



## Naya Pakistan Presidential IT and AI Skill Development Program

IT and AI National Training on War Footing

A Special Initiative of President of Pakistan

### Strategic Partners



## ARTIFICIAL INTELLIGENCE (AI) SPECIALIST

A ONE YEAR AI PROGRAM DESIGNED FOR ABSOLUTE BEGINNERS  
GETTING PAKISTAN READY FOR THE NEW ERA OF COMPUTING ENABLED BY THE RISE OF  
ARTIFICIAL INTELLIGENCE (AI)



I believe that artificial intelligence represents the greatest opportunity in human history.

**KAI-FU LEE**  
CEO of Sinovation Ventures

WORLD  
ECONOMIC  
FORUM



AI is probably the most important thing humanity has ever worked on.

**Sundar Pichai**  
CEO of Google

WORLD  
ECONOMIC  
FORUM

## *Classes Starting All Over Pakistan* *Classes only on Sundays or Evening*

Machine learning and deep learning represents a key evolution in the fields of computer science, data analysis, software engineering, and artificial intelligence. Some commentators are calling AI the fourth industrial revolution. Others are calling it the new electricity. An incredible amount of money is pouring into companies focused on AI/ML and Data Science, as it has the potential to revolutionize most, if not all industries. In the next decade, more than 50% of jobs in the world will be replaced by AI, ranging from translators, editors, assistants, stock traders, securities, drivers, salespeople, customer service reps, accountants, nannies and so on. Prime Minister of Pakistan is extremely pleased to announce a mass movement to train 10,000 students and professionals. This program will teach how to become a machine-learning engineer and data scientist using Python, Anaconda, Keras, and Tensorflow, and apply predictive models

to massive data sets in fields like agriculture, finance, healthcare, education, and more. The classes will only be held on Sundays or Evenings so that everyone can participate. The course does not require any background in software development or statistics anyone can join.

## Predictions for artificial intelligence

In its new report on data and artificial intelligence trends, Gartner explains that “our 2018 predictions for AI are tied to the way it is diffusing. First, recent AI technology breakthroughs, coupled with APIs and cloud architectures, make still-nascent AI capabilities and services more widely available. Second, the success of vendors in applying AI technologies and conversational interfaces in smartphones and smart home virtual assistants creates higher end-user expectations for these capabilities.”

## Predictions for AI and the future of work

Gartner believes that 2018 will mark the beginning of a “democratization of AI, extending its impacts across a much broader swath of companies and governments than previously.” The research firm believes AI will have a profound impact on how we will work — some jobs will become obsolete, while others will be created, and most will change. Pakistani leaders must orchestrate changes in their countries workforce.

## AI will boost revenue generation and productivity

Artificial intelligence augmentation will generate \$2.9 trillion in business value and recover 6.2 billion hours of worker productivity by the year 2021, Gartner predicts.

## AI will create more jobs than it destroys

Artificial intelligence will become a positive net job motivator, creating 2.3 million jobs while only eliminating 1.8 million jobs by the year 2020, Gartner predicts.

## AI will increasingly help humans on the job

One in five workers engaged in mostly nonroutine tasks will rely on artificial intelligence to do their jobs by the year 2022, Gartner predicts.

## AI assistants will rise

20 percent of citizens in developed nations will use artificial intelligence assistants to help them with an array of everyday, operational tasks by the year 2020, Gartner predicts.

The course consists of two semesters of coursework.

### A Two-Semester AI Program in Data Science, Machine Learning, and Deep Learning

**Semester AI 101**  
Deep Learning with Python

**Semester AI 201**  
AI in Practice and  
Microservices

# AI 101: Deep Learning with Python

## Module A: Version Control with Git



You won't find a top programmer, web developer, or AI engineer who doesn't use version control. Because it helps you produce better results and makes collaboration easy. Around the world, in teams large and small, Git is an essential part of the tool chain. We will start learning our learning process by covering Git and Github.

