THE UNIVERSITY OF TEXAS AT DALLAS
Erik Jonsson School of Engineering and Computer Science

Powered By Fullstack Academy

AI & Machine Learning Bootcamp

Syllabus

In the UT Dallas AI & Machine Learning Bootcamp powered by Fullstack Academy, you'll develop an industry-ready AI/ML skill set in just 26 weeks by using top GenAI tools and applying machine learning concepts.

Gemini ChatGPT DALL·E

Hugging Face LangChain

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Why Choose the UT Dallas AI & Machine Learning Bootcamp?

Gain Specialized Experience Using Real-World Tools

AI & Machine Learning Bootcamp students learn by doing through our active learning method. You'll use real-world data technologies and tools like Python, Keras, and TensorFlow to apply your skills with corresponding use cases.

Train With AI & Machine Learning Professionals

UT Dallas AI & Machine Learning Bootcamp classes are taught live online by industry-experienced instructors who are passionate about training the next generation of professionals.

Join a Powerful Alumni Network

Get access to a vast network of 10,000+ Fullstack Academy alumni from across our bootcamps who can help to open doors to new job opportunities.

In-Demand Curriculum

The bootcamp features an immersive curriculum covering a holistic AI portfolio, including AI & machine learning algorithms, data science, deep learning, natural language processing, generative AI, and much more.

Earn a Certificate of Completion

Upon bootcamp graduation, you'll earn a Certificate of Completion jointly issued by UT Dallas and Fullstack Academy, validating your industry-ready skills.

Dedicated Career Coaching

Learn how to build or optimize the ideal AI & machine learning career for you with our career coaching services.

UT Dallas and Fullstack Academy Partnership

Fullstack Academy is one of the longest-running and most reputable bootcamp providers in the nation, with incredible student reviews, years of experience in education, and impressive graduate outcomes.

Through Fullstack Academy's active learning approach, the UT Dallas Artificial Intelligence & Machine Learning Bootcamp helps open doors to opportunities in Texas, remotely, and beyond!

The Fullstack Academy Difference

Founded in 2012, Fullstack Academy is a pioneering and top-rated bootcamp provider that has helped over 10,000 graduates to launch or accelerate their careers in tech.

Fullstack Inclusion

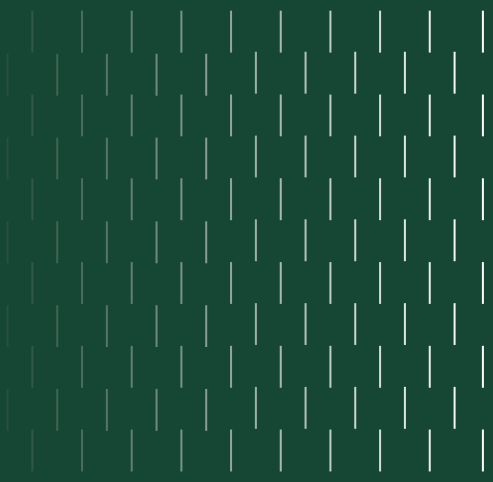
Fullstack can help make your career goals possible, no matter your background. We're committed to providing a welcoming, diverse, and flexible learning environment.

Fullstack Experience

Fullstack's rigorous curriculum focuses on the skills top-tier tech employers are seeking. Guided by passionate instructors and a caring career success team to assist with everything from interview prep to salary negotiations, you'll gain the confidence you need to build a fulfilling career.

Fullstack Outcomes

We're obsessed with helping our students succeed, and it shows: 1,500+ companies across the U.S. have hired our graduates — including notable companies like Google, Amazon, LinkedIn, Bloomberg, Spotify, and Etsy.



Support in Bootcamp and Beyond

Throughout the bootcamp and beyond, the Fullstack Academy Career Success team is committed to helping you land the ideal AI & machine learning role for you.

Proven Employment Outcomes

1,500+ companies across the U.S. have hired Fullstack Academy grads—everywhere from large tech firms to mid-size companies and innovative start-ups.

Professional Career Coaching

Bootcamp grads have the competitive advantage of career coaching and practical experience to land a role

A Built-In Network

You'll join our expansive network of alums—building lasting connections to support you throughout your career.

Perks of the Part-Time Bootcamp:

Learn at a balanced pace.

Maintain your job and other commitments.

