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| **United Kingdom - UK** |

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| University Name | **Royal Halloway (University of London)**  |
| Country | United Kingdom |
| World University Rankings 2019**1** | **251-300th**  |
| European Teaching Rankings 2018**1**(if available) | **51-75th** |
| No. of students**1** | **9099** |
| No. of students per staff**1** | **14.9** |
| No. of International students**1** | **39%** |
| Female:male ratio**1** | **60:40** |
| More  |  At the department of Computer Science there exists the Bsc “Information Security” were some subjects are focusing on security.<https://www.royalholloway.ac.uk/studying-here/undergraduate/computer-science/computer-science-information-security/>Distant learning program for Msc in Information Security<https://www.royalholloway.ac.uk/research-and-teaching/departments-and-schools/information-security/studying-here/distance-learning/>  |

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| Department | Mathematics department & Information Security Group |
| Degree**0** | Master |
| Degree Title | **NA** |
| Study Program | Mathematics of Cryptography and Communications |
| Link | [www.royalholloway.ac.uk/studying-here/postgraduate/mathematics/mathematics-of-cryptography-and-communications/](https://www.royalholloway.ac.uk/studying-here/postgraduate/mathematics/mathematics-of-cryptography-and-communications/) |
| Language | English |
| ECTS credits | 90 |
| Duration  | 1 year full-time or 2 years part-time |
| Cost**0** | UK&EU **9 000 €** (No-EU **19 000 €** ) per year |
| Thesis**0** | yes |
| **Topics2** |
| **Computer Sc.** | **Cryptography**  | **Humanistic**  | **Mathematics** | **Privacy** | **Security** |
| Industrial Applications | 0 | Advanced Cryptology | 0 | Cybercrime | 0 | Algebra and Discrete Mathematics | 1 | Data Extraction | 0 | Hardware and Software Security | 0 |
| Communic. Theory | 1 | Cryptanalysis | 1 | Human Aspects of Security and Privacy | 0 |  Complexity Theory | 1 | Data Privacy | 0 | Network Security  | 0 |
| Computer Networks | 0 | Fundamental of Cryptology | 1 | Security Architecture | 0 | Number Theory | 1 | Privacy-enhancing Technologies | 0 | Security systems | 0 |
| Quantum computing | 1 | Post-quantum Cryptography | 1 | Security Management and Risk Analysis | 0 | Probability and Statistics | 1 |  |  | System Security | 1 |
| Theoretical Computer Science | 0 |  |  |  |  | Topology and Analysis | 1 |  |  |  |  |
| Practical lectures**0,4** | **25%** |
| Software**5** | Mathematica |
| Hardware**5** | NA |
| **Percentage of mandatory subjects on3** |
| Computer Sc.: **31.25%** | Crypto:**56.25%** | Humanistic:**0%** | Math: **12.5%** | Privacy:**0%** | Security:**0%** |
| **Percentage of optional subjects on3** |
| Computer Sc.:**10%** | Crypto:**0%** | Humanistic:**0%** | Math:**80%** | Privacy:**0%** | Security:**10%** |
| List of subjects**6** | Mandatory- Advanced Cipher System- Channels- Theory of Error-Correcting Codes- Public Key CryptographyOptional- Applications of Field Theory- Quantum Information and Coding- Principles of Algorithm Design- Advanced Financial Mathematics- Combinatorics- Computational Number Theory- Complexity Theory- Inference- Topology- Applied Probability |

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| University Name | **University of Bristol**  |
| Country | United Kingdom |
| World University Rankings 2019**1** | **78th**  |
| European Teaching Rankings 2018**1** (if available) | **6th** |
| No. of students**1** | **20 570** |
| No. of students per staff**1** | **13.2** |
| No. of International students**1** | **27%** |
| Female:male ratio**1** | **53:47** |
| More  | The PhD program is a collaboration among Cyber Security and Cryptography (Bristol), Applied Digital Behaviour Lab (Bath, Management) and Identities in Social and Digital Contexts (Psychology, Bath) |

