

Gold Award

Silver Award



in association with
**National Cyber
Security Centre**



Department for
Digital, Culture,
Media & Sport

Academic Centres of Excellence in Cyber Security Education

Developing our capability in cyber security

Academic Centres of Excellence in Cyber Security Education



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Academic Centres of Excellence in Cyber Security Education

The NCSC and the Department for Digital, Culture, Media and Sport (DCMS) introduced a new programme in 2020 to recognise Academic Centres of Excellence in Cyber Security Education. The programme builds on NCSC's existing degree certification programme, offering those universities with a certified undergraduate or postgraduate degree a way to further demonstrate a broader commitment to excellence in cyber security education.

ACE-CSE universities are beacons of excellence both nationally and in their communities. They play a key role in bringing together key stakeholders to develop, shape and support cyber security education to meet the needs of the local population and employers. In doing so, they will help to strengthen their regional ecosystem and help to grow and diversify the cyber security workforce and ensure that everyone, no matter who they are, can acquire the skills and knowledge they need to live and work safely and effectively in an internet age.

In addition to excellence in specialist cyber security education (recognised through the NCSC certified degree scheme), 13 universities spread across all four home nations have also demonstrated that they offer:

- Support from the university's senior management for cyber security.
- A degree in computing at undergraduate and/or postgraduate level.
- A strong, well-qualified teaching/delivery team.

- A coherent and achievable strategy for development.
- Teaching of cyber security across the university to non-specialist staff and students.
- A role in ensuring the cyber security of the university's computing infrastructure.
- External engagement and outreach, for example to schools and under-represented or disadvantaged communities.

This document contains details of all 13 ACEs-CSE and showcases the broad range of excellent work being done by those universities.

The NCSC and DCMS will be working with these universities over the coming years to achieve our own objectives, as well as those of wider UK government. We strongly encourage everyone, whether in the public, private or academic sectors, to consider how they can work with the ACE-CSE universities to improve cyber security awareness, knowledge, and skills both regionally and nationally. Please do either approach your local ACE-CSE directly or, if you would prefer, feel free to contact ace-cse@ncsc.gov.uk.

The ACE-CSE programme is just one of several allied initiatives underway across government, industry, and the academic community. Others of note follow on the next page.

Academic Centres of Excellence in Cyber Security Research (ACEs-CSR)

<https://www.ncsc.gov.uk/information/academic-centres-excellence-cyber-security-research>

Led by the NCSC and the Engineering and Physical Sciences Research Council (EPSRC), 19 universities have been recognised as having an established critical mass of excellent cyber security researchers, supported by good investment and producing impactful results.

Cyber Security Body of Knowledge (CyBOK)

<https://www.cybok.org/>

The CyBOK project is led by the University of Bristol and draws on the expertise of world-leading experts to document the foundational knowledge upon which the field of cyber security is built.

The Colloquium on Information Systems Security Education – UK (CISSE UK)

<https://www.cisseuk.org>

CISSE UK is a national network of Cyber Security Education (CSE) strategists, practitioners, and learners. Its primary aim is to promote impactful CSE collaborations, knowledge sharing, skills acquisition, and good practice throughout all key stages of the education “pipeline”. CISSE UK works closely with government, industry and academia to establish a culture of innovative cyber security education across the UK.

CyberFirst

<https://www.ncsc.gov.uk/cyberfirst>

The CyberFirst programme is a government flagship outreach and cyber security development programme run by the NCSC to help young people explore their passion for technology and cyber security. Together with over 200 government and industry partners, it is inspiring and training the next generation of cyber security specialists. CyberFirst offers secondary level school programmes, a girls' competition and a University bursary programme.



Abertay University

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Academic Centre of Excellence in Cyber Security Education



Who we are

Abertay University is recognised as a leader in Scotland in successfully preparing undergraduate and postgraduate students for employment in the cyber security domain. Our ACE-CSE offers opportunities through our teaching, research and knowledge exchange activities, including work experience and placements, for students, staff and graduates to excel in cyber security and to have a positive impact on the world around us. We strive to ensure that these opportunities are available to all and that students from diverse backgrounds can realise their potential in this domain.

Abertay's ACE-CSE provides opportunities for our students to gain the skills necessary to succeed in the cyber security industry and to contribute to safer and more secure systems and services. We believe that all staff and students across the University should have the knowledge to adopt good cyber security practices. We support the growth of the cyber security industry by engaging with our external communities and helping to provide opportunities to inspire all individuals, and challenge thinking about cyber security.

Our ACE-CSE comprises a Steering Group, Management Board and ACE-CSE Team.

What we do

We are committed to supporting cyber security education through upskilling and reskilling activities, together with institutional development. For upskilling, we are working with Education Scotland to support teachers with cyber security education. For example, we are developing cyber security teaching materials for children aged 4-9, including guidance for teachers on the different protections that they need to put in place for cyber harms.

