upGrad | LIVERPOOL JOHN MOORES UNIVERSITY

MASTER OF SCIENCE IN COMPUTER SCIENCE

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upGrad is an online education platform that enables individuals to develop their professional potential in the most engaging learning environment. Online education is a fundamental disruption to the traditional model and will be having a far-reaching impact. At upGrad, we work towards transforming this online education wave into a tsunami! We take a full-stack approach, by leveraging content, technology, marketing and services, to offer quality education at scale in partnership with corporates and academia.

This translates into rigorous industry relevant programs for individuals looking for a professional upgrade. In last 10 years, digital technology has had a profound impact on billions of lives and thousands of businesses in India and abroad. The pace of growth is only expected to increase further, as the $150 billion Indian IT industry is set to double its revenue in the next 10 years. This growth will be driven by new age digital products and services, which will create millions of new developer jobs. To address this industry need, we have designed a joint Master's in Computer Science, with IIITB & Liverpool John Moores University.

The program will prepare our learners to excel in this rapidly evolving technology landscape, by strengthening their core concepts in computer science and providing exposure to full stack development. Post this program, you will develop into an industry-ready Software Developer, ready to excel in your career. **99**

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Our aim is simple: We strive to create high-impact, on-campus hands-on experiences that prepare students for meaningful and productive careers".

Ronnie Screwvala
Co-founder & Chairman

Words From
The Dean

Our outstanding faculty, curriculum and pedagogy ensures that our graduate programs are ranked among the best in the country. Our learners have been well received by the industry and have been placed with some of the leading companies in the IT industry.

We have partnered with upGrad to offer a rigorous, Post Graduate Diploma in Software Development with five specialisations in trending topics like in Full Stack Development, Cybersecurity, Block Chain, DevOps and Cloud Backend Development - a unique and exciting combination of core Computer Science concepts, development principles and industry-led, hands-on application development experience. In this program, IIITB's experienced faculty will teach the core concepts of computer science along with important software development principles. Additionally, learners will get opportunities to work on industry-relevant projects and interact with industry experts through upGrad's strong industry network. The program has been designed keeping in mind that the future belongs to the software developers who can think and implement end-to-end.

"As an independent institution and a deemed university, IIITB collaborates with the IT industry, leading academic institutions abroad, eminent scientists and industry leaders to offer learners the best possible education."

Prof. S. Sadagopan
Dean - IIIT Bangalore

upGrad as a thought leader in emerging technologies

We have trained:

10K+
Data Scientists

5K+
Machine Learning Engineers

2K+
Full Stack Developers

1.5K+
Big Data Analysts

1K+
Blockchain Developers

Program Highlights

Dedicated Career Assistance
Receive 360 degree career support. Attend mock interviews with hiring managers, resume building workshops and career fairs. Interact with industry mentors.

Specialize in Full Stack Development
Specialization Available in Full Stack Development.

Blended Learning
Learn with the ease and flexibility of recorded sessions as well as live sessions, designed to ensure a wholesome learning experience.

Personalised Mentorship
Get unparalleled personalised mentorship and doubt resolution from IIITB and LJMU's faculty and our panel of industry experts.

For the Industry, by the Industry
Learn from 30+ case studies and industry experts who mentor you throughout the program.

Dual Credentials from IIITB and LJMU
Pursue a Executive PG Programme from IIITB & Master of Science in Computer Science from LJMU.

Exclusive Access
Gain free access to micro-courses in Data Science and Machine Learning.

Get Alumni Status
Earn alumni status of IIITB & LJMU, with digital library access from LJMU.
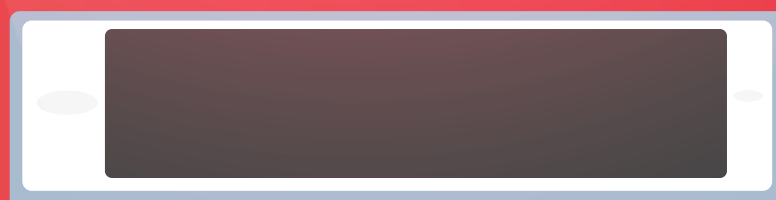
Master's in
Computer Science.
How Does It Work

MASTER'S IN COMPUTER SCIENCE

EXECUTIVE PG PROGRAMME IN SOFTWARE DEVELOPMENT

(Choice of Specialisation)

13 months ☆ 110 credits

International Institute of Information Technology Bangalore

Next ↓ After successful completion of Executive PG Programme in Software Development from IIITB & upGrad.

