



POST GRADUATE CERTIFICATE IN

# SOFTWARE ENGINEERING FOR DATA SCIENCE

5/10 MONTHS | ONLINE WITH CLASSROOM RESIDENCIES\*

# INTRODUCTION

We live in an interesting time where data is reshaping the world. Today businesses are either adapting to the spectrum of data science technologies, or have already gained an edge with the same.

Building holistic data science capabilities calls for an amalgamation of raw data and algorithms to process it. For complex business requirements of today, those algorithms need to be supported by robust software systems, which serve as the foundation for a capable data science arsenal.

This has given rise to a unique demand in the job market for professionals who have strong programming skills to build these systems, along with familiarity with data science to understand the nuances of leveraging data to deliver insightful analysis. With the increased adoption of data science, demand for technology professionals who can implement systems in data science, machine learning and artificial intelligence is increasing.

In order to empower today's technology professionals to build practical skills in this in-demand domain, IIIT-Hyderabad and Great Learning have collaborated to offer this Post Graduate Certificate in Software Systems for Data Science. Offered in an online format, this program enables learners to upskill without quitting their jobs and learn from one of India's top technology institutes. On program completion, learners get a certificate of completion from IIIT-H along with alumni status.

This program will empower learners with the right skills to build the next generation of data science systems.



# IIIT-HYDERABAD: ONE OF INDIA'S TOP-RANKED TECHNOLOGY INSTITUTES



## India's oldest and most reputed IIIT

Established in 1998 as an ICT Research University



## Ranked AAAA+

(Outstanding)  
in All India  
Technical Colleges



## 23 Research Centres

India's 6th best Computer  
Science Research Institution  
-CSrankings.org



## #11 Ranked

in Outlook's Annual Ranking  
of India's Top Technical  
Universities in 2020



## Grade A

Accreditation by NAAC |  
Recognised by UGC |  
Approved by AICTE

## GREAT LEARNING INDIA'S LEADING PROFESSIONAL LEARNING COMPANY

7.4 MILLION+

Learners

2600+

Hiring Companies

5900+

Industry Expert Mentors

170+

Countries



## Best Ed-tech Company of the Year\*

\*Indian Education  
Awards 2022



## Best Online Skills Provider of the Year\*

\*Entrepreneur, Education  
Innovation Awards 2022



## Best Ed-tech Company of the Year\*

\*EdTech Review  
Awards 2020

# Program Delivery - Flexible Learning Paths

## COMPREHENSIVE LEARNING PATH

A comprehensive program for fresh graduates & professionals with limited programming background and experience.

- + Learn Software Development fundamentals + Software Engineering for Data Science
- + 10 Months
- + 10+ Projects & Labs
- + PG Certificate in Software Engineering for Data Science
- + Alumni Status from IIIT Hyderabad Outreach Division

## ACCELERATED LEARNING PATH

An accelerated program for professionals with a background in programming.

- + Learn Software Engineering for Data Science skills
- + 5 Months
- + 5+ Projects & Labs
- + PG Certificate in Software Engineering for Data Science
- + Alumni Status from IIIT Hyderabad Outreach Division

This program is offered in a unique format with two learning paths that candidates can choose according to their programming background, work experience and learning requirements.

Students, fresh graduates, professionals with limited technology experience and those working in functional roles with limited day-to-day programming experience can opt for the Comprehensive Learning Path. This can help candidates build the core software development fundamentals and foundations before venturing into the core concepts of Software Engineering for Data Science.

Professionals and graduates with technology experience and a prior programming background can opt for the Accelerated Learning Path by directly venturing into the core concepts of Software Engineering for Data Science and complete the PG Certificate program in 5 months.



# PROGRAM HIGHLIGHTS

To help professionals become data-proficient and build career critical competencies, Great Learning has collaborated with IIIT - Hyderabad to offer the Post Graduate Certificate in Software Systems for Data Science.

The program enables participants to gain an in-depth understanding of data science and software systems that are widely used by companies. It takes a very practical approach to impart industry-relevant skills, and enables participants to become job-ready.



