The Sports Analytics Club Program, Inc.

Ivy League
Online Data Science Coursework Catalog
Second Edition 2022-2023

PLAYING THE GAME WITH DATA

Compiled by:
William Boyd, SACP Managing Director of Research
william@sacpinc.com

2 Wisconsin Circle, Suite 700
Chevy Chase, Maryland 20815
(o) 202.829.4821
www.sacpinc.com

SACP is incorporated as a not-for-profit in the State of Delaware, and is tax exempt under section 501(c)(3) of the Internal Revenue Code

Table of Contents

HARVARD UNIVERSITY

Steps to Join Course on edx:

1. Click "Enroll" on edx page
2. Sign Up and enter email, full name, username, password, country and create account
3. Click on the right option under "Access This Course" and click Continue
4. Scroll down to the material and you are all set.

Course: High-Dimensional Data Analytics

Synopsis: If you're interested in data analysis and interpretation, then this is the data science course for you. We start by learning the mathematical definition of distance and use this to motivate the use of the singular value decomposition (SVD) for dimension reduction of high-dimensional data sets, and multi-dimensional scaling and its connection to principle component analysis. We will learn about the *batch effect,* the most challenging data analytical problem in genomics today, and describe how the techniques can be used to detect and adjust for batch effects. Specifically, we will describe the principal component analysis and factor analysis and demonstrate how these concepts are applied to data visualization and data analysis of high-throughput experimental data.

Website: edx
Length of Course: 4 weeks
Hours Per Week: 2-4 hours
Start Date: Anytime
Professor: Rafael Irizarry, Michael Love
Link: https://www.edx.org/course/high-dimensional-data-analysis

Course: Causal Diagrams: Draw Your Assumptions Before Your Conclusions

Synopsis: Causal diagrams have revolutionized the way in which researchers ask: What is the causal effect of X on Y? They have become a key tool for researchers who study the effects of treatments, exposures, and policies. By summarizing and communicating assumptions about the causal structure of a problem, causal diagrams have helped clarify apparent paradoxes, describe common biases, and identify adjustment variables. As a result, a sound understanding of causal diagrams is becoming increasingly important in many scientific disciplines.

Website: edx
Length of Course: 9 weeks
Hours Per Week: 2-3 hours
Start Date: Anytime
Professor: Miguel Hernán
Link: https://www.edx.org/course/causal-diagrams-draw-your-assumptions-before-your

Course: Principles, Statistical and Computational Tools for Reproducible Data Science

Synopsis: This course will appeal to students and professionals in biostatistics, computational biology, bioinformatics, and data science. The course content will blend video lectures, case studies, peer-to-peer engagements and use of computational tools and platforms (such as R/RStudio, and Git/Github), culminating in a final presentation of a final reproducible research project. We'll cover Fundamentals of Reproducible Science; Case Studies; Data Provenance; Statistical Methods for Reproducible Science; Computational Tools for Reproducible Science; and Reproducible Reporting Science. These concepts are intended to translate to fields throughout the data sciences: physical and life sciences, applied mathematics and statistics, and computing.

Website: edx
Length of Course: 8 weeks
Hours Per Week: 3-8 hours
Start Date: Anytime
Professor: Curtis Huttenhower, John Quackenbush, Lorenzo Trippa, Christine Choirat
Link: https://www.edx.org/course/principles-statistical-and-computational-tools-for

Course: Data Science: R Basics

Synopsis: We'll cover R's functions and data types, then tackle how to operate on vectors and when to use advanced functions like sorting. You'll learn how to apply general programming features like "if-else," and "for loop" commands, and how to wrangle, analyze and visualize data. Rather than covering every R skill you might need, you'll build a strong foundation to prepare you for the more in-depth courses later in the series, where we cover concepts like probability, inference, regression, and machine learning. We help you develop a skill set that includes R programming, data wrangling with dplyr, data visualization with ggplot2, file organization with UNIX/Linux, version control with git and GitHub, and reproducible document preparation with RStudio.

Website: edx
Length of Course: 8 weeks
Hours Per Week: 1-2 hours
Start Date: Anytime
Professor: Rafael Irizarry
Link: https://www.edx.org/course/data-science-r-basics

Course: Data Science: Visualization

Synopsis: As part of our Professional Certificate Program in Data Science, this course covers the basics of data visualization and exploratory data analysis. We will use three motivating examples and ggplot2, a data visualization package for the statistical programming language R. We will start with simple datasets and then graduate to case studies about world health, economics, and infectious disease trends in the United States.

Website: edx
Length of Course: 8 weeks
Hours Per Week: 1-2 hours
Start Date: Anytime
Professor: Rafael Irizarry
Link: https://www.edx.org/course/data-science-visualization

Course: Data Science: Probability

Synopsis: In this course, part of our Professional Certificate Program in Data Science, you will learn valuable concepts in probability theory. The motivation for this course is the circumstances surrounding the financial crisis of 2007-2008. Part of what caused this financial crisis was that the risk of some securities sold by financial institutions was underestimated. To begin to understand this very complicated event, we need to understand the basics of probability.

Website: edx
Length of Course: 8 weeks
Hours Per Week: 1-2 hours
Start Date: Anytime
Professor: Rafael Irizarry
Link: https://www.edx.org/course/data-science-probability

Course: Data Science: Inference and Modeling

Synopsis: This course will show you how inference and modeling can be applied to develop the statistical approaches that make polls an effective tool and we'll show you how to do this using R. You will learn concepts necessary to define estimates and margins of errors and learn how you can use these to make predictions relatively well and also provide an estimate of the precision of your forecast.

Website: edx
Length of Course: 8 weeks
Hours Per Week: 1-2 hours
Start Date: Anytime
Professor: Rafael Irizarry
Link: https://www.edx.org/course/data-science-inference-and-modeling

Course: Data Science: Productivity Tools

Synopsis: Part of our Professional Certificate Program in Data Science, this course explains how to use Unix/Linux as a tool for managing files and directories on your computer and how to keep the file system organized. You will be introduced to the version control systems git, a powerful tool for keeping track of changes in your scripts and reports. We also introduce you to GitHub and demonstrate how you can use this service to keep your work in a repository that facilitates collaborations.

Website: edx
Length of Course: 8 weeks
Hours Per Week: 1-2 hours
Start Date: Anytime
Professor: Rafael Irizarry
Link: https://www.edx.org/course/data-science-productivity-tools

Course: Data Science: Wrangling

Synopsis: In this course, part of our Professional Certificate Program in Data Science,we cover several standard steps of the data wrangling process like importing data into R, tidying data, string processing, HTML parsing, working with dates and times, and text mining. Rarely are all these wrangling steps necessary in a single analysis, but a data scientist will likely face them all at some point.