As part of a wider Skills Development Scotland funded programme, we have contributed to reskilling military veterans with a penetration testing course. Further, in partnership with University Services, the ACE-CSE team has put in place a new Information Security Policy that safeguards students, staff and stakeholder information, gives management and staff the awareness, knowledge and skills to minimise the occurrence and severity of information security incidents and will help the University to continue its activities.



Our plans for the future

The Tay Cities Region is benefitting from a region and sector-wide City Deal investment from UK and Scottish Government. Abertay University's primary engagement with the Tay Cities Deal is our £18 million cyberQuarter: a new 10-year project to create a cyber security research and development centre at Abertay that is central to our ACE-CSE planning. The cyberQuarter is a response to a national skills shortage, by developing a regional cluster at the interface between academia and industry, with industry partners.

As well as being a pathway for new partnerships, the cyberQuarter will support the creation of new companies through new product and service development. The ACE-CSE will play a

leading role in linking new product and service development to our educational provision, by coordinating student projects that articulate with cyberQuarter activity.

The ACE-CSE and cyberQuarter will work together to deliver opportunities for undergraduate and postgraduate (taught and research) students to work with industry to solve cyber security problems. In this way, we will enhance the experiences our graduates and their career pathways and increase our engagement with a range of cyber security stakeholders. The knowledge gained from cyberQuarter projects will feed into our taught provision through curriculum enhancement and into our skills development work with the wider community.



Cardiff University



Who we are

Cardiff University's ACE-CSE aims to strengthen and enhance the quality and provision of cyber security education and training across the University, in Wales and globally.

The ACE-CSE sits within the School of Computer Science & Informatics, which offers a wide range of high-quality degree programmes including BSc in Computer Science with Security & Forensics, MSc in Cyber Security (fully certified by NCSC in 2022) and MSc in Cyber Security & Technology (provisionally certified by NCSC in 2022), all of which are taught in the new £39m Abacws building.

Our core team is a multi-disciplinary group of researchers from the Cardiff Centre for Cyber Security Research that is recognised by NCSC and by the Engineering and Physical Sciences Research Council (EPSRC) as an ACE-CSR. Cardiff University is one of only three of the research-intensive Russell Group Universities in the UK to hold both ACE-CSE and ACE-CSR status.

The relationships with external organisations – public and private sector – are critical for the success of our ACE-CSE. Our BSc and MSc taught programmes are all heavily informed by industry through our advisory board, which includes Airbus, Admiral, BAE Systems, BT and SME representatives.

What we do

The ACE-CSE team aims to inspire and equip our graduates from diverse socio-economic backgrounds with cyber security skills to improve their employability.

Cardiff University is leading the £13.8m Wales Cyber Innovation Hub, which includes ambitious targets of upskilling and reskilling over 1,500 local people with practical cyber security skills.

Our ACE-CSE supports job creation in Wales and we put Equality, Diversity and Inclusion (EDI) at the heart of everything we do. The MSc in Cyber Security & Technology established in 2021 in partnership with the Ethical Hacking

and Cyber Security team at PwC, and funded by the Cardiff Capital Region City Deal, is one of the prominent examples. As a part of this initiative, up to 45 students from the local region will receive a fully funded studentship and will be offered employment by PwC into their growing Cardiff-based Cyber Security team.

Our outreach work is of strategic importance and has a broad scope – it includes inspirational talks, educational activities and cyber security career events for local secondary schools, and cyber security awareness seminars for the general public. We are also a long-term supporter of the CyberFirst programme.



Our plans for the future

The overall strategic aims of Cardiff University's ACE-CSE are the following:

- Attract academically strong and highly motivated students and staff to study and teach cyber security at Cardiff University.
- Develop world leading Continuing Professional Development (CPD) courses in "hands on" cyber security skills to complement our academic taught programmes.
- Support the Welsh Government and Cardiff Capital Region Deal in nurturing and retaining more cyber security talent in Wales.
- Maintain and enhance high-quality, innovative post-graduate programmes in cyber security and undergraduate programmes with cyber security as a specialism.
- Spark interest in cyber security among young people in Wales by offering outreach activities to secondary schools and further education colleges.
- Offer opportunities to the public to benefit from cyber security skills and knowledge, by organising regular events and upskilling cyber security courses.
- Provide cyber security awareness training to all staff and students across the University.
- Engage with international partners to share good practice, systems infrastructure / test beds and community engagement to mutually strengthen awareness of cyber security challenges and support globally leading research.



De Montfort University

Cyber Technology Institute



Who we are

The ACE-CSE is led by the Cyber Technology Institute (CTI) within the School of Computer Science and Informatics (SCSI). The CTI is already an ACE-CSR, with its long-standing record of world-leading cyber security research and will continue within the teaching side, with additional cross-disciplinary expertise from across the University, in areas such as Business and Law, Economics and Cyber Ethics.

Our vision places emphasis on engaging students and staff to work together to construct and maintain an education that equips graduates to fulfil their ambitions, and allows their teachers to be responsive, creative, and flexible.

