

Shaping Future Minds with CS - Lincoln School of Computer Science

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LINCOLN

- Principal Lecturer & Programme Leader of BSc/MCOMP Computer Science
- TEF Subject Lead for Computing
- Industry Certification Lead
- Main teaching:
 - Mobile Computing
 - Cloud Computing
 - Internet of Things
- Recently completed industry Knowledge Transfer Partnership (KTP) project in cloud-based electro-mechanical locking systems



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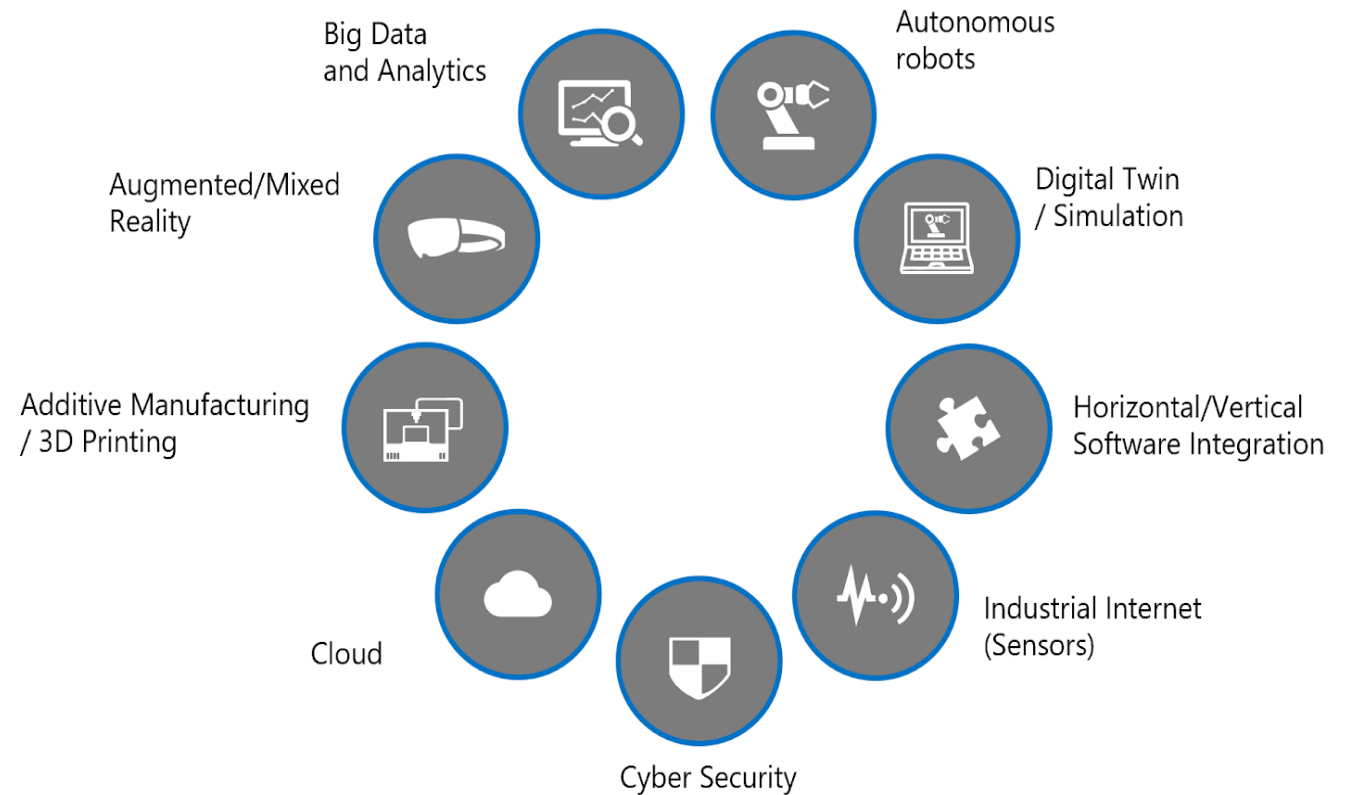
Computer Science at Lincoln

- 833 students enrolled on Computer Science & Games Computing Programmes
- The school works closely with industry to ensure graduates have transferable skills in latest technologies
- MTA certification plays a key role in providing students with digital ‘universal currency’ that demonstrates competence



