Master of Science in Low Power Systems Integration

including the
Certificate in Low Power Systems Integration

Programme Handbook
2005/2006

School of Computer Science
Faculty of Engineering and Physical Sciences, The University of Manchester
Disclaimer: The information contained in this handbook is correct at the time of your receiving it but the University, while retaining proper regard for the interests of students who have begun their programmes, reserves the right to alter the programmes or the timetable if the need arises.
The School of Computer Science is recognised in academia and industry for the excellent level of technical and research skills in areas of electronic system integration. This recognised expertise is now made available through the School's participation in the CEESI consortium, in which we deliver the Low Power System Integration programme. The strategic importance of system integration in the electronics industry is widely recognised.

This is the Handbook for the Master of Science in Low Power Systems Integration (LPSI), and also for the Post Graduate Certificate of Science in Low Power Systems Integration.
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1 Introduction

The MSc in Low Power System Integration will be managed within the existing framework of the Postgraduate training in the School of Computer Science. This particular programme is primarily aimed at students with industrial experience who wish to use the programme as a career development opportunity. It is expected that the students will be either part-time or industrially sponsored. It is expected that around 10 Part-Time students will be registered per annum. They will then join with other students registering through other university programmes that share the modules that make up the CEESI programme.

2 Programme Profile

2.1 MSc in Low Power System Integration

This programme is being provided by a consortium of Universities without parallel in the level of expertise and research innovation in the area of System Integration.

2.2 Aims of MSc in Low Power System Integration

1. produce the highest quality of computing professionals in the area of low power systems integration,
2. provide a vehicle for dissemination of leading edge knowledge and skills, focussing on the worldwide recognition of the research strengths within the School,
3. to attract the highest quality students from the UK and overseas into this area of computer science; offering the opportunity to focus on one specialisation.

2.3 Objectives of MSc in Low Power System Integration

Students will have developed:
1. a deeper knowledge extending well beyond undergraduate level, together with specialist skills in Low Power System Integration
2. an ability to plan and execute a substantial piece of independent research and/or development in low power integrated systems

3 General Information

3.1 Programme Staff

Programme Director
Alex Walker, Room 2.76, Tel: 275 6127, Email: alexw@cs.manchester.ac.uk

3.2 School and Postgraduate Staff

Head of School
Prof. Chris Taylor, Room 2.125, Tel: 275 6154, Email: chris.taylor@manchester.ac.uk

Head of Graduate School
Prof. Roger Hubbold, Room 2.96, Tel: 275 6158, Email: roger@cs.manchester.ac.uk

Student Support Office: Postgraduate
General email address: pgoffice@cs.manchester.ac.uk
Gill Lester (Postgraduate Administrator), Room 2.4, Tel: 275 6210, Email: gles@cs.manchester.ac.uk
Janet Boyd (Postgraduate Secretary), Room 2.3, Tel: 275 6238, Email: jboyd@cs.manchester.ac.uk
3.3 Contact Details

Student Support Office: Postgraduate
Room 2.3, Kilburn Building

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Manchester M13 9PL
United Kingdom

Tel: (+44) 161 275 6181
Fax: (+44) 161 275 6204
Email: pgoffice@cs.manchester.ac.uk

To visit the website of the School of Computer Science go to http://www.cs.manchester.ac.uk/.

The School of Computer Science is located in the Kilburn Building.

4 Entry Qualifications

The programme is directed at specialist students who have obtained a good honours Bachelors degree in either Computer Science/Electronic Engineering or a joint course with at least 50% Computer Science/Electronic Engineering content. The following options describe the expected background of students:

1. The Masters programme is open to students with first or good second class honours degrees in either Computer Science/Electronic Engineering or
2. a joint programme with at least 50% Computer Science/Electronic Engineering, or an overseas equivalent, or
3. an honours degree in another subject together with sufficient relevant industrial experience is also acceptable.
4. Applicants without a UK equivalent honours degree, but with sufficient relevant industrial and educational experience, will be considered for admission.

English Language Requirements. All students are required to be proficient in spoken and written English.

In order to be accepted on an MSc programme in the School of Computer Science applicants need to achieve an IELTS score of 6.5 (minimum) or TOEFL 600+ (paper-based) 250+ (computer-based) or Cambridge Proficiency Grade 'C' (minimum) before the programme start date.

In addition, overseas students who have attained the minimum IELTS score of 6.5, but less than 7.0, are required to attend the University's English classes during the MSc year of study.

The final decision on the standard of English remains with the Admissions Tutor and other very strong evidence of proficiency may be acceptable.

Experience shows that even those students who have passed the required language test find it difficult sometimes to adjust to operating in English entirely. We therefore strongly recommend that all such students take additional measures, such as attending English language courses (the Language Centre at the University provides English Language programmes - see the website at http://langcent.man.ac.uk), reading English literature, speaking and writing English wherever possible.
5 Quality of the Programme

The School of Computer Science has a long and successful history of research and teaching preparing students for leading roles as industrial scientists and engineers.

The programme will form part of a scheme sponsored by EPSRC Masters Training Programme under the title of - Continuing Education in Electronic System Integration (CEESI). This is a consortium, currently consisting of the following Partner Institutions: Bolton Institute, University of Bradford, University of Southampton, Institute for System Level Integration (Universities of Edinburgh, Glasgow, Heriot-Watt and Strathclyde), University of Surrey and Northumbria University.

The strategic importance of system integration in the electronic industry cannot be overrated, this programme is being provided by a consortium of Universities without parallel in the level of expertise and research innovation in this area.

Individual Students

All part-time students in all MSc programmes in Computer Science have a study plan that is discussed with the Programme Director at the start of their programme, this will extend to this programme. This original study plan is then revisited each year of student registration and any necessary adjustments agreed between the student and Director.

6 Programme Structure

6.1 The Academic Year

The part-time Low Power System Integration programme consists of taught modules running over an annual timetable, the academic year runs from September to August and consortium members run course units throughout the year. The general pattern is that part-time students will take two or three modules in each academic year until they have amassed the required 90 credits that allows them to be considered for a research project place to complete the MSc.

Each masters student will also be involved in an Research project, this takes place on completion of the taught course units and generally will take one academic year to complete the research and the scientific solution resulting in an academic dissertation. This project is to be completed and a dissertation submitted within four years of starting the part-time programme.

6.2 The Structure of the Manchester Course Units

The course units are being delivered through a VLE, this provides the student with on-line communications with peers and tutoring staff, through a bulletin board system. Workpackages and some resources are also delivered through the VLE. The teaching material is interactive using quizzes, step through animations and examples. Practical exercises are provided in the work packages, some are then submitted for assessment. Weekly on-line tutorials are provided using IRC technology. At the end of the guided learning the student are set project work, for some course units this may be individual projects and in other circumstances group work is more appropriate, both can be supported through the VLE. It is also intended that some video lectures will be provided with these course units.

6.3 Research Project

For the research component, research projects are

1. are designed by a member of academic staff
2. are designed by the company employing or sponsoring the student
3. designed by the student

In all cases the project will enable the student to develop Research and Development skills and to gain practical experience of applying the techniques covered in the taught part of the programme to realistic situations. Projects relate to current research and development areas, and are undertaken
within research groups in the School or in an industrial setting. Keen students may propose their own projects so long as the project is suitable for the award of an MSc and that it can be accommodated by the School. Research projects last approximately nine to twelve months part-time and culminate in the submission of a dissertation.

