ROYAL HOLLOWAY
University of London

**PROGRAMME SPECIFICATION**

This document describes the **Masters of Science in Computer Science by Research.** This specification is valid for new entrants from **September 2011.**

The aims of programme are:
- provide advanced training in a specialised branch of *computer science r*esearch;
- enable students to acquire the key discipline-specific and generic skills required to *pursue a research career in science*;
- develop the students' ability to communicate results of research to a professional standard, both by oral presentation and by preparation of a scientific paper;
- produce graduates who are equipped to undertake research leading to a PhD and/or undertake employment as scientific researchers at an advanced level.

The programme is delivered over one year (52 weeks) full-time or over two years (104 weeks) part-time and aims to match up students with experts in one of five research disciplines for one year of intensive supervised training. The programme also offers the opportunity of industrial support and collaboration. It is aimed at recent graduates who have achieved a good first degree and who are looking for the opportunity to do in depth research in a chosen topic under the guidance of an expert in the field. The programme will also be of interest to people wishing to return to academic studies after a period of employment.

The research strands (shown below) coincide with fundamental areas of research in Computer Science, in which the Department's contribution has been internationally recognised.
- Machine Learning
- Constraints
- Discrete Optimisation
- Programming Languages and Compilers
- Bioinformatics (Biological Sequence Analysis)

Applicants will be accepted for one of these five basic strands, each of which includes many different possible research opportunities, and students will choose a research topic in consultation with their supervisor during the first term.

The programme will include regular supervision of research work, advanced programme material delivered mainly through tutorial sessions, plus opportunities to take supplementary taught courses, appropriate to individual student needs. Assessment will be based primarily on the chosen research project.

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## Learning outcomes

Teaching and learning in the programmes are closely informed by the active research of staff, particularly in the areas of: computer learning, constraints, discrete optimisation, programming languages and compilers, and bioinformatics (biological sequence analysis). The programme complies fully with Descriptors for a Masters level qualification set out by the Quality Assurance Agency for Higher Education in England and Wales (QAA) as all of its learning outcomes are at Masters (M) level. In general terms the programme provides opportunities for students to develop and demonstrate the following learning outcomes:

*Knowledge and understanding*
- in-depth and critical knowledge of a specialised field;
- knowledge and critical understanding of research methodologies relevant to long-term, advanced scientific research;
- knowledge and understanding of relevant information technology, and its application to the research project;
- advanced understanding of the key features of a good scientific paper, their peer review and how to prepare a paper for publication;
- advanced understanding of the key features of a high quality grant proposal.

*Skills and other attributes*
- advanced discipline-specific research skills in a branch of computer science;
- independently planning and executing a research project to time;*
- oral communication, including presentations to professional audiences, public speaking and communication with the popular media;*
- written communication, including the ability to author scientific posters and produce research papers with a logical structure, appropriate use of citations, and in comprehensible and unambiguous English;*
- producing simple web pages;*
- formulation of clear testable hypotheses and development of valid experimental designs;*
- acquisition, critical analysis and interpretation of data;*
- presentation of graphical data in a clear and appropriate format;*
- information synthesis, for presentation or written report;*
- time management;*
- team-work;*
- self-motivation, flexibility, adaptability;*

* transferable skills

## Teaching, learning and assessment

Teaching and learning is mainly by intensive tutorials based on the chosen research strand, attendance on a research skills course, private study, completion of assignments and of the research project by independent research and private study supported by research supervision. Assessment is by coursework assignments for the research strand and a research project written up in the form of a draft paper for a specified journal. Full details of the assessments for individual courses can be obtained from the Department.

## Details of the programme structure(s)

Courses are designed to broaden the student's experience and to equip them with a wealth of knowledge and transferable skills within the first term. The student takes the Research Skills Programme for postgraduates, provided by the RHUL Graduate School. The significant research component will begin in January and continues to run through to the end of the programme in September. Where appropriate, further background material is provided in lectured courses.

The programme structure is as follows:
**Assessed:**
1. Research Project (75%)

2. Research Techniques course (5%) – Research Skills Programme provided by the Graduate School plus subject-specific training provided by the department
3. One of the following strands (20%):
    - Machine Learning
    - Constraints
    - Discrete Optimisation
    - Programming Languages and Compilers
    - Bioinformatics (Biological Sequence Analysis)

*Non-Assessed:*
4. Up to two half-unit Taught Courses as required by the Programme Director in consultation with the Supervisor. These will provide the necessary background for the research project for those students without the necessary previous experience. Any such course will be one of the following:
    - A module from a taught MSc programme at RHUL;
    - An appropriate final year specialised undergraduate course at RHUL;
    - Reading group tutorials.

