



# Google IT Automation Professional Certificate

ISSUED TO

Akash Singh



Issued on: 18 AUG 2020 | Issued by: Coursera  
Verify: <https://www.youracclaim.com/go/UlZHdydw>



07/21/2020

# Akash Singh

has successfully completed

## Crash Course on Python

an online non-credit course authorized by Google and offered through Coursera



Google

## COURSE CERTIFICATE



Verify at [coursera.org/verify/GTSK88Z2ML92](https://coursera.org/verify/GTSK88Z2ML92)

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their participation in the course.



07/22/2020

# Akash Singh

has successfully completed

Using Python to Interact with the Operating System

an online non-credit course authorized by Google and offered through Coursera



Google

## COURSE CERTIFICATE



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their participation in the course.



07/23/2020

# Akash Singh

has successfully completed

## Introduction to Git and GitHub

an online non-credit course authorized by Google and offered through Coursera



Google

## COURSE CERTIFICATE



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their participation in the course.



07/23/2020

# Akash Singh

has successfully completed

## Troubleshooting and Debugging Techniques

an online non-credit course authorized by Google and offered through Coursera



Google

## COURSE CERTIFICATE



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Coursera has confirmed the identity of this individual and  
their participation in the course.



07/23/2020

# Akash Singh

has successfully completed

## Configuration Management and the Cloud

an online non-credit course authorized by Google and offered through Coursera



Google

## COURSE CERTIFICATE



Verify at [coursera.org/verify/MAWKGCM45XGC](https://coursera.org/verify/MAWKGCM45XGC)  
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their participation in the course.



07/24/2020

# Akash Singh

has successfully completed

Automating Real-World Tasks with Python

an online non-credit course authorized by Google and offered through Coursera

**Google**

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Google

## COURSE CERTIFICATE



Verify at [coursera.org/verify/58ZSXXCFDE89](https://coursera.org/verify/58ZSXXCFDE89)

Coursera has confirmed the identity of this individual and  
their participation in the course.



6 Courses

Crash Course on Python

Using Python to Interact with the Operating System

Introduction to Git and GitHub

Troubleshooting and Debugging Techniques

Configuration Management and the Cloud

Automating Real-World Tasks with Python



07/24/2020

Akash Singh

has successfully completed the online, non-credit Professional Certificate

# Google IT Automation with Python

This six-course certificate, developed by Google, is designed to provide IT professionals with in-demand skills -- including Python, Git, and IT automation -- that can help them advance their careers. The hands-on curriculum is designed to teach learners how to write code in Python, with a special focus on how this applies to automating tasks in the world of IT support and systems administration. Those who received this certificate passed all graded assessments with a score of 80% or above. They should have a strong foundation in how to use Git and GitHub, troubleshoot and debug complex problems, and apply automation at scale by using configuration management and the Cloud in order to prepare them for more advanced IT Support Specialist or Junior Systems Administrator positions.

The online specialization named in this certificate may draw on material from courses taught on-campus, but the included courses are not equivalent to on-campus courses. Participation in this online specialization does not constitute enrollment at this university. This certificate does not confer a University grade, course credit or degree, and it does not verify the identity of the learner.

A faint watermark of the Google logo, showing the letters 'G' in red, yellow, and green, with the word "Google" written vertically next to it.

Verify this certificate at:  
[coursera.org/verify/professional-cert/PJJHFX7ERUEW](https://coursera.org/verify/professional-cert/PJJHFX7ERUEW)



# Google IT Support Professional Certificate

ISSUED TO

Akash Singh



Issued on: 27 JUL 2020 | Issued by: Coursera  
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07/26/2020

# Akash Singh

has successfully completed

## Technical Support Fundamentals

an online non-credit course authorized by Google and offered through Coursera



Google

## COURSE CERTIFICATE



Verify at [coursera.org/verify/LUS9S7774G73](https://coursera.org/verify/LUS9S7774G73)

Coursera has confirmed the identity of this individual and  
their participation in the course.



07/27/2020

## Akash Singh

has successfully completed

### The Bits and Bytes of Computer Networking

an online non-credit course authorized by Google and offered through Coursera



Google

## COURSE CERTIFICATE



Verify at [coursera.org/verify/ANE6CU5XEEUH](https://coursera.org/verify/ANE6CU5XEEUH)  
Coursera has confirmed the identity of this individual and  
their participation in the course.



07/26/2020

## Akash Singh

has successfully completed

Operating Systems and You: Becoming a Power User

an online non-credit course authorized by Google and offered through Coursera

**Google**

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Google

## COURSE CERTIFICATE



Verify at [coursera.org/verify/DCSGSPBHLKKN](https://coursera.org/verify/DCSGSPBHLKKN)

Coursera has confirmed the identity of this individual and  
their participation in the course.



07/27/2020

# Akash Singh

has successfully completed

System Administration and IT Infrastructure Services

an online non-credit course authorized by Google and offered through Coursera



Google

## COURSE CERTIFICATE



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their participation in the course.



07/26/2020

# Akash Singh

has successfully completed

IT Security: Defense against the digital dark arts

an online non-credit course authorized by Google and offered through Coursera



Google

## COURSE CERTIFICATE



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their participation in the course.



5 Courses



07/27/2020

## Akash Singh

has successfully completed the online, non-credit Professional Certificate

Technical Support Fundamentals

The Bits and Bytes of Computer Networking

Operating Systems and You: Becoming a Power User

System Administration and IT Infrastructure Services

IT Security: Defense against the digital dark arts

A small watermark of the Google logo, consisting of the word "Google" in its signature script font next to the multi-colored 'G' logo.

Google

# Google IT Support

Whether you've been tinkering with IT or are completely new to the field, you've come to the right place. This five-course certificate, developed by Googlers, includes industry-relevant curriculum designed to prepare you for an entry-level role in IT support. Think in-person or remote help desk work, either in small shops or at a global company, like Google!

The online specialization named in this certificate may draw on material from courses taught on-campus, but the included courses are not equivalent to on-campus courses. Participation in this online specialization does not constitute enrollment at this university. This certificate does not confer a University grade, course credit or degree, and it does not verify the identity of the learner.

Verify this certificate at:  
[coursera.org/verify/professional-cert/66HX2T358RM6](https://coursera.org/verify/professional-cert/66HX2T358RM6)



07/28/2020

# Akash Singh

has successfully completed

## How Google does Machine Learning

an online non-credit course authorized by Google Cloud and offered through Coursera

*Google Cloud Training*

# COURSE CERTIFICATE



Verify at [coursera.org/verify/72HMBV93GRJJ](https://coursera.org/verify/72HMBV93GRJJ)

Coursera has confirmed the identity of this individual and  
their participation in the course.



07/28/2020

# Akash Singh

has successfully completed

## Launching into Machine Learning

an online non-credit course authorized by Google Cloud and offered through Coursera

*Google Cloud Training*

# COURSE CERTIFICATE



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Coursera has confirmed the identity of this individual and  
their participation in the course.



07/28/2020

# Akash Singh

has successfully completed

## Intro to TensorFlow

an online non-credit course authorized by Google Cloud and offered through Coursera

*Google Cloud Training*

# COURSE CERTIFICATE



Verify at [coursera.org/verify/45DP6HKP5ZH](https://coursera.org/verify/45DP6HKP5ZH)

Coursera has confirmed the identity of this individual and  
their participation in the course.



08/01/2020

# Akash Singh

has successfully completed

## Feature Engineering

an online non-credit course authorized by Google Cloud and offered through Coursera

*Google Cloud Training*

# COURSE CERTIFICATE



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Coursera has confirmed the identity of this individual and  
their participation in the course.



08/01/2020

# Akash Singh

has successfully completed

## Art and Science of Machine Learning

an online non-credit course authorized by Google Cloud and offered through Coursera

*Google Cloud Training*

## COURSE CERTIFICATE



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Coursera has confirmed the identity of this individual and  
their participation in the course.



5 Courses

How Google does Machine Learning

Launching into Machine Learning

Introduction to TensorFlow

Feature Engineering

Art and Science of Machine Learning

Google Cloud

08/01/2020

Akash Singh

has successfully completed the online, non-credit Specialization

*Google Cloud Training*

# Machine Learning with TensorFlow on Google Cloud Platform

This five-course online specialization teaches course participants how to write distributed machine learning models that scale in Tensorflow, scale out the training of those models, and offer high-performance predictions. Also featured is the conversion of raw data to features in a way that allows ML to learn important characteristics from the data and bring human insight to bear on the problem. It also teaches how to incorporate the right mix of parameters that yields accurate, generalized models and knowledge of the theory to solve specific types of ML problems. Course participants experimented with end-to-end ML, starting from building an ML-focused strategy and progressing into model training, optimization, and productionalization with hands-on labs using Google Cloud Platform.

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[coursera.org/verify/specialization/7P4GQCT6PH6G](https://coursera.org/verify/specialization/7P4GQCT6PH6G)



08/02/2020

# Akash Singh

has successfully completed

End-to-End Machine Learning with TensorFlow  
on GCP

an online non-credit course authorized by Google Cloud and offered through Coursera

*Google Cloud Training*

## COURSE CERTIFICATE



Verify at [coursera.org/verify/KQS8YE63UZ77](https://coursera.org/verify/KQS8YE63UZ77)

Coursera has confirmed the identity of this individual and  
their participation in the course.



08/03/2020

# Akash Singh

has successfully completed

## Production Machine Learning Systems

an online non-credit course authorized by Google Cloud and offered through Coursera

*Google Cloud Training*

## COURSE CERTIFICATE



Verify at [coursera.org/verify/PRLTYY7GD9MB](https://coursera.org/verify/PRLTYY7GD9MB)

Coursera has confirmed the identity of this individual and  
their participation in the course.