RESEARCH METHODOLOGIES

2 months ☆ 10 credits

MASTER'S DISSERTATION

4 months ☆ 60 credits

Learn from Industry Experts

PROF. PAULO LISBOA
Head of Dept - Applied Mathematics,
LJMU

PROF. DHIYA AL-JUMEILY
Professor - Artificial Intelligence
LJMU

DR. ATIF WARAICH
Faculty - Computer Science
LJMU

DR. T K SRIKANTH
Professor - Computing
IIIT Bangalore

PROF. TRICHA ANJALI
Associate Professor
IIIT Bangalore

PROF. K V DINESHA
Professor
IIIT Bangalore

PROF. MEENAKSHI
Associate Professor
IIIT Bangalore

PROF. MURALIDHARA
Associate Professor
IIIT Bangalore

PROF. THANGARAJU
Professor
IIIT Bangalore

PROF. SUJIT
Assistant Professor
IIIT Bangalore

PROF. JAYAPRAKASH LALCHANDANI
Assistant Professor
IIIT Bangalore

PROF. R. CHANDRASHEKHAR
Dean (Academics)
IIIT Bangalore

Learn from
Industry Experts

SHAKUN GUPTA
Founder and CTO
Slassy

VARUN SEHGAL
Director | Program Management
Zomato

CHENG-HAN LEE
Program Manager
ex-Microsoft

ANKIT MAHESHWARI
Tech Lead, Impact Running
ex-Housing

ABHIJEET SINGH
Sr. Engineering Manager
Microsoft

ASHUTOSH SHINDE
Engineering Manager
Inmobi

VISHWANATH PATTANSHETTI
Sr. System Analyst
ex-IBM

ROHAN KAPADIA
Software Developer
Swiggy and ex-Amazon

NOBAL MOHAN
Frontend Consultant
ex-Sportskeeda

SHILPA BHAT
Software Consultant
Vision Empower Trust

upGrad Learning Experience

Discussion Forums
Learn from your peers and teaching assistants, and for timely doubt resolution.

Re-learn the Concepts
Get program access for upto 3 years to refresh your concepts

Blended Learning
Learn with the ease and flexibility of recorded sessions as well as live sessions, designed to ensure a wholesome learning experience

Industry-relevant Curriculum
Designed and taught by best in class industry experts, IIIT Bangalore and LJMU's faculty

Hands-On Projects
7+ case studies to choose from as well as a Capstone Project to apply learnings.

*Terms and conditions apply

Industry
Projects
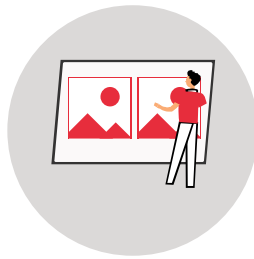
Build a Social Q&A community like Quora

Image viewer web application like Instagram

Image uploader project like Imgur

Blogging website like blogger.com

Decentralised KYC process for banks

Land records and property registration

Supply chain & logistics

Drug traceability & patient data management- healthcare

Blockchain for cybersecurity

Retail banking

Build music recommendation systems

Curriculum

COMMON CONTENT

C0. BASICS OF JAVA PROGRAMMING

FUNDAMENTALS OF PROGRAMMING LANGUAGE WITH BASIC DATA STRUCTURES (JAVA)   2 WEEKS

- Learning the fundamentals of Java and its basic building blocks. Start with writing basic Java programs

