### 1. Programme Title(s):

MSc in Information and Communications Engineering with Industry

### 2. Awarding body or institution:

University of Leicester

### 3. a) Mode of study

Full-time:

The taught modules would all be taken in the first two semesters.  This is followed by the industrial placement, which is between 3 and 12 months long, and would be taken following the end of the first year May/June exam period.  This is followed by the in-house project, taking 10 weeks.

#### b) Type of study

The taught modules and project are campus based.  The Industrial placement is off campus, on the site of the company concerned.

### 4. Registration periods:

The normal period of registration is 24 months. The maximum period of registration is 33 months.

### 5. Typical entry requirements:

**Academic**:

Candidates should normally have at least a good second class honours degree in a relevant subject from a British university; or a qualification recognized by the University as equivalent. Applicants for the "with Industry" variant should have or expect to gain at least a very good second class honours BSc degree or qualification of equivalent standard recognised by the University in a relevant subject.

**English language**
Generally, a score of 6.0 in IELTS or an equivalent is required, but if candidates have been instructed in their u/g courses in English in certain countries for a period of at least two years, this is deemed adequate.  Courses at the University's English Teaching Unit are offered to candidates who fail this requirement.  The course must be complete before the MSc can begin.

### 6. Accreditation of Prior Learning:

None

### 7. Programme aims:

The programme aims to introduce and develop the techniques and knowledge relevant to the design of modern integrated communication and information systems. The course covers the design of embedded systems, digital signal processing techniques, methods of digital communication, together with the study of a variety of radio systems. The programme also aims to make student aware of the role of a communications engineer or IT engineer in industry.

Students should be able to:

• Demonstrate specific knowledge and understanding of advanced topics in information processing and communications and to be able to apply this knowledge in the design and simulation of real-world systems;
• Describe their role in their company and the company's role in relation to customers and the industrial sector in which it sits;

• Continue to develop their professional engineering education through CPD programmes of related areas;
• Work effectively as part of both multi- and single-disciplinary teams;
• Demonstrate clear communication skills and be competent users of IT communication techniques (e.g. oral presentation and report writing);
• Pursue research (MSc graduates only);

**8. Reference points used to inform the programme specification:**

- [The Frameworks for Higher Education Qualifications of UK Degree-Awarding Bodies (Qualifications Frameworks)](#)
- QAA [Master's Degree Characteristics](#)
- QAA Benchmarking Statement [Engineering (2015)](#)
- PDR report (May 2008)
- [University Learning Strategy](#)
- University Employability Strategy
- Graduate Survey (2014)
- First Destination Survey
- External Examiner's Reports

## 9. Programme Outcomes:

| Intended Learning Outcomes | Teaching and Learning Methods | How Demonstrated? |
|---|---|---|
| **(a) Subject and Professional skills** | | |
| **Knowledge** | | |
| Core knowledge of radio systems, digital communications, digital signal processing and embedded systems<br><br>Practical experience of the application of Engineering knowledge to real world scenarios, through the industrial placement. | Lectures, Specified reading, Laboratory classes, Design exercises, Tutorials | Module examinations, Laboratory and design exercise reports, oral presentations |
| **Concepts** | | |
| Design of modern radio, digital signal processing, and embedded systems | Lectures, Practical classes, Tutorials | Module examinations, Laboratory and design exercise reports, oral presentations |
| **Techniques** | | |
| Practical demonstration of experimental methods, Competent use of a variety of engineering design tools.<br><br>Practical experience of the application of Engineering techniques to real world scenarios, through the industrial placement. | Laboratory classes, Individual Project supervision, Practical demonstrations, Lectures | Laboratory and design exercise reports, Individual Project progress and report, Module examinations |
| **Critical analysis** | | |
| Critical appraisal of results. Critical review of literature | Laboratory, design exercise and project supervision | Laboratory and design exercise reports, Project report |
| **Presentation** | | |
| Presentation of scientific results, Participation in scientific discussion | Tutorials, Module seminars, Laboratory classes, Group project supervision, Project | Module presentations, Individual project report |
| **Intended Learning Outcomes** | **Teaching and Learning Methods** | **How Demonstrated?** |
| **Appraisal of evidence** | | |
| Experimental methods, Project design | Lectures, Laboratory classes, Project supervision | Written examinations, Laboratory and design exercise reports, Project reports |
| **(b) Transferable skills** | | |
| **Research skills** | | |
| Literature review, Experimental design, Laboratory skills, Data analysis | Tutorials, lectures, Laboratory classes, Project supervision meetings | Design project, oral presentations, Coursework, Individual project report |
| **Communication skills** | | |
| Report writing, Scientific communication, communication with peers, non-technical managers, technicians etc.<br><br>Learning how to work and communicate in a modern industrial environment | Industrial experience individual presentations | Laboratory and design reports, Individual project report |

