The Future of Work in the Era of Computer Science and AI

A Practical Guide to Thriving in Today's Job Market Powered by AI and Computer Science

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No matter what role you take in today's job market.

you need to know your way around a computer.

Introduction

And yet, millions of workers don't. In the United States alone, **a third of workers possess "limited" digital skills**, with a sixth being unable to complete basic tasks, such as conducting a web search or sending an email.

Though this collective lack of skill is concerning enough today, it's going to become an even more severe issue as computer science-based technologies, such as artificial intelligence (AI) and machine learning, penetrate the workplace. Those with limited digital skills will start to feel like fish out of water, unable to thrive in the workplace as they become overwhelmed with tools and technologies that are beyond their understanding. They'll be **stuck in a metaphorical stone age**, still trying to rub sticks together to create fire while the rest of the world moves forward.

But this technologically lagging workforce presents **opportunities for those who seek education in computer science**. And therein lies the **purpose of this eBook** – to teach you what computer science (and its related technologies) is, why it will be crucial to your job prospects in the coming years, and **what you can do to ensure you're ready for the coming technological revolution in the workplace.**

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01

Understanding the Era of Computer Science and the Looming Presence of AI

Nature of compurer science

Before beginning, it's a good idea to understand the precise nature of computer science. According to the University of Maryland, **computer science is "The study of computers and computational systems."**

The university elaborates, pointing out that computer scientists deal in the development and creation of software, systems, and the code behind many of the technologies used in today's workplace. These technologies include the likes of AI and machine learning, which still require coding and interventions at the human level despite their supposed independence.

It's in the rise of AI that we see the next big shift in the way people work. In the past, nobody used a computer. Today, everybody has a computer at work, a laptop they carry around, and a smart device in their pocket that is essentially a mini-computer itself. In the future, **AI will achieve this level of penetration in work, as data from Statista reveals.**

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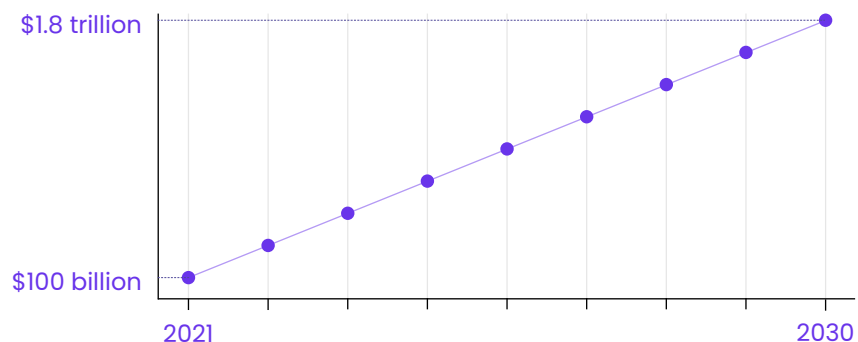
AI will be everywhere.

Mentions of a "brand new era of work" may feel intimidating at first, which is why it's crucial to define what that era will look like. To do so requires an understanding of some of the key technology trends in computer science, with the following five already demonstrating a major impact in fields as varied as healthcare, finance, and transportation.

Machine Learning

Think of machine learning as **the process of creating a virtual "brain" for a computer.** Computer scientists use **coding** and **algorithms** to create machine learning models, which have the ability to learn and adapt, similar tosimilarto humans.

For example, imagine a hospital that has a large collection of images collected from previous patients that were used to detect cancer. Those images could be fed into a machine learning model, with the model learning what those images show (based on your algorithm) and then being able to apply that knowledge to help diagnose future patients.

The machine learning sector will experience tremendous growth over the next decade, with Grand View Research highlighting the potential for a compound annual growth rate (CAGR) of **35.6% between 2022 and 2030**. Note that this means the industry is expected to grow at an average rate of 35.6% per year up until 2030.