Website: edx
Length of Course: 8 weeks
Hours Per Week: 1-2 hours
Start Date: Anytime
Professor: Rafael Irizarry
Link: https://www.edx.org/course/data-science-wrangling

Course: Data Science: Linear Regression

Synopsis: This course, part of our Professional Certificate Program in Data Science, covers how to implement linear regression and adjust for confounding in practice using R. In data science applications, it is very common to be interested in the relationship between two or more variables. The motivating case study we examine in this course relates to the data-driven approach used to construct baseball teams described in Moneyball. We will try to determine which measured outcomes best predict baseball runs by using linear regression.

Website: edx
Length of Course: 8 weeks
Hours Per Week: 1-2 hours
Start Date: Anytime
Professor: Rafael Irizarry
Link: https://www.edx.org/course/data-science-linear-regression

Course: Data Science: Machine Learning

Synopsis: In this course, part of our Professional Certificate Program in Data Science, you will learn popular machine learning algorithms, principal component analysis, and regularization by building a movie recommendation system. You will learn about training data, and how to use a set of data to discover potentially predictive relationships. As you build the movie recommendation system, you will learn how to train algorithms using training data so you can predict the outcome for future datasets. You will also learn about overtraining and techniques to avoid it such as cross-validation. All of these skills are fundamental to machine learning.

Website: edx
Length of Course: 8 weeks
Hours Per Week: 1-2 hours
Start Date: Anytime
Professor: Rafael Irizarry
Link: https://www.edx.org/course/data-science-machine-learning

Course: Data Science: Capstone

Synopsis: By completing this capstone project you will get an opportunity to apply the knowledge and skills in R data analysis that you have gained throughout the series. This final project will test your skills in data visualization, probability, inference and modeling, data wrangling, data organization, regression, and machine learning. Unlike the rest of our Professional Certificate Program in Data Science, in this course, you will receive much less guidance from the instructors. When you complete the project you will have a data product to show off to potential employers or educational programs, a strong indicator of your expertise in the field of data science.

Website: edx
Length of Course: 8 weeks
Hours Per Week: 1-2 hours
Start Date: Anytime
Professor: Rafael Irizarry
Link: https://www.edx.org/course/data-science-capstone

Course: CS50's Introduction to Computer Science

Synopsis: An entry-level course taught by David J. Malan, CS50x teaches students how to think algorithmically and solve problems efficiently. Topics include abstraction, algorithms, data structures, encapsulation, resource management, security, software engineering, and web development. Languages include C, Python, SQL, and JavaScript plus CSS and HTML. Problem sets inspired by real-world domains of biology, cryptography, finance, forensics, and gaming.

Website: edx
Length of Course: 12 weeks
Hours Per Week: 6-18 hours
Start Date: Anytime
Professor: David Malan, Doug Lloyd, Brian Yu
Link: https://www.edx.org/course/introduction-computer-science-harvardx-cs50x

Course: CS50's Computer Science for Business Professionals

Synopsis: This is CS50's introduction to computer science for business professionals, designed for managers, product managers, founders, and decision-makers more generally. Whereas CS50 itself takes a bottom-up approach, emphasizing mastery of low-level concepts and implementation details thereof, this course takes a top-down approach, emphasizing mastery of high-level concepts and design decisions related thereto. Through lectures on computational thinking, programming languages, internet technologies, web development, technology stacks, and cloud computing, this course empowers you to make technological decisions even if not a technologist yourself. You'll emerge from this course with first-hand appreciation of how it all works and all the more confident in the factors that should guide your decision-making.

Website: edx
Length of Course: 6 weeks
Hours Per Week: 2-6 hours
Start Date: Anytime
Professor: David Malan
Link: https://www.edx.org/course/cs50s-computer-science-for-business-professionals

Course: CS50's Web Programming with Python and JavaScript (Next step after Introduction to Computer Science)

Synopsis: Topics include database design, scalability, security, and user experience. Through hands-on projects, you'll learn to write and use APIs, create interactive UIs, and leverage cloud services like GitHub and Heroku. By course's end, you'll emerge with knowledge and experience in principles, languages, and tools that empower you to design and deploy applications on the Internet.

Website: edx
Length of Course: 12 weeks
Hours Per Week: 6-9 hours
Start Date: Anytime
Professor: David Malan, Brian Yu
Link: https://www.edx.org/course/cs50s-web-programming-with-python-and-javascript

Course: CS50's Understanding Technology

Synopsis: This is CS50's introduction to technology for students who don't (yet) consider themselves computer persons. Designed for those who work with technology every day but don't necessarily understand how it all works underneath the hood or how to solve problems when something goes wrong, this course fills in the gaps, empowering you to use and troubleshoot technology more effectively. Through lectures on hardware, the Internet, multimedia, security, programming, and web development, this course equips you for today's technology and prepares you for tomorrow's as well.

Website: edx
Length of Course: 6 weeks
Hours Per Week: 2-6 hours
Start Date: Anytime
Professor: David Malan
Link: https://www.edx.org/course/cs50s-understanding-technology

Course: CS50's Introduction to Artificial Intelligence with Python

Synopsis: CS50's Introduction to Artificial Intelligence with Python explores the concepts and algorithms at the foundation of modern artificial intelligence, diving into the ideas that give rise to technologies like game-playing engines, handwriting recognition, and machine translation. Through hands-on projects, students gain exposure to the theory behind graph search algorithms, classification, optimization, reinforcement learning, and other topics in artificial intelligence and machine learning as they incorporate them into their own Python programs. By course's end, students emerge with experience in libraries for machine learning as well as knowledge of artificial intelligence principles that enable them to design intelligent systems of their own.

Website: edx
Length of Course: 7 weeks
Hours Per Week: 10-30 hours
Start Date: Anytime
Professor: David Malan, Brian Yu
Link: https://www.edx.org/course/cs50s-introduction-to-artificial-intelligence-with-python

Course: CS50's Introduction to Programming with Python

Synopsis: An introduction to programming using a language called Python. Learn how to read and write code as well as how to test and "debug" it. Designed for students with and without prior programming experience who'd like to learn Python specifically. Learn about functions, arguments, and return values (oh my!); variables and types; conditions and Boolean expressions; loops; and objects and methods. Plus exceptions, file I/O, and libraries. Hands-on opportunities for lots of practice. Exercises inspired by real-world programming problems.