08/05/2020

# Akash Singh

has successfully completed

**Image Understanding with TensorFlow on GCP**

an online non-credit course authorized by Google Cloud and offered through Coursera

*Google Cloud Training*

## COURSE CERTIFICATE



Verify at [coursera.org/verify/LQ59RHVJ33F3](https://coursera.org/verify/LQ59RHVJ33F3)

Coursera has confirmed the identity of this individual and  
their participation in the course.



08/06/2020

# Akash Singh

has successfully completed

Sequence Models for Time Series and Natural Language Processing

an online non-credit course authorized by Google Cloud and offered through Coursera

*Google Cloud Training*

## COURSE CERTIFICATE



Verify at [coursera.org/verify/WFA6J7WHB3VM](https://coursera.org/verify/WFA6J7WHB3VM)

Coursera has confirmed the identity of this individual and their participation in the course.



08/05/2020

# Akash Singh

has successfully completed

Recommendation Systems with TensorFlow on  
GCP

an online non-credit course authorized by Google Cloud and offered through Coursera

*Google Cloud Training*

## COURSE CERTIFICATE



Verify at [coursera.org/verify/KNXWKNQCJQF3](https://coursera.org/verify/KNXWKNQCJQF3)

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their participation in the course.



5 Courses

End-to-End Machine Learning  
with TensorFlow on GCP

Production Machine Learning  
Systems

Image Understanding with  
TensorFlow on GCP

Sequence Models for Time  
Series and Natural Language  
Processing

Recommendation Systems with  
TensorFlow on GCP

Google Cloud

08/06/2020

Akash Singh

has successfully completed the online, non-credit Specialization

# Advanced Machine Learning with TensorFlow on Google Cloud Platform

This specialization focuses on advanced machine learning topics using Google Cloud Platform where you will get hands-on experience optimizing, deploying, and scaling production ML models of various types in hands-on labs. This specialization picks up where "Machine Learning on GCP" left off and teaches you how to build scalable, accurate, and production-ready models for structured data, image data, time-series, and natural language text. It ends with a course on building recommendation systems. Topics introduced in earlier courses are referenced in later courses, so it is recommended that you take the courses in exactly this order.

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*Google Cloud Training*

Google Cloud Training

Verify this certificate at:  
[coursera.org/verify/specialization/E6MWELZB23U2](https://coursera.org/verify/specialization/E6MWELZB23U2)



07/27/2020

# Akash Singh

has successfully completed

Google Cloud Platform Big Data and Machine Learning Fundamentals

an online non-credit course authorized by Google Cloud and offered through Coursera

*Google Cloud Training*

## COURSE CERTIFICATE



Verify at [coursera.org/verify/QT9RGRGDG7J9](https://coursera.org/verify/QT9RGRGDG7J9)

Coursera has confirmed the identity of this individual and their participation in the course.



08/31/2020

# Akash Singh

has successfully completed

Modernizing Data Lakes and Data Warehouses  
with GCP

an online non-credit course authorized by Google Cloud and offered through Coursera

*Google Cloud Training*

## COURSE CERTIFICATE



Verify at [coursera.org/verify/RUD28USQRPQB](https://coursera.org/verify/RUD28USQRPQB)

Coursera has confirmed the identity of this individual and  
their participation in the course.



09/04/2020

# Akash Singh

has successfully completed

## Building Batch Data Pipelines on GCP

an online non-credit course authorized by Google Cloud and offered through Coursera

*Google Cloud Training*

### COURSE CERTIFICATE



Verify at [coursera.org/verify/A9Q9HCK4P3V7](https://coursera.org/verify/A9Q9HCK4P3V7)

Coursera has confirmed the identity of this individual and  
their participation in the course.

09/05/2020

# Akash Singh

has successfully completed

Building Resilient Streaming Analytics Systems on  
GCP

an online non-credit course authorized by Google Cloud and offered through Coursera

*Google Cloud Training*

## COURSE CERTIFICATE



Verify at [coursera.org/verify/S8X9WMAH4GJP](https://coursera.org/verify/S8X9WMAH4GJP)  
Coursera has confirmed the identity of this individual and  
their participation in the course.

09/05/2020

# Akash Singh

has successfully completed

## Smart Analytics, Machine Learning, and AI on GCP

an online non-credit course authorized by Google Cloud and offered through Coursera

*Google Cloud Training*

### COURSE CERTIFICATE



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their participation in the course.



5 Courses

Google Cloud Platform Big Data  
and Machine Learning  
Fundamentals

Modernizing Data Lakes and  
Data Warehouses with GCP

Building Batch Data Pipelines on  
GCP

Building Resilient Streaming  
Analytics Systems on GCP

Smart Analytics, Machine  
Learning, and AI on GCP

Google Cloud

26.09.2020

Akash Singh

has successfully completed the online, non-credit Specialization

# Data Engineering, Big Data, and Machine Learning on GCP

This five-course accelerated specialization is designed for data professionals who are responsible for designing, building, analyzing, and optimizing big data solutions. Through a combination of video lectures, quizzes, and hands-on labs, learners carried out serverless data analysis and productionize machine learning models. This specialization is designed to give learners a robust hands-on experience and is primarily lab-focused.

The online specialization named in this certificate may draw on material from courses taught on-campus, but the included courses are not equivalent to on-campus courses. Participation in this online specialization does not constitute enrollment at this university. This certificate does not confer a University grade, course credit or degree, and it does not verify the identity of the learner.

*Google Cloud Training*

Google Cloud Training

Verify this certificate at:  
[coursera.org/verify/specialization/78ZVUEHAU5H5](https://coursera.org/verify/specialization/78ZVUEHAU5H5)



# Daydream

09/07/2020

## Akash Singh

has successfully completed

### Introduction to Augmented Reality and ARCore

an online non-credit course authorized by Google AR & VR and offered through Coursera

***Google Daydream Impact***

## COURSE CERTIFICATE



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Coursera has confirmed the identity of this individual and their participation in the course.



08/22/2020

# Akash Singh

has successfully completed

## AWS Fundamentals: Going Cloud-Native

an online non-credit course authorized by Amazon Web Services and offered through Coursera

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Allen Goldberg, Morgan Willis, Blaine Sundrud  
AWS Training and Certification

## COURSE CERTIFICATE



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Coursera has confirmed the identity of this individual and  
their participation in the course.



08/23/2020

## Akash Singh

has successfully completed

### AWS Fundamentals: Addressing Security Risk

an online non-credit course authorized by Amazon Web Services and offered through Coursera

A handwritten signature of the name "Akash Singh".

A handwritten signature of the name "Nayan Jha".

## COURSE CERTIFICATE



Verify at [coursera.org/verify/V2A8P8SRQMT9](https://coursera.org/verify/V2A8P8SRQMT9)

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their participation in the course.



08/22/2020

# Akash Singh

has successfully completed

## AWS Fundamentals: Migrating to the Cloud

an online non-credit course authorized by Amazon Web Services and offered through Coursera

Cloud Technologist

Technical Architect

## COURSE CERTIFICATE



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Coursera has confirmed the identity of this individual and  
their participation in the course.



08/22/2020

# Akash Singh

has successfully completed

## AWS Fundamentals: Building Serverless Applications

an online non-credit course authorized by Amazon Web Services and offered through Coursera

*Rick Hurst, Jonathan Dion, Adam Becker, Bobbie Aristrain, Wes Gruver*

Rick Hurst, Jonathan Dion, Adam Becker, Bobbie Aristrain, Wes Gruver  
AWS Training and Certification

## COURSE CERTIFICATE



Verify at [coursera.org/verify/2YSL6RCAA8CR](https://coursera.org/verify/2YSL6RCAA8CR)

Coursera has confirmed the identity of this individual and  
their participation in the course.



4 Courses



08/23/2020

**Akash Singh**

has successfully completed the online, non-credit Specialization

AWS Fundamentals

## AWS Fundamentals

In this Specialization, learners gained proficiency in essential concepts, services, and use cases within the Amazon Web Services (AWS) cloud ecosystem, including core AWS services and key AWS security concepts. The Specialization also covered fundamental strategies for planning and migrating existing workloads to AWS and how to build and deploy serverless applications with AWS. Learners are given opportunities to solidify their understanding by engaging in various hands-on labs and exercises throughout the Specialization.

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[coursera.org/verify/specialization/VT3G3J4BLHL8](https://coursera.org/verify/specialization/VT3G3J4BLHL8)



08/22/2020

## Akash Singh

has successfully completed

### Getting Started with AWS Machine Learning

an online non-credit course authorized by Amazon Web Services and offered through Coursera

Blaine Sundrud  
Senior Technical Trainer  
AWS Training and Certification

## COURSE CERTIFICATE



Verify at [coursera.org/verify/SZ3Z53TRT8FZ](https://coursera.org/verify/SZ3Z53TRT8FZ)

Coursera has confirmed the identity of this individual and  
their participation in the course.



HIGHER SCHOOL OF ECONOMICS  
NATIONAL RESEARCH UNIVERSITY

08/23/2020

# Akash Singh

has successfully completed

## Algorithmic Toolbox

an online non-credit course authorized by University of California San Diego and National Research University Higher School of Economics and offered through Coursera

Alexander S. Kulikov, Visiting Professor; Michael Levin, Associate Professor; Neil Rhodes, Adjunct Faculty; Pavel A. Pevzner, Ronald R. Taylor Distinguished Professor of Computer Science, Director, NIH Center for Computational Mass Spectrometry; Daniel M Kane, Assistant Professor, Computer Science and Engineering at the University of California, San Diego

## COURSE CERTIFICATE



Verify at [coursera.org/verify/CBUTJWKWSDKX](https://coursera.org/verify/CBUTJWKWSDKX)

Coursera has confirmed the identity of this individual and their participation in the course.