The research project is an important part of the programme, equal with the taught components and worth 90 credits as course unit CS690. It not only gives students an introduction to scientific research at the highest level, but is an opportunity to gain a deep understanding of the specialist area of Low Power System Integration.

7 Administration and Application Details

7.1 Sponsorship and Funding

The levels of funding available for students changes from year to year, students should refer to the CEESI website to check for any funding options available.

8 Application Process

Each student from whatever background, having been deemed to possess the appropriate academic credentials, will be considered on individual merit. Occasionally an applicant may be invited to an interview with the Programme Director.

9 Syllabus and Modules

The MSc in Low Power System Integration at the University of Manchester is part of the CEESI Consortium of programmes. Students are able to select from the wide variety of course units offered by the partners in the CEESI consortium. Information about those course units can be found at the CEESI Website.

For information about construction of a degree from Manchester see below.

9.1 Degree Structure

Each Student registered for the MSc in Low Power System Integration must complete a total of 90 credits of course units and 90 credits for a research project.

Students registered for the Manchester degree will be required to include two core course units (30 credits) delivered by The University of Manchester, School of Computer Science, these are CS804 and CS821. A detailed syllabus for each of these course units can be found below.

The remaining taught course unit credits (60 credits) can be accumulated by completing course units from other consortium partners see Module Overview.

Once the taught course units have been successfully completed, the student will be able to progress to the research project. For the Manchester degree this will be supervised by a member of academic staff from the School of Computer Science.

9.2 Core Course Units

1. CS804 Low Power System Design (15 Credits)

2. CS821 Self Timed Logic (15 Credits)

The remaining 60 credits would normally be selected from any of the course units offered by the CEESI Consortium Students should discuss course unit selection with the Manchester programme Director.

The MSc syllabus is moderated by the Postgraduate Syllabus Overview Committee which includes industrial participants as well as staff from the university.

1http://www.ceesi.ac.uk/
2http://www.ceesi.ac.uk/
10 Core Course Units

10.1 CS804 Low-Power System Design

Aims of Course Unit

Computing is becoming increasingly mobile, both in recognisable forms such as lap-top computers and in forms where the computing function is concealed such as digital mobile telephones. Mobile computing increases significantly the importance of minimising the power consumed by the system as excessive consumption directly compromises battery life.

Learning Outcomes

A student completing this course unit should:

1. understand the principles of the ARM and Thumb instruction sets and their practical use.
2. understand the principles of low-power RISC processor design.
3. have an insight into the design of memory hierarchies for power-efficient systems, and an ability to apply a systematic methodology to memory hierarchy design.
4. have an overview of the system-level issues involved in designing a particular power-sensitive application (a GSM digital mobile phone handset).
5. have a preliminary view of the potential role of asynchronous design in future low-power systems.
6. an ability to write clear and concise reports on matters relating to low-power design.

Syllabus

1. ARM assembly language programming; ARM software development tools; the ARM programmers' model; the ARM instruction set; writing simple programs; example programs.
2. Support for high-level languages: ARM data types; memory organization; high-level language support.
3. The ARM instruction set in detail: Operating modes and exceptions; conditional execution; instruction types and functions.
4. The Thumb instruction set: The Thumb programmers' model; Thumb instructions; Thumb implementation; Thumb applications; example Thumb programs.
5. ARM integer cores: ARM organization; the ARM 3- and 5-stage pipelines; the ARM7TDMI core; the ARM9TDMI core.
6. Architectural extensions: The ARM coprocessor interface; floating-point support; DSP support.
7. Memory hierarchy: On-chip RAM; caches; memory management; operating systems; the ARM system control coprocessor; the ARM MMU architecture; the ARM memory protection unit.
8. ARM CPUs: The ARM700 series; the ARM810; StrongARM; the ARM800 series; the ARM1020.
9. System-on-Chip development: The ARMulator; JTAG test access port; embedded core debug; embedded trace; the AMBA on-chip bus; hardware prototyping; examples of embedded system chips.
10. Case study - a GSM handset: The GSM digital cellular network; handset organisation; hardware/software trade-offs; power minimisation.
11. Asynchronous design for low power: Motivation for asynchronous design; asynchronous design styles; micropipelines.
12. The AMULET microprocessors: AMULET1 organisation; AMULET1 characteristics; lessons from AMULET1; the AMULET2e asynchronous embedded controller; the AMULET3H SoC subsystem; the DRACO chip.
Teaching and learning methods:

Fully On-Line Distance Learning with on-line support On-line tutorials Student collaboration using moderated Bulletin Boards on-line Group discussion using on-line facilities Work Package documents supplied on-line Course Material Course Notes and Interactive CBT Package supplied on-line On-line Examination Course Book Paper Based Lectures delivered on DVD

Assessment weighting: Learning outcomes (1), (2), (4) and (5) are assessed by examination, learning outcome (3) by examination and completion of laboratory exercises learning outcome (6) by the project work

Assignments (typical): Assignment 1 is concerned with the analysis of cache memory behaviour. Assignment 2 is concerned with the analysis and optimization of a representative low power application program.

Core learning materials (including text, web resources, CD Roms, videos etc)

2. Full course notes, including the laboratory manual, will be supplied as work packages in Text and/or PDF format
3. The ARM CBT (computer based training package) will be supplied on CD
4. ARM Developer Suite (ADS) version 1.0.1 is required for the post-course work. A free demonstration version (with a time-out) will be supplied on loan from the School. Both tools require access to a PC running windows.
5. Conference and Journal Papers: There are two international conferences each year dedicated to low power design (ISLPED, PATMOS), sessions at other conferences, several textbooks. However, the course is based closely on 1. above, and this text is sufficient.
10.2 CS821 - Self Timed Logic

Aims of Course Unit

This course has been developed to give an understanding of the approaches required so that the designer is able to establish when it may be advantageous to use asynchronous techniques to solve a design problem.

Learning Outcomes

A student completing this course unit should:
1. demonstrate an awareness of the potential advantages of asynchronous systems
2. understand asynchronous data and control protocols
3. be aware of asynchronous synthesis tools
4. show familiarity with the latest results from research into asynchronous systems
5. demonstrate an ability to write clear and concise reports on matters relating to asynchronous design

Syllabus

1. Introduction Why consider asynchronous circuits, aims and background, clocking versus handshaking
2. Fundamentals: Handshake protocols, the Muller pipeline, delay models
3. Static data-flow structures: Pipelines and rings, building blocks, example GCD
4. Performance: A qualitative view of performance, quantifying performance, dependency graph analysis
5. Handshake circuit implementations: The latch, Fork, join and merge, function blocks, mutual exclusion, arbitration and metastability
6. Speed-independent control circuits: Signal transition graphs, synthesis procedure. Petrify, design examples using Petrify
7. VLSI programming: Handshake circuits, an asynchronous HDL - Balsa. using Balsa to describe circuits (buffers, stacks, recursive and parameterised structures).
8. An introduction to Amulet processors: Processor implementation techniques, memory organization, asynchronous on-chip interconnect

Teaching and learning methods

- Fully On-Line Distance Learning with on-line support
- On-line tutorials
- Student collaboration using moderated Bulletin Boards on-line
- Group discussion using on-line facilities
- Work Package documents supplied on-line
- Course Material Course Notes and Interactive CBT Package supplied on-line
- On-line Examination
- Full course notes, including the laboratory manual, will be supplied as work packages in Text and/or PDF format.
- Asynchronous Design (interactive computer based training package) will be supplied on CD.