| Data presentation | | |
|---|---|---|
| Use of IT and statistics to show general trends in data

Practical experience of the application of Engineering software within modern industry | Project supervision meetings, supervision in laboratory classes | Laboratory reports, Individual project report |
| **Information technology** | | |
| Competent use of a variety of engineering design tools. Able to write code for Matlab and embedded applications | Lectures, Laboratory classes, Project supervision | PC-based examination (EG7012), laboratory reports, Individual project report |
| **Problem solving** | | |
| Recognition, diagnosis and solution of engineering issues | Making functioning models and explaining their output in of a variety of engineering design tools. | laboratory reports, design report, Individual project report |
| **Working relationships** | | |
| Project management, Working in a company | Industry-based experience, laboratory classes | Project report, Assessment of supervised project work by mentor |
| **Managing learning** | | |
| Time management, Organization skills, study skills | Tutorials, Library and IT skills sessions, Directed reading for design project | Laboratory work design project and individual project |
| **Career management** | | |
| Knowledge of how their work fits into company and into industry sector, appreciation of the knowledge and skills required by an engineer in a commercial industrial setting | Talk from Student Support in induction, and reminder in tutorial, Industry-based experience, individual advice from project supervisor | Industry report |

10. **Special features:**
   (i) After completing the eight taught modules and May/June exams in the first year of the course, students will carry out between 3 and 12 months of paid full- time work in an industrial placement.   Students will be encouraged to undertake the maximum period of employment possible, to gain the full benefit of experience in industry.   Students satisfying the normal PGT criteria for passing taught modules, will aim to start their placement between June and September of the first year and finish it by the end of the May/June exam period of the second year.  Companies providing placement opportunities will be made aware of the possible need for students to return to campus briefly in September of the first year for resit exams.  On their return from placements, students will carry out an in-house project in the Department, as per the normal non-Industry MSc. The project will be supervised and assessed within the Department. The project title will be decided, in conjunction with the student, while she/he is on placement.
   (ii) During the placement, appropriate support will be provided by the Department as laid out in the Code of Practice on Student Placements published by the Quality Office.  An additional member of staff will be employed as an Industrial Placement Officer to arrange the placements and to contact the students each term, answer any concerns they may have and check that they are doing work appropriate for an MSc student and are receiving the necessary support and guidance. Each student will also be assigned to a named Mentor in the industrial placement.
   (iii) During their placement students will undertake a programme of training and practical experience which will be agreed by the placement company and the University, and will be specific to the particular placement.
   (iv) Students will be expected to keep a log-book recording their training and experience which is to be presented for approval to the sponsoring company and the University. After the placement, the student will present a report detailing their work, but also explaining how their skills fit into the team in which they worked, how this team serves the overall company, and

how the company fits into the industrial sector.  This report is the only assessment concerned with the industrial placement.  It will be assessed on a pass/fail basis and will have no credit weighting in the MSc.

(v) Students who do not satisfactorily complete their industrial placement will receive an ordinary MSc in the same subject area as the 'with Industry' MSc.

(vi) Any intellectual property generated during the placement will belong to the industrial partner. The salary paid by the industrial partner to the student will be a matter to be agreed between these two parties, although the departmental representative will make a recommendation. However, students will not be allowed to take unpaid placements.

(vii) This course has been accredited by IET and InstMC for 5 years from the 2014 intake.