A common factor across our cyber security teaching is the strong industrial links and focus on organisational relevance, which is supported through the institute's exceptionally strong Industrial Advisory Group (IAG), consisting of Airbus, BT, Deloitte UK and Rolls-Royce.

What we do

DMU regards its students as co-creators in learning and teaching. We will seek to develop curricula that respond to student needs and employer expectations, through conversation and consultation. Ours is a scholarly community, enriched by its inclusive, responsive, and partnership-based learning environment.

The ACE-CSE has allowed us to support the creation and rapid expansion of student societies, by providing them with a controlled environment, for example, our DMU hacking society has grown to over 150 members from courses across all of our faculties. This has facilitated an increase of diversity within the society, with participants

from different academic subjects presenting new ideas and ways of working within the teams, as well as reaching demographics traditionally underrepresented within cyber security.

We have introduced a wide range of activities, starting with the CYRAN hybrid cyberrange, which incorporates a combination of both physical and virtual hardware, to provide realistic scenarios to act as a learning aid and test bed for use in teaching. By ensuring students are given the opportunity to fail safely in as realistic an environment as possible, we are able to increase their employability and reduce the time required before they can operate in a live environment when beginning a role.



Our plans for the future

We aim to:

- Facilitate the dynamic co-creation of learning opportunities and development of academic disciplines.
- Provide extra tailored training depending on staff, industry, and university needs.
- Enhance curriculum design and delivery to challenge, inspire and engage.
- Deliver university-wide relevant and supportive mentoring and peer mentoring.
- Embed employability and enterprise throughout students' courses of study.
- Provide a culture in which every single person is treated with dignity and respect, valued for their difference, is supported to excel, and that any disparity in experience, representation or outcome is addressed.

We are looking to continue developing our pedagogic curriculum by incorporating the latest cyber tools, and our training Security Operations Centre (SOC), recently built in collaboration with Deloitte.

We are also looking at ways to offer specific sessions to encourage and support women to engage with cyber security, and to provide 'Broader Digital Skills' as a Covid-19 recovery initiative, to support career changing opportunities within the local community.



Lancaster University

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Who we are

The overarching strategy for Lancaster University's ACE-CSE is founded on, and driven by, three distinctive, interlinked values of: social responsibility, multi-disciplinary thinking and mutual collaboration. These values provide the guiding principles by which we deliver cyber security engagement with the local, national and international communities we interact with.

We draw on our multi-disciplinary expertise found in our Cyber Security Research Centre – EPSRC/ NCSC ACE-CSR – to provide a world class knowledge base which we use to grow cyber awareness, tackling key societal cyber security challenges.

What we do

Through our work, we seek to inspire the next generation of cyber-specialists to work flexibly, and with agility, to tackle the challenges of keeping our nation and citizens safe and secure as cyber security increases in importance on the international stage. We are well known for our academic research expertise and our multi-disciplinary NCSC Certified Master's degree in Cyber Security. We have significant expertise in driving cyber security innovation in business through our leading role in the Lancashire and Greater Manchester Cyber Foundries and the Greater Manchester Digital Innovation and Security Hub. Lancaster University is also a University Enterprise Zone specialising in Secure Digitalisation.

Lancaster identified a significant issue around SME (small and medium sized enterprise) adoption of cyber security practice. This has resulted in us adopting a core focus of "cyber innovation" to support businesses to grow and prosper through the use of cyber security, in addition to providing cyber security education to protect themselves. Our programme supports SMEs to develop business and product strategies intertwined with cyber security, ensuring it becomes an integral part of their business growth. Importantly, this programme works with any type of company, as we believe any company can derive growth and productivity from the innovative use of cyber security practices or technology. This programme is at the heart of our business engagement activity and to date we have worked with more than 300 SMEs to develop cyber innovation strategies, generating at least 30 new products to market.



Our plans for the future

We will have a significant impact in the region, working alongside the National Cyber Force located in Lancashire and GCHQ located in Manchester. We are seeking partnerships to help us grow the cyber talent and skills pipeline in the region, including the development of our business support activities to drive the regional cyber-ecosystem including entrepreneurship, scale-up and supporting the continuing development of our student population.

Over the next five years, the University will grow the diversity of talent entering into cyber security careers. This includes ensuring that a range of graduates from diverse academic

disciplines are 'cyber ready' when they begin their roles as lawyers, historians, managers or artists. We will work closely with our school community to develop the awareness of cyber opportunities and career pathways. We will also continue to grow our business engagement and knowledge exchange activities, with a focus on Cyber Entrepreneurship and business scale up, supporting the growth of the cyber economy.



Royal Holloway, University of London



Who we are

Our ACE-CSE includes staff from Royal Holloway's pioneering Information Security Group, colleagues from the departments of Computer Science, Geography, Politics and International Relations, professional service colleagues from Campus Cyber Security, Digital Strategy and the College Executive, and student representatives.

Our strategic objectives are to:

1. Develop and grow a suite of world-class NCSC-certified cyber security degree programmes.
2. Integrate cyber security knowledge, where appropriate, across the institution.
3. Act as an internal network of expertise on institutional cyber security.
4. Establish a cyber security aware campus.
5. Further grow cyber security knowledge exchange and outreach activities beyond the campus.