Conference and Journal Papers

The recommended course text contains the primary reference material for this module. The Annual AsyncXX conference series provides extensive material for those wishing to read around the subject.
10.3 Other Course Units

Modules from other partners are delivered in many different formats and students should enquire directly to the course unit provider.

If reading this on the web, you may consult the CEESI information\(^3\) for details of the schedule of Course Units look under Module Details and Dates.

11 Assessment Regulations and Procedures

11.1 Assessment

The assessment of the MSc in Low Power System Integration consists of two parts (1) an assessment of the course units undertaken, and (2) an assessment of the research project. In order to be allowed to complete the research project, students must pass the taught part of the programme. The award of an MSc is then made entirely on the basis of the output from the research project.

11.2 Low Power System Integration Course Units

1. Each student will be assessed on 90 credits’ worth of coursework and examination questions. Coursework is likely to include practical laboratory exercises (individually or in groups), written essays, and/or other forms appropriate to each individual course unit. The regulations for passing the taught modules are as follows:

   A candidate is required to register for 90 credits’ worth of taught course units (which must include the two core course units), and will normally be considered as passing the taught element of the programme if:

   (a) the credit weighted average is 50% or more on the course unit, and

   (b) the credit weighted average of the practical work is 40% or more, and the credit weighted average of the examination results is 40% or more, and

   (c) course units whose overall results are below 40% amount to no more than 30 credits.

   The results for every student are presented to the Computer Science MSc examination board and provided they fulfill the stated criteria will be confirmed as a pass.

2. A dissertation worth 90 credits is assessed as follows: The general requirements for presentation of a dissertation are set out in the Faculty Ordinances and Regulations. The MSc in Low Power System Integration dissertation is evaluated by two internal examiners at Manchester (your supervisor and another not involved with your work on the project) who submit written reports. These reports and the theses themselves are considered by the external examiner. Agreed recommendations are then made to the MSc panel of the Faculty which gives final approval. The possible recommendations are:

   (a) award degree unconditionally

   (b) award subject to minor corrections

   (c) refer (encourage resubmission following rewriting or additional work)

   (d) reject with no option to resubmit.

   The deadline for part time students is set individually, dependent on their start date for the programme.

   Details about dissertation format etc can be found on the university website\(^4\).

   A guide to the project and dissertation is provided later in this handbook.

All work must be original: students presenting work which is copied from any other source (unless explicitly allowed), including from other students, are breaking university regulations, and will be dealt with under these regulations. Guidance on plagiarism is provided later in this handbook.

\(^3\)http://www.ceesi.ac.uk/

\(^4\)http://www.intranet.manchester.ac.uk/facilities/examinations/thesisregs/regulations.pdf
11.3 MSc with Distinction

An MSc with Distinction is awardable under the following circumstances:

1. the student must have passed the assessment for the coursework course units with an overall mark of at least 70% with no mark below 50% in any course unit at the first attempt, and
2. the dissertation is submitted on time and the examiners award a mark of at least 70%. The external examiner will be consulted before a final recommendation for distinction is forwarded to the MSc Panel.

Diploma students can gain a distinction if they satisfy the same rules.

Part-time students may use 3 calendar months as a writing-up period and still be eligible for a distinction. Such part-time students would be required to submit by January, assuming their programme began in September.

11.4 MSc with Merit

An MSc with Merit is awardable under the following circumstances:

1. the student must have passed the assessment for the coursework course units with an overall mark of at least 60% with no mark below 50% in any course unit at the first attempt, and
2. the examiners award a mark of at least 60% to the dissertation.

Diploma students can gain a merit if they satisfy the same rules.

11.5 Awards by credit accumulation

As well as the MSc, the School offers part-time students a Post Graduate Certificate, by accumulating 60 credits over a period, normally no more than three years. These qualifications are suitable for those who are on release for training and skills enhancement.

The MSc in Low Power System Integration requires a total of 90 credits in taught course units, two of these modules must be delivered by School of Computer Science at Manchester University, assessed as described above, and a 90 credit full project, supervised by a member of Manchester academic staff. The whole must normally be taken within four years, and students are encouraged to take it within a shorter period. These arrangements can be modified to suit personal circumstances.

The Certificate of Low Power System Integration is awarded to students who have successfully taken 60 taught credits (30 credits of which must be from modules delivered by Manchester University) with a result of 50% or more in each module.

The results for every student are presented to the Computer Science MSc examination board and provided they fulfill the stated criteria will be confirmed as a pass.

Upgrading from a Certificate to an MSc is permitted as long as the final award is achieved within a four-year period from first registering for the lower qualification.

11.6 Procedure for students who fail

Students who fail the assessment for the taught part of the programme are permitted single resits of failed examinations on the next occasion that the examinations are normally set. If a candidate satisfies the criteria for a Certificate, they may at the discretion of the Examiners be given the option to re-register accordingly. If in the opinion of the Examiners a candidate fails to meet acceptable standards of performance, they will be excluded from the programme and their registration will be cancelled. In all such circumstances the Programme Director will discuss the candidate’s circumstances with the aim of achieving the most satisfactory outcome.

11.7 Interruptions

An interruption is a formal break, usually of several months, in your course of study. A request is made via the Director to the MSc Panel and circumstances will dictate whether and under what terms it may be granted. The University is generally under an obligation to inform any sponsor if an interruption is granted. The University is sympathetic and helpful in genuine cases of difficulty.
11.8 Academic appeals

No appeal can be made against the academic judgment of Examiners.

However, a student has right of appeal on procedural grounds and on grounds that the Examiners were not in possession of information relating to circumstances that may have affected the student’s academic performance. There is also provision for appeal against decisions on Masters dissertations.

Full details may be found on the University’s policies website\(^5\) under ‘Academic Appeals’.

12 Student Support Services

The School and University offer a wide range of student support services. You are encouraged to make use of these services—they are there for you. If you need any help, whether it be academic help, in finances, in your personal life, with relationships or the family, in legal matters, or with health, there are services provided for you. \textit{Do not hesitate} to use these services.

It is important that any factor that affects your work is communicated to the School, usually directly to the Programme Director. This is entirely confidential. Such factors may be taken into consideration during the assessment process, and we can compensate for any disruption to, or difficulties during, your work here.

You may well want to make the Programme Director your first port of call. She or he will be able to handle some of the issues directly or advise you what other services are relevant.

If you have difficulties of any sort that you don’t want to talk to the programme management about, you may care to consult:

- The advice service of the School of Computer Science. This is located in room 2.9 near the school office and is open 1.30–2.00pm each weekday (except for Wednesdays) during term time. The service offers advice on School and university matters and help with anything that concerns you, whether in your studies, in the School, in the university or in your life outside the university. Each day a member of staff is available with knowledge of the School and university and who is willing to listen and help with whatever you bring along. All visits to the advice centre are strictly confidential.

If you wish to contact one of the advisors at any time other than in a lunchtime session, please do so. A list of the advisors is posted on the advice centre door.

The University operates an excellent professional counselling service:

- The Student Counselling Service.\(^6\) It is based in Crawford House in the University Precinct Centre, is open 9.00–5.00 weekdays, and can be phoned on 275 2864.