HIGHER SCHOOL OF ECONOMICS  
NATIONAL RESEARCH UNIVERSITY

08/23/2020

# Akash Singh

has successfully completed

## Data Structures

an online non-credit course authorized by University of California San Diego and National Research University Higher School of Economics and offered through Coursera

Alexander S. Kulikov, Visiting Professor; Michael Levin, Associate Professor; Neil Rhodes, Adjunct Faculty; Daniel M Kane, Assistant Professor, Computer Science and Engineering at the University of California, San Diego

## COURSE CERTIFICATE



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Coursera has confirmed the identity of this individual and  
their participation in the course.



HIGHER SCHOOL OF ECONOMICS  
NATIONAL RESEARCH UNIVERSITY

08/23/2020

# Akash Singh

has successfully completed

## Algorithms on Graphs

an online non-credit course authorized by University of California San Diego and National Research University Higher School of Economics and offered through Coursera

Alexander S. Kulikov, Visiting Professor; Michael Levin, Associate Professor; Neil Rhodes, Adjunct Faculty; Daniel M Kane, Assistant Professor, Computer Science and Engineering at the University of California, San Diego

## COURSE CERTIFICATE



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Coursera has confirmed the identity of this individual and  
their participation in the course.



HIGHER SCHOOL OF ECONOMICS  
NATIONAL RESEARCH UNIVERSITY

08/24/2020

## Akash Singh

has successfully completed

### Algorithms on Strings

an online non-credit course authorized by University of California San Diego and National Research University Higher School of Economics and offered through Coursera

Alexander S. Kulikov, Visiting Professor; Michael Levin, Associate Professor; Pavel A. Pevzner, Ronald R. Taylor  
Distinguished Professor of Computer Science, Director, NIH Center for Computational Mass Spectrometry; Neil  
Rhodes, Adjunct Faculty  
Department of Computer Science and Engineering  
University of California, San Diego

## COURSE CERTIFICATE



Verify at [coursera.org/verify/7SC2NVV7LNWT](https://coursera.org/verify/7SC2NVV7LNWT)

Coursera has confirmed the identity of this individual and  
their participation in the course.



HIGHER SCHOOL OF ECONOMICS  
NATIONAL RESEARCH UNIVERSITY

08/23/2020

# Akash Singh

has successfully completed

## Advanced Algorithms and Complexity

an online non-credit course authorized by University of California San Diego and National Research University Higher School of Economics and offered through Coursera

Alexander S. Kulikov, Visiting Professor; Michael Levin, Associate Professor; Neil Rhodes, Adjunct Faculty; Daniel M Kane, Assistant Professor, Computer Science and Engineering at the University of California, San Diego

## COURSE CERTIFICATE



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their participation in the course.



HIGHER SCHOOL OF ECONOMICS  
NATIONAL RESEARCH UNIVERSITY

08/23/2020

# Akash Singh

has successfully completed

## Genome Assembly Programming Challenge

an online non-credit course authorized by University of California San Diego and National Research University Higher School of Economics and offered through Coursera



Alexander S. Kulikov, Visiting Professor; Michael Levin, Associate Professor; Neil Rhodes, Adjunct Faculty; Daniel M. Kane, Assistant Professor, Computer Science and Engineering at the University of California, San Diego

## COURSE CERTIFICATE



Verify at [coursera.org/verify/9B4QUTEE2QSC](https://coursera.org/verify/9B4QUTEE2QSC)

Coursera has confirmed the identity of this individual and their participation in the course.



6 Courses

Algorithmic Toolbox  
Data Structures  
Algorithms on Graphs  
Algorithms on Strings  
Advanced Algorithms and Complexity  
Genome Assembly Programming Challenge



08/24/2020

Akash Singh

has successfully completed the online, non-credit Specialization

# Data Structures and Algorithms

In this Specialization, learners developed and honed essential skills in developing fast and reliable programs. Learners studied theoretical aspects of basic algorithms as well as solved many programming assignments where the goal is to implement a program solving a given computational problem correctly and quickly. Learners completed a Capstone Project at the end of the Specialization to apply their new knowledge and skills.

A cluster of five handwritten signatures in black ink, including "Paul", "Neil Rhodes", "Alexander S. Kulikov", "Daniel Kane", and "Michael Levin".

Daniel Kane, Ph.D.,  
Alexander S. Kulikov,  
Ph.D., Neil Rhodes, Pavel  
Pevzner, Ph.D., University  
of California, San Diego,  
Michael Levin, Higher  
School of Economics

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Verify this certificate at:  
[coursera.org/verify/specialization/ZZ33VZW4PCYH](https://coursera.org/verify/specialization/ZZ33VZW4PCYH)



28.09.2020

## Akash Singh

has successfully completed

### Mathematical Thinking in Computer Science

an online non-credit course authorized by University of California San Diego and National Research University Higher School of Economics and offered through Coursera

Three handwritten signatures are shown in blue ink. From left to right: "Alexander S. Kulikov", "Michael Levin", and "Vladimir Podolskii".

Alexander S. Kulikov, Visiting Professor, Department of Computer Science and Engineering;  
Michael Levin, Associate Professor, Computer Science;  
Vladimir Podolskii, Associate Professor, Computer Science

## COURSE CERTIFICATE



Verify at [coursera.org/verify/UFX4T2Z47KW8](https://coursera.org/verify/UFX4T2Z47KW8)

Coursera has confirmed the identity of this individual and their participation in the course.



# UC San Diego

HIGHER SCHOOL OF ECONOMICS  
NATIONAL RESEARCH UNIVERSITY

28.09.2020

## Akash Singh

has successfully completed

### Combinatorics and Probability

an online non-credit course authorized by University of California San Diego and National Research University Higher School of Economics and offered through Coursera

Alexander S. Kulikov  
Visiting Professor  
Department of Computer Science and Engineering

Vladimir Podolskii  
Associate Professor  
Computer Science

## COURSE CERTIFICATE



Verify at [coursera.org/verify/YKNUUR6QB8S](https://coursera.org/verify/YKNUUR6QB8S)

Coursera has confirmed the identity of this individual and their participation in the course.



28.09.2020

## Akash Singh

has successfully completed

### Introduction to Graph Theory

an online non-credit course authorized by University of California San Diego and National Research University Higher School of Economics and offered through Coursera

A handwritten signature in black ink that appears to read "Alexander S. Kulikov".

Alexander S. Kulikov  
Visiting Professor  
Department of Computer Science and Engineering

## COURSE CERTIFICATE



Verify at [coursera.org/verify/2YQ5PVN8ZYEP](https://coursera.org/verify/2YQ5PVN8ZYEP)

Coursera has confirmed the identity of this individual and their participation in the course.



28.09.2020

## Akash Singh

has successfully completed

### Number Theory and Cryptography

an online non-credit course authorized by University of California San Diego and National Research University Higher School of Economics and offered through Coursera

Three handwritten signatures are shown in blue ink. From left to right: Alexander S. Kulikov, Michael Levin, and Vladimir Podolskii.

Alexander S. Kulikov, Visiting Professor, Department of Computer Science and Engineering;  
Michael Levin, Associate Professor, Computer Science;  
Vladimir Podolskii, Associate Professor, Computer Science

## COURSE CERTIFICATE



Verify at [coursera.org/verify/JRGDJ86JL39Y](https://coursera.org/verify/JRGDJ86JL39Y)

Coursera has confirmed the identity of this individual and their participation in the course.



28.09.2020

## Akash Singh

has successfully completed

### Delivery Problem

an online non-credit course authorized by University of California San Diego and National Research University Higher School of Economics and offered through Coursera

A handwritten signature in black ink, appearing to read "Alexander S. Kulikov".

Alexander S. Kulikov  
Visiting Professor  
Department of Computer Science and Engineering

## COURSE CERTIFICATE



Verify at [coursera.org/verify/Z35LRZEZ4PY5](https://coursera.org/verify/Z35LRZEZ4PY5)

Coursera has confirmed the identity of this individual and their participation in the course.



5 Courses

Mathematical Thinking in Computer Science

Combinatorics and Probability

Introduction to Graph Theory

Number Theory and Cryptography

Delivery Problem



28.09.2020

Akash Singh

has successfully completed the online, non-credit Specialization

# Introduction to Discrete Mathematics for Computer Science

Discrete Math is needed to see mathematical structures in the object you work with, and understand their properties. This ability is important for software engineers, data scientists, security and financial analysts (it is not a coincidence that math puzzles are often used for interviews). We cover the basic notions and results (combinatorics, graphs, probability, number theory) that are universally needed.

The online specialization named in this certificate may draw on material from courses taught on-campus, but the included courses are not equivalent to on-campus courses. Participation in this online specialization does not constitute enrollment at this university. This certificate does not confer a University grade, course credit or degree, and it does not verify the identity of the learner.

A handwritten signature in blue ink that reads "Vladimir Podolskii".

Vladimir Podolskii  
Associate Professor  
Computer Science

A handwritten signature in blue ink that reads "Michael Levin".

Michael Levin  
Lecturer  
Computer Science

A handwritten signature in blue ink that reads "Alexander S. Kulikov".