C1. OBJECT ORIENTED PROGRAMMING IN JAVA

- ABSTRACTION AND ENCAPSULATION   1 WEEK

  Understand & apply the concepts of Abstraction & Encapsulation in OOPs

- INHERITENCE AND POLYMORPHISM   1 WEEK

  Understand & apply the concepts of Inheritance & Polymorphism in OOPs

- ARRAYS, ARRAYLISTS, ENVIRONMENT SET UP   1 WEEK

  Learn about the data structure arrays and ArrayLists, perform some array operations & setup the environment for the upcoming modules

- ASSIGNMENT (OPTIONAL)

  Learn to apply your knowledge of OOP to build a simpler version of the Discussion Forum of upGrad platform that can run locally on your computer

C2. OOD + SOFTWARE ENGINEERING

- SDLC AND AGILE METHODOLOGY   1 WEEK

  Introduction to Software Development Life Cycle and the various steps involved in the development of software. Learn about Agile methodologies in detail.

- OBJECT ORIENTED DESIGN   1 WEEK

  Understand the importance of Objected Oriented Design & UML Diagrams

- TESTING AND VERSION CONTROL   1 WEEK

  Learn about unit testing i.e. testing individual units/components of a software, characteristics of Test Driven Development & Code Refactoring. Along with this you will also learn modern SE practices and skills and contribute to an existing software project or codebase uing version control tools like Git

- **ASSIGNMENT - OOAD**   1 WEEK

  Design a basic Food Ordering application from scratch using the concepts of SDLC, OOAD, TDD and version control taught in the course

C3. DATA STRUCTURES AND ALGORITHMS

- **ALGORITHM ANALYSIS + RECURSION**   1 WEEK

  Learn about order of growth, Big-Oh, runtime + memory analysis, and time vs space tradeoff; Learn about algorithmic complexity of problems, and improve the efficiency of their implementations

- **SEARCHING AND SORTING (DIVIDE AND CONQUER INCLUDED)**   2 WEEKS

  Learn about divide-and-conquer techniques such as merge sort and binary search

- **STACKS & QUEUES**   1 WEEK

  Learn about Stacks & Queues and their applications

- **SETS AND DICTIONARIES (HASHTABLE, TREES AND BSTS, HEAPS)** 3 WEEKS

  Understand the usage and application of various important data structures such as Hashtables, Trees, Binary Search Trees and Heaps. Learn about their interesting features, their utility and also find solutions of important problems related to these data struc-

- **GREEDY ALGORITHMS**   1 WEEK

  Learn about the greedy algorithm and how to use it to solve optimisation problems.

- **DYNAMIC PROGRAMMING**   2 WEEKS

  Learn about dynamic programming, which is a popular technique to solve a particular kind of problem where you are required to find the best possible solution from a number of different solutions.

- **GRAPHS & GRAPH ALGORITHMS**   1 WEEK

  Learn various applications and use cases of Graphs. Work on problems which require the application of Graph principles and also practice essential Graph related questions.

- **MANDATORY ASSIGNMENT**   1 WEEK

  An assignment comprising of coding questions based on all the above topics

Exam Week:Exam (Course 2, Course 3, Course 4)   1 WEEK

- **INTERVIEW SKILLS**   1 WEEK

  Learn about the essential soft skills.(Resume Building, Linkedin Building, Networking, Job Interview Skills, Salary Negotiation, etc.) , Communication Skills (Critical Thinking, Business Writing, Confidence Building, Speaking, Listening, Art of Conversing, Business

Buffer Week   1 WEEK

FULL STACK DEVELOPMENT SPECIALIZATION

C4. USER INTERFACES & FRONTEND DEVELOPMENT

- **HTML & CSS** — *1 WEEK*
  Learn how to create basic websites using HTML & CSS

- **JAVASCRIPT & DOM** — *2 WEEKS*
  Learn the basics of JavaScript and DOM manipulation to create an interactive website

- **ADVANCED JAVASCRIPT** — *1 WEEK*
  Learn the advanced concepts of JavaScript

- **AJAX & BACKEND INTEGRATION** — *1 WEEK*
  Make REST API calls to the backend server and integrate the response accordingly to the front-end

- **WEB DEVELOPMENT FRAMEWORKS (REACT)** — *2 WEEKS*
  Write applications using the React Framework and develop professional grade applications