Cloud Computing

Anybody who's ever streamed a movie on Netflix, saved a document to Dropbox, or used a Software as a Service (SaaS) model has experienced cloud computing in action. The concept is simple – **deliver computing services to the end user via the internet.**

Though already well established at the time of writing, the cloud computing industry looks set to enjoy continued growth until 2030. Grand View Research highlights a CAGR of 14.1% in the sector, with **the industry expected to reach over $1.5 trillion (approx. €1.4 trillion) in value by 2030.**

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Cyber Security

With the rise of new technological tools comes a rise in people who wish to exploit those tools to attack, steal from, and otherwise damage businesses. **Cyberattacks are a global problem** that only seems to be growing, with Security Magazine highlighting that **the volume of attacks grew by 38% in 2022 alone.**

Cyber security professionals act like the virtual suit of armor that deflects these attacks by developing tools designed to keep intruders away from sensitive data.

And it's another growth industry, with Fortune Business Insights predicting a **CAGR of 13.8% between 2023 and 2030.**

Big Data

Those in the know often claim that **data is the new oil**, meaning it represents the next big opportunity for companies to make tremendous amounts of money. It's clear to see why, as Tech Jury reports, that **people in 2021 collectively generate a staggering 2.5 quintillion bytes of data per day**, which is a number so large that it's barely comprehensible.

The simple fact is that every company (and every person that the company hires, sells to, or works with) generates massive amounts of data. **Computer science-based technologies**, particularly machine learning, **offer the ability to parse through unfathomably large datasets.**

As somebody who understands how to teach the machines that conduct these tasks, you demonstrate immense value to modern industry and enter **a market that has a predicted CAGR of 13.5% between now and 2030.**

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The Internet of Things (IoT)

The IoT refers to **any physical object that is capable of connecting to the internet** (sharing and collecting data in the process) **to form an enormous network** with all other devices with connections.

Given that range of benefits, those with the computer science skills needed to create and take advantage of IoT devices enter a continually growing industry.

Fortune predicts a CAGR of 26.1% between 2023 and 2030, with the IoT industry **hitting a market value of over $3.35 trillion (approx. €3.12 trillion) by 2030.**

CAGR in the Era of Computer Science

+35.6%	Machine Learning
+26.1%	IoT
+14.1%	Cloud Computing
+13.8%	Cyber Security
+13.5%	Big Data

Ultimately, the statistics tell us two things as we enter deeper into the era of computer science and AI. First, **every industry related to this field is set to experience explosive growth** that far exceeds the average across all industries. **Second, the technologies discussed above** will experience that growth because they're not isolated industries. They're industries that **will permeate** (or have already started to permeate) **practically every other industry on the planet.**

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Charting Your Course Through Computer Science

The jobs career

Given that it's clear to see the direction the trends in the computer science industry point (all major sectors have amazing predicted growth), it's a good idea to familiarize yourself with the **types of roles you're likely to take on should you enter the industry.**

In doing so, you can identify **your potential pathway** into a career. And by virtue of identifying that pathway, you also make it easier to select an educational route that brings you closer to your preferred career.

Key Roles in the Tech Industry

The following are all crucial roles in the tech sector, with each leading you into one of the growing industries discussed in the previous chapter.

Data Scientist

Think of a data scientist as **the mind behind the machine learning "brain" used to extract and analyze enormous datasets.** These professionals are responsible for choosing (or creating) the machine learning and artificial intelligence tools used to extract, analyze, and draw insight from large datasets.

Data Analyst

Data analysts are similar to data scientists in the sense that they collect and analyze the data that a company generates. The key difference is that **analysts draw insight from this data with a view to solving business problems** (or making predictions of future trends), whereas a data scientist is more focused on creating the models used to draw these insights.

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Software Developer

Software developers are **the minds behind the many computer applications you use,** from every app on your phone to the complex programs that incorporate AI and machine learning in modern business. They are the creators, meaning those with skills in this area have the potential to work on developing solutions across many industries.

Cybersecurity Analyst

The second any device connects to the internet, the possibility for a cyberattack to occur is created. Cybersecurity analysts are **the buffers between their employers and these attacks**, as they specialize in analyzing networks, spotting security gaps, and filling those gaps through the implementation of infrastructural security solutions.

UX and UI Designer

User interface (UI) and user experience (UX) design are related fields, though they have some differences. **UI specialists focus on the front end of a website or application**, ensuring that the interface works as it's supposed to work and offers attractive design elements. **UX experts dig deeper to determine how these interfaces align**, with their goal being to create "flow," whether part of the customer journey or simply relating to how a product works.