Alexander S. Kulikov  
Visiting Professor  
Department of  
Computer Science and  
Engineering

Verify this certificate at:  
[coursera.org/verify/specialization/XFXTUKJJPT9S](https://coursera.org/verify/specialization/XFXTUKJJPT9S)



UC San Diego

26.09.2020

## Akash Singh

has successfully completed

Learning How to Learn: Powerful mental tools to help you master tough subjects

an online non-credit course authorized by McMaster University and University of California San Diego and offered through Coursera

*Barbara A. Oakley*

*Terry Sejnowski*

Barb Oakley  
Terry Sejnowski

## COURSE CERTIFICATE



Verify at [coursera.org/verify/6U3997KD6LS2](https://coursera.org/verify/6U3997KD6LS2)

Coursera has confirmed the identity of this individual and their participation in the course.



23.09.2020

## Akash Singh

has successfully completed

### Mastering the Software Engineering Interview

an online non-credit course authorized by University of California San Diego and offered through Coursera

*Christine Alvarado, Mia Minnes, Leo Porter*

Associate Teaching Professor, Assistant Teaching Professor, Assistant Teaching Professor  
Computer Science and Engineering

## COURSE CERTIFICATE



Verify at [coursera.org/verify/WR389ELC59ZA](https://coursera.org/verify/WR389ELC59ZA)

Coursera has confirmed the identity of this individual and their participation in the course.



26.09.2020

## Akash Singh

has successfully completed

### The Science of Well-Being

an online non-credit course authorized by Yale University and offered through  
Coursera

---



Laurie Santos  
Professor  
Psychology

## COURSE CERTIFICATE



Verify at [coursera.org/verify/GG64TP746ATM](https://coursera.org/verify/GG64TP746ATM)

Coursera has confirmed the identity of this individual and  
their participation in the course.



08/24/2020

## Akash Singh

has successfully completed

### Neural Networks and Deep Learning

an online non-credit course authorized by deeplearning.ai and offered through Coursera

A handwritten signature in blue ink that reads "Andrew Ng".

Adjunct Professor Andrew Ng  
Computer Science

## COURSE CERTIFICATE



Verify at [coursera.org/verify/FYSUET7NBAAV](https://coursera.org/verify/FYSUET7NBAAV)

Coursera has confirmed the identity of this individual and  
their participation in the course.



08/25/2020

## Akash Singh

has successfully completed

Improving Deep Neural Networks:  
Hyperparameter tuning, Regularization and  
Optimization

an online non-credit course authorized by deeplearning.ai and offered through  
Coursera

A handwritten signature in blue ink that appears to read "Andrew Ng".

Adjunct Professor Andrew Ng  
Computer Science

## COURSE CERTIFICATE



Verify at [coursera.org/verify/4NX6KNL65BVS](https://coursera.org/verify/4NX6KNL65BVS)

Coursera has confirmed the identity of this individual and  
their participation in the course.



08/25/2020

## Akash Singh

has successfully completed

### Structuring Machine Learning Projects

an online non-credit course authorized by deeplearning.ai and offered through Coursera

A handwritten signature in blue ink that reads "Andrew Ng".

Adjunct Professor Andrew Ng  
Computer Science

## COURSE CERTIFICATE



Verify at [coursera.org/verify/SRSHH8XTKMN6](https://coursera.org/verify/SRSHH8XTKMN6)  
Coursera has confirmed the identity of this individual and  
their participation in the course.



08/26/2020

## Akash Singh

has successfully completed

### Convolutional Neural Networks

an online non-credit course authorized by deeplearning.ai and offered through Coursera

A handwritten signature in blue ink that reads "Andrew Ng".

Adjunct Professor Andrew Ng  
Computer Science

## COURSE CERTIFICATE



Verify at [coursera.org/verify/QPBKGUZV3TJD](https://coursera.org/verify/QPBKGUZV3TJD)

Coursera has confirmed the identity of this individual and  
their participation in the course.



08/26/2020

## Akash Singh

has successfully completed

### Sequence Models

an online non-credit course authorized by deeplearning.ai and offered through  
Coursera

A handwritten signature in blue ink that reads "Andrew Ng".

Adjunct Professor Andrew Ng  
Computer Science

### COURSE CERTIFICATE



Verify at [coursera.org/verify/JP5Y8VH696RV](https://coursera.org/verify/JP5Y8VH696RV)

Coursera has confirmed the identity of this individual and  
their participation in the course.



5 Courses

Neural Networks and Deep Learning

Improving Deep Neural Networks: Hyperparameter tuning, Regularization and Optimization

Structuring Machine Learning Projects

Convolutional Neural Networks

Sequence Models



08/26/2020

**Akash Singh**

has successfully completed the online, non-credit Specialization

# Deep Learning

The Deep Learning Specialization is designed to prepare learners to participate in the development of cutting-edge AI technology, and to understand the capability, the challenges, and the consequences of the rise of deep learning. Through five interconnected courses, learners develop a profound knowledge of the hottest AI algorithms, mastering deep learning from its foundations (neural networks) to its industry applications (Computer Vision, Natural Language Processing, Speech Recognition, etc.).

A handwritten blue ink signature of the name "Andrew Ng".

Adjunct Professor  
Andrew Ng  
Computer Science

The online specialization named in this certificate may draw on material from courses taught on-campus, but the included courses are not equivalent to on-campus courses. Participation in this online specialization does not constitute enrollment at this university. This certificate does not confer a University grade, course credit or degree, and it does not verify the identity of the learner.

Verify this certificate at:  
[coursera.org/verify/specialization/QVRRAVTN2JEV](https://coursera.org/verify/specialization/QVRRAVTN2JEV)



08/25/2020

## Akash Singh

has successfully completed

Introduction to TensorFlow for Artificial Intelligence, Machine Learning, and Deep Learning

an online non-credit course authorized by deeplearning.ai and offered through Coursera

*Laurence Moroney*

Laurence Moroney  
Staff AI Advocate  
Google Brain

## COURSE CERTIFICATE



Verify at [coursera.org/verify/6N4X26JFP2LC](https://coursera.org/verify/6N4X26JFP2LC)

Coursera has confirmed the identity of this individual and their participation in the course.



08/30/2020

## Akash Singh

has successfully completed

### Convolutional Neural Networks in TensorFlow

an online non-credit course authorized by deeplearning.ai and offered through  
Coursera

*Laurence Moroney*

Laurence Moroney  
Staff AI Advocate  
Google Brain

## COURSE CERTIFICATE



Verify at [coursera.org/verify/ULYPBHDLB7G9](https://coursera.org/verify/ULYPBHDLB7G9)

Coursera has confirmed the identity of this individual and  
their participation in the course.



08/30/2020

## Akash Singh

has successfully completed

### Natural Language Processing in TensorFlow

an online non-credit course authorized by deeplearning.ai and offered through  
Coursera

*Laurence Moroney*

Laurence Moroney  
Staff AI Advocate  
Google Brain

## COURSE CERTIFICATE



Verify at [coursera.org/verify/SNYCLD79J7SW](https://coursera.org/verify/SNYCLD79J7SW)

Coursera has confirmed the identity of this individual and  
their participation in the course.



08/30/2020

## Akash Singh

has successfully completed

### Sequences, Time Series and Prediction

an online non-credit course authorized by deeplearning.ai and offered through Coursera

*Laurence Moroney*

Laurence Moroney  
Staff AI Advocate  
Google Brain

### COURSE CERTIFICATE



Verify at [coursera.org/verify/7R9U6GHK9HQ6](https://coursera.org/verify/7R9U6GHK9HQ6)

Coursera has confirmed the identity of this individual and their participation in the course.



4 Courses

Introduction to TensorFlow for Artificial Intelligence, Machine Learning, and Deep Learning

Convolutional Neural Networks in TensorFlow

Natural Language Processing in TensorFlow

Sequences, Time Series and Prediction



08/30/2020

## Akash Singh

has successfully completed the online, non-credit Professional Certificate

# DeepLearning.AI TensorFlow Developer

Congratulations! You have completed all 4 courses of the DeepLearning.AI TensorFlow Developer Professional Certificate program. As part of this Professional Certificate program, you have learned: how to build and train neural networks using TensorFlow, how to improve network performance using convolutions as you train it to identify real-world images, how to teach machines to understand, analyze, and respond to human speech with natural language processing systems, and more! These, and other TensorFlow concepts, are going to be at the forefront of the coming transformation to an AI-powered future.



Laurence Moroney is an  
AI Advocate at Google  
Research

The online specialization named in this certificate may draw on material from courses taught on-campus, but the included courses are not equivalent to on-campus courses. Participation in this online specialization does not constitute enrollment at this university. This certificate does not confer a University grade, course credit or degree, and it does not verify the identity of the learner.

Verify this certificate at:  
[coursera.org/verify/professional-cert/298C3LEJKJJQ](https://coursera.org/verify/professional-cert/298C3LEJKJJQ)



08/29/2020

## Akash Singh

has successfully completed

### Natural Language Processing with Classification and Vector Spaces

an online non-credit course authorized by deeplearning.ai and offered through  
Coursera

*Younes Bensouda Mourri Lukasz Kaiser*

---

Younes Bensouda Mourri, Instructor of AI at Stanford University

Lukasz Kaiser, Staff Research Scientist at Google Brain and Chargé de Recherche at CNRS

## COURSE CERTIFICATE



Verify at [coursera.org/verify/DUZA3J5ZGMR9](https://coursera.org/verify/DUZA3J5ZGMR9)

Coursera has confirmed the identity of this individual and  
their participation in the course.



