Programme Title: BSc(Eng) Telecommunications Engineering with Management

Programme Specification (UG)

Awarding body / institution:	QMUL and Beijing University of Posts and Telecoms (BUPT)
Teaching institution:	QMUL and BUPT
Name of award and field of study:	BSc(Eng) Telecommunications Engineering with Management
Name of interim award(s):	
Duration of study / period of registration:	4 years
QMUL programme code / UCAS code(s):	H6N2
QAA Benchmark Group:	Engineering, but benchmarks subsumed by UKSPEC
FHEQ Level of Award :	Level 6
Programme accredited by:	Institution of Engineering and Technology (IET)
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:

Beijing University of Posts and Telecommunications (BUPT)

Programme outline

This Telecommunications Engineering with Management program offers a comprehensive foundation in core communication technologies, underpinned by advanced mathematics and physics. It covers all theoretical aspects across every layer—from physical to application, with particular emphasis on digital and embedded system design, microwave and millimetre-wave communication, and modern wireless technologies including satellites and 5G communications. These components serve as the foundation for an "anyone, anytime, anywhere" communication model, aligning with BUPT's core strength and mission in telecommunications.

The programme also integrates essential management skills, providing engineers with critical business knowledge needed for leadership roles in telecommunications and technology-driven industries worldwide. Research-informed teaching is included to engage students with emerging and future technologies in telecommunications. Accredited by the IET and aligned with QAA recommendations, the program equips students with essential skills and insights to excel in global technology sectors.

Aims of the programme

The program aims to equip graduates with:

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- a solid foundational knowledge of telecommunications, mathematics, and computer science;
- a comprehensive understanding of network design, signal processing, and digital and embedded systems;
- expertise in the theory, methods, and techniques for assessing and evaluating communication networks;
- a thorough understanding of advanced communication theories and their applications in modern telecommunications technologies.

Graduates of this program will have plenty of career opportunities in telecommunications and related business and management sectors. The program uniquely combines the strengths of both QMUL and BUPT: combining BUPT's robust foundation in engineering and science with QMUL's emphasis on analytical, communication, and entrepreneurial skills, complemented by practical laboratory experience.

What will you be expected to achieve?

The programme offers students opportunities to develop and demonstrate knowledge, understanding, and attributes in the following areas:
• ability to recall factual knowledge and the ability to apply it in familiar and unfamiliar situations;
• proficiency in utilising scientific, mathematical, and software tools in familiar and unfamiliar situations;
• competence in using Information Technology as a primary tool across all aspects of telecommunications and management;
• ability to comprehend practical challanges related to real-world systems, whether hardware or software;
• ability to identify gaps in existing knowledge and effectively search for relevant scientific, mathematical, and software tools to address those gaps;
• capacity to collaborate effectively as part of a team;
• ability to manage time efficiently to meet deadlines and objectives;
• ability to appreciate the financial context in which industry decisions are made;
• ability to reflect on the role of engineering within society and its broader implications.

and develops the following skills:
• the perceptive skills needed to understand information presented through technical circuit diagrams, flow charts, and high-level programming languages;
• the practical skills needed in implementing hardware or software solutions and effectively utilizing laboratory test equipment;
• the analytical skills needed to verify the correct operation of hardware or software systems, as well as identifying and diagnosing faults;
• the design skills needed to synthesize a design (in hardware and/or software) from specifications, select the best option from multiple alternatives, implement the design, and evaluate it against the original specifications;
• Strong written and oral communication skills necessary for effectively presenting information, particularly in written formats;
• the critical reasoning skills needed to assess and appraise various topics within the field.