Product Manager

Traditionally, a product manager has been the go-to person for identifying what customers need, how those needs fit into a company's objectives, and how to create products or features that deliver on those needs. How does computer science fit into that role? The simple answer – **data. Product managers are increasingly becoming experts in using data to generate the insights used to inform product development.**

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Quality Assurance (QA)

A product that's pushed to market without going through testing and QA enters a dangerous sink-or-swim scenario. If you're extremely lucky, the product works as it's supposed to work, and customers are happy. But if you're unlucky, the product breaks, the launch is unsuccessful. Quality assurance specialists make sure the latter scenario doesn't happen.

Tips to Help You Identify Your Best Role

Each of the roles described in this chapter requires different skills, with some focusing on data interpretation and analysis while others require technical coding skills. Use these **quick tips to assess yourself and ensure you take your first steps in the right direction:**

Focus on what drives you, what you're passionate about, ahead of what you think may offer the best career prospects.

Reflect on your skills, strengths, and knowledge gaps to ask yourself what you're suited for right now and whether your knowledge gaps can be filled for other roles.

Ask people who know you well which career path they believe would **suit you** based on your skills and their personal knowledge of you.

Take advantage of **online tools** to **run an "audit" on yourself** to see where your current skills lie.

Determine **your personal values** (both ethical and professional) and focus on the career path that aligns best with those values.

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The Skills Employers Want to See

the importance of soft skills

Any computer science role comes down to the skills you bring to the table. However, many make the mistake of thinking that it's only the technical side of things that matters when it comes to computers. That isn't the case. **While technical skills are crucial**, of course, **there are many soft skills that also matter** in computer science, along with the general skill of **being able to learn and adapt** in a constantly changing industry.

This chapter looks at the key technical, soft, and emerging skills you need to develop to increase your chances of landing a computer science job.

Technical Skills

Technical skills are the bread and butter of a computer science role, and you'll need them regardless of the specific nature of the role for which you apply. While the nature of those technical skills varies depending on the role, **the following three are skills that all computer scientists need to have.**

Python Programming

It would be inaccurate and misleading to claim that Python is the only language you need to learn to be a computer scientist, but it is among the most popular in the data science and machine learning sectors. An enormous 69% of people involved in data science and machine learning model development use Python, as compared to just 24% who say they use R regularly.

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Understanding of Algorithms

Think of algorithms as **the pre-programmed methods that a machine can use to complete the tasks assigned to it.** In machine learning alone, there are four key algorithms (supervised learning, unsupervised learning, semi-supervised learning, and reinforcement), with each having specific purposes for implementation. You need to know what these algorithms are and, more importantly, which are relevant to specific situations.

Data Analysis

According to Statista, global data volumes will climb to a staggering 180 zettabytes by 2025. Given that a single zettabyte is equivalent to 1 billion terabytes of data, it's clear that "Big Data" is far more than a marketing buzzword. That **data is practically useless without analysts who can separate the wheat from the chaff.**

Soft Skills

Soft skills are essentially the **skills that complement your tech skills** that make you more able to work as part of (or in the leadership of) a team.

Problem-Solving

No matter what area of computer science you work in, **you'll spend much of your time solving problems.** Software developers solve problems by creating code. Product managers use data to solve problems related to what the market wants and what products to create. Data scientists and analysts solve the problem of extracting vital information from massive datasets. If you're a computer scientist, you need to be a problem-solver.

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Creative Thinking

It's often difficult to think of computer science as a "creative" subject, at least in the traditional sense of the word. Working within rules is what you do. But **within those rules and functions lies the opportunity to create almost anything that you can imagine.** A dash of creativity ensures that the programs and algorithms you create don't end up being also-rans compared to others.

Communication

Communication is like the backbone of the average company. A lack of it is responsible for myriad problems, with Apollo Technical pointing out that 86% of employees point to poor communication (and the lack of collaboration that results) as the leading cause of workplace mistakes. Simply put – being a good communicator helps you to talk about the solutions you're creating.

Emerging Skills

The above six skills all fall under the umbrella of what companies have traditionally required from their computer scientists. But as we move deeper into the 21st century, **the rise of AI, Big Data, and cloud computing mean the following three skills will experience increasing demand.**

Knowledge of AI and Machine Learning Tools

Forbes points out that 97 million new jobs involving the use of AI will be created by 2025, with many more to follow as we move deeper into the century. **If you understand (and know how to implement) AI and machine learning tools, you position yourself at the crest of a wave** that's going to come crashing down sooner rather than later.