What we do

Our ACE-CSE is engaged with:

- **Cyber security education.** We run seven NCSC-certified cyber security degree programmes, including our MSc Information Security – the first academic cyber security programme in the world, launched in 1992. We also advise on the integration of cyber security in degree programmes across the campus.
- **Cyber security of the campus.** We bring together academic cyber security experts, campus practitioners, management, and stakeholders to advise on institutional cyber security. The recent Cyber Security Project has resulted in a suite of improvements to

campus cyber security, including the rollout of multifactor authentication.

- **Knowledge exchange.** We have a long history of extensive knowledge exchange, including speaking and writing engagements, and involvement in standardisation and advisory panels, aided by our international alumni community of over 4,000 cyber security graduates. This includes 30 years of hosting the annual HP Colloquium, bringing together the academic and practitioner communities to listen to high-calibre speakers and engage with the latest research ideas, and facilitating the annual Smallpeice Trust cyber security residential – three days of workshops and laboratories designed to encourage Year 9 students to consider a career in cyber security.



Our plans for the future

Our plans over the next five years are to:

- Launch a new online MSc Cyber Security programme through Coursera and University of London Worldwide.
- Oversee a major review of cyber security contributions to educational programmes across the University.
- Achieve Cyber Security Essentials Plus certification for the cyber security of the computing infrastructure at Royal Holloway.
- Comprehensively revise and improve the cyber security awareness training programme for staff and students.

Please get in touch if you are interested in:

- Contributing to the design and delivery of our cyber security education.
- Benefitting from our cyber security education expertise.
- Cyber security speakers, panellists, or writers.
- Participating in our External Practitioner Panel.
- Hosting student internships or placements.

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Southampton

University of Southampton

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Academic Centre of Excellence in **Cyber Security Education**



Who we are

Our ACE-CSE sits in the School of Electronics and Computer Science (ECS) and is underpinned by the ACE-CSR. For nearly 10 years, we have been pursuing holistic, interdisciplinary research and excellent education that provide advances to and impact on industry, government and society.

Our research spans over the protection of critical infrastructures, cyber-physical systems and internet of things (IoT), security by design, privacy, anonymity, blockchain for computational assurance, cyber risk, cyber-applied artificial intelligence, and hardware security.

On education, we focus on forming the next generation of cyber leaders through our NCSC-certified undergraduate, graduate and research degrees, in addition to laboratories developed for the teaching of material from CyBOK. We are also up-skilling the existing ICT workforce through short courses and professional modules dedicated to continuing professional development. Our doctoral cohorts sit in ECS's Machine Intelligence for Nano-Electronic Devices and Systems (MINDS) Centre for Doctoral Training.

What we do

Besides our research and institutional taught degrees, we engage in knowledge transfer with public administrations. This focusses on core cyber security concepts, for example, our 2019 NCSC-sponsored workshop on Safety vs Security, as well as on specific technologies, such as our Police-sponsored Cryptocurrency Masterclass. We sit on the South East Regional Strategic Governance Group (SERSGG) of the Police, where we contribute knowledge on cyber threats and mitigations.

We created HECC, the "Higher Education Cyber Challenge," a Capture the Flag (CtF) competition aimed at students of ACE universities.

We also engage with schools by running summer camps for GCSE and AS-Level students, as well as hosting work placement students from local colleges. In the past four years, we have been developing a game-based approach to teach cyber-risk, called Riskio, and one to teach hardware security called CIST. The experience has been very successful, both academically through publication, and practically through international uptake.



Our plans for the future

The ACE-CSE will continue and expand these activities. Our five year strategy involves new courses at undergraduate and postgraduate level and new delivery methods for existing ones, the acquisition of new devices for our cyber education labs, a reinvigorated engagement with external partners, and fresh opportunities to further our outreach programmes with school teachers and pupils, as well as deepening our

impact inside the University and on society at large. We will also develop a digital version of Riskio that can be played at a distance and adapt it for teaching in our foundational modules and Continuing Professional Development (CPD).

See <https://cyber.southampton.ac.uk/> for more information.



University of South Wales (USW)



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Academic Centre of Excellence in Cyber Security Education



Who we are

The University of South Wales (USW) ACE-CSE is located within the School of Computing and Mathematics which currently has 61 members of staff. The core team is made up of the school management team, a member of the Vice Chancellor's Executive Board, the Head of Information Security (IT Services), the link co-ordinator of the National Digital Exploitation Centre (NDEC – a collaboration between USW and THALES), the Head of Business Engagement, Head of Diversity and Inclusion, representatives from Marketing and direct links with Police Science and the South Wales Business School.

