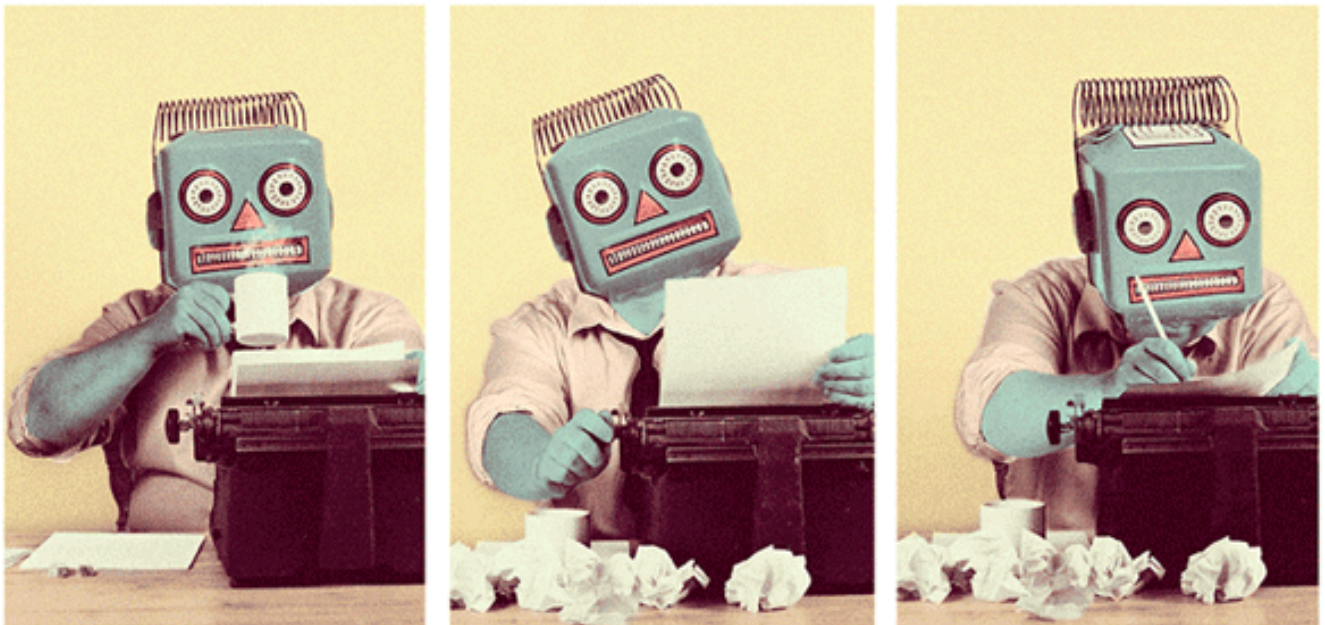# Learn Algorithms for Data Science and Machine Learning

Algorithms are the heart of data science and machine learning, and the subject has attracted thousands of learning resources, practical applications as well as intellectual depth.

Some of the important algorithms used by data scientists and machine learning engineers include regression, classification and clustering techniques, decision trees and random forests, kNN, K-Means, Naive Bayes, machine learning techniques like supervised, unsupervised and reinforcement learning.

In this piece, My goal is to highlight the courses that cover the essential information that every serious aspiring Data Scientist and Machine Learning Scientist needs to know about algorithms and data structures from the field ion.

These courses will equip you to be well-positioned to ace your technical interviews and speak fluently about algorithms.

So, without further ado, let's get started.

Learn Algorithms for Data Science and Machine Learning from Notable Educators

I have compiled these courses according to the difficulty level and student rating data points, and is suitable for Beginners, Intermediate Learners as well as Advanced Learners.

— Algorithms, Data Collection, and Starting to Code

This is a freshman-level course from The University of Colorado to help you build the comfortability you need working with Algorithms.

First, You will learn about algorithms and write your first C program.

Next, You will discover how to store data in your programs.

Furthermore, You will explore how to use data collection to solve problems and answer questions, ones that matter.