**5/10 Month  
Program\***



**350+ Learning  
Hours**



**On-campus  
Residencies\*\***



**Certificate from  
IIIT-H & Alumni  
Status**



**Capstone  
Project**

*\*Based on the chosen learning path : Comprehensive-10 Months, Accelerated-5 Months.  
In addition, pre-work will span for 4-8 weeks depending on the background.*

*\*\*All the on-campus residencies are optional to attend and can be taken online as well.*



# WHO IS THIS PROGRAM FOR?

- ★ Technology professionals who want to be part of Software Engineering teams.
- ★ Professionals looking to build a unique skillset at the intersection of Software Engineering and Data Science.
- ★ Technology leaders and managers who want to lead large scale digital transformation projects in Data Science & AI.
- ★ Early career professionals looking to build Software and Data Engineering skills.



## AFTER THIS PROGRAM, YOU WILL:

- ★ Become a technology expert who can build scalable technical architecture & software systems for Data Science & AI implementations.
- ★ Become an ideal candidate for technical roles such as Full Stack Developer, Sr. Software Engineers, Tech Leads, Software Architect, Technical Program Managers, Data Engineer, Data Systems Designer, Machine Learning Engineer, Technical Systems Architect and more.
- ★ Become an ideal candidate for functional roles such as Program/Project Manager, Solutions Architect for Digital Transformation solutions in Data Science and AI.



The program enables you to gain an in-depth understanding of Data Science and software systems that are widely used by companies. It takes a very practical approach to impart industry-relevant skills and enables you to become job-ready.

## 10-Month Comprehensive Learning

# Curriculum

### PRE-WORK

#### Introduction to Programming in Python

- Python basics - Concept of Mutable and Immutable, Python Vocabulary, Data Types, Control Statements, Functions, Collections in Python
- Exception Handling, File Operations using Python, Modules and Packages

### SOFTWARE DEVELOPMENT FUNDAMENTALS

#### Object-Oriented Programming

- Class, Objects, Methods, Variables
- Inheritance, Polymorphism, Encapsulation
- Abstraction and Abstract Classes

#### Data Structures and Algorithms

- Algorithm and Time Complexity
- Recursion and Space Complexity
- Searching
- Sorting
- Linked List

#### Database Management Systems

- Basics of RDBMS - Keys, Normalization, Indexes, ACID, Constraints
- Basics of SQL Queries (DDL, DML, DQL)
- Using MySQL With the Help of Python, Data Modelling
- Tools - MySQL Workbench

## Web Development Framework

- Introduction to Client Server Architecture
- REST API
- Flask Introduction
- Components of Flask
- Session Management
- Error Handling
- Basics of SQLAlchemy as ORM
- Swagger Docs for Testing APIs

## Front-End Engineering

- HTML, CSS

## PRE-REQUISITES

### Python for Data Science

- Numpy, Pandas, Visualization, EDA

### Introduction to AIML

- Supervised Learning - Linear Models, Decision Trees, Ensemble Models
- Introduction to Deep Learning, Neural Networks
- Introduction to NLP





# HACKATHON

## Software Engineering for Data Science

- SE for AI
- SE Development Methods
- Data Pipelines, Model Pipelines, and ML pipelines

## Data Engineering

- Structured and Unstructured Data
- Databases to store and querying Unstructured data (MongoDB and Cassandra, GraphDB)
- Data - Discovery, Catalogue, Lineage, Governance and Quality
- Dimensionality reduction (LDA and PCA)
- Synthetic data (SDV) and data versioning (DVC)

## Engineering for Cloud

- Cloud computing:- Virtualization and Usage of virtual machines
- Docker, Container, and Kubernetes
- Distributed Systems
- Hadoop file system, MapReduce
- Big data Pipeline
- Spark and Kafka



## HACKATHON

### Designing Intelligent Systems

- Requirements, Architecture and Design Patterns
- Model Quality, Data Quality, System Quality
- Software Engineering Architecture and Design, Microservices
- AIOps, DataOps, MLOps

### Qualities in Intelligent Systems

- NFR qualities in context to Data Science Applications:- Modularity, Reproducibility
- Qualities in intelligent systems:- Completeness, Consistency and Correctness of Data, Explainability, Interpretability, Fairness, Bias
- Secure Software Engineering:- Security and Privacy, Cryptosystems, RSA, Web Applications Vulnerabilities
- Intelligent User Interfaces





# CAPSTONE PROJECT

You will design a complete solution to demonstrate end-to-end pipeline for an Intelligent System under industry experts' guidance. Successful completion of the project will earn you a Post Graduate Certificate in Software Engineering for Data Science.