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Cloud Platforms

The demand for cloud services (and professionals who can implement and manage those services) **is growing.** Gartner reports that spending on public cloud services **will rise to $597.3 billion** (approx. €559.01 billion) **in 2023**, marking a 21.7% increase on 2022's spending figures. Skills in this area make you part of a growing industry.

Cybersecurity Principles

In ISACA's "State of Cybersecurity 2022" report, the organization highlights a survey in which 82% of respondents believe they'll see an increase in the demand for technical cybersecurity roles in 2023. Those figures are in line with the growth numbers mentioned earlier (13.8% CAGR to 2030). In a world of Big Data, the **people who can fight back against hackers are in demand.**

A forecast of the trend of the AI

Over two-thirds (69%) of data science and machine learning **professionals use Python.**

+180 **Zettabytes** will be the **amount of data generated** across the **globe.**

86% Of employers (86%) **say poor communication is the leading cause of workplace mistakes.**

97 **Milion** of **new jobs related to AI** will be available in 2025

+€559 **Bilions spending on public cloud services** by businesses in 2023.

82% Of respondents (82%) in an ISACA survey say that there'll be a r**ise in demand for cybersecurity professionals in 2023.**

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04

Acquiring Your Skills

The Many Ways to Master Computer Science

It's clear that there's demand for the skills a computer scientist can bring to the table, which leads us to the obvious question – **how do you acquire these skills?** The obvious answer is a formal course, such as a Bachelor's degree in computer science, but that's far from the only pathway. Online tutorials, internships, and coding bootcamps also offer routes to developing your skills, though each (along with more formal education) has pros and cons.

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On-Campus Degrees

As the most traditional form of education, an on-campus degree **exposes you to peers with similar mindsets and a faculty that (ideally) has experience in the industries** in which you wish to forge a career. The **downsides** are that studying at a university **costs** a lot of money (an average of £22,000 per year for international students in the UK, for example) and you have less flexibility in your study schedule.

✔️ Pros	❌ Cons
• You get a degree from a **certified** educational institution. • University is a **key social mobility driver**, with a degree opening up many job opportunities. • You get to **network** with peers, industry professionals, and lecturers who can all provide routes into the computer science sector. Many degrees also offer routes into internships.	• You'll **spend a lot of money** to get your degree, though student aid is often available. • Taking on **student debt** can leave you in a disadvantageous position as you enter the job market. • There's **little flexibility** in terms of your learning schedule or the way that you learn.

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Online Degrees

According to McKinsey & Company, enrollments in open online courses rose from 300,000 in 2011 to 220 million in 2021, demonstrating that many students both see the **value in online degrees** and prefer them to on-campus degrees. The reasons why are obvious, **with lower costs and more control over study schedules** being major draws.

✔ Pros	✖ Cons
• Online degrees are **more accessible** to learners all over the world, making them especially attractive to international students. • The **costs** related to online degrees are typically **lower** than those for on-campus degrees. • Online degrees offer **more flexibility**, allowing you to fit your degree around your work and home life. Many degrees also offer routes into internships.	• **Some** online **institutions offer poor accreditation** and certification, making research imperative before you sign up for a degree. • Some students find it more difficult to regulate their studying **without** having a **physical classroom** to attend. • You **miss out on campus life** and the social (and networking) possibilities it holds.

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Online Courses and Tutorials

Ease of availability and the ability to specialize in specific areas of computer science are the biggest draws of online courses, which also tend to be **shorter and cheaper** than full-blown degrees. **Accreditation can be an issue**, though, with some online courses delivering certifications that are barely worth the digital paper they're printed on.

✅ Pros	❌ Cons
• You have a lot of **control** related to **how and when you learn.** • The best online courses offer **specialized training** that moves you further along your career path faster than a full degree. • Online courses are usually **more affordable** than full degree programs.	• Some online courses are weaker than others and may **not deliver the level of accreditation needed** to attract employers. • You may feel **isolated from peers** if the course doesn't have a strong community to underpin it. • Many online courses offer **limited (or no) ways to communicate** with the course creator.

