Programme Specification (PG)

Awarding body / institution:	Queen Mary University of London
Teaching institution:	Queen Mary University of London
Name of final award and programme title:	MSc FT Computer Games
Name of interim award(s):	PG Certificate; PG Diploma
Duration of study / period of registration:	1 academic year
Queen Mary programme code(s):	PMSF-QMCOMP1 PSCGA
QAA Benchmark Group:	
FHEQ Level of Award:	Level 7
Programme accredited by:	
Date Programme Specification approved:	
Responsible School / Institute:	School of Electronic Engineering & Computer Science

Schools / Institutes which will also be involved in teaching part of the programme:

Collaborative institution(s) / organisation(s) involved in delivering the programme:

Programme outline

This programme will provide students with the technical knowledge and skills to work at the leading edge of games development, with a particular focus on how AI and machine learning are used by -- and are changing -- the games industry. The programme has three core themes: games programming, computational game design, and applications of AI, machine learning and data science in games. Dedicated modules introduce these themes, with a range of elective modules allowing students to pursue their specific interests --- programming, design or AI --- in greater depth.

Aims of the programme

This programme aims to:
- Build on students' existing knowledge and skills in computer programming to allow them to design and develop games using industry-relevant approaches. The programme aims to attract students who have programming experience (e.g. from an undergraduate degree) and want to learn more about modern game development.

- Develop students' understanding of AI, machine learning and data science, and their application in games. Students should be able to apply these technologies in their own game design and development practice.
- Prepare students for a career in computer games development and/or research. For example, as a game developer, AI programmer, technically-literate game designer, or as preparation for PhD research at the intersection of games and AI.
- Meet the needs of the games industry for graduates with a fusion of relevant technical and creative skills.

What will you be expected to achieve?

Students who successfully complete the programme will be able to program complex computer games, with an understanding of the modern principles and practice of game development, game design, and the intersection of games and Artificial Intelligence.

Academic Content:	
A 1	How to program computer games using industry-relevant technologies.
A 2	Compare and select appropriate technologies in the context of game development.
A 3	Identify theories and principles of game design and apply them to analyse specific games.
A 4	Describe, compare and apply computational approaches to game-playing, interactive agents, content generation, and player modelling.
A 5	Identify the general performance and limitations of these techniques.
A 6	Describe, compare and apply a range of AI, machine learning and data science methods, both in general and in the context of computer game design and development.
A 7	Identify current trends and ethical issues in the games and AI industries.

Disciplinary Skills - able to:	
B 1	Design, prototype, and playtest new computer games.
B 2	Manage the process of developing a computer game.
B 3	Select appropriate computational methods to solve complex and unfamiliar problems in game design and development.
B 4	Apply AI, machine learning and data science methods in their own design and development practice.
B 5	Evaluate and integrate new research and practice in game development and game AI.

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Attributes:	
C 1	Engage critically with knowledge.
C 2	Be able to constructively engage with external feedback on technical and creative work.
C 3	Have a global perspective on the game and AI industries.
C 4	Be able to communicate to technical and non-technical audiences.
C 5	A strong work ethic and commitment in order to meet the standards required.
C 6	Capable of independent and team working.
C 7	Act with integrity with respect to ethical, legal and regulatory frameworks, ensuring the protection of personal data, safety and security.
C 8	Commitment to continuous professional development; maintaining their knowledge and skills in relation to developments that influence their work.

How will you learn?

By attendance at lectures (typically 16 hours per week), tutorials (typically 8 hours per week), and labs (typically 8 hours per week. Each non-project-based module involves lectures, problem solving coursework and practical sessions. Lectures are used to introduce principles and methods and also to illustrate how they can be applied in practice. Coursework allows students to develop their skills in problem solving and to gain practical experience. Practical sessions provide students with guidance and help while solving a problem. These lessons take the form of exercise classes and programming laboratories that allow the students to learn-by-doing in order to complement the lectures.

Individual projects are undertaken during the summer months under the supervision of an academic member of staff with whom there are weekly consultancy meetings. These are used for students to report on their progress, discuss research and design issues and plan their future work. This develops and reinforces students' ability to communicate technical ideas clearly and effectively. The Projects Coordinator also runs a thread of taught sessions to support the project module. A number of industrial-linked projects are offered each year, which students can apply for.

How will you be assessed?

Modules are assessed through a combination of coursework and written examinations. The compulsory modules on the programme use coursework-based assessment. The project is examined on the basis of a written report, a formal oral presentation, and, where applicable, a demonstration of any software and/or hardware developed by the student.

How is the programme structured?

Please specify the structure of the programme diets for all variants of the programme (e.g. full-time, part-time - if applicable). The description should be sufficiently detailed to fully define the structure of the diet.

See table below for a full module list.

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Semester 1: Students take three compulsory modules: 1) Multi-Platform Game Development; 2) Fundamentals of Game Design; 3) AI in Games.
They choose one elective module from: 4) Introduction to Object-Oriented Programming; 5) Computer Graphics; 6) Machine Learning; 7): Artificial Intelligence; 8) Data Mining; 9) Introduction to Computer Vision.

Semester 2: Students take one compulsory module: 1) Interactive Agents and Procedural Generation.
They choose three elective modules from 2) Advanced Game Development; 3) Computational Game Design; 4) Computational Creativity; 5) ML for Visual Data Analysis; 6) Deep Learning and Computer Vision;

Pending the approval of MSc Data Science and AI by Conversion, the AI in Games module may also be offered in semester 2. A student who took that module in semester 2 would take two elective modules from the Semester 1 list, and two from the Semester 2 list excluding "Computational Game Design" (for which AI in Games is a prerequisite).

Students have a project module during semester 3.