Website: edx
Length of Course: 9 weeks
Hours Per Week: 3-9 hours
Start Date: Anytime
Professor: David Malan
Link: https://www.edx.org/course/cs50s-introduction-to-programming-with-python

Course: CS50's Introduction to Game Development

Synopsis: Learn about the development of 2D and 3D interactive games in this hands-on course, as you explore the design of games such as Super Mario Bros., Pokémon, Angry Birds, and more.

Website: edx
Length of Course: 12 weeks
Hours Per Week: 6-9 hours
Start Date: Anytime
Professor: David Malan, Colton Ogden
Link: https://www.edx.org/course/cs50s-introduction-to-game-development

Course: CS50's Introduction to Programming with Scratch

Synopsis: An introduction to programming using Scratch, a visual programming language via which aspiring programmers can write code by dragging and dropping graphical blocks (that resemble puzzle pieces) instead of typing out text. Used at the start of Harvard College's introductory course in computer science, CS50, Scratch was designed at MIT's Media Lab, empowering students with no prior programming experience to design their own animations, games, interactive art, and stories. Using Scratch, this course introduces students to fundamentals of programming, found not only in Scratch itself but in traditional text-based languages (like Java and Python) as well. Topics include: functions, which are instructions that perform tasks; return values, which are results that functions provide; conditions, via which programs can decide whether or not to perform some action; loops, via which programs can take action again and again; variables, via which programs can remember information; and more. Ultimately, this course prepares students for subsequent courses in programming.

Website: edx
Length of Course: 3 weeks
Hours Per Week: 2-6 hours
Start Date: Anytime
Professor: David Malan, Brian Yu
Link: https://www.edx.org/course/cs50s-introduction-to-programming-with-scratch

Course: Using Python for Research

Synopsis: This course bridges the gap between introductory and advanced courses in Python. While there are many excellent introductory Python courses available, most typically do not go deep enough for you to apply your Python skills to research projects. In this course, after first reviewing the basics of Python 3, we learn about tools commonly used in research settings. This version of the course includes a new module on statistical learning.

Website: edx
Length of Course: 12 weeks
Hours Per Week: 2-4 hours
Start Date: Anytime
Professor: Jukka-Pekka "JP" Onnela
Link: https://www.edx.org/course/using-python-for-research

Course: Introduction to Probability

Synopsis: Probability and statistics help to bring logic to a world replete with randomness and uncertainty. This course will give you tools needed to understand data, science, philosophy, engineering, economics, and finance. You will learn not only how to solve challenging technical problems, but also how you can apply those solutions in everyday life.

Website: edx
Length of Course: 10 weeks
Hours Per Week: 5-10 hours
Start Date: Anytime
Professor: Joseph Blitzstein
Link: https://www.edx.org/course/introduction-to-probability

Course: Introduction to Linear Models and Matrix Algebra

Synopsis: Matrix Algebra underlies many of the current tools for experimental design and the analysis of high-dimensional data. In this introductory online course in data analysis, we will use matrix algebra to represent the linear models that commonly used to model differences between experimental units. We perform statistical inference on these differences. Throughout the course we will use the R programming language to perform matrix operations.

Website: edx
Length of Course: 4 weeks
Hours Per Week: 2-4 hours
Start Date: Anytime
Professor: Rafael Irizarry, Michael Love
Link: https://www.edx.org/course/introduction-to-linear-models-and-matrix-algebra

Course: High Dimensional Data Analysis

Synopsis: We start by learning the mathematical definition of distance and use this to motivate the use of the singular value decomposition (SVD) for dimension reduction of high-dimensional data sets, and multi-dimensional scaling and its connection to principle component analysis. We will learn about the batch effect, the most challenging data analytical problem in genomics today, and describe how the techniques can be used to detect and adjust for batch effects. Specifically, we will describe the principal component analysis and factor analysis and demonstrate how these concepts are applied to data visualization and data analysis of high-throughput experimental data.

Website: edx
Length of Course: 4 weeks
Hours Per Week: 2-4 hours
Start Date: Anytime
Professor: Rafael Irizarry, Michael Love
Link: https://www.edx.org/course/high-dimensional-data-analysis

Course: Statistical Inference and Modeling for High-throughput Experiments

Synopsis: In this course you'll learn various statistics topics including multiple testing problem, error rates, error rate controlling procedures, false discovery rates, q-values and exploratory data analysis. We then introduce statistical modeling and how it is applied to high-throughput data. In particular, we will discuss parametric distributions, including binomial, exponential, and gamma, and describe maximum likelihood estimation. We provide several examples of how these concepts are applied in next generation sequencing and microarray data. Finally, we will discuss hierarchical models and empirical bayes along with some examples of how these are used in practice. We provide R programming examples in a way that will help make the connection between concepts and implementation.

Website: edx
Length of Course: 4 weeks
Hours Per Week: 2-4 hours
Start Date: Anytime
Professor: Rafael Irizarry, Michael Love
Link: https://www.edx.org/course/statistical-inference-and-modeling-for-high-throug

Course: Fat Chance: Probability from the Ground Up

Synopsis: Created specifically for those who are new to the study of probability, or for those who are seeking an approachable review of core concepts prior to enrolling in a college-level statistics course, Fat Chance prioritizes the development of a mathematical mode of thought over rote memorization of terms and formulae. Through highly visual lessons and guided practice, this course explores the quantitative reasoning behind probability and the cumulative nature of mathematics by tracing probability and statistics back to a foundation in the principles of counting.

Website: edx
Length of Course: 7 weeks
Hours Per Week: 3-5 hours
Start Date: Anytime
Professor: Benedict Gross, Joseph Harris, Emily Riehl
Link: https://www.edx.org/course/fat-chance-probability-from-the-ground-up-2

PRINCETON UNIVERSITY

Steps to Join Course on Coursera:

1. Click "Enroll for Free"
2. Sign Up and enter name, email, and password and your account is all set
3. If no screen prompts you, click "Enroll for Free" again
4. When the screen pops up with the title "Full Course, No Certificate" click Continue
5. Fill in questionnaire prompted by Coursera
6. Click "Start" under Week 1 and you're all set!

Course: Algorithms, Part 1

Synopsis: This course covers the essential information that every serious programmer needs to know about algorithms and data structures, with emphasis on applications and scientific performance analysis of Java implementations. Part I covers elementary data structures, sorting, and searching algorithms. Part II focuses on graph- and string-processing algorithms.

Website: Coursera
Length of Course: 54 hours
Hours Per Week: Self-paced
Start Date: Anytime
Professor: Kevin Wayne, Robert Sedgewick
Link: https://www.coursera.org/learn/algorithms-part1

Course: Algorithms, Part 2

Synopsis: This course covers the essential information that every serious programmer needs to know about algorithms and data structures, with emphasis on applications and scientific performance analysis of Java implementations. Part I covers elementary data structures, sorting, and searching algorithms. Part II focuses on graph- and string-processing algorithms.

