employ financial analysis techniques to model, predict and forecast trends
- Model future financial performance of a company using Python and financial fundamentals
- Simulate and model financial portfolios using statistical techniques
- Make API requests to pull financial data and use a variety of Python packages to run financial analysis on large datasets
- Conduct time-series analysis in conjunction with assumptions and variances to develop financial forecasts and analyse forecasts for accuracy
- Create a custom API with mock bank data and configure the API to allow incoming interactions
- Learn to work with databases on the AWS cloud in the service of financial applications
- Understand both uses and disadvantages of a variety of machine learning algorithms and their proper application within the field of finance
- Leverage machine learning to determine lending preferences and how effectively a cluster of customers would produce interest
- Analyse market behavior using machine learning on historical datasets
- Determine the optimal predictors for market strategy and evaluate models for accuracy
- Design and implement smart contracts with the Solidity programming language
- Build an Ethereum blockchain and understand how transactions are validated on a distributed ledger

Course structure

Over the course of 24 weeks, you'll attend informative classes, participate in a variety of individual and team exercises and work independently. Homework assignments provide an opportunity to apply what you've learned and build on it. The goal is to give you a comprehensive learning experience and true insight into a "day in the life" of a fintech professional.

Discussion

Industry professionals lead discussions on the background, history and use of new technologies or concepts.

Project work

You'll work on exercises and projects individually and in teams to put concepts covered in class into practice.

Portfolio projects

You'll build a substantial portfolio of projects that demonstrate your abilities across a wide variety of technologies.

We're here to help

As you move up the learning curve, you are likely to have questions around some of the concepts covered in class. We're here to help, through office hours, as well as a dedicated Slack channel where you can get assistance from trainers, support staff and fellow classmates. All work is done via GitHub, so you can create issues directly on your own projects for trainers to assist you in a truly asynchronous fashion. In addition to learning finance, financial programming and data analysis, you will have access to career services that will help you prepare for technical roles after the program through activities such as:

Career content and practice sessions

Database of customisable tools and templates

- Multiple technical resume templates
- GitHub best practices
- Guidelines to building a portfolio
- Creating an elevator pitch
- Developing a bio

Online career events with industry professionals

Soft skills training

One-on-one career coaching

Meeting employer expectations

It's a fact: companies care about what a person can do, not what a person says they can do. For that reason, our curriculum teaches you how to apply what you've learned to real world scenarios.

The curriculum emphasises in-depth projects, ranging from building algorithms for detecting fraud to creating applications that interface with the Ethereum network. You will use your personal laptop to practice the skills and abilities included in this course.

Sample projects

Currency predictor (Python and time-series analysis)

Description: Large companies often deal with foreign currency transactions while doing international business and as a result, they are always looking for anything that can help them better understand the future direction and risk of various currencies. In this exercise, you will predict future movements in the value of the Japanese yen versus the U.S. dollar.

Skills

- Python
- Scikit-learn
- Statsmodels
- NumPy
- Pandas
- APIs
- Linear regression forecasting
- JSON
- Time-series analysis

Objectives

- Use Python packages like NumPy to run financial analysis on the data you retrieve
- Use time-series models to identify predictable patterns in short-term trends and seasonality of currency
- Incorporate useful explanatory data into the predictive models, such as information on weather and physical commodity production

Risky business (APIs and financial modeling)

Description: One of the most important aspects of financial decisioning is the ability to evaluate and manage risk. For analysts, this is a critical part of the job description and requires a strong understanding of finance and statistics. Furthermore, the ability to script in Python is a helpful skill to run bulk analysis efficiently. In this exercise, you will assume the role of an analyst tasked with predicting credit risk using free data from peer-to-peer lending services.

Skills

- Python
- Pandas
- APIs
- Statistics
- Financial modeling
- Scikit-learn

Objectives

- Enforce financial and statistical concepts fundamental to evaluating and managing risk
- Conduct rigorous statistical methods on financial data from a wide variety of industry sectors
- Use the imbalanced-learn and scikit-learn libraries to build and evaluate models using the two following techniques: resampling and ensemble learning

Projects continued...