Industry 4.0 Influence on Curriculum

- The school is currently a steering group member of a HEFCE funded **Industry 4.0 (ID 4.0)** project
- The project is designed to support development of ID 4.0 ready* curriculum across colleges
- **Cloud Computing** is one of the **technology pillars** of ID 4.0 and supports many of the other pillars
- Viewed as an essential component of our curriculum and links to many of the **MTA certifications**



*Juergen Maier. 2017. Made Smarter Review. (2017). <https://www.gov.uk/government/publications/made-smarter-review> Department for Business, Energy and Industrial Strategy, London. (Retrieved 9/13/2018).

[47] D. Marinescu. 2013. Cloud Computing. Theory and Practice.



Computer Science Curriculum at Lincoln with MTA targets

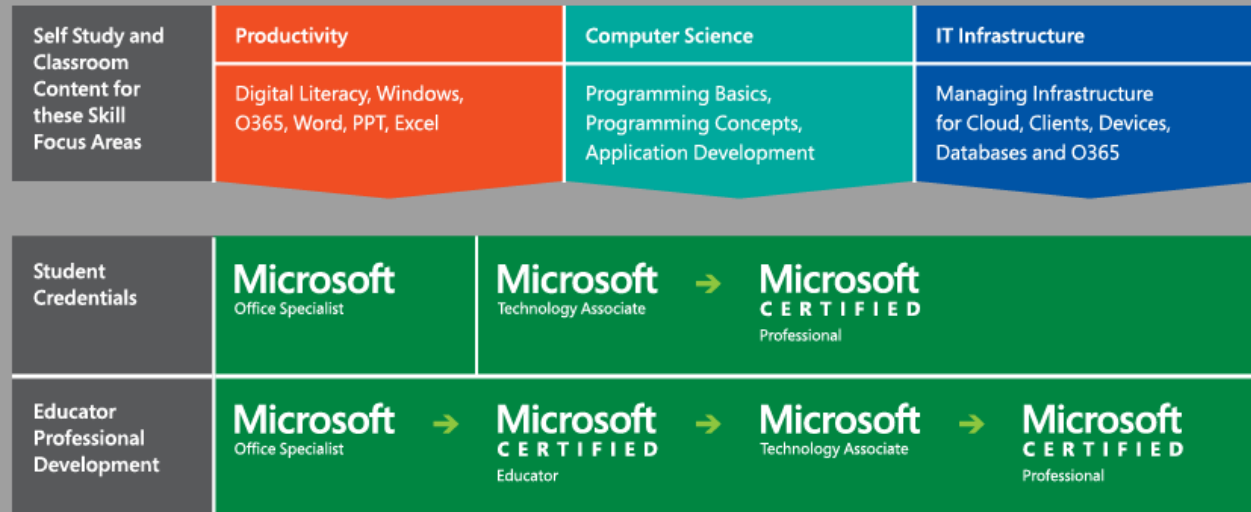
	Computer Science				Options
Level 1	Programming Fundamentals	Maths for Computing	Problem Solving	Computer Architectures	Autonomous Mobile Robotics
	Object-Oriented Programming		Algorithms and Complexity	Operating Systems	Cyber Security
Level 2	Team Software Engineering	Advanced Programming	Scalable Database Systems	Network Fundamentals	Image Processing
		Artificial Intelligence	User Experience Design	Internet of Things	Virtual and Augmented Reality
Level 3	Project	Machine Learning	Option	Big Data	Cross-Platform Development
		Project	Option	Parallel Programming	Cloud Computing
Level 4	Mcomp Research Project		Research Methods	Option	Physics Simulation
			Option	Option	Graphics



MTA Certification at Lincoln

- First rolled out MTA certification to students in November 2017
- All students in the School of Computer Science are given the opportunity to sit one MTA exam per academic year:
 - Year 1: Software Dev and HTML5
 - Year 2: Database Fundamentals and Python Programming
 - Year 3: Students can choose any MTA to sit
- Students keen to engage with MTA to improve their employability - could graduate with 3+ MTA certs
- Feedback from our graduates indicates certification helps to secure desirable employment