- **ASSIGNMENT/PROJECT - FRONTEND** — *1 WEEK*
  Creating the front-end of a blogging website using HTML, CSS and JavaScript

C5. BACKEND DEVELOPMENT

- **MULTITHREADING & STEAMS API** — *0 WEEK*
  Learn about multithreading & Streams API

- **MVC ARCHITECTURE** — *1 WEEK*
  Understand a popular software design architecture called MVC and implement MVC architecture using Spring MVC. Create the backend of a simple project using Spring Boot framework. Understand the basic concepts of Spring framework

- **DATA AND DATABASES IN APPLICATION DEVELOPMENT (JDBC, ORM)** — *3 WEEKS*
  Learn how data and databases form an integral part of the application development. Also, understand the NoSQL databases

- **WEB BACKEND AND REST APIS (INTRODUCTION TO SPRING FRAMEWORK, ORM CONNECTION, REST API)** — *3 WEEKS*
  Implement the REST API endpoints using the JPA specification and Spring Boot

- **ASSIGNMENT/PROJECT - BACKEND (GROUP)** — *1 WEEK*
  Develop the backend for a Q&A website like Quora

Exam Week:Exam	1 WEEK
Buffer Week	1 WEEK

C6. SOFTWARE ARCHITECTURE AND DEPLOYMENT

- **DISTRIBUTED ARCHITECTURES**   1 WEEK
  Learn about distributed systems, where the user load is distributed across various server systems, and learn different techniques to efficiently manage user

- **DESIGN PRINCIPLES (SOLID) AND PATTERNS**   2 WEEKS
  Get introduced to various principles, patterns and styles around which the architectures of a myriad of softwares revolve

- **MICROSERVICES ARCHITECTURE**   1 WEEK
  Learn about Redis & Kafka, ORM L1 & L2

- **SYSTEM DESIGN**   1 WEEK
  Understand what a typical full-stack web application system looks like

- **DEVOPS**   1 WEEK
  Understanding of the process to be followed during the development of an application, from the inception of an idea to its final deployment. Learn about the concept of DevOps and the practices and principles followed to implement it in any company's software

- **CLOUD-NATIVE DEPLOYMENT**   1 WEEK
  Learn how to deploy an application on AWS using Jenkins as a CI/CD tool and following DevOps practices

- **ASSIGNMENT/PROJECT**   1 WEEK
  Course Assignment/Project

Exam Week:Exam	1 WEEK
Buffer Week	1 WEEK

C7. CAPSTONE

- **CAPSTONE PROJECT (GROUP)**   4 WEEKS
  The capstone project will stitch all the concepts learnt during the program

- **AOP - ASPECT ORIENTED PROGRAMMING & APPLICATION SECURITY**   1 WEEK
  Get introduced to Aspect-Oriented Programming. Learn about the various concepts of exception handling and application security

- **COMMUNICATION AMONG MICROSERVICES**   1 WEEK
  Learn and implement various microservices communication techniques

- **NON-BLOCKING APPLICATION(MESSENING QUEUES) - KAFKA**   1 WEEK
  Understand the need for messaging services and learn to integrate them into your

- **ASSIGNMENT/PROJECT - APPLICATION DEVELOPMENT**   2 WEEKS
  Use the concept learnt so far and work on a industry grade project

Exam Week:Exam   1 WEEK
Buffer Week   1 WEEK

Master's:

01. COMPUTING SYSTEMS

- **LOCALITY OF REFERENCE**
  Introduction to C Programs: Types and Functions; Compiling and Running a C
  Program: Using gcc on Linux; Measuring Run time; Impact of locality on Running
  time: High level language features and examples Locality of Reference: Principles;
  Techniques of Design and Implementation in HLLs

- **MEMORY LAYOUT**
  Introduction to Addresses, Pointers, Arrays and Dynamic Allocation in C
  programs;
  Measuring / Tracking Stack and Heap Usage of C programs; Memory Layout (and

- **LINKING AND LOADING**
  Using linker and libraries in C programs (using gcc); Static Linking and Dynamic
  Linking: How to with gcc; Building a C library using gcc; Linking; Impact of Linking
  and Loading on C programs; Case Study