Stock predictor (recurrent neural networks)

Description: Due to the volatility of cryptocurrency speculation, investors will often try to incorporate sentiment from social media and news articles to help guide their trading strategies. One such indicator is the Crypto Fear and Greed Index (FNG), which attempts to use a variety of data sources to produce a daily FNG value for cryptocurrency. You have been asked to help build and evaluate deep learning models using both the FNG values and simple closing prices to determine if the FNG indicator provides a better signal for cryptocurrencies than the normal closing price data.

Skills

- Python
- TensorFlow
- Keras
- Jupyter notebook
- Recurrent neural networks

Objectives

- Use deep learning recurrent neural networks to model Bitcoin closing prices
- Build and train long short-term models (LSTMs) using multiple data sets
- Evaluate and compare the performance of models

Trading bot (algorithmic trading)

Description: You've just determined a winning stock market trading strategy. The problem? It requires you to make trades extremely precisely, with little room for error. Fortunately for you, this class will teach you to program and build your own algorithmic trading bot, capable of responding to incoming market data in real-time.

Skills

- Python
- Pandas
- Numpy
- Machine learning
- Algorithmic trading

Objectives

- Utilise Python, Pandas and a variety of APIs to interpret data streams and market events and respond with trade activities
- Run analysis to determine the quality of your trading bot's performance

Projects continued...

Robo advisor (cloud and machine learning)

Description: You have been hired as a consultant by a prominent retirement plan provider. They would like to increase their client portfolio and want you to create a robo advisor that could be used by current and potential customers to get investment portfolio recommendations for retirement. Using machine learning and natural language processing combined with your AWS skills, you will build a bot that will provide those portfolio recommendations.

Skills

- Python
- AWS
- Machine learning
- Natural language processing

Objectives

- Create an Amazon Lex bot that establishes a conversation with a user
- Use machine learning and natural language processing to program the bot to accurately respond to a user based on their input
- Deploy an Amazon Lambda Function to validate data

Profit splitter (blockchain and cryptocurrency)

Description: Your new start-up has created its own Ethereum-compatible blockchain to help connect financial institutions, but now the team wants to use it to help automate some of the company finances. The goal is to make things easier internally, increase transparency and make accounting and auditing practically automatic. You will develop smart contracts with Solidity to pay employees, distribute profits to different tiers of employees and distribute company shares for those employees in the equity incentive plan.

Skills

- Solidity
- Ganache
- Blockchain

Objectives

- Script smart contracts using the Solidity programming language
- Script smart contracts to distribute funds and stock equity on a specific schedule using guidelines such as a deferred equity incentive plan
- Deploy contracts to a live Testnet

Course curriculum by module

Learning Module	Description	What you'll learn
Intro to fintech	You'll begin with a quick, crash course in finance fundamentals. We want to make sure you have a baseline understanding of things like financial modeling and financial statement analysis.	– Fintech landscape – Time-series analysis – Financial ratios
Financial programming	When it comes to analysing large financial data sets, Python is far more powerful than Excel. By the end of this section, you'll know how to use Python and APIs to run robust financial analyses and build applications that rely on real-time data.	– Python – Financial modeling – Pandas – Matplotlib – Statistical programming – APIs – SQL – NumPy – SciPy – PyViz
Machine learning applications in finance	It's one thing to analyse the past, but it's another to predict future outcomes. You'll learn how to use machine learning techniques to determine credit worthiness, buy and sell stocks and more.	– Algorithmic trading – Random forests – k-Nearest neighbors – Support vector machines – Scikit-learn – Linear regression – Logistic regression – k-Means clustering – Forecasting – Amazon web services
Blockchain and cryptocurrency	As the popularity of blockchain has grown, so has the demand for professionals with related skills. You'll develop a technical understanding of how blockchains work and get hands-on experience with Solidity, the most popular blockchain language and smart contracts.	– Solidity – Smart contracts – Consensus algorithms – Transactions – Validation – Distributed ledger – Ethereum – Cryptocurrency – Mining – Truffle suite – Ganache