## 11.  Indications of programme quality:

The 'with Industry' MSc relies on the industrial partner to provide work suitable for an MSc student. Although it will be the job of the Industrial Placement Officer to help students find suitable placements, no student will be guaranteed a placement, and the overall responsibility for securing one remains with the student.

It is intended that the Industrial Placement Officer build a database of suitable industrial partners, making them aware of the Department's requirements and the skills offered by our students. The role will also include helping students to prepare a CV and apply for placements, with the support of the Careers Service. The Industrial Placement Officer will be a suitably qualified person with some knowledge of engineering in an industrial setting, and will not be an existing staff member in the Engineering Department. There will therefore be no further stretching of current resources beyond the increased enrolment numbers expected from this, more attractive course, and the increased duties pertaining to the new PGT regulations.

Before any placement is confirmed, the Industrial Placement Officer in the Department of Engineering will have ensured that it is of a suitable level and area of expertise. To assess this, the Industrial Placement Officer will ask the industrial partner to fill in a short questionnaire. The industrial partner will be asked to provide:

a. An indication of the area of the company where the student will work.
b. An indication of the area of expertise that the student should have or will gain.
c. Whether the work is suitable only for a UK national, for and EU national or for an overseas student.
d. The resources available to the student. For example, design software, textbooks, laboratory equipment, product specimens, access to company facilities.
e. Identification of a suitable industrial mentor (i.e. a graduate with knowledge of the area and at least a couple of years of experience in the field).

This will be scrutinised by the Industrial Placement Officer to ensure that the level of work is suitable. In the unlikely case that an agreement on the placement cannot be reached between the industrial partner and Industrial Placement Officer, then the placement must be rejected by the latter.

During the second term, the placement tutor will list all available and suitable placements for each of the MSc disciplines and send the list to all students who are studying for an MSc with Industry in that discipline. The students will put themselves forward for as many placements on the list as they choose, providing contact details and a fixed-length (e.g. 200 words) summary of their skills/experience/career aims, which the placement tutor will send to the industrial partner, along with their first semester module marks. The industrial partner will then choose a placement student by whatever means they find appropriate. Rooms will be allocated within the University on a fixed date for the industrial partner to interview prospective students, but if the industrial partner instead chooses to conduct telephone interviews, interviews on their own premises, or simply choose from the students' written accounts of themselves, this will also be possible.

Industrial partners will then send the Industrial Placement Officer a ranked list of their choice of

student. The placement tutor will e-mail offers to the students who have been placed first on each list. Some student will, no doubt, get several choices and some none at this stage. They shall have a fixed period (e.g. one or two days) to take up the offer, after which it will be withdrawn and sent to the next student on the list.

Apart from the allocation process described above, it will also be possible for students to apply independently to companies/sites which are not included in the database maintained by the Industrial Placement Officer. In this case, there will be no fixed procedure, such as the 200-word summary. However, any placement obtained independently by a student will still be subject to scrutiny by the Industrial Placement Officer, as described above.

If a student ends up with no offers of employment at the end of this process, then they will be transferred on to the analogous 'without Industry' MSc. This will be made clear at the start of the MSc.

Once a student has accepted a placement offer, the industrial partner and student will be put in contact, and will arrange a start date and other details between themselves, but the placement tutor will be available to give advice. The student will be issued with a placement handbook to guide them. This will be adapted from the handbook currently given to undergraduate placement students and is to make them aware of the University's Code of Practice on Student Placements, concerning their responsibilities and those of the University and company.

Any student failing to secure a placement by these means by a fixed date (e.g. the end of the second semester) will be transferred to the analogous 'without industry' MSc. This will be made clear to all students before they take up their MSc and also written in the MSc guide.

Contact will be made with the student by the Industrial Placement Officer at least twice in the duration of the placement. Preferably one of these events will take the form of a visit to the company. However, if this is not possible, then the student could meet the placement tutor in the department or they could talk on the telephone.

