



Introduction to **DEEP LEARNING**

Deep Learning:

Powering AI to
Transform Business

\$3.9T

is the estimated business value to be created by AI in 2022, according to Gartner.¹

\$28.5B

was invested in machine learning applications in the first calendar quarter of 2019.²

133 million

new jobs expected to be created by AI by 2022.³

#2

rank holders are Deep Learning engineers, on Indeed's list of the top roles in job listings.⁴

Deep Learning

can be applied in Cyber Security, Healthcare, Pharmaceutical, Agriculture, Retail/E-commerce, Automobiles, Climate Study, Insurance, Marketing Automation, Voice Assistants, Logistics, and Manufacturing.

Why Learn with Us?

80% of more than 1.5 million engineers who graduate every year are unemployed.⁵ This is because of a strong mismatch between the skills corporates seek in new hires and the ones being learned by students.

The solution: a professional program with an in-built deep experiential learning component.



At Turnkey Learning, we serve as a bridge to seamlessly connect learners to educators and create an experience by offering the following:

- Practical, hands-on, LIVE online programs in India
- Small class sizes with on-demand Teaching Assistant support
- Collaborative knowledge-sharing experiences
- Opportunities to apply learning to tackle relevant industry challenges
- Use of cloud platforms to complete assignments
- Weekly office hours with faculty and feedback session with Chief Academic Officer
- Access to Carnegie Mellon University's learning infrastructure for coursework
- Invitation to recruiters to attend student presentations

Certificate of completion from **CARNEGIE MELLON UNIVERSITY**



Our Learning Approach



Learn by Doing

Learning is more effective when concepts taught in class are applied to tackle real-world challenges. Our online classrooms meet that demand by linking theory and practice.



Build Confidence

Our virtual certificate programs are designed to empower learners by providing a learning experience that helps them discover their true potential.



Grow in Your Role

Our approach to e-learning helps learners develop sound analytical skills, engage effectively in diverse teams, and grow professionally.

Instructor and **Program Detail**

Prof. Bhiksha Raj, Carnegie Mellon University, will be conducting this program.



Expertise in deep learning is fast changing from an esoteric desirable to a mandatory prerequisite in many advanced academic settings. It offers a large advantage in the industrial job market. This live online certificate program will teach you the basics of deep neural networks and their applications to various AI tasks.

Syllabus For Introduction to Deep Learning

Module 1: Introduction to Neural Networks

- History and cognitive basis of neural computation
- Connectionist Machines
- Rosenblatt's Perceptron
- Multilayer Perceptrons
- The neural net as a universal approximator

Week: 1, 2 | **Assessment:** Quiz

Module 2: Training Neural Networks

- Training a neural network
- Perceptron learning rule
- Optimization by gradient descent
- Convergence of perceptron algorithm
- Back propagation, Calculus of back propagation
- Convergence issues in back propagation
- Second order methods
- Convergence in neural networks & rates of convergence
- Loss surfaces
- Learning rates, and optimization methods
- Stochastic gradient descent
- Acceleration
- Overfitting and regularization
- Tricks of the trade:
 - Choosing a divergence (loss) function
 - Batch normalization

Week: 3, 4 | **Assessment:** Quizzes, Assignments

Labs

Learning to code networks



- Building your own CNN from scratch
- Building your own MLP from scratch
- Building your own recurrent network

Module 3: Convolutional neural networks: scanning for patterns

- Convolutional Neural Networks (CNNs)
- Weights as templates
- Translation invariance
- Training with shared parameters
- Arriving at the convolutional model
- Models of vision
- Neocognitron
- Mathematical details of CNNs
- Backpropagation in CNNs
- Variations in the basic model
- Some history of the ImageNet

Week: 5, 6, 7 | **Assessment:** Quizzes, Assignments

Module 4: Recurrent neural networks: analyzing time-series data

- Recurrent Neural Networks (RNNs)
- Modeling series
- Back propagation through time
- Bidirectional RNNs
- Stability, Exploding/vanishing gradients
- Long Short-Term Memory Units (LSTMs) and variants
- Loss functions for recurrent networks
- Sequence prediction, Sequence To Sequence Methods & Models
- Labelling Unsegmented Sequence Data with Recurrent Neural Networks

Week: 8, 9, 10 | **Assessment:** Quizzes, Assignments, Project

Project Day / Buffer / Overflow

Labs

Using existing toolkits on large problems



- Training a large MLP
- Face identification and recognition
- Speech recognition
- Sequence-to-sequence conversion

Special Prep Program for FREE!