Website: Coursera
Length of Course: 63 hours
Hours Per Week: Self-paced
Start Date: Anytime
Professor: Kevin Wayne, Robert Sedgewick
Link: https://www.coursera.org/learn/algorithms-part2

Course: Computer Science: Programming with a Purpose

Synopsis: We begin by introducing basic programming elements such as variables, conditionals, loops, arrays, and I/O. Next, we turn to functions, introducing key concepts such as recursion, modular programming, and code reuse. Then, we present a modern introduction to object-oriented programming. We use the Java programming language and teach basic skills for computational problem solving that are applicable in many modern computing environments. Proficiency in Java is a goal, but we focus on fundamental concepts in programming, not Java per se.

Website: Coursera
Length of Course: 88 hours
Hours Per Week: Self-paced
Start Date: Anytime
Professor: Kevin Wayne, Robert Sedgewick
Link: https://www.coursera.org/learn/cs-programming-java

Course: Analysis of Algorithms

Synopsis: This course teaches a calculus that enables precise quantitative predictions of large combinatorial structures. In addition, this course covers generating functions and real asymptotics and then introduces the symbolic method in the context of applications in the analysis of algorithms and basic structures such as permutations, trees, strings, words, and mappings.

Website: Coursera
Length of Course: 21 hours
Hours Per Week: Self-paced
Start Date: Anytime
Professor: Robert Sedgewick
Link: https://www.coursera.org/learn/analysis-of-algorithms

Course: Computer Science: Algorithms, Theory, and Machines

Synopsis: This course introduces the broader discipline of computer science to people having basic familiarity with Java programming. It covers the second half of our book Computer Science: An Interdisciplinary Approach (the first half is covered in our Coursera course Computer Science: Programming with a Purpose, to be released in the fall of 2018). Our intent is to demystify computation and to build awareness about the substantial intellectual underpinnings and rich history of the field of computer science.

Website: Coursera
Length of Course: 20 hours
Hours Per Week: Self-paced
Start Date: Anytime
Professor: Kevin Wayne, Robert Sedgewick
Link: https://www.coursera.org/learn/cs-algorithms-theory-machines

DARTMOUTH COLLEGE

Steps to Join Course on edx:

1. Click "Enroll" on edx page
2. Sign Up and enter email, full name, username, password, country and create account
3. Click on the right option under "Access This Course" and click Continue
4. Scroll down to the material and you are all set.

Course: C Programming: Getting Started

Synopsis: In this course, you will learn the principles of C programming and start coding hands-on in a browser tool that will provide instant feedback on your code. In this course, you will get started with C and learn how to write your first programs, how to make simple computations and print the results to the screen, how to store values in variables and how to repeat instructions using loops.

Website: edx
Length of Course: 5 weeks
Hours Per Week: 2-4 hours
Start Date: Anytime
Professor: Petra Bonfert-Taylor, Rémi Sharrock
Link: https://www.edx.org/course/c-programming-getting-started

Course: C Programming: Language Foundations

Synopsis: In this course, part of the C Programming with Linux Professional Certificate program, you will learn to use logical statements and arrays in C. Logical statements are used for decision-making with follow-up instructions, based on conditions you define. Arrays are used to store, keep track of, and organize larger amounts of data. You will furthermore implement some fundamental algorithms to search and sort data. Within moments of this course, you will be coding hands-on in a new browser tool developed specifically for this course, receiving instant feedback on your code. No need to install anything!

Website: edx
Length of Course: 5 weeks
Hours Per Week: 2-4 hours
Start Date: Anytime
Professor: Petra Bonfert-Taylor, Rémi Sharrock
Link: https://www.edx.org/course/c-programming-language-foundations

Course: C Programming: Modular Programming and Memory Management

Synopsis: In this course, part of the C Programming with Linux Professional Certificate program, you will be introduced to the concept of modular programming: that is, dividing up more complex tasks into manageable pieces. Within moments you will be coding hands-on in a new browser tool developed for this course, receiving instant feedback on your code. No need to install anything!

Website: edx
Length of Course: 5 weeks
Hours Per Week: 2-4 hours
Start Date: Anytime
Professor: Petra Bonfert-Taylor, Rémi Sharrock
Link: https://www.edx.org/course/c-programming-modular-programming-and-memory-manag

Course: C Programming: Pointers and Memory Management

Synopsis: In this course, we will examine a key concept, foundational to any programming language: the usage of memory. This course builds upon the basic concept of pointers, discussed in C Programming: Modular Programming and Memory Management, and introduces the more advanced usage of pointers and pointer arithmetic. Arrays of pointers and multidimensional arrays are addressed, and you will learn how to allocate memory for your own data during program execution. This is called dynamic memory allocation at runtime using pointers.

Website: edx
Length of Course: 5 weeks
Hours Per Week: 2-4 hours
Start Date: Anytime
Professor: Petra Bonfert-Taylor, Rémi Sharrock
Link: https://www.edx.org/course/c-programming-pointers-and-memory-management

Course: C Programming: Advanced Data Types

Synopsis: In this course, part of the C Programming with Linux Professional Certificate program, you will define your own data types in C, and use the newly created types to more efficiently store and process your data. This course will provide a hands-on coding experience in a new browser tool developed for this course that will allow you to receive instant feedback on your code. No need to install anything! You will also gain experience with programming concepts that are foundational to any programming language.

Website: edx
Length of Course: 5 weeks
Hours Per Week: 4-5 hours
Start Date: Anytime
Professor: Petra Bonfert-Taylor, Rémi Sharrock
Link: https://www.edx.org/course/c-programming-advanced-data-types

Course: Linux Basics: The Command Line Interface

Synopsis: In this course, you will learn the history of Linux and how its open source community was able to create today's most advanced operating system. You will navigate the file system, use fundamental Linux commands and master the Linux command line interface. These are essential skills for every developer.

Website: edx
Length of Course: 5 weeks
Hours Per Week: 3-5 hours
Start Date: Anytime
Professor: Petra Bonfert-Taylor, Rémi Sharrock
Link: https://www.edx.org/course/linux-basics-the-command-line-interface

Course: C Programming: Using Linux Tools and Libraries

Synopsis: This seventh and final course in the C Programming with Linux Professional Certificate program will allow you to develop and use your C code within the Linux operating system. Using libraries in C is a fundamental concept when it comes to sharing code with others. In addition to compiling and linking, you will also learn how to pass arguments to an executable program.