Finally, You will devote some time to practice writing C programs to implement STEM computations.

Is it right for you?

This course is suitable for beginners with no background in programming.

This course will equip you to interact with the world in a rigorous, computational way, and help you to start learning to program.

GO TO COURSE

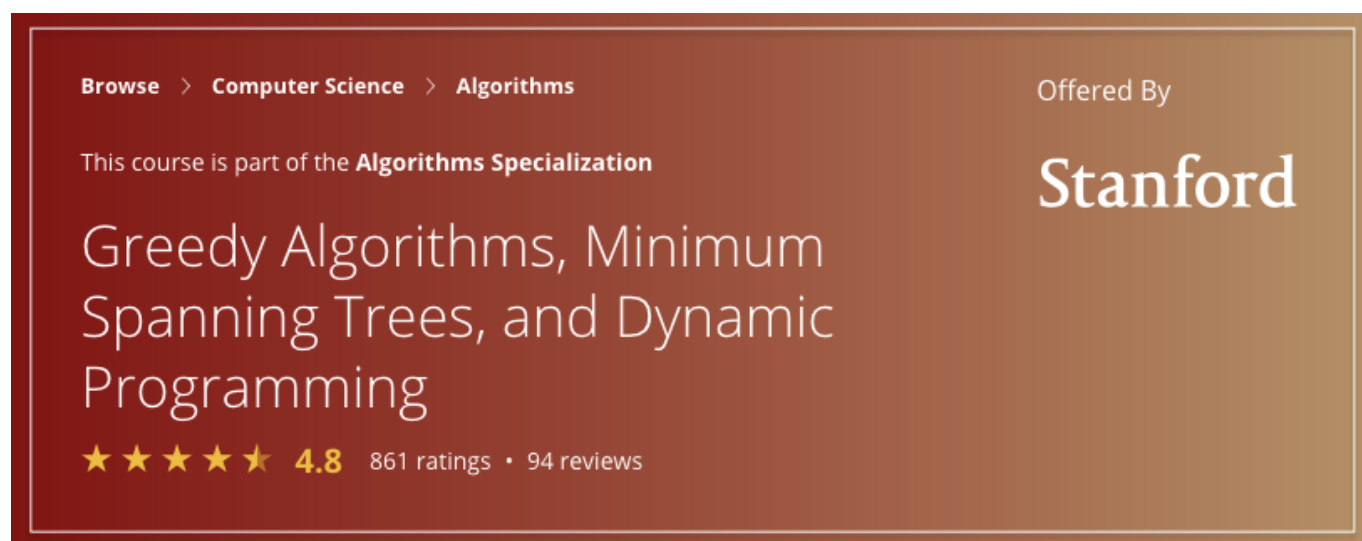## — Greedy Algorithms, Minimum Spanning Trees, and Dynamic Programming

This interactive course on Algorithms is designed by The Stanford University and delivered via Coursera.

First, You will learn about selected review and get an introduction to greedy algorithms through the series of lectures. You will also learn about scheduling application and dig a little deeper into Prim's MST algorithm.

Next, You will learn about Kruskal's MST algorithm and applications to clustering and understand the key concepts in advanced union-find.

Afterwards, You will learn about the Huffman codes and receive a rigorous introduction to dynamic programming.

Finally, You will learn about the Advanced dynamic programming and understand the concepts like knapsack problem, sequence alignment, and optimal binary search tree.

Is it right for you?

This course is suitable for learners with at least basic knowledge of Mathematics and Statistics.

This course is also part of Algorithms Specialization, highlighted below.

By the end of this course, you will be equipped with the sound knowledge of Spanning Tree, Algorithms, Dynamic Programming and Greedy Algorithm.

GO TO COURSE

— Machine Learning: Algorithms in the Real World Specialization

This specialization designed by Alberta Machine Intelligence Institute and University of Alberta and delivered via Coursera.