For special academic problems, you may wish to contact

- The Academic Advisory Service.\(^7\). It is located in the Williamson Building, Room 2.11a, phone 275 3303.

Other services available are:

- The Student Union, which has a wide range of services, including a welfare officer, and a legal advice service.

- The Student Union Advice Centre, Steve Biko Building, Oxford Rd, 275 2930.

- The Student Health Service, Waterloo Place opposite the Kilburn Building, 275 2858.

- The Accommodation Office, Precinct Shopping Centre, 275 2888.

Manchester Student Homes has a ‘Virtual Accommodation Bureau’ (an on-line property database), which contains information on all the available student properties.

- The Careers Service, Crawford House, Precinct Centre.

\(^5\)http://www.man.ac.uk/policies
\(^6\)http://www.campus.manchester.ac.uk/counselling/
\(^7\)http://www.campus.manchester.ac.uk/academicadvisoryservice/
\(^8\)http://www.umu.man.ac.uk/
\(^9\)http://www.umu.man.ac.uk/advice/
\(^10\)http://www.accommodation.man.ac.uk/
\(^11\)http://www.accommodation.manchester.ac.uk/mshcontact/
\(^12\)http://www.careers.manchester.ac.uk/
- The Student Services Centre\textsuperscript{13}, Burlington Street, between the library and the refectory, 275 5000.
- The International Students Advice Team\textsuperscript{14}, 275 2196.
- The University Language Centre\textsuperscript{15}, Email: iwp@manchester.ac.uk.

Contact details for information on english language courses: 306 3397, englang@manchester.ac.uk.

A more detailed list of services for students can be found at this address: http://www.campus.manchester.ac.uk/student/supportandservices/.

12.1 International Students

The University provides special facilities and support for overseas students. See the international students' website\textsuperscript{16} for full details.

The International Society\textsuperscript{17} provides a meeting point for overseas students, provides support and advice and also organises many activities, including welcome activities in the first few weeks of the academic year. See their website for more details.

Each year, there is a range of welcome activities and orientation courses for overseas students on your arrival. See both the University welcome page\textsuperscript{18} and the International Society welcome page\textsuperscript{19}.

The University of Manchester Language Centre\textsuperscript{20} provides a range of courses for those who wish to acquire the English language, from beginners' courses, through to advanced courses, and specialist and technical courses.

Confirmation of registration

If you are an international student, please note that if you require a letter for your visa application, visa extension or your sponsor confirming that you are registered in this School, you must provide \textit{one week's notice} of this request to the Student Support Office.

13 University Regulations, Procedures and Policies

The university website http://www.manchester.ac.uk/policies contains details of university regulations, procedures and policies, including those for work and attendance, for MSc dissertations, for appeals, on plagiarism, etc.

13.1 Ill Health

It is a requirement of your registration with the University of Manchester that you register with a local general practitioner. A list of GP practices can be obtained from the Student Health Service, any University hall of residence or a local Pharmacy. According to guidance issued by the General Medical Council it would not be regarded as good practice for a family member to be the registered GP or to offer treatment except in the case of an emergency.

\textbf{You should always consult your GP (or for emergencies the Accident and Emergency Department of a hospital) if your illness is severe, if it persists or if you are in any doubt about your health.} You should also consult your GP if illness keeps you absent from the University for more than 7 days including week-ends. If you do consult a GP and they consider that you are not fit for attendance at the University, then you should obtain a note from the doctor to that effect or ask them to complete Part III of the University form 'Certification of Student Ill Health' copies of which are available at local GP surgeries and the Student Support Office. You should hand this certificate to your Programme Director or the Student Support Office as appropriate at the earliest opportunity.

\begin{footnotes}
\item[13]http://www.man.ac.uk/ssc
\item[14]http://www.campus.manchester.ac.uk/ssc/internationalteam/
\item[15]http://www.langent.manchester.ac.uk/
\item[16]http://www.manchester.ac.uk/studyhere/internationalstudents/
\item[17]http://www.internationalstudents.org.uk/
\item[18]http://www.man.ac.uk/international/welcome/
\item[19]http://www.mcs.org.man.ac.uk/intsoc/welcome.html
\item[20]http://www.langent.manchester.ac.uk/
\end{footnotes}
If your condition is not sufficiently serious to cause you to seek medical help, then the University will not require you to supply a doctor’s medical certificate unless you are absent from the University due to illness for more than 7 days. You must however contact the Student Support Office as soon as possible and self-certify your illness (that is complete and sign the ‘Certification of Student Ill Health’ form to state that you have been ill) as soon as you are able to attend your school. You should do this if your illness means you are absent from the University for any period up to 7 days (see 1. below) or if you are able to attend the University but your illness is affecting your studies (see 2. and 3. below).

The following sub-paragraphs explain what you should do if your illness affects your attendance at compulsory classes or if you consider that your performance in your studies/examinations has been impaired.

1. If you are unwell and feel unable to attend the University to take a compulsory class, assessment or examination then you must seek advice by contacting the Student Support Office immediately, in person, through a friend or family member, by telephone or by email. This is to ensure that you understand the implications of being absent and the consequences for your academic progress, which might be quite serious. You must do this as soon as possible so that all options can be considered and certainly no later than the day of your compulsory class, assessment or examination. If you do not do this then you will normally be considered to have been absent from the class without good reason, or to have taken the assessment or examination in which case you will be given a mark of zero. You must also complete and hand in a ‘Certification of Student Ill Health’ form on your return.

2. You may be unwell but able to proceed with an assessment or examination and yet feel that your performance will have been impaired. If you wish this to be taken into account as an extenuating circumstance, you must inform the Student Support Office about this on the day of the assessment or examination and hand in to the Student Support Office a completed ‘Certification of Student Ill Health’ form. If you leave this until later it will not normally be possible to take your illness into account when assessing your performance.

3. If, as a consequence of your illness, you wish to seek an extension to a deadline for submitting assessed coursework, you must complete a ‘Certification of Student Ill Health’ form and discuss it with the Programme Director. The application for extension must be made before the deadline and not retrospectively.

4. You may be receiving occasional and ongoing medical attention which affects your studies. If so, you should obtain a letter from your physician which should be given to the Student Support Office before the relevant examination period if you wish your condition to be taken into account as an extenuating circumstance.

Special Circumstances Committee Evidence of illness during the course or examinations is considered by the School’s Postgraduate Special Circumstances Committee, which makes recommendations to the course examiners. It is therefore particularly important that any periods of ill health are properly documented, and that such documentation is deposited with the Postgraduate Office at the time of the illness.

If you wish the Special Circumstances Committee to consider your case you must complete a Special Circumstances form, which is available from the Student Support Office or as a doc file from the web.

Notes

- Certification of Student Ill Health forms are available in the Student Support Office, all schools and halls of residence.
- Your school will give you guidance on the effect of any absence from your studies or if you consider your illness has affected your studies. If you have repeated episodes of ill health which is affecting your studies, your school may refer you to the Student Health Centre.
- If you are found to have been deceitful or dishonest in completing the Certification of Student Ill Health form you could be liable to disciplinary action under the University’s General Regulation XX: Conduct and Discipline of Students.
- The use of the 'Certification of Student Ill Health' forms by GPs as described above has been agreed by the Manchester Local Medical Committee. A GP may make a charge for completing the form.