Website: edx
Length of Course: 5 weeks
Hours Per Week: 4-5 hours
Start Date: Anytime
Professor: Petra Bonfert-Taylor, Rémi Sharrock
Link: https://www.edx.org/course/c-programming-using-linux-tools-and-libraries

UNIVERSITY OF PENNSYLVANIA

Steps to Join Course on edx:

1. Click "Enroll" on edx page
2. Sign Up and enter email, full name, username, password, country and create account
3. Click on the right option under "Access This Course" and click Continue
4. Scroll down to the material and you are all set.

Steps to Join Course on Coursera:

1. Click "Enroll for Free"
2. Sign Up and enter name, email, and password and your account is all set
3. If no screen prompts you, click "Enroll for Free" again
4. When the screen pops up with the title "Full Course, No Certificate" click Continue
5. Fill in questionnaire prompted by Coursera
6. Click "Start" under Week 1 and you're all set!

Course: Software Development Fundamentals

Synopsis: This course, part of the CS Essentials for Software Development Professional Certificate program, will quickly cover Java syntax and keywords and then explore features of object-oriented programming including encapsulation, inheritance, and polymorphism. You will learn how to apply these concepts to programmatic problem solving by investigating class modeling techniques and relationships such as aggregation, realization, and generalization.

Website: edx
Length of Course: 4 weeks
Hours Per Week: 6-8 hours
Start Date: Anytime
Professor: Arvind Bhusnurmath
Link: https://www.edx.org/course/software-development-fundamentals

Course: Data Structures and Software Design

Synopsis: This course, part of the CS Essentials for Software Development Professional Certificate program, will take your skills to the next level by teaching you how to write "good" software that appropriately represents and organizes data, is easy to maintain, and is of high quality.

Website: edx
Length of Course: 4 weeks
Hours Per Week: 8-10 hours
Start Date: Anytime
Professor: Chris Murphy
Link: https://www.edx.org/course/programming-for-the-web-with-javascript

Course: Algorithm Design and Analysis

Synopsis: This course, part of the Computer Science Essentials for Software Development Professional Certificate program, is an introduction to design and analysis of algorithms, and answers along the way these and many other interesting computational questions. You will learn about algorithms that operate on common data structures, for instance sorting and searching; advanced design and analysis techniques such as dynamic programming and greedy algorithms; advanced graph algorithms such as minimum spanning trees and shortest paths; NP-completeness theory; and approximation algorithms.

Website: edx
Length of Course: 4 weeks
Hours Per Week: 6-8 hours
Start Date: Anytime
Professor: Sampath Kannan
Link: https://www.edx.org/course/algorithm-design-and-analysis

Course: Programming for the Web with JavaScript

Synopsis: This course, part of the CS Essentials for Software Development Professional Certificate program, provides an introduction to modern web development using JavaScript. In addition to exploring the basics of web page creation using HTML and CSS, you will learn advanced web page layout and responsive design tools such as Bootstrap. You will also learn how browsers represent a web page data using the Document Object Model (DOM) and how to develop dynamic, interactive web pages using JavaScript in the browser. Beyond fundamental JavaScript syntax and advanced language features such as callbacks, events, and asynchronous programming, you will work with jQuery, which provides functionality for simplified DOM manipulation and event handling. This course will also introduce you to modern web frameworks and component-based libraries such as React.js for efficiently developing modular web page components, and D3.js for creating data-driven documents.

Website: edx
Length of Course: 4 weeks
Hours Per Week: 6-8 hours
Start Date: Anytime
Professor: Chris Murphy, Swapneel Sheth
Link: https://www.edx.org/course/programming-for-the-web-with-javascript

Course: Customer Analytics

Synopsis: Data about our browsing and buying patterns are everywhere. From credit card transactions and online shopping carts, to customer loyalty programs and user-generated ratings/reviews, there is a staggering amount of data that can be used to describe our past buying behaviors, predict future ones, and prescribe new ways to influence future purchasing decisions. In this course, four of Wharton's top marketing professors will provide an overview of key areas of customer analytics: descriptive analytics, predictive analytics, prescriptive analytics, and their application to real-world business practices including Amazon, Google, and Starbucks to name a few. This course provides an overview of the field of analytics so that you can make informed business decisions.

Website: Coursera
Length of Course: 12 Hours
Hours Per Week: Self-Paced
Start Date: Anytime
Professor: Eric Bradlow, Peter Fader, Raghu Iyengar, Ron Berman
Link: https://www.coursera.org/learn/wharton-customer-analytics?specialization=business-analytics

Course: Operations Analytics

Synopsis: This course is designed to impact the way you think about transforming data into better decisions. Recent extraordinary improvements in data-collecting technologies have changed the way firms make informed and effective business decisions. The course on operations analytics, taught by three of Wharton's leading experts, focuses on how the data can be used to profitably match supply with demand in various business settings. In this course, you will learn how to model future demand uncertainties, how to predict the outcomes of competing policy choices and how to choose the best course of action in the face of risk. The course will introduce frameworks and ideas that provide insights into a spectrum of real-world business challenges, will teach you methods and software available for tackling these challenges quantitatively as well as the issues involved in gathering the relevant data.

Website: Coursera
Length of Course: 10 Hours
Hours Per Week: Self-Paced
Start Date: Anytime
Professor: Senthil Veeraraghavan, Sergei Savin, Noah Gans
Link: https://www.coursera.org/learn/wharton-operations-analytics?specialization=business-analytics

Course: People Analytics

Synopsis: In this brand new course, three of Wharton's top professors, all pioneers in the field of people analytics, will explore the state-of-the-art techniques used to recruit and retain great people, and demonstrate how these techniques are used at cutting-edge companies. This course is an introduction to the theory of people analytics, and is not intended to prepare learners to perform complex talent management data analysis. By the end of this course, you'll understand how and when hard data is used to make soft-skill decisions about hiring and talent development, so that you can position yourself as a strategic partner in your company's talent management decisions. This course is intended to introduced you to Organizations flourish when the people who work in them flourish. Analytics can help make both happen. This course in People Analytics is designed to help you flourish in your career, too.

Website: Coursera
Length of Course: 9 Hours
Hours Per Week: Self-Paced
Start Date: Anytime
Professor: Cade Massey, Martine Haas, Matthew Bidwell
Link: https://www.coursera.org/learn/wharton-people-analytics

Course: Accounting Analytics

Synopsis: In this course, taught by Wharton's acclaimed accounting professors, you'll learn how data is used to assess what drives financial performance and to forecast future financial scenarios. While many accounting and financial organizations deliver data, accounting analytics deploys that data to deliver insight, and this course will explore the many areas in which accounting data provides insight into other business areas including consumer behavior predictions, corporate strategy, risk management, optimization, and more. By the end of this course, you'll understand how financial data and non-financial data interact to forecast events, optimize operations, and determine strategy. This course has been designed to help you make better business decisions about the emerging roles of accounting analytics, so that you can apply what you've learned to make your own business decisions and create strategy using financial data.

