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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 Cryptography  Optional  - 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 Project  Optional  - 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" \l "!/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