Academic Year of Study   FT - Year 1

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Multi-Platform Game Development	ECS7003P	15	7	Compulsory	1	Semester 1
Fundamentals of Game Design	ECS7015P	15	7	Compulsory	1	Semester 1
Artificial Intelligence in Games	ECS7002P	15	7	Compulsory	1	Semester 1
Interactive Agents and Procedural Generation	ECS7016P	15	7	Compulsory	1	Semester 2
Artificial Intelligence	ECS759P	15	7	Elective	1	Semester 1
Introduction to Object-Oriented Programming	ECS793P	15	7	Elective	1	Semester 1
Machine Learning	ECS708P	15	7	Elective	1	Semester 1
Data Mining	ECS766P	15	7	Elective	1	Semester 1
Introduction to Computer Vision	ECS709P	15	7	Elective	1	Semester 1
Computer Graphics	ECS762P	15	7	Elective	1	Semester 1
Advanced Game Development	ECS7014P	15	7	Elective	1	Semester 2

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Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Computational Game Design	ECS7017P	15	7	Elective	1	Semester 2
Computational Creativity	ECS7022P	15	7	Elective	1	Semester 2
Machine Learning for Visual Data Analysis	ECS797P	15	7	Elective	1	Semester 2
Deep Learning and Computer Vision	ECS795P	15	7	Elective	1	Semester 2
Project	ECS750P	60	7	Core	1	Semesters 2 & 3

What are the entry requirements?

A 2:1 or above at undergraduate level in Electronic Engineering, Computer Science, Mathematics or a related discipline.
The English language requirements are IELTS 6.5 overall, including 6.0 in Writing, and 5.5 in Reading, Listening and Speaking.

How will the quality of the programme be managed and enhanced? How do we listen to and act on your feedback?

The programme quality will be managed using the standard mechanisms applied across all EECS PGT programmes. Currently:
- Student feedback can be informal provided by individual students to teaching staff, in the form, for example of requests for more support on particular topics or learning outcomes, addressed in the first instance to module teaching staff and if necessary to others in the teaching team (programme lead, teaching officers). Lecturers will often respond with changes in the current delivery.
- Feedback is also formal provided through standard module-level questionnaires and the relevant SSLC.
- Modules and programmes are monitored and developed by subject-level teaching groups and the EECS SETLA committee, with the programme lead, Director of Postgraduate Teaching and Director of Teaching having particular responsibility for the maintenance of programme quality and coherence. In particular, these respond to issues raised in questionnaires and at SSLC, and monitor the annual module reports to ensure that issues arising are dealt with.
- EECS also runs a programme of peer observation of teaching to ensure that teaching quaity is maintained and enhanced.

What academic support is available?

EECS has an established system for academic support across all our postgraduate programmes. A dedicated Programme Coordinator is responsible for overall management of the programme, including induction of students and advising on programme-specific issues. Students are supported by their Academic Advisor, as well as a Senior Tutor specialising in Postgraduate issues. EECS postgraduate modules are taught by teams of one or two faculty members (typically two if a larger module), supported by demonstrators recruited from amongst our PhD students and postdoctoral researchers, who assist with the delivery of laboratory classes.

Programme-specific rules and facts

n/a

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How inclusive is the programme for all students, including those with disabilities?

The modules on this programme follow EECS standard practice. Textbooks are chosen with online availability as an important criterion in the choice, most are available as online digital copies from the library, and some are available open-access. Software is chosen with open-source as a preference, and available cross-platform where possible. Teaching materials and laboratory guides are posted on QM-Plus, but are not usually assessed by the Disability and Dyslexia Service. Lectures are recorded as standard and recordings made available shortly after the event. Computing facilities are available with remote access and how-to guides are posted on the EECS intranet. We anticipate that most students will have access to a decent reliable laptop of at least mid-range capability, and reasonable broadband access. Students who do not have either of these would likely be disadvantaged in their studies.

Links with employers, placement opportunities and transferable skills

The School has a wide range of industrial contacts secured through research projects and consultancy, our Industrial Experience programme and our Industrial Advisory Panel. Academic staff on the programme have strong links with employers in the UK games industry specifically, through research collaborations, regular hosting of industry speakers at seminars and conferences, and engaging with industry events such as Develop:Brighton and the London Game AI meetups. QMUL's IGGI programme has an established network of over 80 games companies that provide placements to our PhD students, including Sony Interactive Entertainment, Creative Assembly, Bossa, and EA.

Students on the programme will benefit from these links primarily through invited speakers from the games industry, as well as staff awareness of industry trends and developments. We also intend to 1) propose a number of projects with games industry partners and 2) form a programme advisory panel with potential employers.

The Industrial Advisory Panel works to ensure that our programmes are state-of-the-art and match the changing requirements of industry. The Panel includes representatives from a variety of Computer Science oriented companies ranging from SMEs to major blue-chips. Recent EECS graduates have found employment as IT consultants, specialist engineers, web developers, systems analysts, software designers and network engineers in a wide variety of industries and sectors. A number of students also go on to undertake PhDs in electronic engineering and computer science. Merril Lynch, Microsoft, Nokia, Barclays Capital, Logica,, Credit Suisse, KPMG, Transport for London, Sky and Selex ES are among the organisations that have recently employed graduates of EECS programmes.

Transferable skills are developed through a variety of means, including embedding of QM Graduate Attributes in taught modules and the summer project, together with the opportunity to participate in extra-curricular activities, e.g. the School's E++ Society, the School's Annual Programming Competition and external competitions with support from the School.

Programme Specification Approval

Person completing Programme Specification:	Dr Jeremy Gow
Person responsible for management of programme:	Dr Jeremy Gow
Date Programme Specification produced / amended by School / Institute Learning and Teaching Committee:	23 Feb 2021
Date Programme Specification approved by Taught Programmes Board:	

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