## Module B: Object Oriented and Functional Programming using Python

In the second module of the course, you'll learn about basic programming concepts, such as lists, dictionaries, classes, functions and loops, and practice writing clean and readable code with exercises for each topic. You'll also learn how to make your programs interactive and how to test your code safely before adding it to a project. It is a fast-paced, thorough introduction to programming with Python 3.6 that will have you writing programs, solving problems, and making things that work in no time. In this module we will also learn Git, the distributed version control system. We will also review Git based GitHub and BitBucket services.



## Module C: Advanced Python Libraries with Anaconda



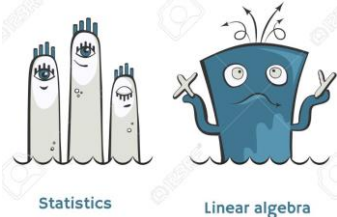
In this module we will also introduce you to Anaconda which is the leading open data science platform powered by Python. The open source version of Anaconda is a high performance distribution of Python and R and includes over 100 of the most popular Python, and R packages for data science, such as NumPy, and Matplotlib, etc.

## Module D: Data Science Essentials



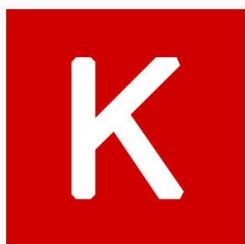
Learn key concepts and techniques used to perform data science; including statistical analysis, data cleansing and transformation, and data visualization with Python.

## Module E: Introduction to Linear Algebra and Statistics



In this part of the course we will introduce the basic mathematical and statistical concepts that are needed to practice data science and understand deep learning. We will also implement these concepts in Python and TensorFlow.

## Module F: The Fundamentals of Deep Learning with Keras with TensorFlow Backend



Before implementing deep-learning algorithms, we will first familiarize ourselves with mathematical blocks of neural networks theory. We going to start by geting our hands dirty writing some simple Keras code right away! And then move on to advanced deep learning concepts. This module will also cover some essential advantages of Keras to convince you it's the deep-learning library of choice.

## Detailed Course Outline Semester AI 101:

Week	Topic	Learning Material
1-2	Introduction to Data Science	<a href="https://www.youtube.com/watch?v=z1kPKBdYks4">https://www.youtube.com/watch?v=z1kPKBdYks4</a> Data Science for Beginners (5 Videos): <a href="https://docs.microsoft.com/en-gb/azure/machine-learning/studio/data-science-for-beginners-the-5-questions-data-science-answers">https://docs.microsoft.com/en-gb/azure/machine-learning/studio/data-science-for-beginners-the-5-questions-data-science-answers</a> Homework (Complete the following course): <a href="https://cognitiveclass.ai/courses/data-science-101/">https://cognitiveclass.ai/courses/data-science-101/</a>
	Build Intelligent Apps: AI as Microservices	<a href="https://wikibon.com/building-ai-microservices-for-cloud-native-deployments/">https://wikibon.com/building-ai-microservices-for-cloud-native-deployments/</a> <a href="https://jaxenter.com/machine-learning-interview-reichhelm-138821.html">https://jaxenter.com/machine-learning-interview-reichhelm-138821.html</a>
	What is DevOps and DataDevOps	<a href="https://www.sdxcentral.com/articles/news/kubeflow-project-tacks-machine-learning-on-top-of-kubernetes/2017/12/">https://www.sdxcentral.com/articles/news/kubeflow-project-tacks-machine-learning-on-top-of-kubernetes/2017/12/</a> <a href="http://container-solutions.com/tensorflow-on-kubernetes-kubeflow/">http://container-solutions.com/tensorflow-on-kubernetes-kubeflow/</a>
3	Version Control with Git	Chapters 1, 2, and 3, Learn Version Control with Git: A step-by-step course for the complete beginner by Tobias Günther <a href="https://www.datacamp.com/courses/introduction-to-git-for-data-science">https://www.datacamp.com/courses/introduction-to-git-for-data-science</a>
4	Getting Started with Python	A Smarter Way to Learn Python: Learn it faster. Remember it longer by Mark Myers <a href="https://www.amazon.com/Smarter-Way-Learn-Python-Remember/dp/1974431479">https://www.amazon.com/Smarter-Way-Learn-Python-Remember/dp/1974431479</a>
	Variables and Simple Data Types	
5	Introducing Lists	
	Working with Lists	
6	If Statements	
	Dictionaries	
7	User Input and while loops	
	Functions	
8	Classes	
	Files and Exceptions	<b>Complete 1-6 Python Assignments</b>
9	Sorting, List Comprehensions, Generators and Iterators, and Randomness	Chapter 1 & 2, Data Science from Scratch by Joel Grus
10	Functional Tools, enumerate, zip and Argument Unpacking, and args and kwargs,	Chapter 2, Data Science from Scratch by Joel Grus
11	Visualizing Data	Chapter 3, Data Science from Scratch by Joel Grus <b>Quiz One: Python Project:</b> <a href="https://www.dropbox.com/s/wymvo1vcw0tcz4q/visualizing%20crypto%20prices.docx?dl=0">https://www.dropbox.com/s/wymvo1vcw0tcz4q/visualizing%20crypto%20prices.docx?dl=0</a> Appear in <b>Microsoft Exam 98-381 Introduction to Programming Using Python</b>