In the first course, You will receive an Introduction to Applied Machine Learning which will help you to understand problem definition and data preparation in a machine learning project. You will also learn to prepare data for effective machine learning applications.

Next, You will learn about the Machine Learning Algorithms: Supervised Learning Tip to Tail. In other words, the second course will take you ahead from understanding the fundamentals of a machine learning project.

In next course "Data for Machine Learning," you will learn the critical elements of data in the learning, training and operation phases. This course will bootstrap your understanding and help you demonstrate the accuracy of your model with much improved, thoughtful feature engineering.

Finally, You will learn about Optimizing Machine Learning models for the optimum performance. You will learn to identify and understand the art of interpretation in

potential unintended effects for your project. You will also gain solid skills in defining procedures to operationalize and maintain your applied machine learning model.

Is it right for you?

This Specialization aims to equip learners with the necessary skills to apply machine learning to data analysis and automation. It assumes basic comfortability in Python and Mathematics.

Through the hands-on exercises, You will be able to clearly define a machine learning problem, identify appropriate data, train a classification algorithm, improve your results, and deploy it.

Moreover, You will also be able to anticipate and mitigate common pitfalls in applied machine learning.

Upon the completion of all the four courses, you will have gone through the entire process of building a machine learning project with sound knowledge of using Algorithms in your projects.

GO TO SPECIALIZATION

— Divide and Conquer, Sorting and Searching, and Randomized Algorithms

This interactive and rigorous course is designed by The Stanford University and delivered via Coursera.

First, you walk through the short series of lectures, readings and quizzes to help you build the sound understanding of "big-oh" notation and asymptotic analysis.

Next, You will learn about the Divide-and-conquer basics and walk through the series of lectures to understand the master method for analyzing divide and conquer algorithms.

Afterwards, You learn the QuickSort algorithm and its analysis, and also probability review.

Finally, You will understand the Linear-time selection, Learn to make use of graphs, cuts, and the contraction algorithm.

Is it right for you?

If you want to grow in your understanding about the algorithms, then this course is for you.

You will need basic comfortability with mathematics to gain a clear understanding of concepts you will learn in this course.

By the end of this course, you will have gained good understanding and employable skills in Algorithms, Randomized Algorithms, Divide and Conquer Algorithms, and also Sorting Algorithms.

GO TO COURSE

— Algorithms on Graphs

Algorithms on Graphs is designed by The University Of California San Diego and

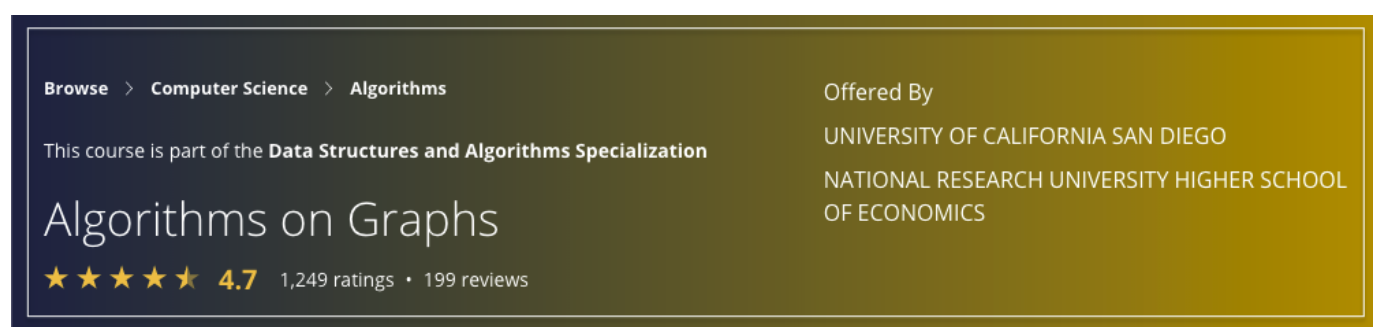The National Research University of Higher School of Economics, and delivered via Coursera.

First, you will learn about the graphs and its most important properties. You will also understand the techniques to traverse graphs and how you can do useful things while traversing the graph in some order.