Our vision is clear: we want to equip our students with the skills, knowledge and experience they need to maximise their potential and future opportunities in the world of work. We aim to meet one of the key objectives of the new National Cyber Security Strategy, which is the establishment of a sustained supply of competent cyber security professionals, who meet the requisite standards and certification to practise confidently and securely. This strategy sits at the heart of the USW ACE-CSE's mission, which is to introduce cyber security to all subject areas, not just computing, and to promote safety and security to schools, colleges, and the local communities in our region.

What we do

Our key provision is in the areas of Computer Systems Security, Digital Forensics and Incident Management and Response.

We currently have four NCSC certified degrees:

- BSc (Hons) Computer Science
- BSc (Hons) Computer Security
- MSc Computer Forensics
- MSc Cyber Security

We are working closely with IT Services to embed cyber security into all courses across the University and to ensure all staff have relevant and continuous awareness training.

As part of our outreach agenda, we are working closely with schools and colleges to ensure potential students are aware of the range of opportunities available to them and, importantly, to ensure that the courses are inclusive and accessible.



Our plans for the future

Our ambitions are:

- To grow staff numbers and expertise within several strands of cyber security through the appointment of new staff and career development of the existing team.
- To grow the workforce by:
 - » Developing postgraduate (PG) awards which enable specialisms in distinct areas of relevance to industry, to enable upskilling or reskilling for those with non-cyber backgrounds and to provide a platform for industry-led research.
 - » Increasing the number of research active staff and PhD students to work with industry on projects of importance to the UK economy.
 - » Developing Continuing Professional Development (CPD) courses to ensure those in employment have the latest knowledge and skills.
 - » Developing outreach activities which help to grow the number of students studying for cyber security related awards, and to actively encourage diversity in the workforce.
 - » Overseeing the implementation of cyber security and digital related degree apprenticeships.
 - » Working closely with CyberFirst Schools in the region.
- To establish a pan university network / community across the University, our further education partners, government and with our industry contacts to ensure our courses and areas of research are relevant.
- To work across all departments to improve the cyber resilience of the University's infrastructure, staff, and students, including development of a cyber hygiene module for all courses, mandatory staff training on Information Security and continued development of internal phishing campaigns.
- To engage closely with schools and colleges to develop appropriate awards at Level 3 to enter the workforce or university, and continued support with CTF competitions, World Skills, BSides Cymru and Cyber College Cymru.
- To ensure our awards are relevant and topical by ensuring they are benchmarked by the QAA, the BCS, ACM/IEEE and aligned to CyBOK.
- To establish a drop-in clinic to support the local community with home security related issues and to provide free seminars on staying safe online, protecting your home and IoT security etc.



University of Surrey

Surrey Centre for Cyber Security



Who we are

Surrey's ACE-CSE is an educational organisation embedded in various sectors of the University, led by academics as well as professionals in cyber security, pedagogy, engineering and psychology.

Surrey's ACE-CSE agenda is driven primarily by the Surrey Centre for Cyber Security (SCCS),

the IT Services and Institute of Education. The community spirit of a multidisciplinary, organisation-wide team allows us to deliver a wide spectrum of cyber education activities, ranging from cutting-edge cyber security degree programmes, awareness training in core cyber security matters for staff, all the way to outreach activities in general cyber education for schools and the general public.

What we do

Our cyber security staff promote research-centred cyber security internally and the University strengthens that via its external links. We have international collaborations through dual PhD programmes and collaborative international cyber security teaching, for example with SusTech in China.

The ACE-CSE team actively supports the student body with our cyber security extracurricular activities, for example CtF, Cambridge to Cambridge and InterAce competitions, and student societies including CompSoc.

The ACE-CSE members have an international cyber security education stature by hosting, co-organising and lecturing at PhD summer and winter schools such as those chaired by NCSC, CommNet, UK-RISe, as well as steering cyber

security international workshops focused on diverse participation such as CrossFyre.

The outreach activities provided by our ACE-CSE include Computer Science taster days, in-school activities, workshops and summer schools on cyber security with a strong focus on widening participation. For example, we host coding competitions for schools, Women in STEM seminars and workshops at the National Teachers conferences. We also take on Sixth Form and A-level students as summer interns, in collaboration with charities like Satro and Nuffield. We also support NCSC and its partners' deliver the CyberFirst programme through contributing to EmPower Cyber Week with teaching material and suggested activities.

We are investing in both infrastructure through a new cyber security teaching laboratory and campus wide IoT networks.



Our plans for the future

Surrey's ACE-CSE will contribute to widening our impact across the university and will consolidate our national collaborations through the following strategic objectives:

- Enhance and grow our ACE-CSE team
- Continue past and current strong investment in cyber security facilities.
- Provide sustained excellence and new degree pathways for cyber security education.
- Enhance cyber security training and awareness across the University of Surrey.
- Accelerate cyber security engagement with industry, government & academia.
- Provide UK-leading excellence in cyber security outreach and wider community engagement.

We will work to further embed cyber security education across the University, relating its importance to employability and research

integrity, to ensure that all students and staff are cyber aware within their professional lives. We are looking for partners from industry to help us promote the importance of cyber awareness across all professions and to help us identify the future skills gap within the cyber security industry.