		<a href="https://www.microsoft.com/en-us/learning/exam-98-381.aspx">https://www.microsoft.com/en-us/learning/exam-98-381.aspx</a> <b>Project 1:</b> <a href="https://www.dropbox.com/s/gfxnrhfbosdwvcw/calculating%20beta.docx?dl=0">https://www.dropbox.com/s/gfxnrhfbosdwvcw/calculating%20beta.docx?dl=0</a> <b>Project 2:</b> <a href="https://www.dropbox.com/s/sebhqixn3q9pe6h/Markowitz%20portfolio%20optimization.docx?dl=0">https://www.dropbox.com/s/sebhqixn3q9pe6h/Markowitz%20portfolio%20optimization.docx?dl=0</a> <b>Project 3:</b> <a href="https://www.dropbox.com/s/hr3ygqx0mkgwfxq/Cryptocurrency%20Arbitrage%20Finding%20Mismatched%20Prices.docx?dl=0">https://www.dropbox.com/s/hr3ygqx0mkgwfxq/Cryptocurrency%20Arbitrage%20Finding%20Mismatched%20Prices.docx?dl=0</a>
12	Basics of Linear Algebra for Machine Learning	<a href="https://machinelearningmastery.com/linear_algebra_for_machine_learning/">https://machinelearningmastery.com/linear_algebra_for_machine_learning/</a> Lesson 01: Introduction to Linear Algebra Lesson 02: Linear Algebra and Machine Learning Lesson 03: Examples of Linear Algebra in Machine Learning
13	NumPy Fundamentals	<a href="https://machinelearningmastery.com/linear_algebra_for_machine_learning/">https://machinelearningmastery.com/linear_algebra_for_machine_learning/</a> Lesson 04: Introduction to NumPy Arrays Lesson 05: Index, Slice, and Reshape NumPy Arrays Lesson 06: NumPy Array Broadcasting <b>Quiz Two: Numpy Quiz</b>
14	Statistics and Regression	Chapter 5, Data Science from Scratch by Joel Grus
15	What is Deep Learning?	Chapter 1, Deep Learning with Python by François Chollet <b>Quiz Three: Deep Learning 1</b> <a href="https://www.youtube.com/watch?v=aircAruvnKk">https://www.youtube.com/watch?v=aircAruvnKk</a> <a href="https://www.youtube.com/watch?v=uXt8qF2Zzfo">https://www.youtube.com/watch?v=uXt8qF2Zzfo</a>
16	The mathematical building blocks of neural networks	Chapter 2, Deep Learning with Python by François Chollet <b>Quiz Four: Deep Learning 2</b>
17	Getting started with neural networks	Chapter 3, Deep Learning with Python by François Chollet <b>Quiz Five: Deep Learning 3</b>
18	Fundamentals of machine learning	Chapter 4, Deep Learning with Python by François Chollet <b>Quiz Six: Deep Learning 4</b>
		Four Projects: Binary Classification Sonar Project 1 for the Navy: Mines vs. Rocks <a href="https://www.dropbox.com/s/v5xykxmmbnagpc/Deep_Learning_Project_One.zip?dl=0">https://www.dropbox.com/s/v5xykxmmbnagpc/Deep_Learning_Project_One.zip?dl=0</a> Multi-Class Classification Iris Flowers Project 2 for Mothers who love Gardening and Flowers: Identifying Flower Types <a href="https://www.dropbox.com/s/ume0f03g9hdovdl/Deep_Learning_Project_Two.zip?dl=0">https://www.dropbox.com/s/ume0f03g9hdovdl/Deep_Learning_Project_Two.zip?dl=0</a> Regression Housing Pricing Project 3 for Fathers who want to buy a House: Predicting Housing Prices <a href="https://www.dropbox.com/s/m98hfdo615t0z43/Deep_Learning_Project_Three.zip?dl=0">https://www.dropbox.com/s/m98hfdo615t0z43/Deep_Learning_Project_Three.zip?dl=0</a> Dropout Regularization Sonar Project 4 for the Navy: Mines vs. Rocks <a href="https://www.dropbox.com/s/s6h1ksnmfxukl7k/Deep_Learning_Project_Four.zip?dl=0">https://www.dropbox.com/s/s6h1ksnmfxukl7k/Deep_Learning_Project_Four.zip?dl=0</a>