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Coding Bootcamps

Think of a coding bootcamp as a **concentrated shot of some of the most crucial skills you'll need** in a computer science role. They're often intensive, requiring you to dedicate all of yourself to a fast-paced and short-term program, but the benefits are that they're often run by organizations looking for good coders to hire.

✅ Pros	❌ Cons
• A **fast-paced and intensive learning style** that pushes you to achieve more. • Bootcamps are **faster and cheaper than degrees** while still providing a solid basis in coding skills. • You'll build a **solid foundation** in a programming language, giving you something to build from for later courses.	• Bootcamps are **inflexible** and **require** you to commit **a lot of time** to your work. • Lack of standardization is an issue in bootcamps, meaning **the skills you develop may not be what employers are looking for.** • A bootcamp **qualification** alone **may not be enough** to put you on the radar of top employers.

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Acquiring Your Skills

Get ready for the job market

You've completed a course or degree. Now, you're out in the big wide world of a computer science industry that's on the verge of explosive growth and it can all feel so overwhelming. **Preparing for the job market means developing a plan of action that takes four key elements into account:**

Step 1 - Building Your Resume

Your resume is the first thing an employer sees about you. Think of it like an online dating profile in that you're trying to put your best foot forward to show the employer why they should go on a date (i.e., arrange an interview) with you. Use these tips to build a resume that stands out:

◎ **Tailor your resume** so that it suits the **specific needs of the company.** Recruiters look for keywords when they're scanning (think "supervised learning" for a machine learning role) and will discard resumes that don't fit the bill.

🔍 Focus on the **tools you've used and the skills you've developed**, again in the context of the specific role for which you apply. There's no point waxing lyrical about tools that have nothing to do with the work you'll be doing.

🚩 Keep the **formatting of the resume itself clear and simple**, with a focus on skills and tools. You can tell the story of "you" in a cover letter or rely on your portfolio of work to demonstrate your skills.

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Step 2 - Preparing for Job Interviews

Your resume worked and you have an interview lined up with a tech company. To use the dating analogy from earlier, this is your chance to **get dressed up to impress your potential partner** (i.e., an employer). Use these tips to ensure you're ready for what's sure to be a stress-filled couple of hours:

Spend some time brushing up on the skills you highlighted in your resume as a lot of tech interviews require you to complete little challenges or assignments.

Review any materials the interviewer sends in advance because they often hold clues to the types of questions you'll be asked.

During the interview itself, recognize that you're in a pressure-cooker environment and **try not to be too hard on yourself if you make a mistake** or run out of things to say.

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Step 3 - Networking (Online and Offline)

What you know is obviously important. But **it's who you know that often helps you get in front of employers from leading tech companies**, or at least opens up opportunities thanks to your wider circle.

Building up a network is easier now that you have online resources available, though that doesn't mean you should underestimate the power of old-fashioned face-to-face networking. **Your peers, lecturers, and researchers you meet during your studies are great starting points**, with the latter two often having industry connections. **Attending industry conferences is also a good idea**, both for staying up-to-date and exposing you to major players in the industry.

Shifting to the online side of things, **LinkedIn is the obvious starting point** given that the platform has 930 million members spread across 200 countries. As a hub for people who share their skills, expertise, and industry connections, it's ideal for the online networker. Others online resources are **webinars**, which connect you to peers and industry players, and communities like Shapr and Elpha, which exist so people can create communities through which they build connections.

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Step 4 – Staying Updated With Industry Trends

A computer scientist who doesn't **stay up-to-date** with what's happening in the industry is like an old dog who refuses to learn new tricks – eventually, the old tricks stop impressing people.

Subscribe to tech news platforms (and make sure to set notifications for your particular industry interests) to receive news about anything that may affect what you do.

Follow the most influential people in the AI and computing industries to see what they're saying about what's coming up in the future.

Attend industry events to keep in touch with the movers and shakers who'll shape how the computing industry evolves in the coming years.

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06

Acquiring Your Skills

About the impacts

"This information is all well and good," you say. "But **how do the skills learned** in a computer science course, and my work in general, **have an impact on society** at large?"

It's a good question, and **it can be answered by looking at some brief success stories** related to the application of computer science, AI, and the technologies related to both.