Context-based aims and objectives:
• to be able to explain the mathematical principles that underpin the telecommunications engineering discipline, including digital circuit design, electromagnetic theory, and communication systems;
• to be able to explain scientific principles such as modulation and de-modulation principles within communication systems;
• to be able to identify and apply key engineering principles (e.g. from the information theory) to the analysis of important telecommunication processes (digital designs, modulation, de-modulation, data transmission, etc.);
• to be able to analyse the advantages and limitations of various principles for analogue and digital system designs and radio propagation channel effects on the received signal quality;
• to be able to effectively apply quantitative methods and computer software for solving telecommunications engineering problems, such as signal processing.
• to be able to demonstrate the use of creativity to design solutions for practical business technology problems, and for the creation of telecom system design in response to a set task;
• to be able to identify security issues and legal requirements in the practice of telecommunication engineering activities;
• to be able to discuss about the importance of ethical conduct in telecommunications engineering, including current standards for data protection and copyright compliance;
• to be able to analyse and evaluate codes of practice and industry standards within telecommunications.

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> **Please note that the following information is only applicable to students who commenced their Level 4 studies in 2017/18, or 2018/19**
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> In each year of undergraduate study, students are required to study modules to the value of at least 10 credits, which align to one or more of the following themes:
>
> - networking
> - multi- and inter-disciplinarity
> - international perspectives
> - enterprising perspectives.
>
> These modules will be identified through the Module Directory, and / or by your School or Institute as your studies progress.

Academic Content:	
A1	Apply knowledge of mathematics, statistics, natural science and engineering principles to the solution of complex problems. Some of the knowledge will be at the forefront of the particular subject of study. This LO is covered in several modules in years 1 & 2 to provide a solid foundation. Further year 3 and 4 modules, including telecommunications specific modules, also cover this LO to reinforce understanding and to appreciate the application of scientific principles.
A2	Analyse complex problems to reach substantiated conclusions using first principles of mathematics, statistics, natural science and engineering principles. This LO is covered in many modules across all years of study to understand the fundamentals such as mathematics and physics with particular emphasis being given in years 1 and 2. This LO ensures that students are able to explain the mathematical principles underpinning the telecommunication engineering discipline, such as Maxwell's equations, linear algebra, Fourier and digital cosine transforms, etc.
A3	Select and apply appropriate computational and analytical techniques to model complex problems, recognising the limitations of the techniques employed. This LO is covered in several modules with particular emphasis being given in years 3 and 4, including many telecoms specific modules like Digital Systems Design, Embedded System Design, and Modern Wireless Technologies. Students will be able to identify and apply key engineering principles (e.g. from the information theory) to the analysis of important telecoms design and application processes.
A4	Select and evaluate technical literature and other sources of information to address complex problems. This LO is covered in modules like AI Foundations and Applications, Machine Learning, Digital Circuit Design, etc.
A5	Adopt a holistic and proportionate approach to the mitigation of security risks. This LO is covered in Internet Protocols and Networks, and Microwave, Millimeterwave and Optical Transmission module.
A6	Use practical laboratory and workshop skills to investigate complex problems. This LO is covered in modules like Physics, Digital Circuit Design, Digital Systems Design, and Embedded System Design, and Modern Wireless Technologies. Students will practice and apply their learning in the laboratory environment to solve telecommunications engineering problems.
A7	Select and apply appropriate materials, equipment, engineering technologies and processes, recognising their limitations. This LO is covered in modules like Digital Circuit Design, AI Foundations and Applications, Embedded System Design, and Microwave, Millimeterwave and Optical Transmission.

