Module Specification

Module Summary Information

1	**Module Title**	Network Game Programming
2	**Module Credits**	20
3	**Module Level**	7
4	**Module Code**	CMP7210

5	**Module Overview**

This module builds on the concepts taught in Quality of Service in Network Environments. It addresses the use of network technology and models in games design to enhance game play in the form of a networked game. This is a practical-based module where you will get 'hands-on' experience of network game programming, including low-level network programming and networking middleware, such as RakNet, to implement multi-player game features such as managing teams, message passing, lobbies, synchronising game data, voice data, peer-to-peer vs. client/server, managing connections and dealing with NAT, network games in IPv4 and IPv6 environments, etc. It also considers the impact of network games on the network and covers analysing network game load and issues of scalability. Being programming based this module also enhances your transferable skills to other computing and software engineering disciplines: you develop confidence in gaining important technical skills and become an independent problem solver willing to take on new challenges and experiences.

The module will be taught by a series of practical sessions that will be augmented with mini-lectures and tutorials, covering important concepts that underpin networked-game programming practice. In addition there will be opportunities to gain formative feedback on programs developed in sessions and on the assessment.

6	**Indicative Content**

- Protocols, e.g. TCP and UDP, QoS, flow control, transport layer protocols, reliability.
- State management and replicating game state.
- Serialisation.
- Distributed application programming models, e.g. Client/Server vs peer-to-peer and hybrid models.
- Network game features such as multiplay, lobby system and voice communication,
- Socket programming.
- Remote Procedure Calls (RPC).
- Network middleware, e.g. RakNet.
- Testing, debugging and performance optimisation of network game.

7	Module Learning Outcomes
	On successful completion of the module, students will be able to:
1	Synthesize a design for a network protocol based on the development of a prototype to compare different network programming models.
2	Implement a network game with an efficient protocol based on a given set of requirements.
3	Present a critical appraisal of the performance and efficiency of a network game.
4	Apply and evaluate network programming security methods to secure a network game.

8	Module Assessment		
Learning Outcome			
	Coursework	**Exam**	**In-Person**
1-4			X

9	Breakdown Learning and Teaching Activities	
Learning Activities		**Hours**
Scheduled Learning (SL) includes lectures, practical classes and workshops, peer group learning, Graduate+, as specified in timetable		48
Directed Learning (DL) includes placements, work-based learning, external visits, on-line activity, Graduate+, peer learning, as directed on VLE		100
Private Study (PS) includes preparation for exams		52
Total Study Hours:		200