08/29/2020

## Akash Singh

has successfully completed

### Natural Language Processing with Probabilistic Models

an online non-credit course authorized by deeplearning.ai and offered through Coursera

*Younes Bensouda Mourri Lukasz Kaiser*

---

Younes Bensouda Mourri, Instructor of AI at Stanford University

Lukasz Kaiser, Staff Research Scientist at Google Brain and Chargé de Recherche at CNRS

## COURSE CERTIFICATE



Verify at [coursera.org/verify/XKG28XHSL989](https://coursera.org/verify/XKG28XHSL989)

Coursera has confirmed the identity of this individual and their participation in the course.



09/05/2020

## Akash Singh

has successfully completed

### Natural Language Processing with Sequence Models

an online non-credit course authorized by deeplearning.ai and offered through Coursera

*Younes Bensouda Mourri Lukasz Kaiser*

---

Younes Bensouda Mourri, Instructor of AI at Stanford University  
Lukasz Kaiser, Staff Research Scientist at Google Brain and Chargé de Recherche at CNRS

## COURSE CERTIFICATE



Verify at [coursera.org/verify/DRPXB6EZS3FV](https://coursera.org/verify/DRPXB6EZS3FV)

Coursera has confirmed the identity of this individual and their participation in the course.



25.09.2020

## Akash Singh

has successfully completed

### Natural Language Processing with Attention Models

an online non-credit course authorized by deeplearning.ai and offered through Coursera

*Younes Bensouda Mourri Lukasz Kaiser*

---

Younes Bensouda Mourri, Instructor of AI at Stanford University

Lukasz Kaiser, Staff Research Scientist at Google Brain and Chargé de Recherche at CNRS

## COURSE CERTIFICATE



Verify at [coursera.org/verify/39GA4CSSJN4X](https://coursera.org/verify/39GA4CSSJN4X)

Coursera has confirmed the identity of this individual and their participation in the course.



4 Courses

Natural Language Processing  
with Classification and Vector  
Spaces

Natural Language Processing  
with Probabilistic Models

Natural Language Processing  
with Sequence Models

Natural Language Processing  
with Attention Models



25.09.2020

Akash Singh

has successfully completed the online, non-credit Specialization

# Natural Language Processing

Congratulations! You have completed all four courses of Natural Language Processing – a deeplearning.ai Specialization. As part of this Specialization, you have learned the classical machine learning skills and the state-of-the-art deep learning techniques needed to build NLP systems. You are now equipped to design applications that perform question-answering and sentiment analysis, create tools to translate languages and summarize text, and build chatbots! These, and other NLP applications, are going to be at the forefront of the coming transformation to an AI-powered future.

*Younes Bensouda Mourri Łukasz Kaiser*

Younes Bensouda  
Mourri  
Instructor of AI at  
Stanford University

Łukasz Kaiser  
Staff Research Scientist  
at Google and Chargé  
de Recherche at CNRS

The online specialization named in this certificate may draw on material from courses taught on-campus, but the included courses are not equivalent to on-campus courses. Participation in this online specialization does not constitute enrollment at this university. This certificate does not confer a University grade, course credit or degree, and it does not verify the identity of the learner.

Verify this certificate at:  
[coursera.org/verify/specialization/7DP7EJJUGCK6](https://coursera.org/verify/specialization/7DP7EJJUGCK6)



08/24/2020

## Akash Singh

has successfully completed

### AI For Everyone

an online non-credit course authorized by deeplearning.ai and offered through  
Coursera

A handwritten signature in blue ink that reads "Andrew Ng".

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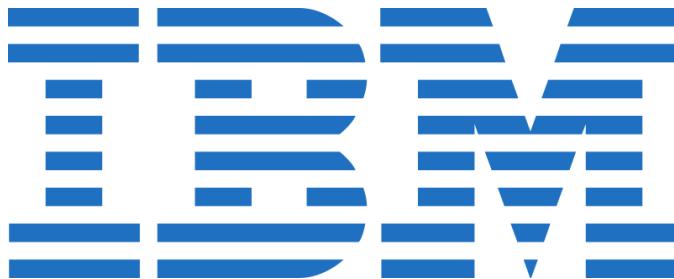
Adjunct Professor Andrew Ng  
Computer Science Department  
Stanford University

## COURSE CERTIFICATE



Verify at [coursera.org/verify/K5UT54E8S6G7](https://coursera.org/verify/K5UT54E8S6G7)

Coursera has confirmed the identity of this individual and  
their participation in the course.



09/07/2020

# Akash Singh

has successfully completed

## Introduction to Artificial Intelligence (AI)

an online non-credit course authorized by IBM and offered through Coursera

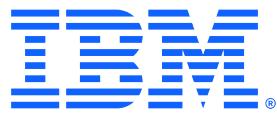
A handwritten signature in black ink.

Rav Ahuja  
AI & Data Science Program Director  
IBM Skills Network

## COURSE CERTIFICATE



Verify at [coursera.org/verify/CBATREAXB7AV](https://coursera.org/verify/CBATREAXB7AV)  
Coursera has confirmed the identity of this individual and  
their participation in the course.



27.09.2020

# Akash Singh

has successfully completed

Getting Started with AI using IBM Watson

an online non-credit course authorized by IBM and offered through Coursera

Rav Ahuja  
AI & Data Science Program Director  
IBM Skills Network

## COURSE CERTIFICATE



Verify at [coursera.org/verify/FSPB9NVNLLK6](https://coursera.org/verify/FSPB9NVNLLK6)

Coursera has confirmed the identity of this individual and  
their participation in the course.



# Fundamentals of Scalable Data Science

ISSUED TO

Akash Singh



Issued on: 27 SEP 2020

Issued by: Coursera | Authorized by: IBM

Verify: <https://www.youracclaim.com/go/J796iRs0>



27.09.2020

# Akash Singh

has successfully completed

## Fundamentals of Scalable Data Science

an online non-credit course authorized by IBM and offered through Coursera

Romeo Kienzler  
Chief Data Scientist  
IBM Watson IoT

## COURSE CERTIFICATE



Verify at [coursera.org/verify/AR62MK4R5928](https://coursera.org/verify/AR62MK4R5928)

Coursera has confirmed the identity of this individual and  
their participation in the course.



08/21/2020

# Akash Singh

has successfully completed

## Facial Expression Recognition with Keras

an online non-credit course authorized by Coursera Project Network and offered through Coursera

Snehan Kekre  
Instructor  
Machine Learning and Data Science

## COURSE CERTIFICATE



Verify at [coursera.org/verify/XYEPNXGTCPZX](https://coursera.org/verify/XYEPNXGTCPZX)  
Coursera has confirmed the identity of this individual and  
their participation in the course.



22.09.2020

# Akash Singh

has successfully completed

## Facial Expression Classification Using Residual Neural Nets

an online non-credit course authorized by Coursera Project Network and offered through Coursera

Ryan Ahmed

Ryan Ahmed  
Adjunct Professor

## COURSE CERTIFICATE



Verify at [coursera.org/verify/Z3DFZDA8M7BW](https://coursera.org/verify/Z3DFZDA8M7BW)  
Coursera has confirmed the identity of this individual and  
their participation in the course.



22.09.2020

# Akash Singh

has successfully completed

## Emotion AI: Facial Key-points Detection

an online non-credit course authorized by Coursera Project Network and offered through Coursera

Ryan Ahmed

Ryan Ahmed  
Adjunct Professor

## COURSE CERTIFICATE



Verify at [coursera.org/verify/9PNAHEU8H2KN](https://coursera.org/verify/9PNAHEU8H2KN)  
Coursera has confirmed the identity of this individual and  
their participation in the course.



08/23/2020

# Akash Singh

has successfully completed

## Create a Python Application using MySQL

an online non-credit course authorized by Coursera Project Network and offered through Coursera

*David Dalsveen*

---

David Dalsveen  
Subject Matter Expert  
Freedom Learning Group

## COURSE CERTIFICATE



Verify at [coursera.org/verify/JYGMLXDK9CVS](https://coursera.org/verify/JYGMLXDK9CVS)

Coursera has confirmed the identity of this individual and their participation in the course.



08/23/2020

# Akash Singh

has successfully completed

## Animation for Game Development Using PyGame

an online non-credit course authorized by Coursera Project Network and offered through Coursera

*Kerri-Leigh Grady*

---

Kerri-Leigh Grady  
Subject Matter Expert  
Freedom Learning Group

## COURSE CERTIFICATE



Verify at [coursera.org/verify/X57MYU7D3UAH](https://coursera.org/verify/X57MYU7D3UAH)

Coursera has confirmed the identity of this individual and their participation in the course.



09/04/2020

# Akash Singh

has successfully completed

Create your own Sudoku Solver using AI and  
Python

an online non-credit course authorized by Coursera Project Network and offered  
through Coursera

*Ahmed Elhelow*

---

Ahmed Elhelow  
Teaching Assistant  
Computer Science

## COURSE CERTIFICATE



Verify at [coursera.org/verify/9UPU7Q5E7GJ6](https://coursera.org/verify/9UPU7Q5E7GJ6)

Coursera has confirmed the identity of this individual and  
their participation in the course.



09/07/2020

# Akash Singh

has successfully completed

## Classify Radio Signals from Space using Keras

an online non-credit course authorized by Coursera Project Network and offered through Coursera

---

Snehan Kekre  
Instructor  
Machine Learning and Data Science

## COURSE CERTIFICATE



Verify at [coursera.org/verify/4R74LD3WJ7ZA](https://coursera.org/verify/4R74LD3WJ7ZA)  
Coursera has confirmed the identity of this individual and  
their participation in the course.