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Disciplinary Skills - able to:	
B 1	Design solutions for complex problems that meet a combination of societal, user, business and customer needs as appropriate. Students will be able to identify and discuss user needs in the creation of telecommunications engineering content. This will also involve considering some issues like health and safety, cultural environment, etc. This LO is covered in modules like Principles of Telecommunication Systems, Digital Systems Design, and Innovation and Technology for Engineering.
B 2	Apply an integrated or systems approach to the solution of complex problems. This LO is covered in many modules across all years of study to provide concepts of systems and components performance and reinforce understanding through the use of analytical methods and modelling techniques in telecommunication systems. Modules like Object-Oriented Programming, Software Engineering, and Internet Protocols and Networks cover this LO.
B 3	Evaluate the environmental and societal impact of solutions to complex problems and minimise adverse impacts. Students will be able to analyse and appraise the requirements and constraints of a range of problems related to telecoms content and systems creation, and deployment. This LO is covered in modules like Innovation and Technology for Engineering, and Project.
B 4	Identify and analyse ethical concerns and make reasoned ethical choices informed by professional codes of conduct. This LO is covered in modules like Electric and Magnetic Fields, Machine Learning, and Embedded System Design.
B 5	Use a risk management process to identify, evaluate and mitigate risks (the effects of uncertainty) associated with a particular project or activity. This LO is covered in modules like Electric and Magnetic Fields, Enterprise Management, Innovation and Technology for Engineering, and Project.
B 6	Discuss the role of quality management systems and continuous improvement in the context of complex problems. This LO is covered in modules like Computer Fundamentals and Programming, Software Engineering, Innovation and Technology for Engineering.
B 7	Apply knowledge of engineering management principles, commercial context, project and change management, and relevant legal matters including intellectual property rights. This LO is covered in modules like Project, Innovation and Technology for Engineering and Business Technology Strategy, where students come across many management analytic tools which they can apply for decision making, project and operations management to achieve engineering objectives.

Attributes:	
C 1	Adopt an inclusive approach to engineering practice and recognise the responsibilities, benefits and importance of supporting equality, diversity and inclusion. This LO is covered in Machine Learning, and Business Technology Strategy.
C 2	Function effectively as an individual, and as a member or leader of a team. This learning outcome is covered in modules like Communication Skills, New Horizons English, Personal Development Plan & Entrepreneurial Skills, Enterprise Management, Enterprise Management, and Object-Oriented Programming.
C 3	Communicate effectively on complex engineering matters with technical and non-technical audiences. This LO is covered in modules like Communication Skills, Computer Fundamentals and Programming, Personal Development Plan & Entrepreneurial Skills, and Project, where students are expected to demonstrate their design or project findings to technical and non-technical audiences.
C 4	Plan and record self-learning and development as the foundation for lifelong learning/CPD. This LO is covered in modules like Personal Development Plan & Entrepreneurial Skills, and Project.

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How will you learn?

All taught courses involve lectures, problem-solving coursework, laboratory work, case study and independent study. 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. Laboratory works provide students with the guidance and help while solving a problem using a wide range of tools and techniques. This allows students to learn-by-doing in order to complement the lectures. QM Graduate Attributes are available for all JP/JEI students to identify students' attributes and develop students' knowledge, skills and behaviour that employers value.

How will you be assessed?

The assessment of the taught course units takes place through written examination papers and continuous assessment, in line with IET accreditation standard practice. Continuous assessment include practical coursework, group based projects and in-class tests.

The final year project is examined on the basis of a written report, a formal viva and project management performance throughout the project period. In addition to the final year project, various other modules include project and team-work.

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.

Most modules are shown with a value of 15 credits. This is to simplify the procedure to fit the QM system. EBx modules are normally 44 contact hours instead of 33 so should count for more than 15 credits; BBx modules use Chinese credits that do not map exactly to QM credits. CBx modules are co-delivered by QM and BUPT. Personal Development Plan & Entrepreneurial Skills is marked as a Core module with no credits as it forms part of Engineering Environment which is a mix of QM and BUPT modules. Engineering Environment is worth 15 credits and counts 5% towards the award of Honours.

In addition, there are more modules than in a degree in London in order to satisfy Chinese requirements - the module load is not symmetrical across semesters as the technical modules are balanced with the Chinese compulsory modules not shown.
All modules are taught in English and every module must be passed for a degree to be awarded (Chinese regulations) - so are all shown as the core.

The programme has two parts: technical content and compulsory courses. The degree is awarded on the basis of the technical content, but the compulsory part must be passed to get a degree to comply with Chinese MoE requirements.
Only modules shown on the QM transcript counting towards the award of Honours are included; Chinese compulsory courses are not shown in detail, nor are short summer semester modules, but these must all be passed for the award of the degree so a pass/fail module is included to allow that to be handled at QM.