# Semester AI 201: AI in Practice and Microservices

## Module A: Docker Deep Dive



This course provides a soup-to-nuts learning experience for core Docker technologies, including the Docker Engine, Images, Containers, Registries, Networking, Storage, and more. All of the behind the scenes theory is explained, and all concepts are clearly demonstrated on the command line. No prior knowledge of Docker or Linux is required.

## Module B: Python Serverless Container Based Microservices Development



In recent years REST (REpresentational State Transfer) has emerged as the standard architectural design for web services and web APIs. In this module I'm going to show you how easy it is to create a RESTful web service using Python, Flask, Docker and Serverless Containers.

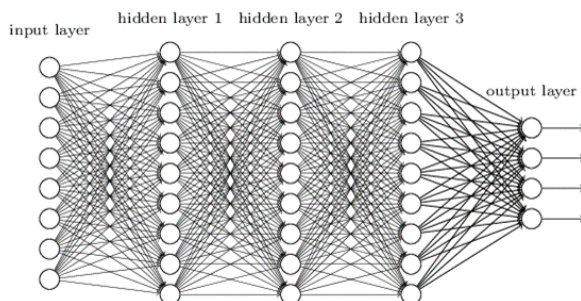
## Module C: Introduction to Linux and Bash



Linux containers are poised to take over the world; we will start our course with an introduction of Linux and the command line. For many non-technical people, the command line (also referred to as CLI, Terminal, bash, or shell) is a place of mystery. However, you only have to know a handful of basic commands to start feeling comfortable. In this module we will cover the basic commands to get you started.

## Module D: Deep Learning in Practice

Deep neural network



This module is structured around a series of practical code examples, demonstrating on real world problems every the notions that gets introduced. We strongly believe in the value of teaching using concrete examples, anchoring theoretical ideas into actual results and tangible code patterns. These examples all rely on Keras, the Python deep learning library. We will cover Deep Learning for computer vision, text and sequences, finance, and advanced neural network design.