09/07/2020

# Akash Singh

has successfully completed

## Advanced Game Development Using PyGame

an online non-credit course authorized by Coursera Project Network and offered through Coursera

*Kerri-Leigh Grady*

---

Kerri-Leigh Grady  
Subject Matter Expert  
Freedom Learning Group

## COURSE CERTIFICATE



Verify at [coursera.org/verify/Q78Y5VU5XU9W](https://coursera.org/verify/Q78Y5VU5XU9W)  
Coursera has confirmed the identity of this individual and  
their participation in the course.



11 Sep, 2020

# Akash Singh

has successfully completed

## Computer Vision - Object Detection with OpenCV and Python

an online non-credit course authorized by Coursera Project Network and offered through  
Coursera

Ilias Papachristos

Ilias Papachristos  
Data Analyst - Scientist

## COURSE CERTIFICATE



Verify at [coursera.org/verify/J2F24RXR5T3V](https://coursera.org/verify/J2F24RXR5T3V)  
Coursera has confirmed the identity of this individual and  
their participation in the course.



11 Sep, 2020

# Akash Singh

has successfully completed

## Computer Vision - Object Tracking with OpenCV and Python

an online non-credit course authorized by Coursera Project Network and offered through  
Coursera

Ilias Papachristos

Ilias Papachristos  
Data Analyst - Scientist

## COURSE CERTIFICATE



Verify at [coursera.org/verify/DEB9NMBTMSX9](https://coursera.org/verify/DEB9NMBTMSX9)  
Coursera has confirmed the identity of this individual and  
their participation in the course.



08/27/2020

## Akash Singh

has successfully completed

### Mathematics for Machine Learning: Linear Algebra

an online non-credit course authorized by Imperial College London and offered through Coursera

Two handwritten signatures in black ink. The first signature on the left appears to read "David Dye". The second signature on the right appears to read "Samuel J. Cooper".

David Dye and Samuel J. Cooper

## COURSE CERTIFICATE



Verify at [coursera.org/verify/7Y8QAJECMVCT](https://coursera.org/verify/7Y8QAJECMVCT)

Coursera has confirmed the identity of this individual and their participation in the course.



08/27/2020

## Akash Singh

has successfully completed

### Mathematics for Machine Learning: Multivariate Calculus

an online non-credit course authorized by Imperial College London and offered through Coursera

Two handwritten signatures in black ink. The first signature on the left appears to read "David Dye". The second signature on the right appears to read "Samuel J. Cooper".

David Dye and Samuel J. Cooper

## COURSE CERTIFICATE



Verify at [coursera.org/verify/W6QYTWTJ25Z9](https://coursera.org/verify/W6QYTWTJ25Z9)

Coursera has confirmed the identity of this individual and their participation in the course.



08/27/2020

## Akash Singh

has successfully completed

### Mathematics for Machine Learning: PCA

an online non-credit course authorized by Imperial College London and offered through Coursera

A handwritten signature in blue ink that reads "Marc Deisenroth".

Marc Deisenroth  
Lecturer in Statistical Machine Learning  
Department of Computing  
Imperial College London

## COURSE CERTIFICATE



Verify at [coursera.org/verify/UY39UXXFWBEC](https://coursera.org/verify/UY39UXXFWBEC)

Coursera has confirmed the identity of this individual and their participation in the course.



3 Courses

Mathematics for Machine Learning: Linear Algebra  
Mathematics for Machine Learning: Multivariate Calculus  
Mathematics for Machine Learning: PCA

Imperial College London

08/27/2020

Akash Singh

has successfully completed the online, non-credit Specialization

# Mathematics for Machine Learning

A sequence of 3 courses on the prerequisite mathematics for applications in data science and machine learning. Successful participants learn how to represent data in a linear algebra context and manipulate these objects mathematically. They are able to summarise properties of data sets and map them onto lower dimensional spaces with principal component analysis. Finally they can solve optimisation problems and use this skill to train models for describing data such as simple neural networks.

Three handwritten signatures are shown in the top right corner. The first signature is "David Dye". Below it is "Samuel J. Cooper" and "Marc Deisenroth".

David Dye  
Professor of Metallurgy  
Department of Materials  
Imperial College London

Samuel J. Cooper  
Lecturer  
Dyson School of Design  
Engineering  
Imperial College London

Marc Deisenroth  
Senior Lecturer  
Department of  
Computing  
Imperial College London

The online specialization named in this certificate may draw on material from courses taught on-campus, but the included courses are not equivalent to on-campus courses. Participation in this online specialization does not constitute enrollment at this university. This certificate does not confer a University grade, course credit or degree, and it does not verify the identity of the learner.

Verify this certificate at:  
[coursera.org/verify/specialization/XDC7LMJ6D3MS](https://coursera.org/verify/specialization/XDC7LMJ6D3MS)



09/05/2020

# Akash Singh

has successfully completed

## Introduction to HTML5

an online non-credit course authorized by University of Michigan and offered through Coursera

*Colleen van Lent*

---

Colleen van Lent, Ph.D.  
Lecturer  
School of Information, University of Michigan

*Charles Severance*

---

Charles Severance  
Clinical Professor, School of Information  
University of Michigan

## COURSE CERTIFICATE



Verify at [coursera.org/verify/PXF8SZQP9N9E](https://coursera.org/verify/PXF8SZQP9N9E)

Coursera has confirmed the identity of this individual and  
their participation in the course.



09/06/2020

# Akash Singh

has successfully completed

## Introduction to CSS3

an online non-credit course authorized by University of Michigan and offered through Coursera

*Colleen van Lent*

---

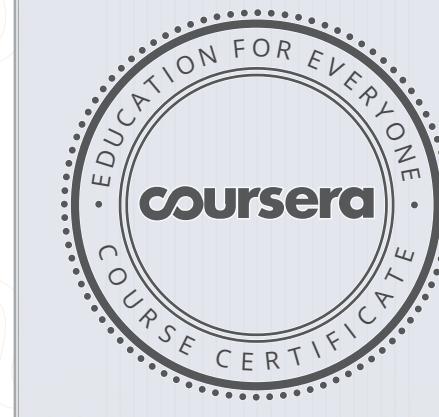
Colleen van Lent, Ph.D.  
Lecturer  
School of Information, University of Michigan

*Charles*

---

Charles Severance  
Clinical Professor, School of Information  
University of Michigan

## COURSE CERTIFICATE



Verify at [coursera.org/verify/A2DSJ6CBLYSY](https://coursera.org/verify/A2DSJ6CBLYSY)

Coursera has confirmed the identity of this individual and their participation in the course.



09/06/2020

# Akash Singh

has successfully completed

## Interactivity with JavaScript

an online non-credit course authorized by University of Michigan and offered through Coursera

*Colleen van Lent*

---

Colleen van Lent, Ph.D.  
Lecturer  
School of Information, University of Michigan

*Charles*

---

Charles Severance  
Clinical Professor, School of Information  
University of Michigan

## COURSE CERTIFICATE



Verify at [coursera.org/verify/ZC7X5KK9FM8W](https://coursera.org/verify/ZC7X5KK9FM8W)  
Coursera has confirmed the identity of this individual and  
their participation in the course.



09/06/2020

# Akash Singh

has successfully completed

## Advanced Styling with Responsive Design

an online non-credit course authorized by University of Michigan and offered through Coursera

*Colleen van Lent*

---

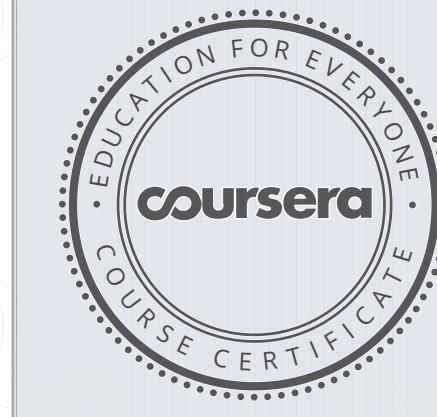
Colleen van Lent, Ph.D.  
Lecturer  
School of Information, University of Michigan

*Charles*

---

Charles Severance  
Clinical Professor, School of Information  
University of Michigan

## COURSE CERTIFICATE



Verify at [coursera.org/verify/TEEJNPA82FUT](https://coursera.org/verify/TEEJNPA82FUT)

Coursera has confirmed the identity of this individual and their participation in the course.



09/06/2020

# Akash Singh

has successfully completed

## Web Design for Everybody Capstone

an online non-credit course authorized by University of Michigan and offered through Coursera

*Colleen van Lent*

---

Colleen van Lent, Ph.D.  
Lecturer  
School of Information, University of Michigan

*Charles*

---

Charles Severance  
Clinical Professor, School of Information  
University of Michigan

## COURSE CERTIFICATE



Verify at [coursera.org/verify/JFRCHE3JUJZ2](https://coursera.org/verify/JFRCHE3JUJZ2)

Coursera has confirmed the identity of this individual and their participation in the course.



5 Courses

**Introduction to HTML5**  
**Introduction to CSS3**  
**Interactivity with JavaScript**  
**Advanced Styling with Responsive Design**  
**Web Design for Everybody Capstone**



09/06/2020

**Akash Singh**

has successfully completed the online, non-credit Specialization

# **Web Design for Everybody: Basics of Web Development & Coding**

This Specialization covers how to write syntactically correct HTML5 and CSS3, and how to create interactive web experiences with JavaScript. Mastering this range of technologies will allow you to develop high quality web sites that work seamlessly on mobile, tablet, and large screen browsers accessible. During the capstone you will develop a professional-quality web portfolio demonstrating your growth as a web developer and your knowledge of accessible web design. This will include your ability to design and implement a responsive site that utilizes tools to create a site that is accessible to a wide audience, including those with visual, audial, physical, and cognitive impairments.

