Programme Specification

**A statement of the knowledge, understanding and skills that underpin a taught programme of study leading to an award from
The University of Sheffield**

Programme Details

1. Programme title	Data Communications
2. Programme code	EEET01
3. QAA FHEQ level	7
4. Faculty	Engineering
5. Department	Electronic and Electrical Engineering
6. Other departments providing credit bearing modules for the programme	Computer Science
7. Accrediting Professional or Statutory Body	The Institution of Engineering Technology
8. Date of production/revision	December 2023

Awards	Type of award	Duration
9. Final award	MSc	1 year
10. Intermediate awards	PG Diploma	1 year
	PG Certificate	1 year

Programme Codes

11. JACS code(s) *Select between one and three codes from the HESA website.*	H640		
12. HECoS code(s) S*elect between one and three codes from the HECoS vocabulary.*	100165		

Programme Delivery

13. Mode of study	Full-time
14. Mode of delivery	In-person

15. Background to the programme and subject area

Electronic information transfer, or data communication, is playing an increasingly important role in all aspects of modern living. Utilities such as land based and mobile telephone systems, the internet and digital broadcasting of both radio and television depend on the reliable transmission of digital information. Industrial and commercial enterprises such as financial institutions, manufacturing plants, the railway network and the national power supply grid use data communication networks to monitor and control the state of their systems. Domestic applications of data communication are growing rapidly.

The subject area of data communications covers transmission media (mainly wireless, cable or optical fibre), the hardware that makes data communication physically possible, the computer networks that control and sort the information and the information coding methods that reduce error rates and minimise the transmission of redundant information. Between them, these issues fall within the ambits of electronic engineering and computer science and thus the programme is run jointly by the Department of Electronic and Electrical Engineering and the Department of Computer Science. Both departments are internationally renowned for their research in areas directly related to the programme. The modules comprising the programme are delivered by expert academic staff who are active at the forefront of research in many aspects of data communications. Their work spans a spectrum of issues ranging from the high-level networking and architectural issues at one end to the low-level issues dealing with devices and processes at the other.

This programme is designed to provide a thorough grounding in all aspects of data communication systems, from transmission methods and hardware to information coding, with a focus on the latest advances in digital data communication technology and systems. It offers a means of skill conversion for those with a numerate background who wish to move into related areas of work, and as a means of updating and focusing skills for those already in the industry. It is accredited by the Institution of Engineering and Technology as a means of obtaining the further learning which, together with an appropriate accredited BEng(Hons) degree, satisfies the educational requirements for Chartered Engineer status. It is delivered with a bias towards research and development, and we expect most graduates from this programme either to gain employment in the R & D commercial/industrial sector or to embark on further studies leading to a PhD, either at Sheffield or elsewhere.

Further information about the programmes may be found on the internet at
https://www.sheffield.ac.uk/eee/postgraduate/courses

16. Programme aims

MSc Data Communications aims to:	
A1	provide access to a Masters' level degree programme in data communications to graduates or professionals from a variety of backgrounds.
A2	provide students with "accredited" further learning which together with an appropriate BEng(Hons) degree will satisfy the educational base needed to become a Chartered Engineer.
A3	foster in students a commitment to self-improvement and continuing professional development.
A4	provide students with a detailed knowledge and understanding of the rapidly developing field of data communications.

A5	provide teaching that is underpinned by the research attainment and scholarship of the staff.
A6	prepare students for a professional research and development career in the data communications engineering industry.

17. Programme learning outcomes

Knowledge and understanding

On successful completion of the programme, students will be able to demonstrate knowledge and understanding of:

		Links to Aim(s)
K1	The advanced engineering science relevant to communications engineering.	A1, A2, A4
K2	Analytical methods relevant to data communications.	A4
K3	State of the art data communication technologies and imminent developments in the field.	A4, A5
K4	The research methods and scientific techniques relevant to electronic and electrical engineering.	A3
K5	The area of their individual research topic.	A5

Skills and other attributes

On successful completion of the programme, students will be able to:

S1	Gather, organise and critically evaluate information needed to formulate and solve problems.	A5
S2	Apply acquired knowledge effectively and efficiently in any data communications environment.	A4, A5
S3	Produce verbal and written communications appropriate for the presentation of technical information.	A7
S4	Write computer programmes to solve engineering problems.	A4
S5	Work independently, and as a group, on technical problems.	A5, A6
S6	Manage time effectively.	A6
S7	Plan and execute a major research-based investigation.	A6
S8	Engage with personal and professional development.	A2

18. Learning and teaching methods

Development of the programme learning outcomes is promoted through the following teaching and learning methods:

Lectures – used to transmit information, explain theories and concepts, and illustrate methods of analysis design.