Academic Year of Study   FT - Year 1

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Personal Development Plan & Entrepreneurial Skills 1	EBC3002	0	3	Core	1	Semesters 1 & 2

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Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
New Horizons English 1	BBC4031	15	4	Core	1	Semester 1
Advanced Mathematics 1	BBC4911	15	4	Core	1	Semester 1
Linear Algebra	BBC4913	15	4	Core	1	Semester 1
Computer Fundamentals and Programming	BBC3502	15	3	Core	1	Semester 1
New Horizons English 2	BBC4032	15	4	Core	1	Semester 2
Introduction to Electronic Systems	BBC4102	15	4	Core	1	Semester 2
Advanced Mathematics 2	BBC4921	15	4	Core	1	Semester 2
Physics D	BBC4923	15	4	Core	1	Semester 2

Academic Year of Study FT - Year 2

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Personal Development Plan & Entrepreneurial Skills 2	EBC4002	0	4	Core	2	Semesters 1 & 2
Engineering Mathematics 2	BBC4111	15	4	Core	2	Semester 1
AI Foundations and Applications	EBU4213	15	4	Core	2	Semester 1
Signals and Systems Theory	BBC4374	15	4	Core	2	Semester 1
Enterprise Management	EBU5402	15	5	Core	2	Semester 1
Data Structures	BBC4108	15	4	Core	2	Semester 1
Digital Circuit Design	EBU4202	15	4	Core	2	Semester 2

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Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Object-Oriented Programming	EBU4211	15	4	Core	2	Semester 2
Probability Theory and Stochastic Processes	BBC4941	15	4	Core	2	Semester 2
Digital Signal Processing	EBU5376	15	5	Core	2	Semester 2
Communication Skills	BBC4104	15	4	Core	2	Semester 2

Academic Year of Study   FT - Year 3

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Personal Development Plan & Entrepreneurial Skills 3	EBC5002	0	5	Core	3	Semesters 1 & 2
Principles of Telecommunication Systems	BBC6302	15	6	Core	3	Semester 1
Embedded System Design	EBU6470	15	6	Core	3	Semester 1
Machine Learning	CBU5201	15	5	Core	3	Semester 1
Electric and Magnetic Fields	BBC5210	15	5	Core	3	Semester 1
Internet Protocols and Networks	EBU5213	15	5	Core	3	Semester 2
Software Engineering	EBU5314	15	5	Core	3	Semester 2
Innovation and Technology for Engineering	EBU5610	15	5	Core	3	Semester 2
Digital Systems Design	EBU6335	15	6	Core	3	Semester 2
Business Technology Strategy	BBC6031	15	6	Core	3	Semester 2

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Academic Year of Study   FT - Year 4

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Chinese Compulsory Topics	BBF6000	0	6	Core	4	Semester 1
Engineering Environment (Telecom)	EBC6010	15	6	Core	4	Semester 1
Modern Wireless Technologies	EBU6411	15	6	Core	4	Semester 1
Microwave, Millimeterwave and Optical Transmission	EBU6366	15	6	Core	4	Semester 1
Project	BBC6521	30	6	Core	4	Semesters 1 & 2

What are the entry requirements?

Pass the minimum entry requirements for BUPT. As a national key university, all entrants to BUPT must score above the top line in the Chinese national entrance examinations. In addition, BUPT's requirement is much higher than that and the level is approximately equivalent to the top 2-3% of the population in China of that age group.

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

The JP/JEI operates an Academic Committee which is responsible under the contract and MoE licence for all matters relating to the delivery of taught programmes at school level including monitoring the application of relevant QM policies. All proposals for module and programme amendments are also reviewed by the TNE Education Committee before submission to Taught Programmes Board.

The JP/JEI conducts an Annual Programme Review of the taught undergraduate provision. The process is normally organised with the Director and co-Director of JP/JEI who submit to the JP/JEI Academic Committee and JP/JEI Steering Committee. The review report will also feed to the School's Annual Programme Review process. Students' views are considered in this process through analysis of the module evaluations and comments on SSLC meetings and student focus group meetings. In addition BUPT conducts a biannual review of all programmes.