## 5-Month Accelerated Learning

## Curriculum

### Pre-requisites

#### Python for Data Science

- Numpy, Pandas, Visualization, EDA

#### Introduction to AIML

- Supervised Learning - Linear Models, Decision Trees, Ensemble Models
- Introduction to Deep Learning, Neural Networks
- Introduction to NLP

### Hackathon

#### Software Engineering for Data Science

- SE for AI
- SE Development Methods
- Data Pipelines, Model Pipelines, and ML pipelines

### Data Engineering

#### Software Engineering for Data Science

- Structured and Unstructured Data
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## Hackathon

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## Languages and Tools covered



and many more

# FACULTY & ACADEMIC ADVISORS\*



## Y. Raghu Reddy

**Associate Professor and Head, Software Engineering Research Center, IIIT Hyderabad, India**

Dr. Y. Raghu Reddy currently works as an Associate Professor at International Institute of Information Technology (IIIT Hyderabad), India. His primary research interests are in design and construction of complex software systems. He has published a number of peer-reviewed publications in these areas. He has also published a book titled "Aspect Oriented Software Development: An Approach to Consuming UML Design Models" in 2009.



## Ramesh Loganathan

**Professor of Practice, Co-Innovation**

Prof. Ramesh Loganathan works at the International Institute of Information Technology (IIIT Hyderabad) as a Professor of Co-Innovation and leads the outreach division at IIIT-H. He is an accomplished technologist with more than 20 years experience in product engineering and R&D leadership.