## Module E: TensorFlow Eager Execution

TensorFlow Eager execution is an imperative, define-by-run interface where operations are executed immediately as they are called from Python. This makes it easier to get started with TensorFlow, and can make research and development more intuitive.

## Module F: Build AI Microservices for Serverless Containers Deployments



In this module we will learn to use Docker, and AWS Fargate to simplify server deployment and use continuous integration and deployment strategy. For developing API we will use Flask and REST. If user authentication and storage are required we will

use Firebase, which is a backend as a service and its real-time document database Firestore.

## Module G: Deploying and Scaling Deep Learning with TensorFlow, Keras, and AWS Fargate

In the last module we will learn how to execute these TensorFlow and Keras in production with vision and recommendation models and how to export, package, deploy, optimize, serve, monitor, and test models using Docker, and AWS Fargate.

## Course Outline Semester AI 201:

	Topic	Learning Material
0	Data Analysis	Chapters 4-10 and Projects from Chapter 14 Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython, 2 <sup>nd</sup> Edition, by Wes McKinney <a href="https://www.amazon.com/Python-Data-Analysis-Wrangling-IPython-ebook/dp/B075X4LT6K/ref=sr_1_1">https://www.amazon.com/Python-Data-Analysis-Wrangling-IPython-ebook/dp/B075X4LT6K/ref=sr_1_1</a>
	Building a data science portfolio	<a href="https://www.dataquest.io/blog/data-science-portfolio-project/">https://www.dataquest.io/blog/data-science-portfolio-project/</a> <a href="https://www.dataquest.io/blog/how-to-setup-a-data-science-blog/">https://www.dataquest.io/blog/how-to-setup-a-data-science-blog/</a> <a href="https://www.dataquest.io/blog/data-science-portfolio-machine-learning/">https://www.dataquest.io/blog/data-science-portfolio-machine-learning/</a> <a href="https://www.dataquest.io/blog/build-a-data-science-portfolio/">https://www.dataquest.io/blog/build-a-data-science-portfolio/</a> <a href="https://www.dataquest.io/blog/how-to-share-data-science-portfolio/">https://www.dataquest.io/blog/how-to-share-data-science-portfolio/</a>
1	Developing Web Applications with Python using Flask	Flask Web Development: Developing Web Applications with Python 2nd Edition <a href="http://shop.oreilly.com/product/0636920089056.do">http://shop.oreilly.com/product/0636920089056.do</a> <a href="https://github.com/miguelgrinberg/flasky">https://github.com/miguelgrinberg/flasky</a>
2	Deep Learning REST API	<a href="https://towardsdatascience.com/deploying-keras-deep-learning-models-with-flask-5da4181436a2">https://towardsdatascience.com/deploying-keras-deep-learning-models-with-flask-5da4181436a2</a> <a href="https://blog.keras.io/building-a-simple-keras-deep-learning-rest-api.html">https://blog.keras.io/building-a-simple-keras-deep-learning-rest-api.html</a> <a href="https://github.com/jrosebr1/simple-keras-rest-api">https://github.com/jrosebr1/simple-keras-rest-api</a> <a href="https://www.pyimagesearch.com/2018/01/29/scalable-keras-deep-learning-rest-api/">https://www.pyimagesearch.com/2018/01/29/scalable-keras-deep-learning-rest-api/</a> <a href="https://www.pyimagesearch.com/2018/02/05/deep-learning-production-keras-redis-flask-apache/">https://www.pyimagesearch.com/2018/02/05/deep-learning-production-keras-redis-flask-apache/</a>
3	What is a Container	Lesson Two: Building the Containers with Docker <a href="https://www.udacity.com/course/scalable-microservices-with-kubernetes--ud615">https://www.udacity.com/course/scalable-microservices-with-kubernetes--ud615</a>