Areas of Study



MTA Learning Approach

- Specific modules targeted for MTA in years 1 and 2
- Learning materials for MTA linked into relevant lectures for targeted modules
 - i.e. chapter of official MTA courseware textbook
- Supports student learning by nudging towards contextualised material
- Additional learning materials such as Gmetrix and MTA courses on Lynda.com are also linked
- Students enjoy the different approaches (mock tests, videos, and textbooks) to aid different learning styles

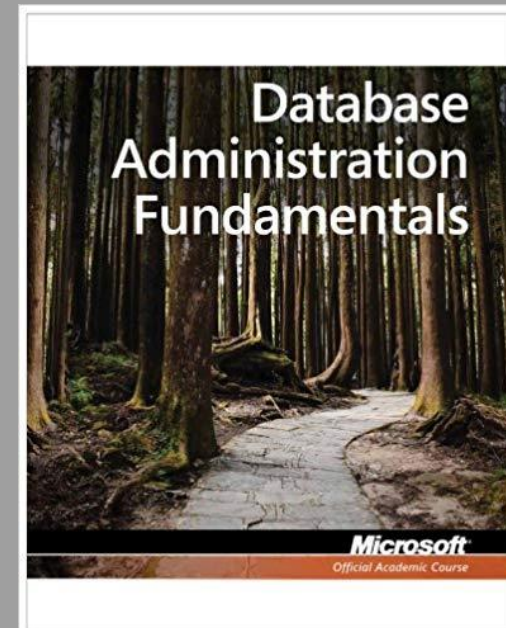


LEARNING PATH

Prepare for the MTA: Database Fundamentals Exam (98-364)

This learning path helps aspiring database administrators prepare for and pass the Microsoft Technology Associate (MTA): Database Fundamentals exam (98-364). For more information on this exam and the MTA certification designation, visit <https://www.microsoft.com/en-us/learning/exam-98-364.aspx>.

4 Courses Apr 04, 2019



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Graduate Success with MTA



"Getting MTA Qualifications really helped me stand out from the crowd when applying for graduate jobs, allowing me to demonstrate industry-standard knowledge and experience. Having a recognised and trusted name like Microsoft on my CV shows not only that I have desirable skills, but also that I had the discipline, desire, and time management to spend time outside of my degree studies doing additional learning."

- Jemma Mears, Junior Marketing Executive at 3SDL Ltd



"I must tell you that having sat both MTA examinations on Database and Cloud Fundamentals, the recruiting manager was very impressed with my achievements. I had a call this morning to say that I've been offered the position."


- Qudus Tihamiyu, Junior Database Consultant at N4 Stack






Sharing Achievements



- Students are keen to broadcast their achievements on professional networks as part of improving their employability
- Growing awareness among students of the importance of certification in industry


Arthur Jones
Student at University of Lincoln
4mo


 **MTA: Cloud Fundamentals - Certified 2018 was issued by Microsoft to Ar...**
youracclaim.com


8 Likes · 6 Comments

 Like  Comment  Share Top Comments ▼

 Add a comment... 

 **Mike Davies** Strategic Account Director at Microsoft
Amazing! Good see your still producing the next waive of azure specialists
Derek Foster
Like Reply | 1 Like

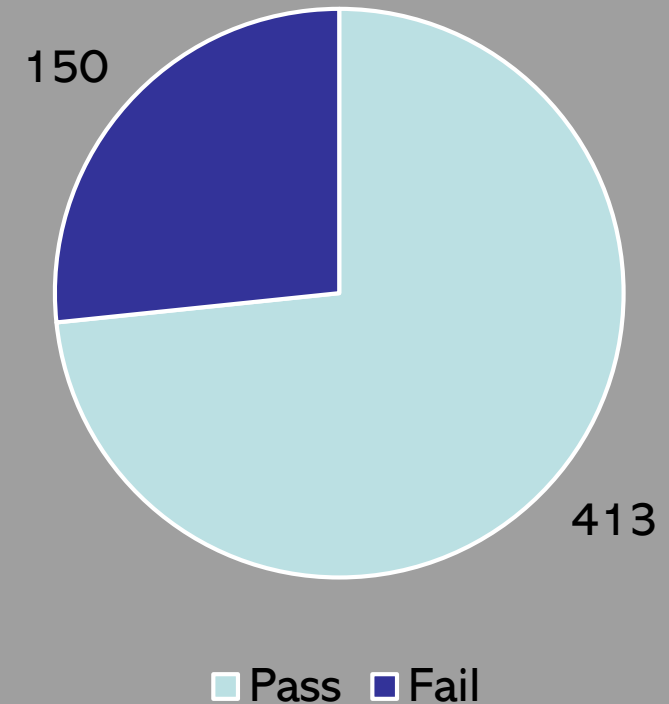
 **Derek Foster** Principal Lecturer in Computer Science at University of Lincoln
Nice one Arthur! :)
Like Reply | 1 Like · 1 Reply