If the placement is terminated before the agreed time, then the placement tutor will endeavour to discover the events that caused the termination and report to the MSc exam board. If the termination is due to the student's behaviour or negligence, then the Department reserves the right to withdraw the MSc with Industry, and award the student the analogous ordinary MSc. If the circumstances are outside the student's control, then the Industrial Placement Officer will endeavour to find an alternative placement. In this case, whether an alternative placement can be found or not, the student will be awarded an MSc with Industry.

The University's Code of Practice on Student Placements shall be adhered to.

## 12. Scheme of Assessment

This programme follows the same scheme as the non-industry-based MSc, namely the Senate Regulation 6for Taught Postgraduate Programmes.  120 credits are allocated to the taught modules, 60 to the project and none to the industrial placement. See
http://www2.le.ac.uk/offices/sas2/regulations/general-regulations-for-taught-programmes.

## 13. Progression points

See: Senate Regulation 6 governing taught postgraduate programmes
http://www2.le.ac.uk/offices/sas2/regulations/general-regulations-for-taught-programmes

In order to progress onto the industrial placement students must:  1) have passed  **at least one module at Merit level** and have **failed maximum one module** at the end of **Semester 1**; any student failing to satisfy this requirement at the end of Semester 1 will be removed from the MSc with

Industry programme, and revert back to the standard campus-based MSc; 2) have passed **at least two modules at Merit level** and have **failed maximum two modules** at the end of **Semester 2**; any student failing to satisfy this requirement at the end of Semester 2 will be removed from the MSc with Industry programme, and revert back to the standard campus-based MSc. In the event that the student is moved to the standard campus-based MSc, the company where the placement was to be held will be notified immediately. For overseas students, the UKBA will also be informed immediately. This may happen in June of the first year. Companies offering placements will be warned of this eventuality at the outset, and any contract of employment shall be made subject to satisfactory completion of the taught part of the MSc.

## 14. Rules relating to re-sits or re-submissions:

Re-assessment rules for taught postgraduate programmes apply. See: Senate Regulation 6 governing taught postgraduate programmes
http://www2.le.ac.uk/offices/sas2/regulations/general-regulations-for-taught-programmes

The written examinations in the taught elements of the programme can be resat. Generally, coursework cannot be resat. In practice all but the weakest students failing a module will be able to pass it by resitting the examination. In the case that a module has no components that can be resat, this must be stated explicitly in the module description given in the MSc handbook. The project would not be able to be resat. Before failing the project, the student would undergo a viva, in which the original mark given to the project could be raised to no more than the pass mark (50%). Any student failing the project would not receive an MSc, but may be considered for a Postgraduate Diploma or Postgraduate Certificate.

## 15. Additional information [e.g. timetable for admissions]

Admissions will only take place in October each year.

## 16. External Examiner

The details of the External Examiner(s) for this programme and the most recent External Examiners' reports can be found here.

## Appendix 1: Programme structure (programme regulations) All modules are compulsory

|  | Credits | Dates |
| --- | --- | --- |
| **YEAR 1** |  |  |
| Compulsory |  |  |
|  |  |  |
| Induction | 0 | Week 1 / Semester 1 |
| EG7012 MATLAB and CAD | 15 | Semester 1 |
| EG7013 Modelling and Classification of Data | 15 | Semester 1 |
| EG7014 High Reliability Embedded Systems | 15 | Semester 1 |
| EG7021 Radio Systems | 15 | Semester 1 |
| EG7016 Design of Discrete Systems | 15 | Semester 2 |
| EG7017 Real-Time Signal Processing | 15 | Semester 2 |
| EG7022 Digital Communications | 15 | Semester 2 |
| EG7023 Radio Communications | 15 | Semester 2 |
|  |  |  |
| **YEAR 2** |  |  |
| Industrial Placement | 0 | Semester 1&2* |
|  |  |  |
| EG7020 Individual Project | 60 | Semester 2/Summer |

\*'with Industry' programme includes an industrial placement of 3-12 months, following the end of the first year May/June exam period, with students returning to UoL to complete the project/dissertation after their placement.

**Appendix 2: Module Specifications**

See module specification database http://www.le.ac.uk/sas/courses/documentation