Coursework assignments – generally require students to seek additional information and work on their own, or sometimes in small groups, to develop understanding of subject matter.

Problem Sheets – to assist students with their understanding and to resolve specific problems.

Formative quizzes – to provide regular evaluation of basic competency in modules.

Dissertation – a major individual research study supervised by a member of academic staff and possibly a partner from industry, allows the student ample scope to display initiative, originality and creativity.

19. Assessment and feedback methods

Opportunities to demonstrate achievement of the programme learning outcomes are provided through the following assessment methods:

Examinations – usually of two/three hours duration consisting of competency based, threshold questions, and one/two more challenging questions to allow students to demonstrate depth of understanding.

Coursework submissions – these include design studies, computational assignments and research reports.

Oral presentations– students present their research work to their supervisors and peer group.

Group design work–students will work in teams to tackle engineering problems and present their findings.

Individual project reports - interim and detailed final reports are written describing the research work.

Opportunities for feedback are provided using the following methods:

Formative quizzes – Quizzes will be provided to allow students to check their basic competency.

Project supervision – During the individual research project students will be given verbal feedback during regular project meetings.

Discussion with subject experts – students are encouraged to ask questions of our subject experts during teaching sessions to gain feedback on problems faced and develop student learning.

20. Programme structure and student development

Taught modules - Upon successful completion of the taught modules, students will have developed a thorough understanding of the fundamental principles underlying data communications. Most modules introduce advanced specialist knowledge designed to further enhance students' understanding and ability, and also to broaden their knowledge more generally. By the end of the second semester, students will be familiar with state-of-the-art data communications. They will be able to assimilate and process advanced engineering concepts and present these orally and in writing to a variety of audiences.

Group design project - Students will work in small groups to tackle engineering problems set in a global context. The project aims to enhance design, project management, communication, and group working skills, which aim to help to develop student employability and professional development.

Research project - On successful completion of the research project, MSc students will, in addition, have developed their skills in research methods, time management and project management and will display initiative and imagination in their acquisition of frontier knowledge and in their approach to problem solving.

Detailed information about the structure of programmes, regulations concerning assessment and progression and descriptions of individual modules are published in the University Calendar available online at http://www.sheffield.ac.uk/calendar/.

21. Criteria for admission to the programme

Most students enter with UK degree level qualifications of at least lower second, although preferably upper second or first-class standard or with equivalent qualifications from overseas. Those with industrial experience are considered on an individual basis. Applications are welcome from graduates of most of the disciplines that involve a high degree of mathematical competence. Typically, students are expected to have degrees in an Electronic or related subject, or from backgrounds including Physics. Other branches of Engineering, Mathematics and Computer Science Students with these backgrounds will be considered carefully. In general, those with a non-electronics background will be required to have a higher degree qualification in order to be admitted. General University requirements regarding English qualifications must also be satisfied.

Detailed information regarding admission to programmes is available from the University's On-Line Prospectus at http://www.shef.ac.uk/courses/. Specific details about the courses we offer in the departments can be found at https://www.sheffield.ac.uk/eee/postgraduate/courses.

22. Reference points

The learning outcomes have been developed to reflect the following points of reference:

Subject Benchmark Statements
https://www.qaa.ac.uk/quality-code/subject-benchmark-statements

Framework for Higher Education Qualifications (2014)
https://www.qaa.ac.uk/docs/qaa/quality-code/qualifications-frameworks.pdf

University Vision
https://www.sheffield.ac.uk/vision

23. Additional information

The high admissions requirement reflects our desire to attract only the best students, who will benefit the most from our top-rated research and our good quality teaching. From our existing MSc, a significant number of MSc graduates remain with us to subsequently study for PhDs.

This specification represents a concise statement about the main features of the programme and should be considered alongside other sources of information provided by the teaching department(s) and the University. In addition to programme specific information, further information about studying at The University of Sheffield can be accessed via our Student Services web site at http://www.shef.ac.uk/ssid.