STAFFORDSHIRE UNIVERSITY

Faculty of Computing, Engineering and Technology

Computer Science, Computing Science & Software Engineering Student Handbook

CertHE, DipHE, BSc, BSc(Hons), BEng, BEng(Hons), MEng	Computing Science
DipHE, BSc, BSc(Hons), BEng, BEng(Hons), MEng	Software Engineering
DipHE, BSc, BSc(Hons), BEng, BEng(Hons), MEng	Computer Science

There is a supplementary handbook for the Fast-Track Integrated Masters validation.

Author: Clare Stanier
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PART TWO – STUDENT GUIDE SEE FACULTY WEB SITE

WELCOME TO THE FACULTY OF COMPUTING, ENGINEERING AND TECHNOLOGY.

It is my pleasure to welcome you as a student to the Faculty of Computing, Engineering and Technology. You are joining a multidisciplinary community of about 3000 students and over 150 staff, involved in education, research and practice in all areas of computing, engineering and advanced technology. We all hope that you will find your time with us to be enjoyable and productive. An education in any area is a challenging prospect, but developing your creativity, skills and resourcefulness in such a fast changing discipline as computing in this new millennium has many benefits, in vocational practice or many other future careers.

We are committed to creating a productive, efficient and friendly atmosphere within the Faculty and welcome your partnership in this, but if you are experiencing problems, the staff are there to help you.

Professor Michael Goodwin
Dean of the Faculty of Computing, Engineering and Technology

Part One – Award Guide

This student handbook attempts to answer some of the questions you will have about your award. You will be notified of any changes but to ensure that you have the most up to date information, please regularly check the university's web site www.staffs.ac.uk and the Faculty web site www.staffs.ac.uk/fcet

1   USEFUL CONTACTS AND RESOURCES

1.1   Academic Officers.

Award Leader – in charge of the Computer Science, Computing Science and Software Engineering Awards
Dr Clare Stanier; room: K224; phone: (01785) 353463 e-mail: c.stanier@staffs.ac.uk

Placement Tutor – in overall charge of placements.
Ian Sunley; room: K340; phone: (01785) 353418; e-mail: G.I.Sunley@staffs.ac.uk

Final Year Project Tutor – in overall charge of the final year project
Rob Kinmond; room: K336; phone: (01785) 353305; e-mail: R.M.Kinmond@staffs.ac.uk

1.2   Administrative and Pastoral Support.

CSSE Administrator – administrative support for CSSE awards
Julie Perkins; room: K243; phone: (01785) 353432; e-mail: J.A.Perkins@staffs.ac.uk

Placements Manager – day to day management of the Placements Unit.
Maria-Louise Feenan; room: C012 (Beacon Building); phone: (01785) 353257;
e-mail: M.Feenan@staffs.ac.uk

Student Advisor – general pastoral support and guidance.
Janice Kalisz; room: K232; phone: (01785) 353345; e-mail: J.C.Kalisz@staffs.ac.uk

A full list of staff contact information is available at

http://www.staffs.ac.uk/faculties/comp_eng_tech/new_students/General_Faculty_Information.jsp

1.3   Internet Resources

Various up to date information is held on the Internet at the following address:

- http://www.staffs.ac.uk/faculties/comp_eng_tech/about_the_faculty/currstu.jsp .

There you can find up to date details of module class timetables, assessment deadlines, tutors, modules. Timetables can be accessed at

http://www.fcet.staffs.ac.uk/current_students/stafford_timetable.htm.

The modules you take have learning support material held in a system called Blackboard which is available at: http://Blackboard.staffs.ac.uk

Information about the library is available at http://library.staffs.ac.uk

Information about Information Services is available at
http://www.staffs.ac.uk/uniservices/infoservices/

Information about the facilities provided in the various computing laboratories is available at
http://www.staffs.ac.uk/faculties/comp_eng_tech/facilities_and_labs/