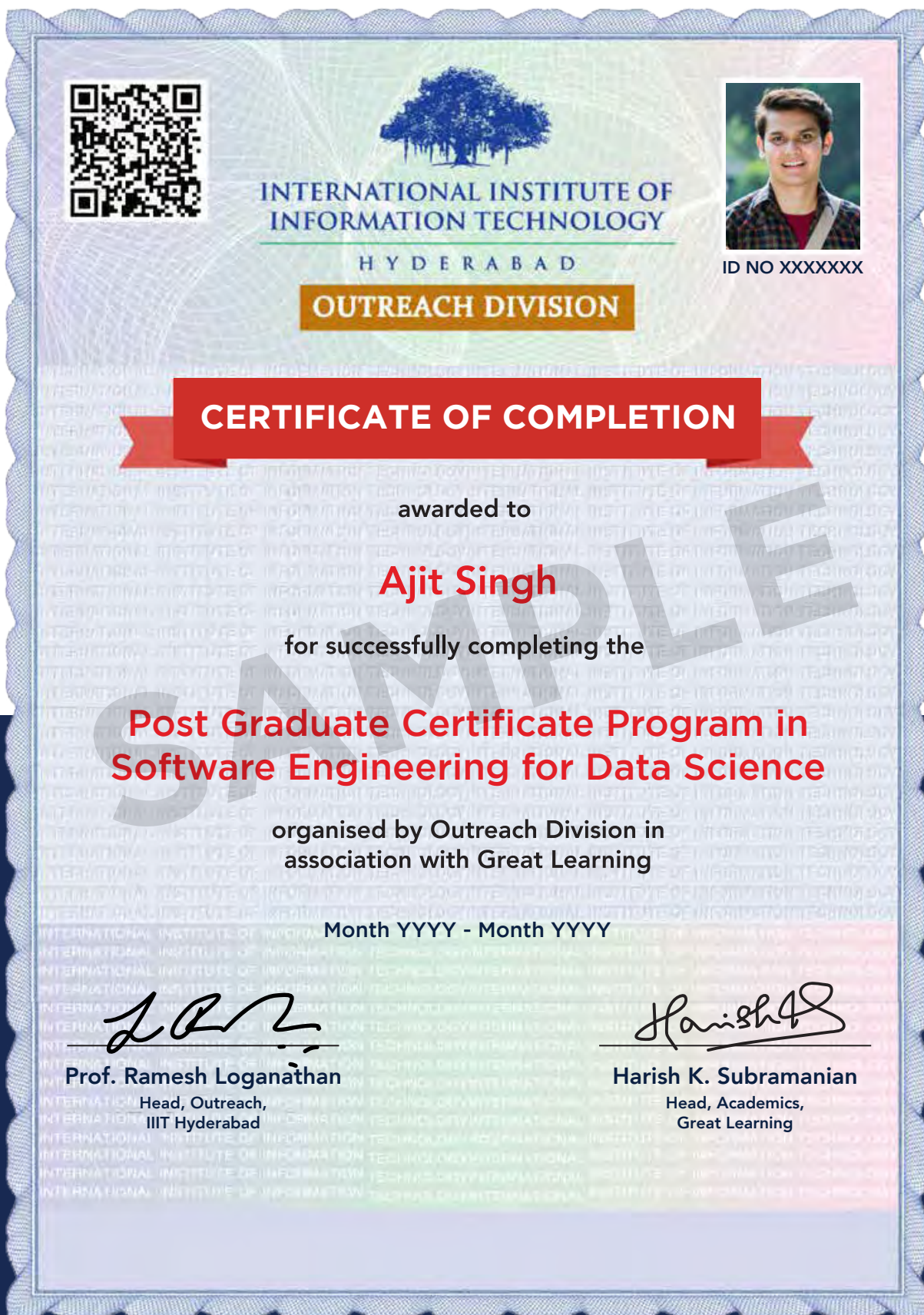
## Dr. Karthik Vaidyanathan

**Assistant Professor at the Software Engineering Research Center, IIIT-Hyderabad.**

Dr. Vaidyanathan obtained his Ph.D. from the Gran Sasso Science Institute, Italy and completed his postdoctoral research at the University of L'Aquila, Italy. His main interests lie in the intersection of Software Architecture and Machine Learning with a specific focus on microservices and IoT domains. His research focuses on how Machine Learning techniques can be leveraged to better architect self-adaptive systems and better define architecting practices for developing Machine Learning-enabled software systems. As a part of his research activities, he serves as a reviewer/organizing committee member in various workshops, conferences, and journals.

# CERTIFICATE

On successful completion of the program, you will receive a PG Certificate from IIIT-Hyderabad.





# GREAT LEARNING CAREER SUPPORT

All program participants will receive career support through GL Excelerate.



## RESUME BUILDING AND INTERVIEW PREPARATION

We help you build your resume to highlight your skills and your previous professional experience. You will also learn to crack interviews with our interview preparation sessions.



## CAREER GUIDANCE

Get access to career mentoring from industry experts who've transitioned to roles in the industry. Benefit from their guidance on how to build a rewarding career.



## E-PORTFOLIO

An e-portfolio is a snapshot of all the projects done and skills acquired during the program that is shareable across social media channels. This will help you showcase your expertise to potential recruiters.



## GREAT LEARNING JOB BOARD

The program provides candidates access to the Great Learning Job Board. 2600+ organizations approach us with job opportunities that are shared through the Job Board with our candidates.

# COMPANIES THAT HIRE FROM US



**2600+**  
More Companies

# TESTIMONIALS



## Vatsala Vaddiraju

**Ex-Lead Programming Analyst, Agfirst Farm Credit Bank, Columbia, USA**

“Videos provided are very clear in both content coverage and recording quality. Assignments and quizzes helped me know how much I learned. We have been given several channels to approach the program office, which I appreciate a lot. First step towards Great Learning!!”



## N Venkata Surya Bharadwaj

**B.Tech Graduate, Fresher**

“Learning the concepts from the basics and to the end is absolutely great for beginners like me and for non-technical professionals too. Mentoring sessions are great where you have hands-on sessions and they are very friendly. I'm happy with this program offered by Great Learning.”



## Akshay Gangumalla

**Retail Sales & Marketing Associate, HEMA**

“Having worked in the technology profiles prior to my management, I always wanted to be involved in the Data science program. Great Learning has provided me with the perfect platform to build on my career with access to well designed curriculum, faculty and supporting management. It's been a refreshing experience.”