Surrey's ACE-CSE is forming partnerships with charities and local communities to further our ACE-CSE mission of supporting cyber security education in the community. For example, one focus is supporting older people to become more confident and adopt secure practices online.

We will continue working with the Widening Participation & Outreach team (WPO) to promote our outreach activities within schools and will also engage with third sector and non-profit organisations to co-design activities to disseminate the importance of safety and security.



University of the West of England (UWE)



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Academic Centre of Excellence in Cyber Security Education



Who we are

The University of the West of England is home to over 30,000 students and is the largest provider of Higher Education in the South West. Within UWEcyber, we are active across four core domains: teaching, research, industry and community engagement, and outreach to support and engage learners across different communities throughout the region. Within the Department of Computer Science and Creative Technologies, the Cyber Security & Business Computing cluster is home to our cyber security

activities, but we collaborate across all faculties of the University.

We have a long-standing undergraduate programme in both cyber security and digital forensics, and our MSc Cyber Security was certified by the NCSC in 2018. We have also established a strong partnership with Gloucestershire College, to support across our region and to offer the BSc Cyber Security Technical Professional, the first NCSC-certified degree apprenticeship across England and Wales.

What we do

Beyond traditional teaching and research, we operate a number of outreach initiatives to upskill our students, to educate school students and staff, and to network with regional employers. Our flagship programme, UnlockCyber, hosts an annual Cyber Taster Day, supported by regional cyber security industry partners including Leonardo, Airbus, OVO Energy, Dyson, Nationwide, PwC, IBM and South West Regional Cyber Crime Unit. In addition, we have hosted teacher workshops, NCSC Girl Guides activities, the Cyber Security Challenge, and our Independent South West Regional Girls Final for the NCSC CyberFirst contest. We also hosted the first ever BSides Bristol in 2019, a community-led

and industry-supported two-day InfoSec event recognised worldwide.

In 2019 we established a new Cyber Security studio space within the UWE Foundry, which is supported by the Institute of Coding. The UWE Foundry specifically creates a disruptive and innovative space for student and industry collaboration, where students can work on industry briefs and projects. We integrate students from our partnership colleges, including Gloucestershire College, to be involved in our activities, and offer opportunities for students to get involved with outreach, research, and industry engagement, through our partner links such as the South West Cyber Resilience Centre.



Our plans for the future

As an ACE-CSE, we aim to be a beacon of cyber excellence across the region. We continue to collaborate on real-world challenges related to research and teaching with a number of industry partners. Our weekly UWEcyber guest seminar series provides an excellent forum for students to hear from industry and academic speakers about current cyber security challenges, and how they can get involved through placements and job opportunities. We continue to seek more schools and education providers to work with, to support the pipeline of diverse talent into cyber security, and to better inform all about how cyber security impacts on our modern lives, and we have significant aspirations in this area.

We believe that cyber security education is important for all and hope to reach students in “hard-to-reach” places, including students who may not necessarily pursue higher education pathways. Our partnership with Gloucestershire College is an important first step on this journey, to accommodate learners outside of the typical university sphere. Our NCSC-certified Degree Apprenticeship presents an exciting new opportunity for students in our region.

We continue to invest in people and our team of cyber security academics at UWE continues to expand, delivering research with impact to inform our teaching.



Who we are

The rich variety of cyber security teaching across the University of Warwick is driven by the external demand for more skills in the area and the influence that cyber security now has across a wide range of disciplines. At the core of the Warwick ACE-CSE strategy lies the realisation that gathering and harnessing our collective skills and knowledge allows us all to capitalise on insights from the latest educational developments and research initiatives, while expanding our capability to deliver world-beating education in cyber security.

We provide degree level and postgraduate cyber security courses certified by NCSC. The undergraduate and postgraduate WMG Cyber Security Centre specialist courses provide practical skills, academic knowledge and real-world insight to students who will become the cyber security leaders of the future. The Computer Science department has established cyber security courses for postgraduates as well as dedicated cyber security modules on its prestigious undergraduate courses.

What we do

Cyber security is not a subject for technical computing specialists alone. It touches many key disciplines, from psychology to politics, sociology to engineering, business to ethics. Recent years have seen a moving frontier in which cyber security has become increasingly relevant to students on an expanding array of courses.

Fostering interdisciplinary cyber security is a key commitment of the Warwick ACE-CSE, and is achieved through supporting curriculum development, maintaining a central list of relevant modules to support students who want to study across a broader set of perspectives, and through supporting the development, delivery,

and promotion of a wide range of educationally relevant events and initiatives.

A good example of our work involves cyber security education and the Global South. Funded by Warwick outreach resources, a team of our postgraduates helped to co-author a 78-page Cyber Security: A Guide to the Global South. It has been praised by the National Security Adviser to the President of the Congo (DRC) for improving cyber education in the country. This is widely used for training and education in the DRC and elsewhere and was recently translated into Spanish.



Our plans for the future

Our ambition for the future is to grow staff numbers and expertise within several strands of cyber security through the appointment of new staff, and through the career development of the existing team.