The Invention of Google

Our first story looks at a pair of **Stanford-educated Ph.D. students named Sergey Brin and Larry Page**. Towards the end of the 1990s, the pair teamed up to work on a research project with **a simple goal – make it easier to find what you're looking for on the then**-new world wide **web.**

Together, **they came up with a search engine named Google,** which **used algorithms to crawl websites** and deliver results based on what a user types into a text box. Over two decades later, Google is one of the top names in the tech industry. And if you need proof of that, remember that **"Google it"** is the phrase most people use when they're trying to tell you to research something using the web.

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Tesla Redefines the Car Industry

The growth of the **electric vehicle** (EV) industry shows us precisely what direction we're heading in with cars, as **the industry is expected to hit over $561 billion (approx. €524 billion) in 2023.** Tesla is one of the leading names in the EV industry. But **what separates Tesla from the rest** is that its vehicles are an interesting cross-section of **EV technology and computer science** genius.

On the manufacturing side of things, Tesla already has plans in place to introduce **augmented reality (AR)** into its production lines. This technology would give technicians real-time data about the parts they're working on, delivered directly in front of their eyes as they're working.

The infotainment systems built into Tesla vehicles also offer examples of computer science work in action. The systems **are essentially computers themselves**, as they can connect to cloud-based services like Netflix and Hulu) in addition to featuring video games that owners can play, hopefully when they're not driving. Of course, there's also the autonomous driving technology Tesla has in development.

Starbucks Uses AI and Data Science for Business Decisions

Starbucks offers a mobile app and loyalty card service to its customers, neither of which are particularly revolutionary. But **it's what's going on behind the app that's remarkable.**

The Starbucks app **analyzes user actions**, constantly collecting data used in predictive analysis to determine what products to offer and when to offer them to maximize its revenues. The app also includes a **"virtual barista"** which is essentially **an AI-driven chatbot** that allows users to place orders via voice commands. Again, each of these orders feeds into the masses of data the app collects.

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Take Your First Step into a Computer Science Career

And now?

After reading this eBook, it should be clear that forging a path in computer science, AI, or data science places you in a position to **enjoy a career that's only going to grow as time goes on.** The question now is simple – what do you do **next?**

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What do you do next?
The answer is equally simple – **focus on your education.** Formal education in computer science serves as the foundation on which you can build a strong career. Think of it as the bedrock that offers **a strong base on which you can create a great future** in a world that's increasingly shifting toward AI.

Opit - Open Institute of Technology

Given that there are so many university programs and online courses to choose from, your biggest challenge now lies in **finding a course that delivers the right balance of education, accreditation, and connections.** And that's where the **Open Institute of Technology (OPIT)** comes in.

Offering both a **Master's degree** in Applied Data Science & AI and a **Bachelor's degree** in Modern Computer Science, OPIT is a fully online EU-accredited institution that makes computer science accessible to students all over the world.

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24/7 x 365 days

Access to **tutors 24/7 and 365 days** per year so you're never left stuck if you start struggling with the content.

Progressive assessments

A course that focuses on progressive assessments (using real-world problems) **ahead of make-or-break final exams.**

Credit transfer

Credit transfer options **that take your past work experience and any work and previous studies** into account.

English & Online

An online learning environment that allows you to **self-pace your experience** so you can schedule your education around your other commitments.

Fully accredited

Certification from an institution that is **accredited** under both the **European Qualification Framework** and the Malta Qualification Framework.

Industry partnerships

Access to faculty members and peers who have **strong industry connections** with organizations like Microsoft and Google.

Standard&fast track

The choice between **standard and fast-track degrees,** allowing those who want to speed up their learning experience to obtain their degrees faster.

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Start your career

Bachelor in Modern Computer Science

STUDY LEVEL
Undergraduate

CREDITS
180 ECTS - EQF › / MQF › Level 6

DURATION
2 (fast-track) or 3 years

LOCATION
Online / Fully remote

Go to Bachelor →

Master in Applied Data Science & AI

STUDY LEVEL
Postgraduate

CREDITS
90 ECTS - EQF › / MQF › Level 7

DURATION
12 or 18 months

LOCATION
Online / Fully remote

Go to Master →

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of Technology