# COURSE SPECIFICATION DOCUMENT

**Academic School / Department:** Science, Innovation & Technology

**Programme:** MSc Applied Computer Science (Conversion)

***FHEQ* Level:** 7

**Course Title:** Computer Architecture and Networks

**Course Code:** COMP 7110

**Total Hours:** 200
Timetabled Hours: 39
Guided Learning Hours 21
Independent Learning Hours: 140

**Credit** 20 UK CATS credits
10 ECTS credits
4 US credits

**Course Description:**
This module develops an integrated understanding of computer systems architecture and networked infrastructure as foundational components of modern information systems. It introduces core architectural principles, operating system concepts and networking models, and examines how these layers interact to support secure, scalable and efficient computing environments.

**Prerequisites:**
None

**Aims and Objectives:**

- Develop an understanding of the fundamental principles of computer architecture, including processor organisation, memory hierarchy and operating system concepts.
- Introduce core networking models, protocols and infrastructure technologies that underpin modern distributed and internet-based systems.
- Enable students to analyse how hardware, operating systems and networked environments interact to support the development and deployment of information systems.
- Develop the ability to evaluate architectural and networking decisions in relation to performance, scalability, reliability and organisational requirements.
- Provide awareness of infrastructure-level security considerations and risks associated with the design and operation of computer systems and networks.

**Programme Outcomes:**
A1, A2, A4, B1, B3, C2, C4, D1, D4

A detailed list of the programme outcomes are found in the Programme Specification. This is located at the archive maintained by Registry and found at:
https://www.richmond.ac.uk/programme-and-course-specifications/

**Learning Outcomes:**
On successful completion of the course, students will be able to:

1. Critically evaluate computer system architectures, including processor, memory and operating system components, in terms of performance and design trade-offs.
2. Analyse networking models and protocols and explain their role in supporting distributed and internet-based systems.
3. Evaluate infrastructure-level security considerations and identify potential vulnerabilities within system and network architectures.
4. Assess architectural and networking decisions in relation to scalability, reliability and organisational requirements.
5. Demonstrate an integrated understanding of how hardware, operating systems and networks collectively support the deployment of information systems.

**Indicative Content:**

- Von Neumann architecture and instruction execution concepts
- CPU structure (ALU, control unit, registers – conceptual level)
- Memory hierarchy (cache, RAM, persistent storage)
- Data representation and addressing concepts
- Performance considerations and bottlenecks
- Processes and threads
- Memory management concepts
- Scheduling principles
- OSI and TCP/IP layered models
- IP addressing and subnetting concepts
- Routing and switching principles
- Core protocols (HTTP, DNS, TCP, UDP – conceptual operation)
- Client–server and distributed systems
- CIA triad and system-level threat surfaces
- Network vulnerabilities and common attack vectors (conceptual)
- Firewalls and segmentation (conceptual role)
- Secure configuration principles
- Infrastructure resilience and reliability considerations
- Scalability considerations
- Performance vs cost trade-offs
- Infrastructure choices in organisational settings

**Assessment:**

This course conforms to the Richmond University Standard Assessment Norms approved at Academic Board and are located at https://www.richmond.ac.uk/university-policies/

**Teaching Methodology**:
Teaching is delivered through lectures, seminars, design workshops, guided learning, laboratory-based activities and iterative practical tasks. Students participate in collaborative design exercises, undertake usability evaluations, and receive formative feedback that supports the development of reflective, evidence-based design practice.

***Indicative Text(s):***

- Lee, R. B. (2022). *Security basics for computer architects*. Cham: Springer Nature.
- Stallings, W. (2021). *Computer organization and architecture designing for performance.* Harlow: Pearson.
- Tanenbaum, A. S., Feamster, N. and Wetherall, D. (2021). *Computer Networks*. 6th edition. Harlow: Pearson.

***Journals***

*Journal of Software Engineering.*

*International Journal of Software Engineering and Computer Systems.*

See syllabus for complete reading list.

**Change Log for this CSD:**

| Nature of Change | Date Approved & Approval Body (School or AB) | Change Actioned by Registry Services |
|---|---|---|
| Guided Learning Hours menu updated | October 2025 | |
| Total Hours Updated | October 2025 | |
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