- **LOOP UNROLLING**
  Measuring the impact of (hardware) caching and cache page size on C programs;
  Redis and Memcache; Loop Unrolling; Measuring the impact of Loop unrolling on
  C programs (under different scenarios); Loop Unrolling Techniques; Limitations;
  Different Cache Structures

- **MULTI-THREADING**
  Multi-threaded Programming using POSIX Threads; Designing Multithreaded code;
  Measuring performance of multi-threaded code on multi-core systems (including the
  shared-cache effect);

- **FILE SYSTEM**
  Process scheduling, Memory management, I/O, File security, Interprocess communica-
  tion, Distributed processing, Replication and consistency, Fault tolerance, Synchroniza-
  tion;
  Filesystems; System calls for getting file attributes and directory information;

- **PERFORMANCE ASPECTS OF HTTP**
  Analyse and understand different code modules of a basic HTTP server and relate them
  to different functions; Identify and test performance aspects of a typical HTTP server;
  Modular structure of a HTTP server; Performance factors and bottlenecks; DNS concepts

- **SOCKET PROGRAMMING**
  Implement a server process that can listen on a port, receive requests from the client
  and respond accordingly

02. RESEARCH METHODOLOGIES

- ### INTRODUCTION TO RESEARCH AND RESEARCH PROCESS

  What is research and what is its role in everyday life?; Importance of having a clear research objective; Differences between two common areas of research i.e. scientific and social research; Data, information and knowledge; Structure of the research

- ### RESEARCH DESIGN

  Research design and how it helps in proceeding with research problem; Different types of research; Components of research design - Research Methods, Sampling; Pyramid of

- ### LITERATURE REVIEWING

  The process of formulating a research question; Resources used for literature reviewing; How to do a literature review

- ### RESEARCH PROJECT MANAGEMENT

  Essential techniques associated with Research Project Management - Project Planning, Work Breakdown Structure, Gantt Chart, Replanning

- ### REPORT WRITING AND PRESENTATION SKILLS

  Writing the thesis report and the presentation of thesis report - Structure of the written thesis report and that of the video presentation; Citation methods and rules - Journal Paper, Conference Paper, Website, Video

- ### SCIENTIFIC ETHICS

  Different aspects of the scientific code of conduct and ethics - Copyrights and Intellectual Property, Professional Standards, Conflict of Interest, Professional Ethics and Collaboration in Research
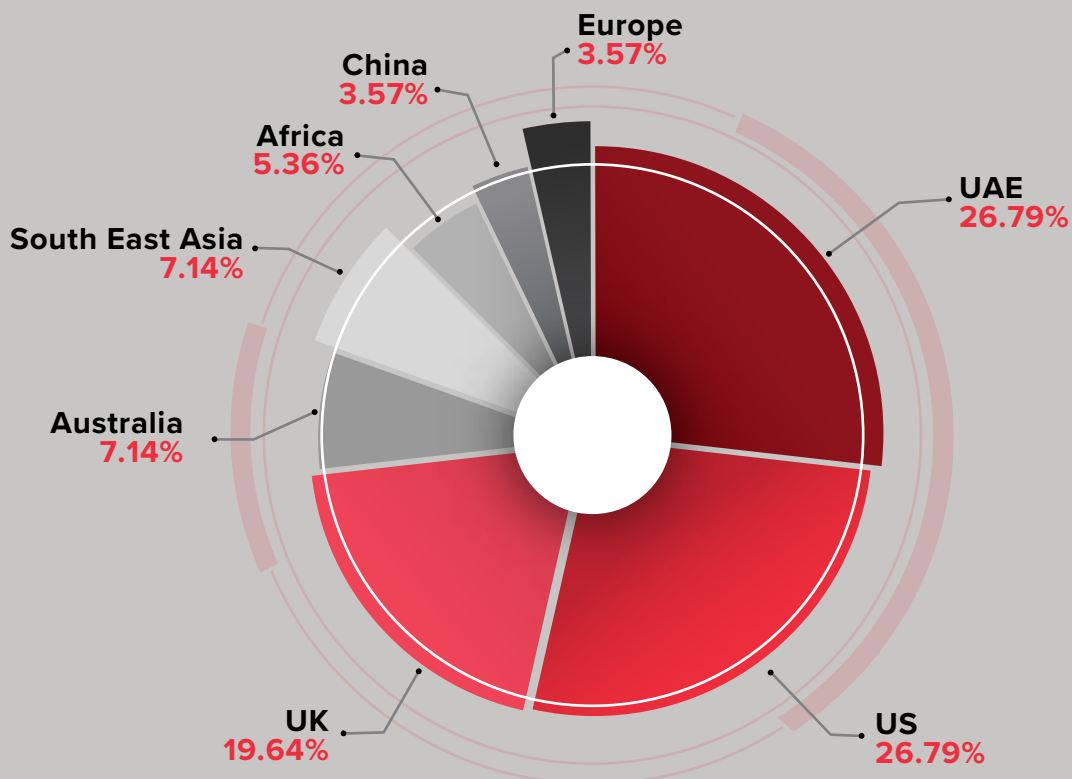
03. THESIS