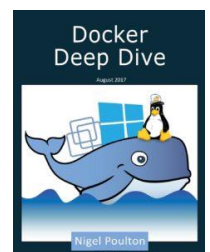
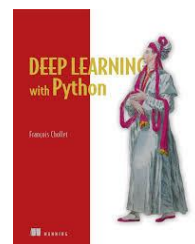
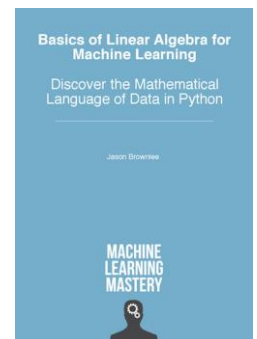
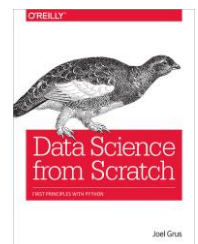
		<a href="https://www.youtube.com/watch?v=EnJ7qX9fkU">https://www.youtube.com/watch?v=EnJ7qX9fkU</a>
	Benefits of Containers	<a href="https://www.youtube.com/watch?v=cCTLjAdIQho">https://www.youtube.com/watch?v=cCTLjAdIQho</a>
	Container Registry	<a href="https://www.youtube.com/watch?v=76rX4s73MrM">https://www.youtube.com/watch?v=76rX4s73MrM</a>
	Creating Docker Images and Containers	<a href="https://medium.com/@sachin.abeywardana/docker-for-data-science-4901f35d7cf9">https://medium.com/@sachin.abeywardana/docker-for-data-science-4901f35d7cf9</a> <a href="https://www.analyticsvidhya.com/blog/2017/11/reproducible-data-science-docker-for-data-science/">https://www.analyticsvidhya.com/blog/2017/11/reproducible-data-science-docker-for-data-science/</a> Chapters 1-7, Docker Deep Dive by Nigel Poulton
4	Containerizing an App	Chapter 8, Docker Deep Dive by Nigel Poulton <a href="https://docs.docker.com/engine/admin/volumes/bind-mounts/#choosing-the--v-or-mount-flag">https://docs.docker.com/engine/admin/volumes/bind-mounts/#choosing-the--v-or-mount-flag</a> <a href="https://medium.com/statuscode/dockercheatsheet-9730ce03630d">https://medium.com/statuscode/dockercheatsheet-9730ce03630d</a> <b>Quiz One: Docker Deep Dive</b>
	Chapters 1-7, Linux: Easy Linux for Beginners by Felix Alvaro	Using Linux OS and the Command Line inside a Container
5	Understanding Microservices	Lesson One: <a href="https://www.udacity.com/course/scalable-microservices-with-kubernetes--ud615">https://www.udacity.com/course/scalable-microservices-with-kubernetes--ud615</a> Chapters 1, Python Microservices Development by Tarek Ziade
	Introducing Cloud Native Architecture and Microservices	Chapter 1, Cloud Native Python by Manish Sethi
6	Building React Web Apps using Microservices in Python	Chapters 2-5, Cloud Native Python by Manish Sethi The Road to learn React: Your journey to master plain yet pragmatic React.js <a href="https://leanpub.com/the-road-to-learn-react">https://leanpub.com/the-road-to-learn-react</a> Reference: <a href="https://testdriven.io/part-one-intro/">https://testdriven.io/part-one-intro/</a>
7	Using Nginx in Containers	NGINX: A Practical Guide to High Performance <a href="https://www.nginx.com/resources/library/nginx-practical-guide-high-performance/">https://www.nginx.com/resources/library/nginx-practical-guide-high-performance/</a>
8	AWS Fargate and Azure Container Instances	<a href="https://www.youtube.com/watch?v=GJ3S4CEAcJE">https://www.youtube.com/watch?v=GJ3S4CEAcJE</a> <a href="https://diginomica.com/2018/03/23/aws-lambda-kubernetes-future-serverless/">https://diginomica.com/2018/03/23/aws-lambda-kubernetes-future-serverless/</a> <a href="https://hackernoon.com/azure-container-instances-vs-aws-fargate-3216607f63f4">https://hackernoon.com/azure-container-instances-vs-aws-fargate-3216607f63f4</a> <a href="https://aws.amazon.com/fargate/">https://aws.amazon.com/fargate/</a> <a href="https://azure.microsoft.com/en-us/services/container-instances/">https://azure.microsoft.com/en-us/services/container-instances/</a> <a href="https://thenewstack.io/the-future-of-kubernetes-is-serverless/">https://thenewstack.io/the-future-of-kubernetes-is-serverless/</a>
	Deep Learning Containers	<a href="https://www.nvidia.com/en-us/gpu-cloud/deep-learning-containers/">https://www.nvidia.com/en-us/gpu-cloud/deep-learning-containers/</a>
9	Data Science Methodology	<a href="https://cognitiveclass.ai/courses/data-science-methodology-2/">https://cognitiveclass.ai/courses/data-science-methodology-2/</a>
10-11	Deep learning for computer vision	Chapter 5, Deep Learning with Python by François Chollet <b>Quiz Two: Deep Learning for Computer Vision</b>
12-13	Deep learning for text and sequences	Chapter 6, Deep Learning with Python by François Chollet <b>Quiz Three: Deep Learning for Text and sequences</b>
13-15	Advanced neural network design	Chapter 7, Deep Learning with Python by François Chollet <b>Quiz Four: Advanced Neural Network Design</b>
16-17	Generative deep learning	Chapter 8, Deep Learning with Python by François Chollet <b>Quiz Five: Generative Deep Learning</b>
18-19	TensorFlow Eager Execution	<a href="https://github.com/tensorflow/tensorflow/tree/master/tensorflo">https://github.com/tensorflow/tensorflow/tree/master/tensorflo</a>