Next, You will walk through the series of lectures to learn the shortest paths algorithms, from the simplest to the advanced, especially those which open door for 1000000 times faster algorithms used in Google Maps and other navigational services.

Afterwards, You will use these algorithms in hands-on exercises to work on the Fast Shortest Routes industrial capstone project.

Finally, You will finish with the minimum spanning trees which are used to plan road, telephone and computer networks and also find applications in clustering and approximate algorithms.

Is it right for you?

This course is suitable for learner who want to understand Algorithms on Graphs.

Upon the successful completion of this course, You will be able to optimize your

time to get to work, find cheapest way to connect set of computers into a network or efficient algorithm to automatically find communities and opinion leaders in Social Networks, and much more.

GO TO COURSE

— Algorithms Specialization

Algorithms specialization is designed by Stanford and delivered via Coursera.

This specilazation is an introduction to algorithms and aims to equip learners with life-long skills in Algorithms, Dynamic Programming, Greedy Algorithms, and Divide And Conquer Algorithms.

The topics covered are extremely thorough but emphasize conceptual understanding over low-level implementation and mathematical detail.

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This specialization is suitable for beginners with at least little experience in programming.

Upon the successful completion of this Specialization, you will be well-positioned to ace your technical interviews and speak fluently about algorithms with other programmers and computer scientists.

GO TO SPECIALIZATION

— Data Structures and Algorithms Specialization

Data Structures and Algorithms Specialization is designed by the University of California San Diego and National Research University Higher School of Economics,
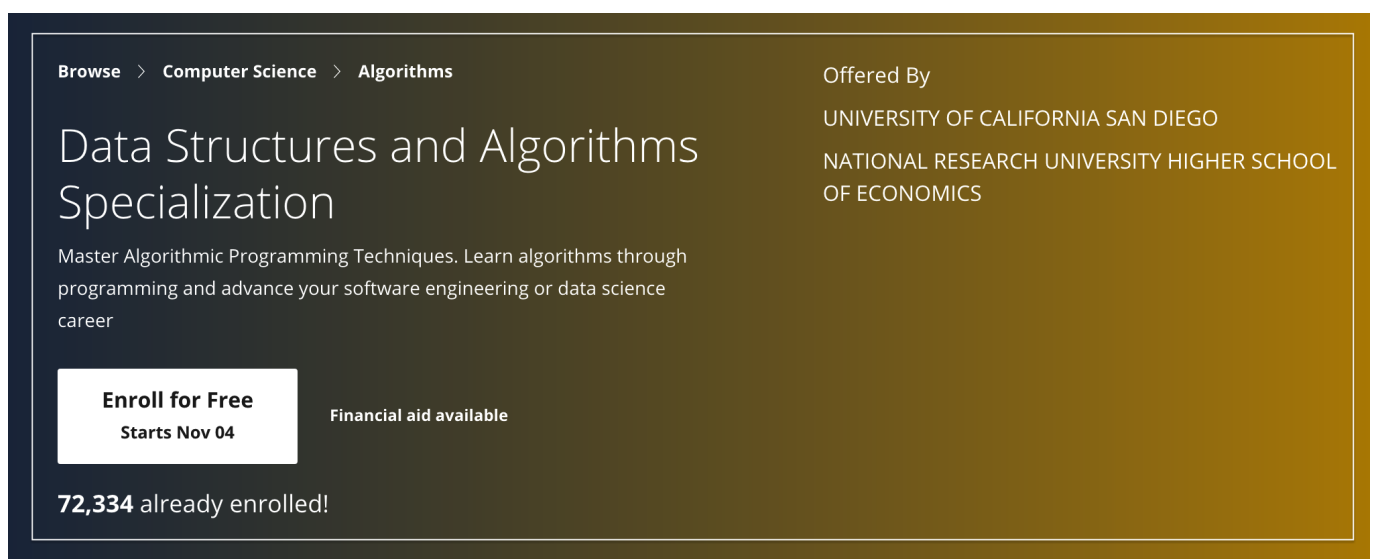
and delivered via Coursera.