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MTA Stats at Lincoln

- 563 MTA exams taken in previous 18 months – fantastic level of student engagement
- 413 exams passed – **73%** pass rate
- Most successful MTA's were **Database Fundamentals** and **Software Development Fundamentals**
- Most challenging MTA exam for students to pass was **Network Fundamentals**
- MTA exams run during January and May directly after official exam weeks

563 MTA Exam Sits since Nov'17



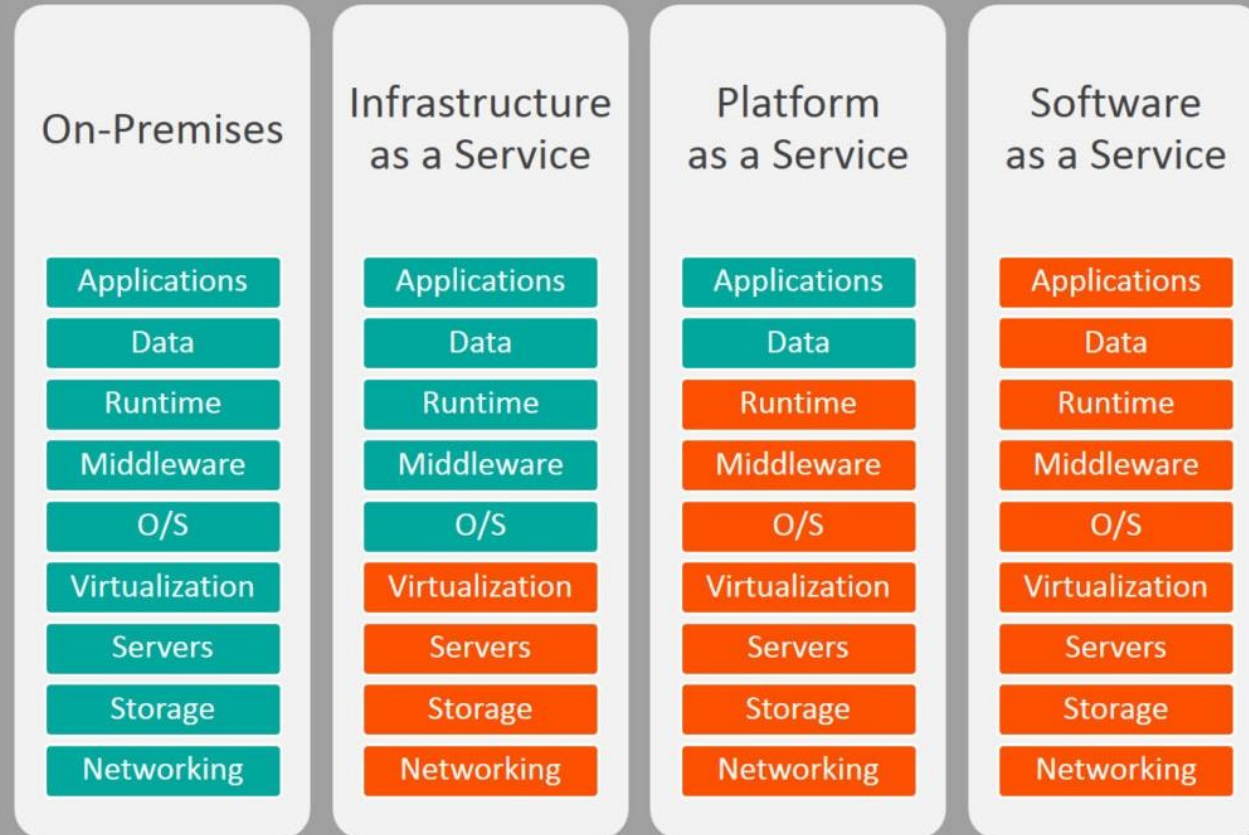
MTA Stats at Lincoln

- TODO: Stats for all MTAs taken at Lincoln



Cloud-first Focus at Lincoln

- Cloud is an important enabler of current and future technologies
- Cloud concepts are taught in an agnostic fashion, with services supporting a number of topics at Lincoln:
 - **Web Development** (Azure)
 - **Database Systems** (Azure / GCP)
 - **Cloud Computing** (GCP) – emphasis on infrastructure as code
 - Related MTA Certification for all of the above topics offered to students using a **blended learning** approach
 - Closely following Microsoft Azure-related certification development at MTA level



Cloud Working Group

- Lincoln an ACM ITiCSE Working Group leader for Cloud Curriculum Development
- Other members include **Microsoft**, Google, and international universities
- Produced a Working Group paper on the design and implementation of cloud-based curriculum for CS
- Comprehensive set of **Knowledge Areas** and **Learning Outcomes** developed that meets industry needs
- Best practices and guidelines identified for adoption of cloud curricula in HE
- Supporting certification discussed
- Download copy of paper [here](#)

Cloud Computing: Developing Contemporary Computer Science Curriculum for a Cloud-First Future

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ABSTRACT

Cloud Computing adoption has seen significant growth over the last five years. It offers a diverse range of scalable and redundant service deployment models, including Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS), Software-as-a-Service (SaaS), and Containers-as-a-Service (CaaS). These models are applied to areas such as IoT, Cyber-Physical Systems, Social Media, Data Science, Media Streaming, Ecommerce, and Health Informatics. The growth in cloud presents challenges for companies to source cloud expertise to support their business, particularly small and medium-sized enterprises with limited resources. The UK Government recently published the *Digital Skills Crisis* report, identifying skill-set challenges facing industry, with a shortage in cloud skills negatively impacting business. While cloud technologies have evolved at significant pace, the development of Computer Science