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| Department | School of Mathematics |
| Degree**0** | Master |
| Degree Title | **NA** |
| Study program | Master in Mathematics of Cybersecurity |
| Link | <http://www.bris.ac.uk/study/postgraduate/2019/sci/msc-mathematics-of-cybersecurity/> |
| Language | English |
| ECTS credits | 90 |
| Duration  | 1 year full-time |
| Cost**0** | UK&EU **16 400** **€** (No-EU **26 700** **€** ) per year |
| Thesis**0** | yes |
| **Topics2** |
| **Computer Sc.** | **Cryptography**  | **Humanistic**  | **Mathematics** | **Privacy** | **Security** |
| Industrial Applications | 0 | Advanced Cryptology | 0 | Cybercrime | 0 | Algebra and Discrete Mathematics | 1 | Data Extraction  | 1 | Hardware and Software Security | 1 |
| Communic. Theory | 1 | Cryptanalysis | 0 | Human Aspects of Security and Privacy | 0 |  Complexity Theory | 0 | Data Privacy | 1 | Network Security  | 1 |
| Computer Networks | 0 | Fundamental of Cryptology | 1 | Security Architecture | 0 | Number Theory | 1 | Privacy-enhancing Technologies | 0 | Security systems | 0 |
| Quantum computing | 1 | Post-quantum Cryptography | 0 | Security Management and Risk Analysis | 0 | Probability and Statistics | 1 |  |  | System Security | 0 |
| Theoretical Computer Science | 0 |  |  |  |  | Topology and Analysis | 0 |  |  |  |  |
| Practical lectures**0,4** | **25%** |
| Software**5** | R, Python, Hadoop, Spark |
| Hardware**5** | NA |
| **Percentage of mandatory subjects on3** |
| Computer Sc.:**6.25%** | Crypto:**0%** | Humanistic:**0%** | Math:**31.25%** | Privacy:**43.75%** | Security:**18.75%** |
| **Percentage of optional subjects on3** |
| Computer Sc.:**35%** | Crypto:**10%** | Humanistic:**0%** | Math:**42.5%** | Privacy:**2.5%** | Security:**10%** |
| List of subjects**6** | Mandatory- Introduction of Mathematical Cybersecurity- Data Science Toolbox- Anomaly Detection- Complex Network 4- Cybersecurity Project Preparation- Cybersecurity ProjectOptional- Topics in Discrete Mathematics 34- Quantum Computation- Multivariate analysis 34- Quantum Information Theory- Algebraic Number Theory 4- Systems Security- Bayesian Modelling- Number Theory- Information Theory 3- Machine Learning - Cryptography A |

**Manual**

**0.** Sentences between parenthesis are the possible answer for this cell, they should be removed while filling.

**1.** Informations on:

- World University Rankings 2019

- European Teaching Rankings 2018

- No. of students

- No. of students per staff

- No. of International students

- Female:male ratio

Can be found on the World University Rankings web page, link:

[https://www.timeshighereducation.com/world-university-rankings/2019/world-ranking#!/page/0/length/25/sort\_by/rank/sort\_order/asc/cols/stats](https://www.timeshighereducation.com/world-university-rankings/2019/world-ranking%22%20%5Cl%20%22%21/page/0/length/25/sort_by/rank/sort_order/asc/cols/stats)

If the related information is not available, please fill the cell with **NA** in red.

**2.** Topics.

The list of topics with description can be found in *list\_topics.docx* file.

If the particular topic is covered, please change the “0” value to “1” (even if the topic is partially covered), if the information is not available please change “0” to “**NA**”, otherwise leave “0”.

**3.** Subjects.

Use the *template\_subjects.xlsx* file to fill the percentages.

If the related information is not available, please fill the cell with **NA** in red.

**4.** Practical lecture.

Consider the value computed in *template\_subjects.xlsx* file and round it to the lower value among 0, 25, 50, 75 and 100%. Consider ONLY mandatory subjects.

For example, if you have 34%, in the excel file, it becomes 25%.

If the related information is not available, please fill the cell with **NA** in red.

**5.** Mentioned software and hardware used during the (mandatory) subjects.

If the related information is not available, please fill the cell with **NA** in red.

**6.** List the title of each subject.

If the related information is not available, please fill the cell with **NA** in red