13.2 Student Representation and Feedback

The School and University take seriously both the issues of student representation and that of quality control of the course. Student representatives are elected and will have the opportunity to bring issues to relevant members of staff, and see that they are dealt with satisfactorily. The Programme Director has overall responsibility for the running of the course, and regular meetings of all students with the Programme Director will be arranged. At other times, the Programme Director is available for any issue to be raised. If a student is not satisfied with the way an issue is dealt with, then the Head of School may be approached, or the complaints procedure invoked.

All course units have course evaluation questionnaires. Students are encouraged to complete these for they are part of the quality assessment. They are processed by the School, they are read by the course unit lecturers and their appraisers, the Programme Director, the external examiners, and others who are concerned with the course quality. Other quality controls are maintained by the Postgraduate Syllabus Overview Committee (which maintains industrial relevance as well as quality), the Faculty, the government Engineering and Physical Science Research Council, and the accreditation bodies.

13.3 Guidance to Students on Plagiarism and Other Forms of Academic Malpractice

As a student, you are expected to cooperate in the learning process throughout your programme of study by completing assignments of various kinds that are the product of your own study or research. For most students this does not present a problem, but occasionally, whether unwittingly or otherwise, a student may commit what is known as plagiarism or some other form of academic malpractice when carrying out an assignment. This may come about because students have been used to different conventions in their prior educational experience or through general ignorance of what is expected of them.

This guidance is designed to help you understand what we regard as academic malpractice and hence to help you to avoid committing it. You should read it carefully, because academic malpractice is regarded as a serious offence and students found to have committed it will be penalized. At the very least a mark of only 30% would be awarded for the piece of work in question, but it could be worse; you could be awarded zero (with or without loss of credits), fail the whole unit, be demoted to a lower class of degree, or be excluded from the programme.

Academic malpractice includes plagiarism, collusion, fabrication or falsification of results and anything else intended by those committing it to achieve credit that they do not properly deserve. In addition to the advice that follows, your School will give you advice on how to avoid academic malpractice in the context of your discipline. It will also design assessments so as to help you avoid the temptation to commit academic malpractice. Finally, you should take note that work you submit may be screened electronically to check against other material on the web and in other submitted work.

You should read the following guidelines carefully and direct any questions to your Programme Director or to the Student Services Centre.

Plagiarism

Plagiarism is a serious academic offence and the disciplinary consequences are severe.

Plagiarism is presenting the ideas, work or words of other people without proper, clear and unambiguous acknowledgement. It also includes 'self-plagiarism' (which occurs where, for example, you submit work that you have presented for assessment on a previous occasion), and the submission of material from 'essay banks' (even if the authors of such material appear to be giving you permission to use it in this way). Obviously, the most blatant example of plagiarism would be to copy another student's work. Hence it is essential to make clear in your assignments the distinction between: (a)
the ideas and work of other people that you may have quite legitimately exploited and developed, and (b) the ideas or material that you have personally contributed.

To assist you, here are a few important do's and don'ts:

1. Do get lots of background information on subjects you are writing about to help you form your own view of the subject. The information could be from electronic journals, technical reports, unpublished dissertations, etc. Make a note of the source of every piece of information at the time you record it, even if it is just one sentence.

2. Don't construct a piece of work by cutting and pasting or copying material written by other people, or by you for any other purpose, into something you are submitting as your own work. Sometimes you may need to quote someone else's exact form of words in order to analyse or criticize them, in which case the quotation must be enclosed in quotation marks to show that it is a direct quote, and it must have the source properly acknowledged at that point. Any omissions from a quotation must be indicated by an ellipsis (?) and any additions for clarity must be enclosed in square brackets, e.g. "[These results suggest? that the hypothesis is correct]." It may also be appropriate to reproduce a diagram from someone else's work, but again the source must be explicitly and fully acknowledged. However, constructing large chunks of documents from a string of quotes, even if they are acknowledged, is another form of plagiarism.

3. Do attribute all ideas to their original authors. Written 'ideas' are the product that authors produce. You would not appreciate it if other people passed off your ideas as their own, and that is what plagiarism rules are intended to prevent. A good rule of thumb is that each idea or statement that you write should be attributed to a source unless it is your personal idea or it is common knowledge. (If you are unsure if something is common knowledge, ask other students: if they don't know what you are talking about, then it is not common knowledge.)

As you can see, it is most important that you understand what is expected of you when you prepare and produce assignments and that you always observe proper academic conventions for referencing and acknowledgement, whether working by yourself or as part of a team. In practice, there are a number of acceptable styles of referencing depending, for example, on the particular discipline you are studying, so if you are not certain what is appropriate, ask your tutor or the course unit coordinator for advice! This should ensure that you do not lay yourself open to a charge of plagiarism inadvertently, or through ignorance of what is expected. It is also important to remember that you do not absolve yourself from a charge of plagiarism simply by including a reference to a source in a bibliography that you have included with your assignment; you should always be scrupulous about indicating precisely where and to what extent you have made use of such a source.

So far, plagiarism has been described as using the words or work of someone else (without proper attribution), but it could also include a close paraphrase of their words, or a minimally adapted version of a computer program, a diagram, a graph, an illustration, etc taken from a variety of sources without proper acknowledgement. These could be lectures, printed material, the Internet or other electronic/AV sources.

Remember: no matter what pressure you may be under to complete an assignment, you should never succumb to the temptation to take a 'short cut' and use someone else's material inappropriately. No amount of mitigating circumstances will get you off the hook, and if you persuade other students to let you copy their work, they risk being disciplined as well (see below).

Collusion

Collusion is any agreement to hide someone else's individual input to collaborative work with the intention of securing a mark higher than either you or another student might deserve. Where proved, it will be subject to penalties similar to those for plagiarism. Similarly, it is also collusion to allow someone to copy your work when you know that they intend to submit it as though it were their own and that will lay both you and the other student open to a charge of academic malpractice.

On the other hand, collaboration is a perfectly legitimate academic activity in which students are required to work in groups as part of their programme of research or in the preparation of projects and similar assignments. If you are asked to carry out such group work and to collaborate in specified
activities, it will always be made clear how your individual input to the joint work is to be assessed and graded. Sometimes, for example, all members of a team may receive the same mark for a joint piece of work, whereas on other occasions team members will receive individual marks that reflect their individual input. If it is not clear on what basis your work is to be assessed, to avoid any risk of unwitting collusion you should always ask for clarification before submitting any assignment.

Fabrication or Falsification of Results

For many students, a major part of their studies involves laboratory or other forms of practical work, and they often find themselves undertaking such activity without close academic supervision. If you are in this situation, you are expected to behave in a responsible manner, as in other aspects of your academic life, and to show proper integrity in the reporting of results or other data. Hence you should ensure that you always document clearly and fully any research programme or survey that you undertake, whether working by yourself or as part of a group. Results or data that you or your group submit must be capable of verification, so that those assessing the work can follow the processes by which you obtained them. Under no circumstances should you seek to present results or data that were not properly obtained and documented as part of your practical learning experience. Otherwise, you lay yourself open to the charge of fabrication or falsification of results.

Finally

If you commit any form of academic malpractice, teaching staff will not be able to assess your individual abilities objectively or accurately. Any short-term gain you might have hoped to achieve will be cancelled out by the loss of proper feedback you might have received, and in the long run such behaviour is likely to damage your overall intellectual development, to say nothing of your self-esteem. The disciplinary consequences for you can be severe. You are the one who loses.