*Colleen van Lent*

Colleen van Lent, Ph.D.  
Lecturer  
School of Information,  
University of Michigan

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Verify this certificate at:  
[coursera.org/verify/specialization/6LXKVVXCEZN5](https://coursera.org/verify/specialization/6LXKVVXCEZN5)



13 Sep, 2020

# Akash Singh

has successfully completed

## Introduction to Data Science in Python

an online non-credit course authorized by University of Michigan and offered through Coursera

A handwritten signature in black ink that appears to read "Christopher Brooks".

---

Christopher Brooks  
Research Assistant Professor  
School of Information

## COURSE CERTIFICATE



Verify at [coursera.org/verify/98GWKCR3TS4X](https://coursera.org/verify/98GWKCR3TS4X)  
Coursera has confirmed the identity of this individual and  
their participation in the course.



19.09.2020

# Akash Singh

has successfully completed

## Applied Plotting, Charting & Data Representation in Python

an online non-credit course authorized by University of Michigan and offered through  
Coursera

A handwritten signature in black ink that appears to read "Christopher Brooks".

---

Christopher Brooks  
Research Assistant Professor  
School of Information

## COURSE CERTIFICATE



Verify at [coursera.org/verify/J3MGQJ4JKSNT](https://coursera.org/verify/J3MGQJ4JKSNT)

Coursera has confirmed the identity of this individual and  
their participation in the course.



14 Sep, 2020

# Akash Singh

has successfully completed

## Applied Machine Learning in Python

an online non-credit course authorized by University of Michigan and offered through Coursera

A handwritten signature in black ink that reads "Kevyn Collins-Thompson".

Kevyn Collins-Thompson  
Associate Professor  
School of Information

## COURSE CERTIFICATE



Verify at [coursera.org/verify/RE9SDH2BP9WC](https://coursera.org/verify/RE9SDH2BP9WC)  
Coursera has confirmed the identity of this individual and  
their participation in the course.



16 Sep, 2020

# Akash Singh

has successfully completed

## Applied Text Mining in Python

an online non-credit course authorized by University of Michigan and offered through Coursera

A handwritten signature in black ink that reads "V.G. Vinod Vydiswaran".

V.G. Vinod Vydiswaran  
Assistant Professor  
School of Information

## COURSE CERTIFICATE



Verify at [coursera.org/verify/HVYCJ6HZUTF](https://coursera.org/verify/HVYCJ6HZUTF)

Coursera has confirmed the identity of this individual and their participation in the course.



16 Sep, 2020

# Akash Singh

has successfully completed

## Applied Social Network Analysis in Python

an online non-credit course authorized by University of Michigan and offered through Coursera

A handwritten signature in black ink, appearing to read "Daniel Romero, Ph.D.", placed over a dotted line.

Daniel Romero, Ph.D.  
Assistant Professor  
School of Information  
University of Michigan

## COURSE CERTIFICATE



Verify at [coursera.org/verify/QDQL64GS67FA](https://coursera.org/verify/QDQL64GS67FA)

Coursera has confirmed the identity of this individual and their participation in the course.



5 Courses



19.09.2020

**Akash Singh**

has successfully completed the online, non-credit Specialization

# Applied Data Science with Python

The 5 courses in this University of Michigan specialization introduce learners to data science through the python programming language. This skills-based specialization is intended for learners who have a basic python or programming background, and want to apply statistical, machine learning, information visualization, and text analysis techniques to gain new insight into their data. In the final course, students will work on real-world data analysis projects, building a portfolio which showcases their work while at the same time helping real clients gain a better understanding of their data.

The online specialization named in this certificate may draw on material from courses taught on-campus, but the included courses are not equivalent to on-campus courses. Participation in this online specialization does not constitute enrollment at this university. This certificate does not confer a University grade, course credit or degree, and it does not verify the identity of the learner.

A handwritten signature in black ink.

Christopher Brooks  
Research Assistant  
Professor  
School of Information

A handwritten signature in black ink.

Kevyn Collins-Thompson  
Associate Professor  
School of Information

A handwritten signature in black ink.

Daniel Romero, Ph.D.  
Assistant Professor  
School of Information  
University of Michigan

A handwritten signature in black ink.

V. G. Vinod Vydiswaran  
Assistant Professor  
School of Information

Verify this certificate at:  
[coursera.org/verify/specialization/CDHTSAH9DL4R](https://coursera.org/verify/specialization/CDHTSAH9DL4R)



28.09.2020

# Akash Singh

has successfully completed

## Understanding and Visualizing Data with Python

an online non-credit course authorized by University of Michigan and offered through Coursera

Brenda Gunderson  
Kerby Shedden  
Brady West

Brenda Gunderson, Ph.D., Lecturer IV

Kerby Shedden, Ph.D., Professor

Brady T. West, Ph.D., Research Associate Professor

## COURSE CERTIFICATE



Verify at [coursera.org/verify/NZAP8BJ96RXW](https://coursera.org/verify/NZAP8BJ96RXW)

Coursera has confirmed the identity of this individual and their participation in the course.



26.09.2020

# Akash Singh

has successfully completed

## Inferential Statistical Analysis with Python

an online non-credit course authorized by University of Michigan and offered through Coursera

*Brenda Gunderson  
Kerby Shedden  
Brady West*

Brenda Gunderson, Ph.D., Lecturer IV

Kerby Shedden, Ph.D., Professor

Brady T. West, Ph.D., Research Associate Professor

## COURSE CERTIFICATE



Verify at [coursera.org/verify/RQ2CUCNPCQU6](https://coursera.org/verify/RQ2CUCNPCQU6)

Coursera has confirmed the identity of this individual and their participation in the course.



27.09.2020

# Akash Singh

has successfully completed

## Fitting Statistical Models to Data with Python

an online non-credit course authorized by University of Michigan and offered through Coursera

*Brenda Gunderson  
Kerby Shedden  
Brady West*

Brenda Gunderson, Ph.D., Lecturer IV

Kerby Shedden, Ph.D., Professor

Brady T. West, Ph.D., Research Associate Professor

## COURSE CERTIFICATE



Verify at [coursera.org/verify/AVVVEG8LLQ8S](https://coursera.org/verify/AVVVEG8LLQ8S)

Coursera has confirmed the identity of this individual and their participation in the course.



3 Courses

Understanding and Visualizing  
Data with Python

Inferential Statistical Analysis  
with Python

Fitting Statistical Models to  
Data with Python

28.09.2020

**Akash Singh**

has successfully completed the online, non-credit Specialization

# Statistics with Python

This specialization is designed to teach learners beginning and intermediate concepts of statistical analysis, and use of the Python programming language to conduct data analyses. Learners will learn where data come from, what types of data can be collected, how to effectively summarize and visualize data, how to utilize data for estimation and assessing theories, proper interpretations of inferential results, and how to apply more advanced statistical modeling procedures.

Brenda Gunderson  
Kerby Sheden  
Brady T. West

Brenda Gunderson,  
Ph.D., Lecturer IV

Kerby Sheden, Ph.D.,  
Professor

Brady T. West, Ph.D.,  
Research Associate  
Professor

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Verify this certificate at:  
[coursera.org/verify/specialization/ZZAH9HLFxEW6](https://coursera.org/verify/specialization/ZZAH9HLFxEW6)



University of  
California, Irvine

09/09/2020

Akash Singh

has successfully completed

Introduction to the Internet of Things and  
Embedded Systems

an online non-credit course authorized by University of California, Irvine and offered  
through Coursera

A handwritten signature in black ink that reads "Ian Harris".

Ian Harris  
Professor  
Department of Computer Science

COURSE  
CERTIFICATE



Verify at [coursera.org/verify/VDX8CEHFZMV5](https://coursera.org/verify/VDX8CEHFZMV5)

Coursera has confirmed the identity of this individual and  
their participation in the course.



09/10/2020

## Akash Singh

has successfully completed

### The Arduino Platform and C Programming

an online non-credit course authorized by University of California, Irvine and offered through Coursera

Ian Harris  
Professor  
Department of Computer Science

## COURSE CERTIFICATE



Verify at [coursera.org/verify/CL972RE9GPKB](https://coursera.org/verify/CL972RE9GPKB)

Coursera has confirmed the identity of this individual and their participation in the course.



University of  
California, Irvine

09/10/2020

# Akash Singh

has successfully completed

## Interfacing with the Arduino

an online non-credit course authorized by University of California, Irvine and offered  
through Coursera

A handwritten signature in black ink that reads "Ian Harris".

Ian Harris  
Professor  
Department of Computer Science

## COURSE CERTIFICATE



Verify at [coursera.org/verify/CX5U5R6YSZCM](https://coursera.org/verify/CX5U5R6YSZCM)

Coursera has confirmed the identity of this individual and  
their participation in the course.



University of  
California, Irvine

09/10/2020

# Akash Singh

has successfully completed

The Raspberry Pi Platform and Python  
Programming for the Raspberry Pi

an online non-credit course authorized by University of California, Irvine and offered  
through Coursera

A handwritten signature in black ink that reads "Ian Harris".

Ian Harris  
Professor  
Department of Computer Science

COURSE  
CERTIFICATE



Verify at [coursera.org/verify/6ELJSQKCF9ZR](https://coursera.org/verify/6ELJSQKCF9ZR)

Coursera has confirmed the identity of this individual and  
their participation in the course.