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## Progression and award requirements

The requirements for the award of the MSc are:
- **Distinction:** an overall weighted average on or above 70.00%, with at least 70% in the Research Project and a pass mark of at least 50% in all assessed course components and satisfactory completion in any supplementary courses required to be taken
- **Merit**: an overall weighted average between 60.00% – 69.99%, with no mark for any assessed course component falling below 50% and satisfactory completion in any supplementary courses required to be taken.
- **Pass:** an overall weighted average between 50.00% – 59.99%, provided that i) the mark for the Research Project is at least 50% and ii) the average mark for the coursework for the selected strand must be at least 50% with no individual mark falling below 40% and iii) the mark for the research techniques course is at least 50%, and that satisfactory completion is achieved in any supplementary courses required to be taken.
- **Fail:** an overall weighted average on or below 49.99%, or where the mark for any assessed course component is below 50%.

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## Student support and guidance

- Each student is allocated a Supervisor who meets with them regularly through the programme. The supervisor's role is to advise on academic, pastoral and welfare issues. Students have tutorials with their Supervisor throughout the first term. The tutorials include personal and technical presentations by the student, technical report writing and also address such issues as: how to get the most out of lectures and coursework, time management, how to use additional resources such as libraries and the web, and issues surrounding plagiarism. During the remainder of the academic year the Supervisor and the Student meet regularly for discussion and monitoring of progress with the research project.
- Each student is also allocated an Advisor who is an academic member of the department working in an area more distant from the research project, who may be consulted on general matters if and when the need arises. The director of undergraduate studies and the head of department provide a back-up system of academic, pastoral and welfare advice.
- All staff are available and accessible through a system of timetabled sign-up sheets on the doors of their offices, or via appointments made by email.
- Detailed student handbook supplied to every student, and course notes and other learning resources available either in hard copy or on the department's web site.
- Course definition sheets for each course, outlining the course organisation, methods of assessment and coursework handout and submission dates.
- 24-hour card access to a computer science dedicated research laboratory.
- Induction sessions run by technical support staff on the use of the departmental computing systems.
- Technical back up provided by the systems support staff for problems with using the departmental computing system.
- Extensive supporting materials and learning resources in College libraries and computer centre.

- College Careers Service and Departmental Careers Service liaison officer.
- Access to all College and University support services, including Student Counselling Service, Health Centre and the Education Support Unit for students with special needs.

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## Admission requirements
The normal entry requirement for applicants would be at least an Upper Second class UK first degree in Computer Science, Mathematics or, possibly, another science subject. However the Department also has considerable flexibility in its admissions and offers policy, and may consider applicants with an equivalent qualification from an overseas institution. The Department also strongly encourages applications from non-standard applicants, such as candidates who hold other qualifications or those who have relevant work experience. Students whose first language is not English may also be asked for a qualification in English Language at an appropriate level. It may also be helpful to contact the Admissions Office for specific guidance on the entrance requirements for particular programmes.

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## Further learning and career opportunities
Students are provided with training in a range of subject-specific and transferable skills that prepare them for both scientific and vocational careers. Computer Science opens up a wide range of career opportunities and the Department has a number of important links with industry. Computer Science graduates from the Department have found employment in a wide range of jobs. Many have gone into software houses such as Logica, while others have entered larger firms such as British Telecom, Texas Instruments and British Aerospace. A large number enter careers with a management or financial slant, for example in Andersen Management Consultancy, or large multi-national companies. The College Careers Office organises recruitment visits by companies and there are a number of careers fairs during the year when students can make useful contacts with prospective employers. On the other hand, the programme provides a route to PhD research programmes both at this department and elsewhere, through the experience of working with a world leading expert in the chosen research area. For further details please refer to the Careers Service.

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## Indicators of quality and standards
Royal Holloway's position as one of the UK's leading research-intensive institutions was confirmed by the results of the most recent Research Assessment Exercise (RAE 2008) conducted by the Higher Education Funding Council (HEFCE). The new scoring system for the RAE 2008 measures research quality in four categories, with the top score of 4* indicating quality that is world-leading and of the highest standards in terms of originality, significance and rigour. 60% of the College's research profile is rated as world-leading or internationally excellent outperforming the national average of 50%. The College is ranked 16th in the UK for research of 4* standard and 18th for 3* and 4* research. 65% of the Computer Science Department's research profile is of 3* and 4* standard.

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## List of programmes
The programme is taught entirely by staff at Royal Holloway, University of London, and leads to an award of the University of London.

**Masters programme in Computer Science by Research**

MSc Computer Science by Research (1071)

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