		<a href="#">w/contrib/eager</a> <a href="http://web.stanford.edu/class/cs20si/lectures/march9guestlecture.pdf">http://web.stanford.edu/class/cs20si/lectures/march9guestlecture.pdf</a> <a href="https://docs.google.com/presentation/d/1e1gE2JJXipWm1UJgor_y8pHcM8L8oMaCVtvQvZUBIQY/edit#slide=id.g2f12664f01_0_0">https://docs.google.com/presentation/d/1e1gE2JJXipWm1UJgor_y8pHcM8L8oMaCVtvQvZUBIQY/edit#slide=id.g2f12664f01_0_0</a>
20	A Brief Introduction to PyTorch	<a href="https://pytorch.org/">https://pytorch.org/</a>
		<b>Project: Build a Crypto Graphics Web AI App using Microservices, React, TensorFlow/Keras and MPLD3</b> <a href="http://mpld3.github.io/">http://mpld3.github.io/</a>

## Text Books:

1. A Smarter Way to Learn Python by Mark Myers  
<https://www.amazon.com/Smarter-Way-Learn-Python-Remember/dp/1974431479>
2. Data Science from Scratch by Joel Grus  
<http://choonsiong.com/public/books/Data%20Science%20from%20Scratch.pdf>
3. Basics of Linear Algebra for Machine Learning by Jason Brownlee  
[https://machinelearningmastery.com/linear\\_algebra\\_for\\_machine\\_learning/](https://machinelearningmastery.com/linear_algebra_for_machine_learning/)
4. Deep Learning with Python by Francois Chollet  
<https://www.manning.com/books/deep-learning-with-python>
5. Docker Deep Dive by Nigel Poulton  
[https://www.amazon.com/Docker-Deep-Dive-Nigel-Poulton/dp/1521822808/ref=sr\\_1\\_1](https://www.amazon.com/Docker-Deep-Dive-Nigel-Poulton/dp/1521822808/ref=sr_1_1)