13.4 Complaints Procedure

The University has a formal Complaints Procedure. Copies of the procedure and form can be found on the University’s policies webpage\(^\text{21}\) under ‘Student Complaints Procedure’.

In essence, most complaints can be dealt with quickly and informally. Complaints should be made promptly, orally or in writing, to an appropriate member of staff, such as your Programme Director or tutor. If your complaint is of a general nature it might be best to mention it to your student representative so that he/she can raise it at the relevant school committee. If you are dissatisfied with the response, you should put the complaint in writing to the Head of School, or, if the complaint relates to actions taken by the Head of School, you should write to the Dean of the Faculty concerned. The Head/Dean concerned will investigate the matter and come back to you, normally within 10 working days. If, having pursued the matter informally, you are still dissatisfied you should refer the matter formally and in writing to the University’s Registrar and Secretary. You should consult the Complaints Procedure for advice on how a formal complaint should be carried out. If you need help using the procedure or guidance on where to refer your complaint, you can seek advice from any of the following: The Central Academic Advisory Service, the appropriate Faculty or School Secretary, the office of Student Support and Services, or the Students’ Union Advice Centre (Students’ Union, tel. 275 2930).

The Complaints Procedure does not cover the following:

1. disciplinary issues (for which a separate procedure exists)
2. matters where other separate procedures apply, e.g. harassment, academic appeals relating to examinations or assessments, appeals against exclusion on academic grounds, or against refusal to be issued with a Certificate of Satisfactory Work and Attendance, or Complaints about the Students’ Union.

Information on these separate procedures can be obtained from the University’s policies webpage.

\(^{21}\)http://www.manchester.ac.uk/policies
A Guide to MSc Projects

A.1 Introduction

The individual project is in many ways the most important single component of the MSc programme. It provides the opportunity for you to demonstrate independence and originality, to plan and organise a large project over a long period, and to put into practice the techniques you have been taught throughout the course. Whatever your level of academic achievement so far, you can show your individuality and inspiration in this project. It should be the most satisfying piece of work in your course.

A.2 The Project Coordinator

The project coordinator Dr Rizos Sakkaliou is responsible for the overall organisation of MSc projects. You can email him whenever you have any problem with the organisation of your individual project.

A.3 Choosing a Project

The idea for your project may be a proposal from a member of staff or your own, or perhaps a combination of the two. After project proposals are published (around mid-January), you should discuss the projects that interest you with the supervisors as soon as possible so that you have plenty of time to think about the best choices for you. Not every project is suitable for every student; some may be specifically tailored to a particular degree and some may only suit students with a very specific set of interests. Each proposal will indicate these constraints in order to help you to make an informed choice.

Project proposals originating outside the school (e.g. from actual or potential employers or sponsors) are encouraged, but you must provide clear details of what the project involves and have the approval of the Programme Director. In exceptional cases permission may be given to do the project work in another institution or country, subject to suitable arrangements for regular contact with your supervisor in the school being made and approved.

If you have your own idea for an individual project it is your responsibility to find a member of staff who both approves of the proposed programme of work and is willing to supervise it. External projects cannot be approved unless a suitable internal supervisor can be found. Not all project ideas are suitable for an MSc dissertation since certain academic requirements have to be met. The project coordinator will assist you in finding a supervisor but you cannot assume that one can be found in every case.

A.4 Assessment

General requirements. All MSc projects are required to contain some element of original work. This does not mean that they have to produce ground-breaking, innovative research results (although some do). It means that they have to cover some new ground. An implementation project could develop a complex application which does not already exist, or enhance some existing application or method to improve its functionality or performance. Projects which are predominantly survey reports can be backed up with experimentation, implementation, theoretical or conceptual analysis, new illustrative examples, etc. Your supervisor will advise on how to develop your project appropriately. A distinction level project involves a combination of sound background research, a solid implementation or piece of theoretical work, and a well-structured and well-presented report detailing the project’s background, objectives and achievements.

Assessment. For the purpose of the MSc degree and the award of distinctions, the only thing that can be taken into consideration is the quality of your final dissertation. Formally, your project work is assessed on the basis of your dissertation only. You cannot compensate for a poor write-up by a well-conducted project. You cannot get credit for ideas or experiments not included in the
dissertation. Dissertations not meeting minimal standards of presentation will not be accepted for award of the MSc degree, no matter how good the project work itself.

Other considerations. Remember that your attitude to, and performance in, the individual project is taken very seriously by prospective employers and other institutions to which you may be applying. Your project work is usually reported in some detail in academic references provided for you by your supervisor or other staff members. In this respect you do obtain credit for the way in which you approach your individual project.

A.5 Allocation

You must complete the Project Choice Form available from the Postgraduate Office after the project proposals are announced (mid-January). If you choose from the published proposals your first choice of project cannot be guaranteed since individual supervisors can only take responsibility for a limited number of projects. In some cases you may be allocated the project but another member of staff will be assigned to supervise it. Failing this, you may be allocated your second choice.

When considering a project, you must consult the prospective supervisor, so that you agree on pre-requisites, background and project aims and objectives. You will need his or her signature in order to be allowed to choose a project. If you are enrolled in a specialized MSc programme you must make sure that your project is approved by the Programme Director as suitable for the programme.

A.6 Equipment

You are permitted to develop software (or hardware, if appropriate) on your own equipment, provided that you can duplicate it in the School for demonstration to your supervisor. However, you should prepare a fall-back position in case your equipment misbehaves. Remember that the software on some cheap home computers is not reliable. It is not unusual for a potentially good project to be spoilt by bugs in compilers, libraries etc. on home computer equipment.

If you wish to use software which is not currently provided please inform your supervisor immediately. A request can then be made to purchase it if an acceptable alternative is not available. A purchase request will need the support of your supervisor and is not guaranteed to be approved.

Please note that there is no excuse for failing to keep adequate backups on your home computer. If you lose your program or your data or your report because of a system failure no allowance can be made. Extensions will not be given at the end of the project for you to re-type a lost report, for example.

A.7 Supervision

The relationship between yourself and your supervisor is often critical to the success of the project. You will be given guidance in the Research Skills course unit (CS699) on how to manage this relationship, and how to cope with research in general.

You must make sure that you arrange regular meetings with your supervisor. The meetings may be brief once your project is under way but your supervisor needs to know that your work is progressing. You should inform the supervisor of your address and any changes to it, so that he or she can contact you, if necessary. If you need to talk to your supervisor between meetings and cannot locate him/her in their office, leave a note, or send electronic mail, asking them to suggest a time when they will be available. When you go to see your supervisor you should have prepared a written list of points you wish to discuss. Take notes during the meeting so that you do not forget the advice you were given and the conclusions that were reached.

A.8 The Dissertation

The dissertation is an extremely important part of the project. We give advice below on how to structure and present your dissertation. Regulations will be found on the University website\textsuperscript{22} by the time you start writing up.

\textsuperscript{22}http://www.manchester.ac.uk/policies
The dissertation serves to show what you have achieved and should demonstrate that:

- You understand the wider context of computing by relating your choice of project, and the approach you take, to existing products or research.
- You can apply the theoretical and practical techniques taught in the course to the problem you are addressing, and that you understand their relevance to the wider world of computing.
- You are capable of criticising your own work objectively and making constructive suggestions for improvements or further work based on your experiences so far.
- You can explain your thinking and working processes clearly and concisely to third parties who may not be experts in the field in which you are working.