Website: Coursera
Length of Course: 10 Hours
Hours Per Week: Self-Paced
Start Date: Anytime
Professor: Brian Bushee, Christopher Ittner
Link: https://www.coursera.org/learn/accounting-analytics?specialization=business-analytics

Course: Business Analytics Capstone

Synopsis: The Business Analytics Capstone Project gives you the opportunity to apply what you've learned about how to make data-driven decisions to a real business challenge faced by global technology companies like Yahoo, Google, and Facebook. At the end of this Capstone, you'll be able to ask the right questions of the data, and know how to use data effectively to address business challenges of your own. You'll understand how cutting-edge businesses use data to optimize marketing, maximize revenue, make operations efficient, and make hiring and management decisions so that you can apply these strategies to your own company or business. Once you complete your analysis, you'll be better prepared to make better data-driven business decisions of your own.

Website: Coursera
Length of Course: 13 Hours
Hours Per Week: Self-Paced
Start Date: Anytime
Professor: Wharton Teaching Staff
Link: https://www.coursera.org/learn/wharton-capstone-analytics?specialization=business-analytics

Course: Introduction to Python Programming

Synopsis: This course provides an introduction to programming and the Python language. Students are introduced to core programming concepts like data structures, conditionals, loops, variables, and functions. This course includes an overview of the various tools available for writing and running Python, and gets students coding quickly. It also provides hands-on coding exercises using commonly used data structures, writing custom functions, and reading and writing to files. This course may be more robust than some other introductory Python courses, as it delves deeper into certain essential programming topics.

Website: Coursera
Length of Course: 28 Hours
Hours Per Week: Self-Paced
Start Date: Anytime
Professor: Brandon Krakowsky
Link: https://www.coursera.org/learn/python-programming-intro

Course: Data Analysis Using Python

Synopsis: This course provides an introduction to basic data science techniques using Python. Students are introduced to core concepts like Data Frames and joining data, and learn how to use data analysis libraries like pandas, numpy, and matplotlib. This course provides an overview of loading, inspecting, and querying real-world data, and how to answer basic questions about that data. Students will gain skills in data aggregation and summarization, as well as basic data visualization.

Website: Coursera
Length of Course: 17 Hours
Hours Per Week: Self-Paced
Start Date: Anytime
Professor: Brandon Krakowsky
Link: https://www.coursera.org/learn/data-analysis-python

Course: Introduction to Java and Object-Oriented Programming

Synopsis: This course provides an introduction to the Java language and object-oriented programming, including an overview of Java syntax and how it differs from a language like Python. Students will learn how to write custom Java classes and methods, and how to test their code using unit testing and test-driven development. Topics include basic data structures like Arrays and ArrayLists and overloading methods.

Website: Coursera
Length of Course: 17 Hours
Hours Per Week: Self-Paced
Start Date: Anytime
Professor: Brandon Krakowsky
Link: https://www.coursera.org/learn/java-object-oriented-programming

Course: Inheritance and Data Structures in Java

Synopsis: This course provides a comprehensive look at Java inheritance, including access modifiers and overriding methods. Students are introduced to abstract classes, and will learn how to read and write to files, use regular expressions for parsing text, and how to leverage complex data structures like collections and maps.

Website: Coursera
Length of Course: 21 Hours
Hours Per Week: Self-Paced
Start Date: Anytime
Professor: Brandon Krakowsky
Link: https://www.coursera.org/learn/java-inheritance-data-structures

Course: Big Data and Education

Synopsis: In this course, you will learn how and when to use key methods for educational data mining and learning analytics on this data. You will examine the methods being developed by researchers in the educational data mining, learning analytics, learning-at-scale, student modeling, and artificial intelligence communities. You'll also gain experience with standard data mining methods frequently applied to educational data. You will learn how to apply these methods and when to apply them, as well as their strengths and weaknesses for different applications.

Website: edx
Length of Course: 8 weeks
Hours Per Week: 6-12 hours
Start Date: Anytime
Professor: Ryan Baker
Link: https://www.edx.org/course/big-data-and-education

Course: Computational Thinking for Problem Solving

Synopsis: In this course, you will learn about the pillars of computational thinking, how computer scientists develop and analyze algorithms, and how solutions can be realized on a computer using the Python programming language. By the end of the course, you will be able to develop an algorithm and express it to the computer by writing a simple Python program.

Website: Coursera
Length of Course: 18 Hours
Hours Per Week: Self-Paced
Start Date: Anytime
Professor: Susan Davidson
Link: https://www.coursera.org/learn/computational-thinking-problem-solving

COLUMBIA UNIVERSITY
IN THE CITY OF NEW YORK

COLUMBIA UNIVERSITY

Steps to Join Course on edx:

1. Click "Enroll" on edx page
2. Sign Up and enter email, full name, username, password, country and create account
3. Click on the right option under "Access This Course" and click Continue
4. Scroll down to the material and you are all set.

Course: Machine Learning for Data Science and Analytics

Synopsis: This data science course is an introduction to machine learning and algorithms. You will develop a basic understanding of the principles of machine learning and derive practical solutions using predictive analytics. We will also examine why algorithms play an essential role in Big Data analysis.

Website: edx
Length of Course: 5 weeks
Hours Per Week: 7-10 hours
Start Date: Anytime (for free option), May 16th (for paid option)
Professor: Ansaf Salleb-Aouissi, Cliff Stein, David Blei, Itsik Peer, Mihalis Yannakakis, Peter Orbanz
Link: https://www.edx.org/course/machine-learning-for-data-science-and-analytics

Course: Enabling Technologies for Data Science and Analytics: The Internet of Things

Synopsis: In this data science course, you will learn about the major components of the Internet of Things and how data is acquired from sensors. You will also examine ways of analyzing event data, sentiment analysis, facial recognition software and how data generated from devices can be used to make decisions.

Website: edx
Length of Course: 5 weeks
Hours Per Week: 7-10 hours
Start Date: Anytime (for free option), May 16th (for paid option)
Professor: Fred Jiang, Julia Hirschberg, Michael Collins, Shih-Fu Chang, Zoran Kostic, Kathy McKeown
Link: https://www.edx.org/course/enabling-technologies-for-data-science-and-analyti

Course: Statistical Thinking for Data Science Analytics

Synopsis: This statistics and data analysis course will pave the statistical foundation for our discussion on data science. You will learn how data scientists exercise statistical thinking in designing data collection, derive insights from visualizing data, obtain supporting evidence for data-based decisions and construct models for predicting future trends from data.