curriculum in the further and higher education sector has lagged behind. The challenges faced in the sector includes the training of educators, institutional gaps (software and hardware policies), regulatory constraints, and access to cloud platforms. By embedding fundamental cloud skills throughout the educator and student journey, both stakeholders will be better positioned to understand and practically

apply the use of appropriate cloud services, and produce graduates to support the needs of industry. This working group has carried out work to: i) assess current cloud computing curricula in CS and similar programs, ii) document industry needs for in-demand cloud skills, iii) identify issues and gaps around cloud curriculum uptake, and iv) develop solutions to meet the skill demands on core Cloud Computing topics, technical skills exercises, and modules for integration with contemporary Computer Science curricula.

CCS CONCEPTS

• Social and professional topics → CS1; • Computer systems organization → Cloud computing;

KEYWORDS

Cloud Computing, Education, Computer Science, Curriculum Development, Distributed Computing

ACM Reference Format:

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1 WORKING GROUP OBJECTIVES AND INTRODUCTION

Cloud Computing is commonly referred to as service models such as PaaS, IaaS, and SaaS, offered as pay-as-you-go utility computing [6]. These service models are rapidly being adopted by companies to ease the burden on traditional on-premises hardware and software,

*Working Group Leader

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Software Development in Year 1

- All year 1 students enrolled on programming modules weighted at 38% of entire academic year
- Programming languages are Python and C#
- Ideally suited to **MTA 98-381** (Python) and **MTA 98-361** (C#)
- Modules signpost to MTA learning materials by mapping specific lecture content to relevant MTA objectives
- Good MTA engagement and pass rate for first year students taking programming modules



Network Systems in Year 2

- TODO: module detail and linkage to MTA 98-366



Database Systems in Year 2

- TODO: module detail and linkage to MTA 98-364



Summary

- Computer Science curriculum is industry informed at Lincoln
- Preparing a next generation workforce for Industry 4.0 needs
- Types of academic topics that are robustly aligned for MTA certification based on Lincoln experience:
 - **Fundamental Programming**
 - **Databases**
 - **Networking**
 - **Web Development**
- Give students autonomy to select their preference of MTA in their final year



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Questions?



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