Experience an immersive curriculum covering in-demand technologies and tools.

Curriculum Concepts

Unit 1

Programming Refresher

You will acquire essential Python skills that will serve as one of the building blocks for your journey throughout the program. After starting with the fundamentals, you will quickly progress to more advanced concepts. If you're new to coding or looking to strengthen your programming skills, you'll get hands-on practice with real-world scenario-based projects. You'll also learn to work with Python's powerful file-handling techniques and functional programming methods, in addition to using tools like Jupyter Notebook.

Key Learning Objectives

Python Fundamentals

Develop and execute Python programs for real-world applications.

Python Data Types and Operators

Learn essential Python data types and file-handling techniques.

Conditional Statements, Loops, and Python Functions

Learn and apply decision control structures, looping mechanisms, and argument types in Python.

Key Skills

- Python Fundamentals
- Arrays
- Variables
- Data Types
- Loops
- Operators
- Functions
- Conditional Statements

Tools & Technologies

python™

jupyter

*Curriculum is subject to change.

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Unit 2

Applied Data Science with Python

This unit provides a comprehensive understanding of data science essentials, including data preparation, model building, and evaluation. You will learn concepts like strings, Lambda functions, and lists. Additionally, you will explore topics like NumPy, linear algebra, and statistical concepts, including measures of central tendency and dispersion, skewness, covariance, and correlation. The unit also covers hypothesis testing, such as Z-test, T-test, and ANOVA, and data manipulation using pandas. You will also develop data visualization skills using popular libraries.

Key Learning Objectives

Python Libraries for Data Science

Utilize Python libraries for data science and perform advanced data manipulation and analysis with NumPy and Pandas.

Hypothesis Testing and Data Manipulation

Conduct hypothesis testing and statistical analysis, and implement data cleaning, transformation, and feature engineering techniques.

Key Skills

- Data Visualization
- Arrays
- Data Wrangling
- Data Analysis
- Data Cleaning
- Statistical Analysis
- Data Pre-processing
- Hypothesis Testing
- Probability Distribution

Tools & Technologies

NumPy matplotlib pandas seaborn jupyter

*Curriculum is subject to change.

Unit 3

Machine Learning

This unit provides a comprehensive overview of various machine learning types and their applications. You will explore the machine learning pipeline and gain insights into supervised learning, regression models, and classification algorithms. The unit also covers unsupervised learning, clustering techniques, ensemble modeling, and evaluation of popular machine learning frameworks.

Key Learning Objectives

Understanding Machine Learning Models

- Understand and differentiate types of machine learning models.
- Apply supervised learning techniques to classification and regression problems.

Develop, Train, and Validate Machine Learning Models

- Develop and train machine learning models using Python packages.
- Evaluate and validate machine learning models using performance metrics.
- Apply machine learning models to real-world use cases.

Key Skills

Supervised Learning

Ensemble Learning

Unsupervised Learning

Recommendation Systems

Tools & Technologies

NumPy matplotlib pandas learn jupyter

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Unit 4
Deep Learning

This unit teaches how to implement deep learning using AI and machine learning frameworks like Keras and TensorFlow. You will explore the fundamental concepts and applications of deep learning while studying the distinctions between deep learning and machine learning. This unit covers a wide range of topics, including neural networks, forward and backward propagation, TensorFlow, Keras, performance optimization techniques, model interpretability, convolutional neural networks (CNNs), transfer learning, object detection, recurrent neural networks (RNNs), autoencoders, and creating neural networks. By the end of the unit, you will have a solid foundation in deep learning principles and the knowledge to build and optimize deep learning models with Keras and TensorFlow.

Key Learning Objectives

Implementing and Optimizing Deep Neural Networks

- Design and implement deep neural networks for image and text classification.
- Apply advanced optimization algorithms to enhance model training.

Improving Model Accuracy and Developing Sequential Models

- Utilize transfer learning and object detection based on real-world use cases.
- Perform hyperparameter tuning and regularization for improved model accuracy.
- Develop sequential models for time-series and video data classification.

Key Skills

- Deep Neural Networks
- Optimization Algorithms
- Convolutional Neural Networks
- LSTM
- Recurrent Neural Networks
- Gated Recurring Networks

Tools & Technologies

Keras, PyTorch, TensorFlow, TensorBoard, python, jupyter

*Curriculum is subject to change.