Website: edx
Length of Course: 5 weeks
Hours Per Week: 7-10 hours
Start Date: Anytime (for free option), May 16th (for paid option)
Professor: Andrew Gelman, David Madigan, Lauren Hannah, Eva Ascarza, James Curley, Tia Zheng
Link: https://www.edx.org/course/statistical-thinking-for-data-science-and-analytic

STANFORD UNIVERSITY

Steps to Join Course on edx:

1. Click "Enroll" on edx page
2. Sign Up and enter email, full name, username, password, country and create account
3. Click on the right option under "Access This Course" and click Continue
4. Scroll down to the material and you are all set.

Course: Computer Science 101

Synopsis: CS101 is a self-paced course that teaches the essential ideas of Computer Science for a zero-prior-experience audience. Computers can appear very complicated, but in reality, computers work within just a few, simple patterns. CS101 demystifies and brings those patterns to life, which is useful for anyone using computers today.

Website: edx
Length of Course: 6 weeks
Hours Per Week: 4-6 hours
Start Date: Anytime
Professor: Nick Parlante
Link: https://www.edx.org/course/computer-science-101

Course: Statistical Learning

Synopsis: This is an introductory-level course in supervised learning, with a focus on regression and classification methods. The syllabus includes: linear and polynomial regression, logistic regression and linear discriminant analysis; cross-validation and the bootstrap, model selection and regularization methods (ridge and lasso); nonlinear models, splines and generalized additive models; tree-based methods, random forests and boosting; support-vector machines; neural networks and deep learning; survival models; multiple testing. Some unsupervised learning methods are discussed: principal components and clustering (k-means and hierarchical).

Website: edx
Length of Course: 11 weeks
Hours Per Week: 3-5 hours
Start Date: Anytime
Professor: Trevor Hastie, Robert Tibshirani
Link: https://www.edx.org/course/statistical-learning

Course: Algorithms: Design and Analysis, Part 1

Synopsis: Welcome to the self-paced course, Algorithms: Design and Analysis! Algorithms are the heart of computer science, and the subject has countless practical applications as well as intellectual depth. This specialization is an introduction to algorithms for learners with at least a little programming experience. The specialization is rigorous but emphasizes the big picture and conceptual understanding over low-level implementation and mathematical details. After completing this specialization, you will be well-positioned to ace your technical interviews and speak fluently about algorithms with other programmers and computer scientists.

Website: edx
Length of Course: 6 weeks
Hours Per Week: 2-4 hours
Start Date: Anytime
Professor: Tim Roughgarden
Link: https://www.edx.org/course/algorithms-design-and-analysis

Course: Algorithms: Design and Analysis, Part 2

Synopsis: Welcome to the self-paced course, Algorithms: Design and Analysis, Part 2! Algorithms are the heart of computer science, and the subject has countless practical applications as well as intellectual depth. This course is an introduction to algorithms for learners with at least a little programming experience. The course is rigorous but emphasizes the big picture and conceptual understanding over low-level implementation and mathematical details. After completing this course, you will have a greater mastery of algorithms than almost anyone without a graduate degree in the subject.

Website: edx
Length of Course: 6 weeks
Hours Per Week: 2-4 hours
Start Date: Anytime
Professor: Tim Roughgarden
Link: https://www.edx.org/course/algorithms-design-and-analysis-part-2-2

Course: R Programming Fundamentals

Synopsis: This course covers the basics of R: a free programming language and software environment used for statistical computing and graphics. R is widely used by data analysts, statisticians, and data scientists around the world. This course covers an introduction to R, from installation to basic statistical functions. You will learn to work with variable and external data sets, write functions, and hear from one of the co-creators of the R language, Robert Gentleman.

Website: edx
Length of Course: 6 weeks
Hours Per Week: 2-3 hours
Start Date: Anytime
Professor: Susan Holmes
Link: https://www.edx.org/course/r-programming-fundamentals

Course: Mining Massive Datasets

Synopsis: The course is based on the text Mining of Massive Datasets by Jure Leskovec, Anand Rajaraman, and Jeff Ullman, who by coincidence are also the instructors for the course. The major topics covered include: MapReduce systems and algorithms, Locality-sensitive hashing, Algorithms for data streams, PageRank and Web-link analysis, Frequent itemset analysis, Clustering, Computational advertising, Recommendation systems, Social-network graphs, Dimensionality reduction, and Machine-learning algorithms.

Website: edx
Length of Course: 7 weeks
Hours Per Week: 5-10 hours
Start Date: Anytime
Professor: Jeffrey Ullman, Jure Leskovec, Anand Rajaraman
Link: https://www.edx.org/course/mining-massive-datasets

Course: Introduction to Probability Management

Synopsis: This course assumes that you are comfortable with Microsoft Excel, but you do not need training in statistics. If you wish to receive a verified certificate, you must download the free SIPmath™ Modeler Tools for Excel from nonprofit ProbabilityManagement.org, and it is recommended that you procure The Flaw of Averages: Why we Underestimate Risk in the Face of Uncertainty, John Wiley & Sons, either the 1st or 2nd Edition.

Website: edx
Length of Course: 10 weeks
Hours Per Week: 1-5 hours
Start Date: Anytime
Professor: Sam Savage
Link: https://www.edx.org/course/introduction-to-probability-management

Course: Databases: Relational Databases and SQL

Synopsis: This course is one of five self-paced courses on the topic of Databases, originating as one of Stanford's three inaugural massive open online courses released in the fall of 2011. The original "Databases" courses are now all available on edx.org. This course provides an introduction to relational databases and comprehensive coverage of SQL, the long-accepted standard query language for relational database systems.

Website: edx
Length of Course: 2 weeks
Hours Per Week: 8-10 hours
Start Date: Anytime
Professor: Jennifer Widom
Link: https://www.edx.org/course/databases-5-sql

Course: Databases: Advanced Topics in SQL

Synopsis: This course is one of five self-paced courses on the topic of Databases, originating as one of Stanford's three inaugural massive open online courses released in the fall of 2011. The original "Databases" courses are now all available on edx.org. This course is broad and practical, covering indexes, transactions, constraints, triggers, views, and authorization, all in the context of relational database systems and the SQL language. This course builds on concepts introduced in Databases: Relational Databases and SQL and is recommended for learners seeking to advance their understanding and use of relational databases.