University staff have been involved in Cyber First Teaching (advanced course) and in the last year, 360 students have attended these courses. Staff regularly teach in academies and schools including, Coventry, Cardiff, Reading, London, and Basingstoke. As well as promoting cyber security in schools, our outreach activities have

involved student visits to Warwick, where the schoolchildren attended cyber security lectures and demonstrations.

We welcome engagement with partners to further develop links with local schools, businesses and other organisations, with regional business communities and with national and international groups who might benefit from a relationship with the Warwick Academic Centre of Excellence in Cyber Security Education.



Edinburgh Napier University

Silver Award



in association with
National Cyber
Security Centre



Department for
Digital, Culture,
Media & Sport

Academic Centre of Excellence in Cyber Security Education



Who we are

The Edinburgh Napier University (ENU) ACE-CSE is located in the School of Computing, and comprises around 20 academic staff, complemented by several other key individuals from across the University.

Our industry aligned degrees have led to ENU being the first university in the UK to have full NCSC certification for our undergraduate and postgraduate Cyber Security and Digital Forensics courses. Our MSc in Advanced Security and Digital Forensics (ASDF) has been running for over a decade and was one of the first Master's in the UK to gain full certification from the NCSC.

What we do

Our School of Computing runs more than 25 separate degrees in computing, including eight cyber security and digital forensics courses.

Key to our programmes is the strong integration of articulation routes for a diverse range of students from schools, colleges and industry, with part-time and fully distance learning. The School has developed a strong Cyber Security Graduate Apprenticeship (GA) programme, which integrates with leading cyber security companies, allowing their employees to gain a cyber security degree while also working in industry.

A fully online mode of delivery of the Master's course makes us one of the few ACEs-CSE in the UK to provide a fully online practical-based degree in cyber security, via our internationally leading virtualised teaching platform (vSoC) for cyber security. This helped us win "Best Cyber

Educational Programme" at the Scottish Cyber Security Awards.

We have strong integration with industry and law enforcement at ENU, helping to provide the right skills for our graduates to meet the needs of employers.

We host many conferences and employment events with industry speakers, as well as running successful Continuing Professional Development (CPD) courses, which has led to students working with industry partners, in producing useful applied research, as well as founding start-up companies.

We support a thriving cyber community within ENU, including our student led cyber society, ENUSEC. This has led to running many events, including large scale conferences and CTF competitions, with hundreds of attendees from a range of countries



Our plans for the future

Keeping at the forefront

Cyber security specific employability events will be scaled to include non-cyber students and aimed at improved student engagement with the wider cyber community towards employment and solving real world cyber problems. In terms of teaching, we are delivering on the MASCOTS (Mentoring; Articulation; Supporting; Careers; Opportunities; Taster; and Sustainment) programme, which aims to fully support those with neuro-diverse abilities.

New teaching provision/programmes

We have ambitions for several new programmes, including introductory courses in cyber available

to students and staff across the ENU, new cyber and data science provision in the school, and inter-department IoT and smart cities teaching and research.

Integration within the HEI

Our teaching provision in cyber security will expand to include a university-wide offering, to provide fundamental cyber security understanding for students, and to encourage interdisciplinary integration with cyber topics. We aim for further integration with the ENU IS department, with the ENU ACE offering IS staff places on our NCSC Master's course, and initiatives such as working on staff awareness and training programmes.

Kingston
University
London

Kingston University

Silver Award



in association with
National Cyber
Security Centre



Department for
Digital, Culture,
Media & Sport

Academic Centre of Excellence in Cyber Security Education



Who we are

- Among the top 20 Universities in the UK for Computer Science in 2021 and first among modern universities.
- NCSC fully certified Master's course in Network and Information Security.
- Undergraduate course in Cyber Security and Forensics.
- Range of security research actively undertaken in our Digital Information Research Centre, along with communications, vision, network, physical and cyber security.

Kingston University has risen in university league tables in recent years with a leading place in a number of disciplines, as we continue to focus on our areas of expertise and the needs of our region. The University benefits from one of the most diverse student bodies in the UK, modern facilities and excellent links to industry, and continues to be popular with the local community that it serves as well as international students. This commitment to diversity has been recognised externally by Athena Swan awards. We have been able to make significant investments in the past few years, including into research facilities and larger infrastructure such as an award-winning Town House building.

What we do

In the last few years, we have strategically invested to establish a Cyber Centre at the intersection between industry, research and education, to pursue and promote academic excellence in cyber education, and to provide services to the local community and industry. This has been complemented by additional investments in a state-of-the-art cyber security laboratory for students and partners, along with new lectureships and PhD scholarships. During the pandemic, the centre was able to work with the University on securely virtualising the cyber facilities, including the labs.

Funding was awarded by Kingston to the Cyber Centre to help position the University as the "place to go" for regional cyber security education, particularly in the specialised domain of cyber intelligence, analytics and visualisation. The Centre builds on the substantial expertise and credentials in the domain of security, both in terms of research and education.