University of  
California, Irvine

11 Sep, 2020

# Akash Singh

has successfully completed

## Interfacing with the Raspberry Pi

an online non-credit course authorized by University of California, Irvine and offered through Coursera



Ian Harris  
Professor  
Department of Computer Science

## COURSE CERTIFICATE



Verify at [coursera.org/verify/3HB2BEZS5DCB](https://coursera.org/verify/3HB2BEZS5DCB)  
Coursera has confirmed the identity of this individual and  
their participation in the course.



University of  
California, Irvine

10 Sep, 2020

# Akash Singh

has successfully completed

## Programming for the Internet of Things Project

an online non-credit course authorized by University of California, Irvine and offered through Coursera

Ian Harris  
Professor  
Department of Computer Science

## COURSE CERTIFICATE



Verify at [coursera.org/verify/4APENKJMAPP4](https://coursera.org/verify/4APENKJMAPP4)  
Coursera has confirmed the identity of this individual and  
their participation in the course.



6 Courses

**Introduction to the Internet of Things and Embedded Systems**

**The Arduino Platform and C Programming**

**Interfacing with the Arduino**

**The Raspberry Pi Platform and Python Programming for the Raspberry Pi**

**Interfacing with the Raspberry Pi**

**Programming for the Internet of Things Project**



11 Sep, 2020

**Akash Singh**

has successfully completed the online, non-credit Specialization

# An Introduction to Programming the Internet of Things (IOT)

Design, create, and deploy a fun IoT device using Arduino and Raspberry Pi platforms. In this Specialization covers embedded systems, the Raspberry Pi Platform, and the Arduino environment for building devices that can control the physical world. In the final Capstone Project, you'll apply the skills you learned by designing, building, and testing a microcontroller-based embedded system, producing a unique final project suitable for showcasing to future employers.

A handwritten signature in black ink that reads "Ian Harris".

Ian Harris  
Professor  
Department of  
Computer Science

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Verify this certificate at:  
[coursera.org/verify/specialization/66VS33TYNU8U](https://coursera.org/verify/specialization/66VS33TYNU8U)



# Open Source Software Development, Linux and Git Specialization

ISSUED TO

Akash Singh



Issued on: 02 NOV 2020

Issued by: Coursera | Authorized by: The Linux Foundation

Verify: <https://www.youracclaim.com/go/3OAz5VuA>



11 Sep, 2020

# Akash Singh

has successfully completed

## Open Source Software Development Methods

an online non-credit course authorized by The Linux Foundation and offered through Coursera

A handwritten signature in black ink, appearing to read "Jerry Cooperstein".

Jerry Cooperstein  
Director of Training  
Training & Certification

## COURSE CERTIFICATE



Verify at [coursera.org/verify/73V3AP7CZSSR](https://coursera.org/verify/73V3AP7CZSSR)

Coursera has confirmed the identity of this individual and their participation in the course.



11 Sep, 2020

# Akash Singh

has successfully completed

## Linux for Developers

an online non-credit course authorized by The Linux Foundation and offered through Coursera

A handwritten signature in black ink, appearing to read "Jerry Cooperstein".

Jerry Cooperstein  
Director of Training  
Training & Certification

## COURSE CERTIFICATE



Verify at [coursera.org/verify/ZAVB3HYK9KPY](https://coursera.org/verify/ZAVB3HYK9KPY)

Coursera has confirmed the identity of this individual and their participation in the course.



11 Sep, 2020

# Akash Singh

has successfully completed

## Linux Tools for Developers

an online non-credit course authorized by The Linux Foundation and offered through Coursera

A handwritten signature in black ink, appearing to read "Jerry Cooperstein".

Jerry Cooperstein  
Director of Training  
Training & Certification

## COURSE CERTIFICATE



Verify at [coursera.org/verify/QXXCXUN8K8S4](https://coursera.org/verify/QXXCXUN8K8S4)  
Coursera has confirmed the identity of this individual and  
their participation in the course.



12 Sep, 2020

# Akash Singh

has successfully completed

## Using Git for Distributed Development

an online non-credit course authorized by The Linux Foundation and offered through Coursera

A handwritten signature in black ink, appearing to read "Jerry Cooperstein".

Jerry Cooperstein  
Director of Training  
Training & Certification

## COURSE CERTIFICATE



Verify at [coursera.org/verify/P347J44LRHM9](https://coursera.org/verify/P347J44LRHM9)

Coursera has confirmed the identity of this individual and their participation in the course.



4 Courses

Open Source Software  
Development Methods

Linux for Developers

Linux Tools for Developers

Using Git for Distributed  
Development

12 Sep, 2020

## Akash Singh

has successfully completed the online, non-credit Specialization

# Open Source Software Development, Linux and Git

This certifies that the holder of this "Open Source Software Development, Linux and Git" Specialization can work comfortably and productively in open source development communities; has a good understanding of the Linux environment, as well as methods and tools required to successfully use it; and can effectively use Git, the distributed version control system.

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A handwritten signature in black ink.

Jerry Cooperstein  
Direction of Training  
The Linux Foundation

Verify this certificate at:  
[coursera.org/verify/specialization/KB5C796RE85P](https://coursera.org/verify/specialization/KB5C796RE85P)



UNIVERSITY  
OF LONDON

Nov 3, 2020

# Akash Singh

has successfully completed

## Introduction to Virtual Reality

an online non-credit course authorized by University of London, Goldsmiths, University of London and offered through Coursera

Dr Sylvia Xueni Pan  
Lecturer, Department of Computing  
Goldsmiths, University of London

Dr Marco Gillies  
Computing Department,  
Goldsmiths, University of London

## COURSE CERTIFICATE



Verify at [coursera.org/verify/C5DZXUWYTKLK](https://coursera.org/verify/C5DZXUWYTKLK)

Coursera has confirmed the identity of this individual and their participation in the course.



UNIVERSITY  
OF LONDON

Nov 7, 2020

# Akash Singh

has successfully completed

## 3D Models for Virtual Reality

an online non-credit course authorized by University of London, Goldsmiths, University of London and offered through Coursera

Dr Sylvia Xueni Pan  
Lecturer, Department of Computing  
Goldsmiths, University of London

## COURSE CERTIFICATE



Verify at [coursera.org/verify/SBTM8WFD6UMA](https://coursera.org/verify/SBTM8WFD6UMA)

Coursera has confirmed the identity of this individual and their participation in the course.



UNIVERSITY  
OF LONDON

Nov 21, 2020

# Akash Singh

has successfully completed

## 3D Interaction Design in Virtual Reality

an online non-credit course authorized by University of London, Goldsmiths, University of London and offered through Coursera

A handwritten signature in black ink, appearing to read "Dr. Sylvia Xueni Pan".

---

Dr Sylvia Xueni Pan  
Lecturer, Department of Computing  
Goldsmiths, University of London

## COURSE CERTIFICATE



Verify at [coursera.org/verify/CAMLCMWKBR2H](https://coursera.org/verify/CAMLCMWKBR2H)

Coursera has confirmed the identity of this individual and their participation in the course.



UNIVERSITY  
OF LONDON

Nov 21, 2020

# Akash Singh

has successfully completed

## Building Interactive 3D Characters and Social VR

an online non-credit course authorized by University of London, Goldsmiths, University of London and offered through Coursera

Dr Sylvia Xueni Pan  
Lecturer, Department of Computing  
Goldsmiths, University of London

Dr Marco Gillies  
Computing Department,  
Goldsmiths, University of London

## COURSE CERTIFICATE



Verify at [coursera.org/verify/LCAANYM9Y8B5](https://coursera.org/verify/LCAANYM9Y8B5)

Coursera has confirmed the identity of this individual and their participation in the course.



UNIVERSITY  
OF LONDON

Nov 30, 2020

# Akash Singh

has successfully completed

## Making Your First Virtual Reality Game

an online non-credit course authorized by University of London, Goldsmiths, University of London and offered through Coursera

Dr Sylvia Xueni Pan  
Lecturer, Department of Computing  
Goldsmiths, University of London

Dr Marco Gillies  
Computing Department,  
Goldsmiths, University of London

## COURSE CERTIFICATE



Verify at [coursera.org/verify/ZUGE2289LGGQ](https://coursera.org/verify/ZUGE2289LGGQ)

Coursera has confirmed the identity of this individual and their participation in the course.



5 Courses

Introduction to Virtual Reality

3D Models for Virtual Reality

3D Interaction Design in Virtual Reality

Building Interactive 3D Characters and Social VR

Making Your First Virtual Reality Game



UNIVERSITY  
OF LONDON

Nov 30, 2020

## Akash Singh

has successfully completed the online, non-credit Specialization

# Virtual Reality

This specialisation from the University of London will introduce you to virtual reality. Virtual reality is one of the highest demand skill sets in the jobs market, and this specialisation will give you an introduction to the subject and key skills in the field. You will hear from world-leading lecturers and industry experts, use Unity to develop your own VR environment, and end the specialisation by creating your first VR game.

Two handwritten signatures in black ink. The signature on the left appears to be "Dr. Marco Gillies" and the signature on the right appears to be "Dr. Sylvia Xueni Pan".

Dr Marco Gillies PhD  
Cantab  
Dr Sylvia Xueni Pan PhD

The online specialization named in this certificate may draw on material from courses taught on-campus, but the included courses are not equivalent to on-campus courses. Participation in this online specialization does not constitute enrollment at this university. This certificate does not confer a University grade, course credit or degree, and it does not verify the identity of the learner.

Verify this certificate at:  
[coursera.org/verify/specialization/A8GYD9WLR7LU](https://coursera.org/verify/specialization/A8GYD9WLR7LU)