Remember that second markers, and other readers, will not have followed the project throughout. Make the presentation reasonably self-contained. State the objectives clearly; provide sufficient background material.

Many students underestimate the importance of the dissertation. You should consider that the aim of the project is to produce a good dissertation and that software, hardware, theory etc. that you develop during the project are merely a means to this end. Do not make the mistake of leaving the write-up to the last minute. Ideally you should produce the bulk of the report as you go along and use the last month or two to bring it together into a coherent document.

Remember that quantity does not automatically guarantee quality. A 150 page report is not twice as good as a 75-page one, nor a 10,000 line implementation twice as good as a 5,000 line one. Conciseness, clarity and elegance are invaluable qualities in report writing, just as they are in programming, and will be rewarded appropriately. Also, it is important to appreciate that the appropriate size and structure of a report can vary significantly from one project to the next. Despite these variations, however, most good reports have the following components in common.

Presentation. Below we give an outline of how the dissertation should be presented. This is for guidance only: University regulations for the dissertation can be found on the University’s policies webpage25 and should be followed exactly. The dissertation must be bound in the university approved manner. The University Library offers a binding service, as do other local binderies.

Title page. This must be in the standard form described in University regulations24.

Acknowledgements. It is usual to thank those individuals who have provided particularly useful assistance, technical or otherwise, during your project. Your supervisor will obviously be pleased to be acknowledged as he or she will have invested quite a lot of time overseeing your progress.

Contents page. This should list the main chapters and (sub) sections of your report. Choose self-explanatory chapter and section titles and use double spacing for clarity. If possible you should include page numbers indicating where each chapter/section begins. The table of contents should not have more than two levels of headings (say chapters and sections within chapters).

Abstract. The abstract is a very brief summary of the report’s contents. It should be about half a page long. Somebody unfamiliar with your project should have a good idea of what it is about having read the abstract alone and will know whether it will be of interest to them.

Introduction. This is one of the most important components of the report. It should begin with a clear statement of what the project is about so that the nature and scope of the project can be understood by the reader. It should summarise everything you set out to achieve, provide a clear summary of the project’s background and relevance to other work and give pointers to the remaining sections of the report which contain the bulk of the technical material.

25http://www.manchester.ac.uk/policies
24http://www.manchester.ac.uk/policies
Background. The background section of the report should set the project into context by relating it to existing published work (or unpublished work) on which the project builds. The background section is sometimes included as part of the introduction but more usually is a separate chapter, or collection of chapters if the project involved an extensive amount of research. The published work may be in the form of research papers, articles, text books, technical manuals, or even existing software or hardware of which you have had experience. You must acknowledge the sources of your inspiration; you are expected to have seen and thought about other people’s ideas; your contribution will be putting them into practice or developing them in some new direction. One rule is clear: if you present another person’s work as your own and do not cite your sources of information/inspiration you are cheating. When referring to other pieces of work, cite the sources at the point they are referred to or used, rather than just listing them at the end. The University takes a very strict line on plagiarism, and its standard notice on the subject is included in this Handbook (and is available on the University website).

Body of report. The central part of the report usually consists of three of four chapters detailing the technical work undertaken during the project. The structure of these chapters is highly project dependent. Usually they reflect the chronological development of the project, e.g. design, implementation, experimentation, optimisation, although this is not always the best approach. However you choose to structure this part of the report, you should make it clear how you arrived at your chosen approach in preference to the other alternatives documented in the background. For implementation projects you should describe and justify the design of your program at some high level, e.g. using dataflow diagrams, pseudocode, ADT specifications, Z, VDL, etc., and should document any interesting problems with, or features of, your implementation. Integration and testing are also important to describe. Your supervisor will advise you on the most suitable structure for these middle sections.

Conclusions and future work. All projects should conclude with an objective evaluation of the project’s successes and failures and suggestions for future work which can take the project further. Even the very best pieces of work have their limitations. You will not have time, and you should not try, to tie up every loose end. You are expected to provide a proper critical appraisal of what you have done. Your assessors are bound to spot the limitations of your work and you are expected to be able to do the same.

Bibliography. This consists of a list of all the books, articles, manuals etc. used in the project and referred to in the report. You should provide enough information to allow the reader to find the source. You should give the full title and author and should state where it is published, including full issue number and date, and page numbers where necessary. In the case of a text book you should quote the name of the publisher as well as the author(s).

Appendix. The appendices contain information which is peripheral to the main body of the report. Information typically included are things like program listings, tables, proofs, graphs or any other material which would break up the flow of the text if it appeared. Large program listings are rarely required, and should be compressed as much as possible, e.g. by printing in multiple columns and by using small font sizes, omitting inessential code etc.

User guide. For projects which result in a new piece of software you should provide a proper User Guide providing easily understood instructions on how to use it. A particularly useful approach is to treat the User Guide as a walk-through of a typical session, or set of sessions, which collectively display all the features of your package. Technical details of how the package works are rarely required. Keep it concise and simple. Do not bother including instructions at the level of ‘Turn on the machine, and then insert disk’. The use of diagrams illustrating the package in action can often be effective. A user guide is sometimes included as a chapter in the main body of the report, but is often better as an appendix to the main report. Do not include user guides for trivial pieces of code where these are not the main subject of the dissertation.
Format. The University requires that dissertations are submitted in a certain format whose description is available on the University's policies webpage. Make sure that your dissertation is in the required format (there are various 'style files' to help with this), otherwise it may not be accepted at submission time.

A.9 Assessment of the Dissertation

Dissertations are normally assessed on the following broad criteria:

Background research. This assesses your awareness of relevant background work and how your project builds upon or exploits existing techniques or results. For implementation projects, it assesses the way you arrived at your initial project specification, work programme and list of objectives.

General competence. This assesses your general approach, the clarity of your objectives, and your ability to relate the significance of your achievements to the state-of-the-art.

Technical accuracy. This assesses the main technical output from the project, as regards correctness, elegance, usability etc. of the final product, theoretical or practical, and the techniques employed.

Report. This assesses the quality of the write-up itself: the organisation of the material, quality of the prose, clarity of explanations, spelling, punctuation, legibility, relevance of diagrams, etc. Note that reports falling below minimum acceptable standards will not be accepted.

Finally... Remember that one of your supervisor’s main responsibilities is to advise on how to write up your project results. You are not expected to be able to produce a perfect dissertation without help. You should discuss with your supervisor all aspects of the dissertation, but particularly its structure and how to present the material. You might find it useful to look at MSc dissertations from previous years.

A.10 Project Seminars

Students give a seminar in the first two to three months of the project, although project supervisors may decide to postpone the seminar if they think a later time is more suitable. The seminar will give you experience in communicating your work to others in a formal manner and will also allow you and your supervisor to consider the progress you have made up to this point. The seminar is a compulsory part of CS699, although it does not contribute to the final project mark. You will receive feedback and comments from your supervisor and a second marker, usually the other internal project examiner. They will fill out and sign a feedback form together, which addresses presentation skills and progression. The assessment and feedback criteria are outlined in this form. Other students and staff will also attend the seminars, and this is an excellent opportunity to obtain feedback from them. The question and answer session after the seminar is therefore an invaluable part of the process. Indeed, one of the main aims of this is to help each student with the project by providing useful ideas, feedback and encouragement.