## Rimjhim Kakkar

**Teacher-Partner with CueMath**

“I am enrolled with the Great Learning for Software Engineering in Data Science Course, offered by IIIT Hyderabad, and it has been a wonderful experience so far. The team is pragmatic and the course content comprehensive, with highly qualified mentors who possess rich experience in the relevant field. Thus altogether an awesome experience.”



# ADMISSIONS PROCESS



Fill in the online application form for the learning path you have chosen-Accelerated or Comprehensive.



Shortlisted candidates will go through a screening process from the Admission Director's office.



Selected candidates will be provided with an offer of admission to the program. Candidates are required to confirm their participation by paying the admission fee.

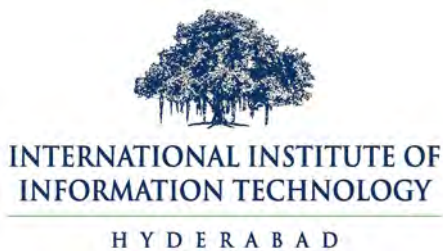
## ELIGIBILITY

- ★ Applicants should have 50% or above in Xth, XIIth and Bachelor's Degree.
- ★ Fresh graduates and early career professionals with limited exposure to technology/programming are also encouraged to apply for the Comprehensive learning path.
- ★ Professionals with prior programming experience and software development knowledge & experience can apply for the 5-Month Accelerated Learning Path.

## PROGRAM FEES

The fees for the Post Graduate Certificate in Software Engineering for Data Science will be based on the learning path chosen as detailed below

- ★ **Comprehensive Learning Path**  
10 Months | Online + Optional In-campus residencies  
**₹2,50,000 + GST**
- ★ **Accelerated Learning Path**  
5 Months | Online + Optional In-campus residencies  
**₹1,65,000.00 +GST**



International Institute of Information Technology, Hyderabad (IIITH) is an autonomous university, founded as a not-for-profit public private partnership (N-PPP) in 1998, and is the first IIT in India under this model. Over the years, the institute has evolved strong research programmes in various areas, with an emphasis on technology and applied research for industry and society. The institute facilitates interdisciplinary research and a seamless flow of knowledge. Several world-renowned centres of excellence are part of IIITH's research portfolio. It has established various joint collaboration and co-innovation models with an industry outreach spanning significant national and multinational companies. Its innovative curriculum allows students the flexibility of selecting their courses and projects. Apart from academics the institute provides students with a comprehensive environment that promotes art and culture, sports, societal contributions and self-governance. Even undergraduate students get to participate in ongoing research and technology development - an opportunity unprecedented in India. As a result, a vibrant undergraduate programme co-exists along with a strong postgraduate programme.



Great Learning is a leading global ed-tech company for professional and higher education. It offers comprehensive, industry-relevant programs across various cutting-edge Technology, Data, and Business domains. Great Learning's programs are developed in collaboration with the world's foremost academic institutions such as Stanford Executive Education, MIT Professional Education, Wharton Online, The University of Texas at Austin, Northwestern School of Professional Studies, National University of Singapore, Deakin University, IIT Madras, IIT Bombay, IIT Roorkee, IIIT-Delhi, Great Lakes Institute of Management, and more. They are constantly reimaged and revamped to address the dynamic needs of the industry.

Great Learning is the only ed-tech company to provide these programs in a blended mode, classroom mode, and purely online mode, relying on its vast network of expert mentors and highly qualified faculty to deliver an unmatched learning experience for learners in India and the world over. Great Learning is on a mission to enable transformative learning and career success in the digital economy for professionals and students across the globe and till date, we have impacted over 7.4 million learners from over 170 countries.

READY TO ADVANCE  
YOUR CAREER?

APPLY NOW

SPEAK TO A PROGRAM ADVISOR  
+91 80 4718 8477

HAVE QUESTIONS ABOUT THE PROGRAM OR  
HOW IT FITS IN WITH YOUR CAREER GOALS?

iiithyd\_seds@greatlearning.in

VISIT OUR WEBSITE

<https://www.mygreatlearning.com/post-graduate-course-software-engineering-iiit-hyderabad>