Unit 5

Natural Language Processing

This unit focuses on Natural Language Processing (NLP), where you'll learn how to turn raw text into meaningful insights. From understanding key NLP concepts like tokenization and syntactic analysis to exploring advanced techniques such as word embeddings and text classification, you'll gain hands-on experience with real-world scenarios and use cases. Whether building sentiment analysis models or working with popular tools like NLTK, you'll be guided through every step. By the end of the unit, you'll have the skills to preprocess, analyze, and model text data, and be prepared to address NLP challenges in various domains.

Key Learning Objectives

Build and Implement NLP Models

- Preprocess and transform text data for NLP tasks.
- Build and implement NLP models for text classification and sentiment analysis.

Advanced NLP Models

- Utilize word embeddings to enhance text representation in NLP models.
- Develop and evaluate machine translation systems.
- Implement advanced NLP models using sequence modeling and attention mechanisms.

Key Skills

Text Data Analysis

Attention Model

Vector Representations

Sentiment Analysis

Sequence Model

Tools & Technologies

NLTK

python™

jupyter

*Curriculum is subject to change.

Unit 6

Essentials and Applications of Generative AI

Generative AI is discussed in depth throughout this unit, from foundational concepts to advanced applications. You'll explore key generative models like Variational Autoencoders (VAEs) and Generative Adversarial Networks (GANs), and understand how transformers and attention mechanisms power the latest AI breakthroughs. With hands-on practice, you'll learn to build, fine-tune, and deploy models. By the end of the unit, you'll be equipped to design and optimize AI models for a wide range of real-world tasks, including text generation, chatbot development, and image synthesis.

Key Learning Objectives

Generative AI Models, Transformer Models, and Attention Mechanisms

- Design and implement generative AI models for various applications.
- Understand and apply attention mechanisms in transformer models.

Large Language Models (LLMs)

- Develop and fine-tune large language models (LLMs) for enhanced performance.
- Apply the LangChain framework to build generative AI applications.
- Optimize and evaluate generative AI models using hyperparameter tuning and benchmarking techniques.

Key Skills

Prompt Engineering	Vector Embedding	Document Loader	Text Splitters
Text-to-image	Chatbot App Development	Model Fine-tuning	

Tools & Technologies

DALL·E · Google T5XXL · LangChain · Stable Diffusion · Gemini · vizard · miro

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Unit 7

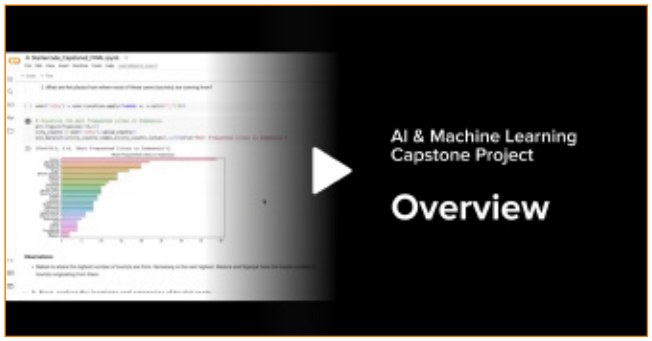
Capstone Project

The capstone project provides a valuable opportunity to implement the skills learned throughout this bootcamp. You will solve industry-specific challenges by applying various AI and ML techniques. The capstone project will help you showcase your knowledge and skills to employers.

Key Learning Objectives

The capstone project will enhance your understanding of the AI decision cycle. It will include performing exploratory data analysis, building and fine-tuning a model with cutting-edge AI-based algorithms, and presenting results.

Watch an Overview Video of the Capstone Project



Watch an Example of a Student Capstone Project

*Curriculum is subject to change.

Career Success Services

Starting in the bootcamp, you'll receive guidance and tools you'll need to power your job search. Upon bootcamp graduation, and for a full year beyond, you'll have the opportunity to opt into the Fullstack Academy Career Success Program and access 1:1 personalized career coaching to help achieve your desired career outcome.

Interview Prep

- Mock Technical interviews (algorithms/whiteboarding)
- Mock Standard Interviews (Q&A)

Workshops

- How to Pitch Yourself
- Technical Resume Guidance
- LinkedIn Optimization
- Navigating the Job Search Process
- Job Application Best Practices
- Salary Negotiation
- Interview Answer Prep
- Leveraging Transferable Skills

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