2   GLOSSARY.

Module	A unit of study with defined learning outcomes, curriculum and assessment. The module definition is to found in the module specification for the module. Each module has a number of Credits, associated with it. A single module is worth 15 Credits and notionally requires 150 hours of learning activity to complete. This learning activity being divided between time for class contact hours with staff, independent study and assessment. The number of allocated learning hours rises in proportion to the number of Credits attributed to a module at the rate of 10 hour per credit. All modules are multiples of the basic unit of 15 Credits. So for example, a double module will be worth 30 Credits and will have a learning time of 300 hours.
Core module	This is a module that you must take and pass to qualify for a given award title or range of titles.
Award Option	This is a module chosen from a list of Award Option modules. Award Option modules are studied in conjunction with the core modules and form the prescribed set of modules for a particular named award.
Computing Option	A Computing Option is a module designed to be taken by students on the Computing Degree Schemes. These modules can be found at the back of this handbook.
General Option	This is a module which you can choose from a set of modules which have been designed to complement your Award. This is to allow you to broaden your knowledge and skills base if you wish by taking some supplementary studies in addition to your main subject area. More specifically for students on the Computer Science and Software Engineering Degree Scheme, a general option slot is where modules can be chosen from either, a) the full list of Computing modules at the relevant level (see Section 16), provided the modules have not already been taken and any module specific admission requirements are met; Or b) the modules on the University General Option list, excepting modules from the University IT Programme – again provided the module has not already been taken and any module specific admission requirements are met. See http://www.staffs.ac.uk/modules/options/index.php If the module you choose is from a) above then the module will count as a specific option module (specifically a computing option module). If the module you choose is from b) above, then it will count as a general option module. The available modules may be subject to constraints such as timetabling, disqualified combinations and pre-requisites.
Curriculum	The subject content of your studies. This can be used to refer to a

	single module or to the content of a package of modules.
Co-requisites	Co-requisites are those modules that you must take as a package. All the Level C core modules can be considered to be co-requisites. We have defined co-requisites to make sure that there is sufficient shape and coherence in your programme of study to make it a rewarding and interesting experience. A co-requisite is therefore a module which must be studied in addition to and normally at the same time as a particular module.
Designated Award	This refers to the award onto which a student is registered. It defines a programme of study i.e. a combination of modules that will lead to a degree with a specific name e.g. BSc (Hons) Computing Science.
Disqualified Combinations	Disqualified combinations are those modules which you cannot study together. This is normally because the content of the modules overlaps in some way, such that by taking both you would not cover the equivalent of two-modules learning.
Grade (Point)	On completion of the assessment of a module, you will be assigned a grade for that module in the range 0 to 15. In considering your performance at the end of a Level, grades will be averaged to produce grade point average for the Level (weighted by the size of the module). The Level H project counts as 3 separate grades.
Level	This indicates the academic level at which study is to be undertaken – Certificate level (module level 1), Intermediate level (module level 2) and Honours level (module level 3). Normally it corresponds to one year of study for full-time students. However, students may take modules from different levels at the same time, provided that they meet the requirements for their award.
Learning Time	The total time needed to complete the classes, private study and assessments for a module.
Programme of Study	This refers to the collection of core and option modules which make up your Award.
Pre-requisites	A pre-requisite is defined as a specific requirement that you must meet before you can take a module. In a similar way as entry to an Award was dependent on your achieving A-Level or BTEC passes for example, or having other prior knowledge, for some modules you will have to be 'qualified' to take them. This will normally mean studying for a module at an earlier level in the Award. Pre-requisites are specified to make sure that you have the knowledge and skills you will need to be successful in your chosen modules. Please refer to the Undergraduate Modular Framework Regulations for a more detailed description of this term in particular the distinction between the terms 'Pre-requisites' and 'Special Admissions Requirements'.
Route	A route is the specification of core and option modules which define a

	named Award e.g. Computer Science.
Scheme	The term Scheme is used to refer to a collection of awards that belong together academically. Schemes define a structure of study which ensures coverage of fundamental knowledge and skills within a particular academic area, while permitting some specialisation within the area.
Special Admissions Requirements	The information given here provides you with the details as to the type of background knowledge you will be expected to have accumulated prior to the start of a module. This knowledge may have been acquired by studies which you have undertaken before entering the University. Further details are given in the Undergraduate Modular Framework Regulations handbook, in particular the distinction between the terms 'Special Admissions Requirements' and 'Pre-requisites'.
Teaching block	A period of study into which the year is divided, that may include induction, learning, assessment and academic counselling. There are currently two teaching blocks in each academic year.

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3 EDUCATIONAL AIMS AND OVERVIEW

Guiding Philosophy

The guiding academic philosophy of the Computer Science and Software Engineering subject area is that of fostering excellence in practical scholarship, by which is meant the fostering of the achievement of academic potential focused on the development of subject areas and techniques that maximise our graduates' ability to solve professional problems within computing.

Professional accreditation by the British Computer Society and the Institute for the Management of Information Systems is vital and influences the engineering aspects included in the design of the Scheme. What this means to you is that your degree is recognised by Computing Professional bodies and on completion you may apply for professional membership of these societies.

Educational Aims of the Awards.