This specialization aims to help the learners deeply understand about the algorithmic techniques for solving various computational problems and learn the implementation of about 100 algorithmic coding problems in a programming language of your choice.

> *You will also have an access to two hands-on real-world projects: Big Networks and Genome Assembly.*

Through the guided series of lectures and hands-on exercises, You will understand the key concepts to analyze both road networks and social networks and will learn how to compute the shortest route between two cities that is 1000 times faster than the standard shortest path algorithms.

You will finish this specialization by learning the techniques to assemble genomes from millions of short fragments of DNA and understand how assembly algorithms fuels recent developments in personalized medicine.

Browse > Computer Science > Algorithms

Data Structures and Algorithms Specialization

Master Algorithmic Programming Techniques. Learn algorithms through programming and advance your software engineering or data science career

Enroll for Free
Starts Nov 04   **Financial aid available**

72,334 already enrolled!

Offered By
UNIVERSITY OF CALIFORNIA SAN DIEGO
NATIONAL RESEARCH UNIVERSITY HIGHER SCHOOL OF ECONOMICS

Is it right for you?

This specialization is suitable for learners with basic knowledge of at least one programming language: C++, Java, Python, C, C#, Javascript, Haskell, Kotlin, Ruby, Rust, Scala.

You also need basic knowledge of discrete mathematics:

Proof by induction

Proof by contradiction.

Upon the successful completion of this specialization, you will have gained solid understanding of Debugging, Software Testing, Algorithms, Data Structures, and Computer programming.

This specialization offers a wealth of programming challenges that you may face at your next job interview.

GO TO SPECIALIZATION

— Analysis of Algorithms

This advanced level course to learn Analysis of Algorithms is created by Princeton University and delivered via Coursera.

In this course, you will learn a calculus that enables precise quantitative predictions of large combinatorial structures.

This course is divided into 4 modules;

Analysis of Algorithms

Recurrences

Generating Functions

Asymptotics

You will also understand the basic structures such as permutations, trees, strings, words, and mappings.

In addition, this course covers generating functions and real asymptotics and then gives you an introduction to the symbolic method in the context of applications in the analysis of algorithms.

Moreover, you will receive an in-depth introduction to the symbolic method in the context of applications in the analysis of algorithms.

Is it right for you?

This course is suitable for learners who have a good background in mathematics and intermediate comfortability with algorithms.

This is an excellent course to get a solid understanding of generating functions and

real asymptotics.

GO TO COURSE

— Advanced Algorithms and Complexity

Advanced Algorithms and Complexity Course is designed by The University of California San Diego and National Research University Higher School of Economics, and delivered via Coursera.

This course equips learners to confidently step into the area of more complex problems and algorithms to solve them.

First, You will start with networks flows that are used in applications such as optimal matchings, finding disjoint paths and flight scheduling as well as image segmentation in computer vision.

Next, You will proceed to learn linear programming with applications in optimizing budget allocation, portfolio optimization, finding the cheapest diet satisfying all requirements and many others.

Afterwards, You will continue to follow through series of lectures and discuss inherently hard problems for which no exact good solutions are known (most likely not to be found) and how to solve them in practice.

Finally, You will finish with a soft introduction to streaming algorithms that are heavily used in Big Data processing.

Is it right for you?

This course is suitable for learners with basic knowledge of algorithms and intermediate comfortability with Python.

Upon the successful completion of this course, you will have inherited knowledge with much improved skills in Python Programming, Linear Programming (LP), Np-Completeness and Dynamic Programming

GO TO COURSE

Thanks for making it to the end ;)

If you liked these resources, I've got a few practical reads for you. One about Maths for Machine Learning and Data Science and one about the Best AI Courses on the Internet.

I've also got this data science newsletter that you might be into. I send a tiny email once every fortnight with some useful and cool stuff I've found/made.

Don't worry, I hate spam as much as you.