6. Probability and Statistics Crash Course  
<https://docs.google.com/file/d/0BzVk8fxj9agkVGIBWEVrMIRvaGs/edit>

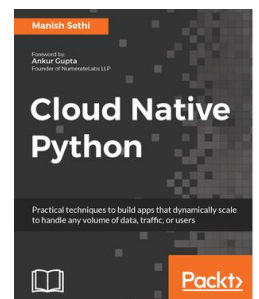
7. Python Microservices Development by Tarek Ziade  
[https://www.amazon.com/Python-Microservices-Development-deploy-microservices-ebook/dp/B01N7N7BU9/ref=sr\\_1\\_1](https://www.amazon.com/Python-Microservices-Development-deploy-microservices-ebook/dp/B01N7N7BU9/ref=sr_1_1)



8. Learn Version Control with Git: A step-by-step course for the complete beginner by Tobias Günther

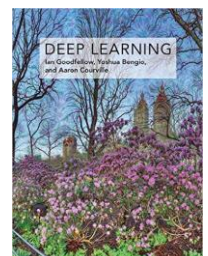


9. Cloud Native Python by Manish Sethi



## **Reference Material:**

10. Deep Learning: Take machine learning to the next level  
<https://www.udacity.com/course/deep-learning--ud730>

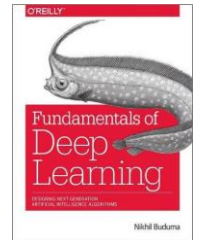


11. Deep Learning (Adaptive Computation and Machine Learning series) by Ian Goodfellow, Yoshua Bengio, Aaron Courville

Free Web Book: <http://www.deeplearningbook.org/>

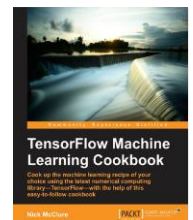
12. Fundamentals of Deep Learning: Designing Next-Generation Machine Intelligence Algorithms by Nikhil Buduma

<http://shop.oreilly.com/product/0636920039709.do>



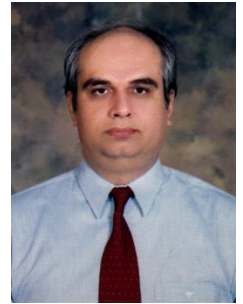
13. TensorFlow Machine Learning Cookbook by Nick McClure

<https://www.packtpub.com/big-data-and-business-intelligence/tensorflow-machine-learning-cookbook>



## The Teaching Team:

**Mr. Zia U. Khan** (<http://www.facebook.com/ziakhan.edu>) will be the co-instructor for this course. He is the CEO of Panacloud (Pvt.) Ltd. He has fifteen years of experience in teaching computer science subjects and has extensive experience in development of business and financial software solutions. For eight consecutive years, in 2007, 2008, 2009, 2010, 2011, 2012, 2013 and 2014 he has received the Most Valuable Professional (MVP) Award from Microsoft USA. He has a Master of Science in Engineering (MSE), Master of Business Administration (MBA), and Master of Accountancy (MAC) in MIS, all three from Arizona State University. He is also a CPA and CMA in USA.



**Mr. Inam ul Haq** is the CTO of Zaavia and has over a decade of software development and teaching experience. He will be the co-instructor for this course. He is the academic supervisor of Saylani Mass Training Program, which is teaching computer science to thousands of students completely free of cost.



**Dr. Noman Islam** Associate Professor at Iqra University



**Mr. Anees Ahmed**, more than ten years of experience in Databases and Data Analysis



**Mr. Zeeshan Hanif**, CTO Panacloud with more than ten years of experience in application development.



**Mr. Khurram Raheel Meher** is a Senior Developer at Panacloud and Senior Teacher at Saylani Faisalabad



**Dr. Muhammad Gufran**, Assistant Professor at FAST-NUCES Faisalabad



**Mr. Nasir Hussain**

He has a Masters in Computer Science from University of Karachi UBIT. He also has over ten years of experience in working with different software houses and banks.