The Staff-Student Liaison Committee (SSLC) provides a formal means of communication and discussion between QM and BUPT and JP/JEI students. The committee consists of student representatives from each year in JP/JEI together with appropriate representation from staff within the QM and BUPT. It is designed to respond to the needs of students, as well as act as a forum for discussing programme and module developments. SSCLs meet once a semester.

Two student focus group meetings are held each semester to collect and discuss students' concerns, problems, and suggestions. QM staff including JP/JEI Director, Director of Education, Director of Assessment, Directors of Programmes, Lecturers, Student Support Officer, Administrators attend the meeting and make sure each question raised by students is answered by the specific responsible department or staff. Regarding students' suggestions, if they are not fully discussed during the meeting, the relevant department/staff will explore further and respond back to students

Minutes from SSLC and focus groups are circulated to all staff and students by the JP/JEI Student Support Officer.

What academic support is available?

Induction and pastoral support is provided through BUPT. Students are organised into "classes" of 30 as in the usual Chinese model. Each class has a tutor who provides pastoral support.

Feedback mechanisms from students are: (i) directly to the lecturers (ii) to their tutor (as described above), (iii) through an SSLC that meets once a semester and (iv) via Student Focus Group meetings held twice per semester. Because of the large numbers of students, a separate SSLC is held for each cohort.

For every module, whether taught by QM or BUPT, a formal office hour is provided during each teaching week. In addition QM staff give advice and supervision remotely using a variety of techniques, mainly using MS Teams.

From 2024/25, JP/JEI launched a new Fresher to Thriver (F2T) Programme. It is designed to support first-year students in their smooth transition to university life. It takes a student-centered approach, integrating various elements to enrich the student experience. The primary focus is on providing tailored support that meets the specific needs of students.

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

Modules will be delivered to BUPT JP/JEI students at BUPT campuses. The learning outcomes for the module are clearly stated in the module descriptor. The teaching is normally delivered in person at BUPT campus. The lectures are not recorded but all electronic materials will be available on QMPlus, including the reading list. Tools such as SensusAccess will be used if necessary.

A specific disabled students support that complies with Chinese law is applied to this programme since the students are physically in China.

Programme-specific rules and facts

The Special Regulations for the JP/JEI apply to this programme.

Links with employers, placement opportunities and transferable skills

There are two Industrial Advisory Boards (IABs) ; One based in the UK and another one based in China. The IABs meet every year either in person, online or via correspondence. The meeting minutes of the two boards are available to each board.

We also have a dedicated Industrial Liaison Manager is part of the JP/JEI team to develop links with industry. There is a compulsory internship for all year 3 students to ZTE telecom centre. All JP/JEI students spend 2 weeks at a ZTE telecom training centre where they have access to a wide range of equipment including a variety of modern base stations, soft switches and a linking Synchronous Digital Hierarchy (SDH) networks. The Queen Mary-BUPT Summer School is available mainly for second-year (Year 2) students taking place in London every year during the summer term. This optional two- to three-week programme features strong industry connections with Amazon Web Services (AWS). The programme is developed in collaboration between QMUL academic staff and input from AWS; the programme is led and taught by AWS accredited academic staff. Students in this Summer School will have access to AWS resources and training necessary for certification, which will be recorded on their QMUL transcripts, enhancing their employability and career prospects.

There are various other opportunities for students to enhance transferable skills such as the Year-2 Design and Build project, Design and Build Winter Hack (in London), JP/JEI Innovation Projects and competitions organised by BUPT in a variety of subjects.

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In addition, there will be frequent invited industry lectures to year 3and 4 students, primarily organised the JP/JEI Student Innovation Centre.

To date the JP/JEI has a record of nearly 100% employment or PG education. In fact, most JP/JEI graduates (>70%) go on to PG education.

Programme Specification Approval

Person completing Programme Specification:

Md Hasanuzzaman Sagor

Person responsible for management of programme:

Michael Chai

Date Programme Specification produced / amended by School / Institute Education Committee:

Date Programme Specification approved by Taught Programmes Board:

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