“Introduction to Machine Learning”

with

Dr. Naveena Yanamala, Ph.D.

Eligibility: Enroll for “Introduction to Deep Learning” with Prof. Bhiksha Raj.



About the Instructor

Dr. Naveena Yanamala, Ph.D., is the Principal Data Scientist in the Heart & Vascular Institute at WVU Medicine. She is currently an adjunct professor appointed in the Institute for Software Research, School of Computer Science, Carnegie Mellon University, and in the Center for Computational Natural Sciences and Biology, International Institute for Information Technology (IIIT). Dr. Yanamala has 13+ years of experience in conducting effective interdisciplinary research at the intersection of biology, health, and computation. She is a published applied ML/AI researcher with more than 60 journal articles, 4 review articles and 3 conference papers in international and national scientific journals.

WHAT WILL YOU LEARN?

Topic 1	<p>Introduction to Machine Learning & Key Concepts</p> <p>Lecture 1 : AL/ML/DL and Applications & Introduction to General Pipeline</p>
Topic 2	<p>Theoretical Foundations to Machine Learning</p> <p>Lecture 2: Statistics and Probability</p> <p>Lecture 3: Law of Large numbers</p> <p>Lecture 4: EDA & Data Pre-processing</p>
Topic 3	<p>Paradigms of Machine Learning</p> <p>Lecture 5: Dimensionality Reduction & Visualization</p> <p>Lecture 6 - 7: Classification</p> <p>Lecture 8: Clustering</p> <p>Lecture 9: Regression</p>
Topic 4	<p>Best Practices in Machine Learning</p> <p>Lecture 10: Model Selection</p> <p>Lecture 11: Model Optimization & Ethics in ML</p> <p>Lecture 12: Introduction to CNN</p>

FAQ

Q. What is the Eligibility Test and is there a test fee?

A. The Eligibility Test is a series of objective questions to assess an applicant. Qualifying the test will gain the applicant entry to the program.
No, there is no test fee.

Q. Does Turnkey Learning offer placements for graduates?

A. No, Turnkey Learning does not have a placement cell yet. However, we invite interested talent managers to our learners' final presentations at the end of the programs and enable networking opportunities.

Q. How do I complete the program payment?

A. If you qualify in the Eligibility Test, you will receive a link in your registered email for payment completion. Click on the link and follow the instructions to complete payment.

Q. What are the benefits of the programs to our organization(s)?

A. We equip learners not only with theoretical knowledge but also application-based know-how. Combined with the collaborative classroom structure, group discussions, and presentations, we help learners hone soft skills and interactive skills to nurture holistic development which is integral to organizational leadership.

Q. Can we refer our employees to offered programs?

A. Yes. Please check Corporate Sponsors for more details.

Q. Do you help with hiring and how can Corporates connect to initiate a conversation?

A. Yes. We invite hiring managers to our end of the program presentations by learners. Please check careers for more details.

[More FAQs](#)

For all queries:



info@turnkeylearning.com



+91 63669 20661

+91 70323 33516

+91 70323 33816

Data Source:

¹ <https://www.forbes.com/sites/louiscolumbus/2019/03/27/roundup-of-machine-learning-forecasts-and-market-estimates-2019/#165303907695>

² <https://www.forbes.com/sites/louiscolumbus/2020/01/19/roundup-of-machine-learning-forecasts-and-market-estimates-2020/#39b53eab5c02>

^{3,4} <https://enterpriseproject.com/article/2019/8/ai-artificial-intelligence-careers-salaries-7-statistics>

⁵ <https://www.indiatoday.in/education-today/featurephilia/story/80-engineers-are-unemployed-how-can-we-prepare-engineers-for-the-jobs-of-tomorrow-1468240-2019-03-01>