Website: edx
Length of Course: 2 weeks
Hours Per Week: 8-10 hours
Start Date: Anytime
Professor: Jennifer Widom
Link: https://www.edx.org/course/advanced-topics-in-sql

Course: Databases: Modeling and Theory

Synopsis: This course is one of five self-paced courses on the topic of Databases, originating as one of Stanford's three inaugural massive open online courses released in the fall of 2011. The original "Databases" courses are now all available on edx.org. This course covers underlying principles and design considerations related to databases; it can be taken either before or after taking other courses in the Databases series.

Website: edx
Length of Course: 2 weeks
Hours Per Week: 8-10 hours
Start Date: Anytime
Professor: Jennifer Widom
Link: https://www.edx.org/course/modeling-and-theory

Course: Databases: Semistructured Data

Synopsis: This course is one of five self-paced courses on the topic of Databases, originating as one of Stanford's three inaugural massive open online courses released in the fall of 2011. The original "Databases" courses are now all available on edx.org. Part of the Databases series, this is a standalone course; learners seeking to develop an understanding of topics in this course do not need to take other Databases courses. This course covers the JSON and XML standards for semistructured data, along with query languages and schema declaration features for XML.

Website: edx
Length of Course: 2 weeks
Hours Per Week: 8-10 hours
Start Date: Anytime
Professor: Jennifer Widom
Link: https://www.edx.org/course/semistructured-data

Course: Databases: OLAP and Recursion

Synopsis: This course is one of five self-paced courses on the topic of Databases, originating as one of Stanford's three inaugural massive open online courses released in the fall of 2011. The original "Databases" courses are now all available on edx.org. This course builds on concepts introduced in Databases: Relational Databases and SQL and is recommended for learners seeking to understand On-Line Analytical Processing (OLAP) and/or recursion in the SQL language.

Website: edx
Length of Course: 2 weeks
Hours Per Week: 8-10 hours
Start Date: Anytime
Professor: Jennifer Widom
Link: https://www.edx.org/course/olap-and-recursion

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Steps to Join Course on edx:

1. Click "Enroll" on edx page
2. Sign Up and enter email, full name, username, password, country and create account
3. Click on the right option under "Access This Course" and click Continue
4. Scroll down to the material and you are all set.

Course: Fundamentals of Statistics

Synopsis: Statistics is the science of turning data into insights and ultimately decisions. Behind recent advances in machine learning, data science and artificial intelligence are fundamental statistical principles. The purpose of this class is to develop and understand these core ideas on firm mathematical grounds starting from the construction of estimators and tests, as well as an analysis of their asymptotic performance.

Website: edx
Length of Course: 18 weeks
Hours Per Week: 10-14 hours
Start Date: Anytime until May 21st, re-opens on August 22nd
Professor: Philippe Rigollet, Jan-Christian Hütter, Karene Chu
Link: https://www.edx.org/course/fundamentals-of-statistics

Course: Introduction to Computer Science and Programming Using Python

Synopsis: This course is the first of a two-course sequence: Introduction to Computer Science and Programming Using Python, and Introduction to Computational Thinking and Data Science. Together, they are designed to help people with no prior exposure to computer science or programming learn to think computationally and write programs to tackle useful problems. Some of the people taking the two courses will use them as a stepping stone to more advanced computer science courses, but for many it will be their first and last computer science courses. This run features lecture videos, lecture exercises, and problem sets using Python 3.5. Even if you previously took the course with Python 2.7, you will be able to easily transition to Python 3.5 in future courses, or enroll now to refresh your learning.

Website: edx
Length of Course: 9 weeks
Hours Per Week: 14-16 hours
Start Date: June 1st
Professor: John Guttag, Eric Grimson, Ana Bell
Link: https://www.edx.org/course/introduction-to-computer-science-and-programming-7

Course: Introduction to Computational Thinking and Data Science

Synopsis: 6.00.2x will teach you how to use computation to accomplish a variety of goals and provides you with a brief introduction to a variety of topics in computational problem solving . This course is aimed at students with some prior programming experience in Python and a rudimentary knowledge of computational complexity. You will spend a considerable amount of time writing programs to implement the concepts covered in the course.

Website: edx
Length of Course: 9 weeks
Hours Per Week: 14-16 hours
Start Date: May 25th
Professor: John Guttag, Eric Grimson, Ana Bell
Link: https://www.edx.org/course/introduction-to-computational-thinking-and-data-4

Course: Probability – The Science of Uncertainty and Data

Synopsis: The world is full of uncertainty: accidents, storms, unruly financial markets, noisy communications. The world is also full of data. Probabilistic modeling and the related field of statistical inference are the keys to analyzing data and making scientifically sound predictions. Probabilistic models use the language of mathematics. But instead of relying on the traditional "theorem-proof" format, we develop the material in an intuitive -- but still rigorous and mathematically-precise -- manner. Furthermore, while the applications are multiple and evident, we emphasize the basic concepts and methodologies that are universally applicable.

Website: edx
Length of Course: 16 weeks
Hours Per Week: 10-14 hours
Start Date: August 29th
Professor: John Tsitsiklis, Patrick Jaillet, Dimitri Bertsekas, Karene Chu, Qing He, Eren Can Kizildag, Jimmy Li, Jagdish Ramakrishnan, Katie Szeto, Kuang Xu
Link: https://www.edx.org/course/probability-the-science-of-uncertainty-and-data

Course: Data Analysis : Statistical Modeling and Computation in Applications

Synopsis: Data science requires multi-disciplinary skills ranging from mathematics, statistics, machine learning, problem solving to programming, visualization, and communication skills. In this course, learners will combine these foundational and practical skills with domain knowledge to ask and answer questions using real data. This course will start with a review of common statistical and computational tools such as hypothesis testing, regression, and gradient descent methods.

Website: edx
Length of Course: 16 weeks
Hours Per Week: 10-15 hours
Start Date: May 17th
Professor: Stefanie Jegelka, Caroline Uhler, Karene Chu
Link: https://www.edx.org/course/statistics-computation-and-applications

Course: Machine Learning with Python: from Linear Models to Deep Learning

Synopsis: Machine learning methods are commonly used across engineering and sciences, from computer systems to physics. Moreover, commercial sites such as search engines, recommender systems (e.g., Netflix, Amazon), advertisers, and financial institutions employ machine learning algorithms for content recommendation, predicting customer behavior, compliance, or risk. As a discipline, machine learning tries to design and understand computer programs that learn from experience for the purpose of prediction or control. In this course, students will learn about principles and algorithms for turning training data into effective automated predictions.

Website: edx
Length of Course: 15 weeks
Hours Per Week: 10-14 hours
Start Date: May 16th
Professor: Regina Barzilay, Tommi Jaakkola, Karene Chu
Link: https://www.edx.org/course/machine-learning-with-python-from-linear-models-to