Recruitment for the undergraduate Cyber Security and Digital Forensics course has increased markedly in recent years and the MSc in Network and Information Security was awarded full NCSC certification in 2020. Kingston was also one of the founding members of the UK chapter of CISSE.



Our plans for the future

In the next few years Kingston University intends to continue to support the practice of the Centre, helping it to deliver its strategy and achieve milestones. This includes successful transition to gold ACE-CSE status, maintenance, and accreditation of our core cyber courses, as well as continued development and delivery of cyber education across the University, in the local area and to local businesses, schools and other bodies.

The Centre will also help the University achieve security milestones and continue to build its network with industries, academia and the local community.



Queen's University Belfast

The Centre for Secure
Information Technologies



Who we are

Since its foundation in 2009, the Centre for Secure Information Technologies (CSIT) at Queen's has developed a strong reputation in this critical technology area. We have been recognised as an ACE-CSR since 2011. Our Leverhulme Interdisciplinary Network on Cybersecurity and Society (LINCS) doctoral training programme has been running since 2015 and addresses the challenge of threats to the security of governmental, economic, and social activity conducted in cyberspace.

Our diverse ACE-CSE team is led by Dr Sandra Scott-Hayward from the School of Electronics, Electrical Engineering and Computer Science (EEECS), and is made up of staff from each faculty and professional services including Information Services, People and Culture, and Careers.

Together, we are delivering Queen's cyber security strategy to strengthen cyber security awareness and knowledge across all education pathways, operational areas of the institution and the wider community.

What we do

Over recent years, we have expanded the cyber security curriculum provision through the addition of new modules for undergraduate students in the School of EEECS, which will enable us to offer a new specialism in cyber security for our Computer Science students. This builds on our certified Master's degree in Applied Cyber Security, which has been running since 2014. As part of developing cyber security expertise across degree pathways, we offer joint courses between Cyber Security and Law at Master's level.

NI Cyber. Our strong industry engagement enables us to both offer our students access to a vibrant cyber security cluster, and to provide a pipeline of high-quality graduates with skills that are relevant for the future.

A highlight of the LINCS programme has been the doctoral scholar's involvement and success in the Atlantic Council's Cyber 9/12 Strategy Challenge competition. With the successor LINAS programme (Leverhulme Interdisciplinary Network on Algorithmic Solutions), we are building on the successful collaborations that have taken root through LINCS.

CSIT played a leading role in the formation and evolution of the local cyber security cluster,



Our plans for the future

We are developing cyber security training for the complete student body. We are also collaborating with the Digital Catapult NI's Immersive Lab to explore the design of immersive scenario-based 3D training to enable an individual training experience.

Across the University, cyber security will continue to grow as a subject of inquiry within the social sciences, concerning such issues as digital piracy, privacy and the law, international relations and conflict, and public policy, and within the medical and life sciences, concerning such issues as securing healthcare data, security of connected medical devices, food security, and biosecurity.

Northern Ireland has an ambitious target of growing the number of cyber security professionals in the region to 5,000 by 2030. Demonstrating the University's commitment to supporting individuals to upskill and reskill, Queen's, supported by the Department for the Economy, is offering postgraduate Certificate scholarships in Applied Cyber Security. Over the next five years, QUB ACE-CSE initiatives will further build the talent pipeline to develop awareness and knowledge of cyber security within and beyond Queen's, which we believe is fundamental to addressing the societal challenge of cyber security.

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Glossary of terms

ACM	Association for Computing Machinery
ACE-CSE	Academic Centre of Excellence in Cyber Security Education
ACE-CSR	Academic Centre of Excellence in Cyber Security Research
ASDF	Advanced Security and Digital Forensics
BCS	The Chartered Institute for IT
BSc	Bachelor of Science
CISSE UK	The Colloquium on Information Systems Security Education – UK
CPD	Continuing Professional Development
CTF	Capture the Flag
CTI	Cyber Technology Institute
CyBOK	The Cyber Security Body of Knowledge
DCMS	Department for Digital, Culture, Media and Sport
EDI	Equality, Diversity and Inclusion
EPSRC	Engineering and Physical Sciences Research Council
GCHQ	UK Government Communications Headquarters
HEI	Higher Education Institute

IAG	Industrial Advisory Group
ICT	Information Communications Technology
IEEE	Institute of Electrical and Electronics Engineers
IoT	Internet of Things
IT	Information Technology
MINDS	Machine Intelligence for Nano-Electronic Devices and Systems
MSc	Master of Science
NDEC	National Digital Exploitation Centre
NCSC	National Cyber Security Centre
PhD	Doctor of Philosophy
PG	Post-Graduate
QAA	The Quality Assurance Agency for Higher Education
SOC	Security Operations Centre
SCSI	School of Computer Science and Informatics
SME	Small and medium sized Enterprise
STEM	Science, Technology, Engineering and Mathematics



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in association with
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Department for
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Media & Sport

Academic Centres of Excellence in Cyber Security Education

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