- ### MASTER'S DISSERTATION

  A lengthy written study on some topic under upGrad's guidance, involving extended period of research and writing. The list of some sample research topics is as follows:-
  1. Investigate a diagnosis of eye diseases using imaging ophthalmic data
  2. Structure medical images with information geometry
  3. Using Social media feed to place tweets regarding natural disasters on a map
  4. Developing a recommender system for a Media giant

Meet the Class

Years of work experience

4 to 7 years
16%

7 to 10 years
11%

0 to 4 years
48%

10+ years
11%

Opportunity to network with our international learners

Europe
3.57%

China
3.57%

Africa
5.36%

South East Asia
7.14%

Australia
7.14%

UAE
26.79%

UK
19.64%

US
26.79%

Hear from
our learners

Joel Varghese
Software Engineer,
Zoreum Blockchain Labs

The program has been very useful and my experience with upGrad and the student mentors at upGrad has been very good. The content taught is very relatable and the method of delivery is also convenient for working professionals like us

Kriti Jain
Software Engineer,
Ministry of Defence

upGrad teaches complex topics in a very simple manner. The case studies are easily understandable and have added value to my resume and helped me bag a 125% salary hike. The curriculum is very relevant to today's market scenario and the upGrad team has done a good job in bringing education right at our palms

Akshay Mathur
Software Technologist,
Philips

"The program has taught me a lot and the case studies have been very useful. The student mentors are very helpful and have helped me solve any and every problem that I have faced. It has been a great experience for me, I would definitely recommend the program to my friends.

Kumar Shubham
SDET - II,
Blackbuck

"With upGrad, my experience has been wonderful. Managing work and studying has been the best decision of my life, thanks to upGrad. While it seemed difficult in the beginning, my student mentor helped me plan my schedule and manage time to maintain a work-life-study balance, which truly saved me! upGrad helped me gain a 60% salary hike

Program Details & Admission Process

PROGRAM DURATION AND FORMAT
19 months | Online

PROGRAM FEE
Please refer to the website for program fee

PROGRAM START DATES
Please refer to the website for program start dates.

ELIGIBILITY
Bachelor's Degree with 50% or equivalent passing marks. No coding experience required.

WEEKLY COMMITMENT (12-15 hours/week)

6-7 HOURS
Asynchronous learning time.

6-7 HOURS
Assignments and projects.

SELECTION PROCESS

STEP 1: Selection Test

Fill out an application and take a short 20-minute online test with questions

STEP 2: Review and Shortlisting of Suitable Candidates

Our faculty will review all applications, consider the educational and professional background of an applicant and review the test scores wherever applicable. Following this, offer letters will be rolled out so you are assured a great peer group to learn and network with.

STEP 3: Enrollment for Access to Prep Content

Make a quick block payment with assistance from our loan partners where required, receive immediate access to the prep content and begin your upGrad journey.

For any queries, reach us on the following numbers:

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