Guidelines on seminar organisation can be found on the seminar organisation page.

A.11 Pitfalls

Why do some projects go wrong? Here are some of the common causes of failure:

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25 http://www.manchester.ac.uk/policies
26 http://www.cs.manchester.ac.uk/Postgrad/ACS-CS/webpages/seminar.pdf
27 http://www.cs.manchester.ac.uk/Postgrad/ACS-CS/webpages/seminar-organisation.html
- Choosing or starting the project too late. Submit your project request form on time and start the project as soon as you can. The longer you leave it the harder it is to get motivated, especially when all your friends seem to be flying ahead. You should aim to have completed most of the project by early August, thus leaving sufficient time to fill in gaps and write the dissertation.

- Failing to meet your supervisor regularly. If you arrange a meeting with your supervisor, turn up at the agreed time. If you are stuck for any reason and you have no meeting arranged, contact him or her immediately. You gain no sympathy from anyone if you lose contact with your supervisor and produce a poor project as a result. Your supervisor will be happy to help you but he or she can do nothing if they are unaware that you are having trouble. Also, make sure that you are prepared for each meeting with your supervisor. This may take the form of a completed piece of work that you have done ready to demonstrate to your supervisor; or it may be that you have hit some problem, in which case come along prepared to explain the problem so that you both can attempt to solve it. Always bring your laboratory workbook and any results you have to each supervision.

- Allowing too little time for the report. You should try to produce as much of your report as you can as you go along, even though you don’t know in advance its exact structure. Written work along the way has two forms: (1) written accounts which describe a piece of work you have completed along the way. Write these at the time that each stage is completed—it is much easier then; and (2) an evolving plan of your dissertation—chapters, sections and their contents. This changes as the project evolves, but will provide guidance to the overall structure. The last two weeks of the project should be dedicated to pulling together the material you have accumulated and producing a polished final product.

- Failing to plan a fall-back position if the planned work is not completed on time. Try to plan your project in stages so that if things go wrong in a later stage you have a completed stage to fall back on.

- Trying to satisfy an external customer at the expense of your academic work. Do not let any outside interests interfere with your work. The guidance for your project should come from your supervisor, not your prospective employer.

- Over- or under-ambition. Try to be realistic about what you can achieve in the time available. A good project requires a lot of input from you and should prove to be technically challenging throughout. At the same time, however, it is better to do a small job well than to fail to do a big job. Your supervisor will advise you on his or her expectations of the project and this will help you to set your sights accordingly.

- Submission of preliminary drafts. Do not submit your dissertation without letting your supervisor read through it first. He or she will invariably have comments and suggestions for improvement. Don’t leave this to the last moment—give your supervisor a good period to read and comment as he or she will possibly have several to look at, and it can take a while to read through a draft. You should normally expect to revise the complete draft at least once. Dissertations failing to meet minimum standards will not be accepted for award of the MSc degree.

The dissertation has to be your own original work. Guidance on the use of the work of others and on plagiarism can be found elsewhere in this handbook.

A.12 Research Project Timetable

Mid January. Project proposals are posted on the web and announced to students—go to the postgraduate information page and navigate from there. Having persuaded the list, you should:

- Obtain a Project Subscription form from the Student Support Office in the School.
- Go and see the supervisors of the projects you are interested in to discuss the projects in detail.
- Get them to sign the Project Subscription form. This is vital; you will not be assigned a project unless you have seen the supervisor first. Bear in mind that members of staff may be away even during term time, so do not leave this until the last moment.

http://www.cs.manchester.ac.uk/Postgrad/informationstudents.php
- When you have completed your enquiries, return the form to the Student Support Office in the School (we suggest that you keep a copy). You should indicate at least three choices on the form (in order of preference). This is important: you may be given any of these, so do not select a project unless you are really prepared to do it! Of course, the allocation scheme will respect your preference order—typically, every year around 70% of the students who submit a form by the deadline are allocated their first choice—but clashes of one kind or another always happen.

Please perform this exercise as quickly as possible (i.e. start thinking about a project immediately after the projects are announced—typically, around mid-January—or well beforehand if you wish to arrange your own project) and

- hand in your form by the deadline (typically, in the 2nd half of February). Please note that there is no advantage if you hand your form in early (but there is a disadvantage if you hand in after the deadline).

The project coordinator will then collate the data and attempt, in discussion with programme directors and supervisors, to give as many people as possible their first choices, or, failing that, one of their most preferred choices. Please note that, in general, only one person will get to do one project. Also, there is a limit to the total number of projects that a staff member is capable of supervising. For these reasons, there is a strong likelihood of disappointment if you plump for popular projects/supervisors. Unfortunately there is no way of knowing the pattern of demand in advance (you might like to ask staff members about the level of interest in projects when you see them). If you are unsuccessful, there will be a further round of the process in March.

A final point: It is possible that you wish to do a project of your own devising, or follow up an idea that has arisen in conversation with a staff member. If you wish to do a project that does not appear on the list then you should first get the agreement of a staff member to supervise you, and then hand in a description of the project (signed by the supervisor) to the Student Support Office in the School, again by the deadline. Projects with industrial partners may also be available.

Second half of February. Project preferences must have been handed into the Student Support Office in the School.

End of February. First round of the MSc project allocation is now on the web. Students still without projects should continue making selections on a fresh form (available from the Postgraduate Office) and should

- hand them in as soon as possible from this point on; allocation will be done on a first-come first-served basis every few days.

Start of Easter Vacation. Project allocation complete. Start working on your project as soon as you have completed your examinations. Plan your work. You have the whole summer before you and it is very easy to underestimate the time required to complete the project. Do not write the dissertation in the last week but write it as you work on the project.

June—early July. Project seminar (see Section A.10 for details).

Mid Summer. You must give prior notice of your intention to submit by completing a ‘Notice of Submission’ form obtainable from the University’s policies webpage. A fee is payable for late notice. The rules regarding the form of the dissertation are currently being made and will in due time appear on the University’s policies webpage. You will be made aware of the rules, and you will also be told where to submit both, the Notice of Submission Form as well as the dissertation itself.

20http://www.manchester.ac.uk/policies
30http://www.manchester.ac.uk/policies
Second week of September. The deadline for the submission of MSc dissertations varies from year to year but is usually in the second week of September. Two bound copies of your dissertation must be submitted. Bear in mind that binding may take some time—please allow for this.

To let us know that you have submitted, could you please email pgoffice@ses.manchester.ac.uk.

Submitting late. If you are unable to submit by the deadline in the second week of September you must request the permission to submit late. The relevant form is available on the Faculty’s webpage31.

B Advice on Essay Writing

For help in developing your essay writing skills (and as preparation for writing your dissertation) useful webpages have been compiled by the Faculty of Humanities:

- Study skills: Essay writing32.

Here are some other UK based sites which you might want to pursue:

- How to write an essay33 (University of Birmingham, Department of English)
- Essay-Writing34 (University of Leeds, Institute of Communication Studies)

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31http://www.epi.manchester.ac.uk/informationforcurrentstudents/
32http://www.humanities.manchester.ac.uk/studyskills/assignments
33http://www.bham.ac.uk/english/bibliography/students/essay.htm
34http://ics.leeds.ac.uk/icosys/ay2004/STSK1030.pdf