1. Provide a sound general education in computing.
2. Enable the student to achieve the highest award within his or her overall ability.
3. Enable the student to specialise in depth in areas corresponding to his or her ability and choice.
4. Whenever possible, give a practical emphasis to the student's studies.
5. Provide a programme in which the student's general education is enhanced, including transferable skills
6. [Sandwich awards only]Enable the student, by means of a one-year period of supervised work in an industrial, commercial or public service setting, to gain relevant experience in the computing profession
7. Produce graduates who are fitted to undertake employment in industry, commerce or public service as computing professionals, or (for those with suitable degree classification) to undertake programmes of further study or research in appropriate institutions.
8. Ensure that the student has as wide a range of choice and flexibility as possible, whilst ensuring that individual awards are coherent and meaningful.

Specific aims for the individual awards:

The scheme has 3 award titles. These are:
DipHE, BSc(Hons),BSc,BEng(Hons),BEng,MEng Computer Science
CertHE, DipHE, BSc(Hons),BSc,BEng(Hons),BEng,MEng Computing Science
DipHE, BSc(Hons),BSc,BEng(Hons),BEng,MEng Software Engineering

Computer Science

This is a technical Computing award with a broad focus - it aims to produce graduates who are proficient in software development as well as the structure and operation of computers and their interface with their environment. Computer Scientists have the technical knowledge, skills and background to design, create and support many types of computer systems. A typical career could be as a Systems Developer, Technical Support Engineer or Embedded Software Specialist.

Computing Science

This award aims to provide a robust education in the field of Computing while allowing the widest possible choice. The award specifies a core of modules which cover the essential learning outcomes for all Computing graduates and then allows the student to select other modules to tailor their course of study to their particular interests and skills. Students on this award may want to sample a wide range of topics across the field of Computing, may be interested in a combination of subjects not covered by a specialised or joint award, or may have transferred from a more specialised award part-way through their degree as their interests developed.

The final destination of a Computing Science graduate will depend on their interests and which combination of subjects they have studied. Typical job titles of recent graduates include Application Programmer, Web Designer, Software Engineer, IT consultant, Systems Engineer and IT Systems analyst.

Software Engineering

This award aims to produce graduates who can develop software solutions to a wide range of real-world problems. They should be proficient in several programming languages, understand the theoretical underpinning of these languages, and be able to use them in the development of robust, large scale systems.   They should be experts in the entire software development lifecycle, from project initiation to maintenance.

Software Engineers can apply their skills in all areas of the computing industry - from business systems to computer games to embedded systems. Typical job titles of recent graduates include Application Programmer, Software Engineer, and Systems Developer.

The MENG (All Awards)

The MEng award is an integrated masters award. It allows you to develop your knowledge and skills as a computing professional to a higher level than the Bachelors awards. However, the MEng award cannot be guaranteed to run every year. If you intend to study for an MEng, you need to be registered for a BEng(Hons) rather than a BSc(Hons). Apart from the BEng(Hons) route possibly leading onto an MEng year, the BEng(Hons) and BSc(Hons) awards are undifferentiated, following common curriculum and learning outcomes until the final year is reached when BENG students have an additional core module – CE00879-3 Information Systems Engineering in Industry.

The central focus of the MEng is the fostering of the ability of the MEng students to develop computing-based solutions to problems within the discipline of product development to a high professional standard. As part of this the students will undertake further study in computing aimed at either broadening their base of understanding or further deepening the expertise they already have in given areas. The MEng modules by negotiated study provide the mechanism for this. In the Negotiated Studies modules, the core study of a given subject area is defined by the learning activities of a level H (level 3) module that covers the subject area that the student has chosen to study. However, agreed additional research and advanced study would be undertaken and assessed specifically for the MEng, by a written report which may be supported by relevant practical work. The core study component module may not be a module which the student has previously passed at level 3. The subject areas that form the core of study for a Negotiated Studies module must be approved by the Scheme Leader as relevant to their award. Since the study may involve appropriate broadening and contextual study as well as deepening for further specialisation, the Scheme Leader will have to take into account the balance between increased specialisation and appropriate broadening when they approve the study.

There is a single taught core for all Level M students: Personal Development & Research Methods. There are a number of deliverables for the module including a presentation, a literature review, an abstract and a dissertation project proposal. It is designed to provide students with the tools and techniques to produce a group project that forms 4 of their 8 modules.

The specific product development idea and associated overall goals of the Group Project would need to be discussed and approved by the Scheme Leader as relevant for the award and as having potential to fulfill the requirements for a Group Project as defined by the module descriptor.

In addition, reflecting the emphasis on commercial product development, the MEng project is a group project in which students will form a software development team and play various different roles in the production of a substantial software product to commercial or near commercial standards. It will provide students with the opportunity to develop and display their professional engineering skills, both technical and managerial. Each student will have the opportunity to exercise leadership as part of the project roles they will play. Emphasis is placed

on group management and leadership, the management of project and the design and implementation of a software product.
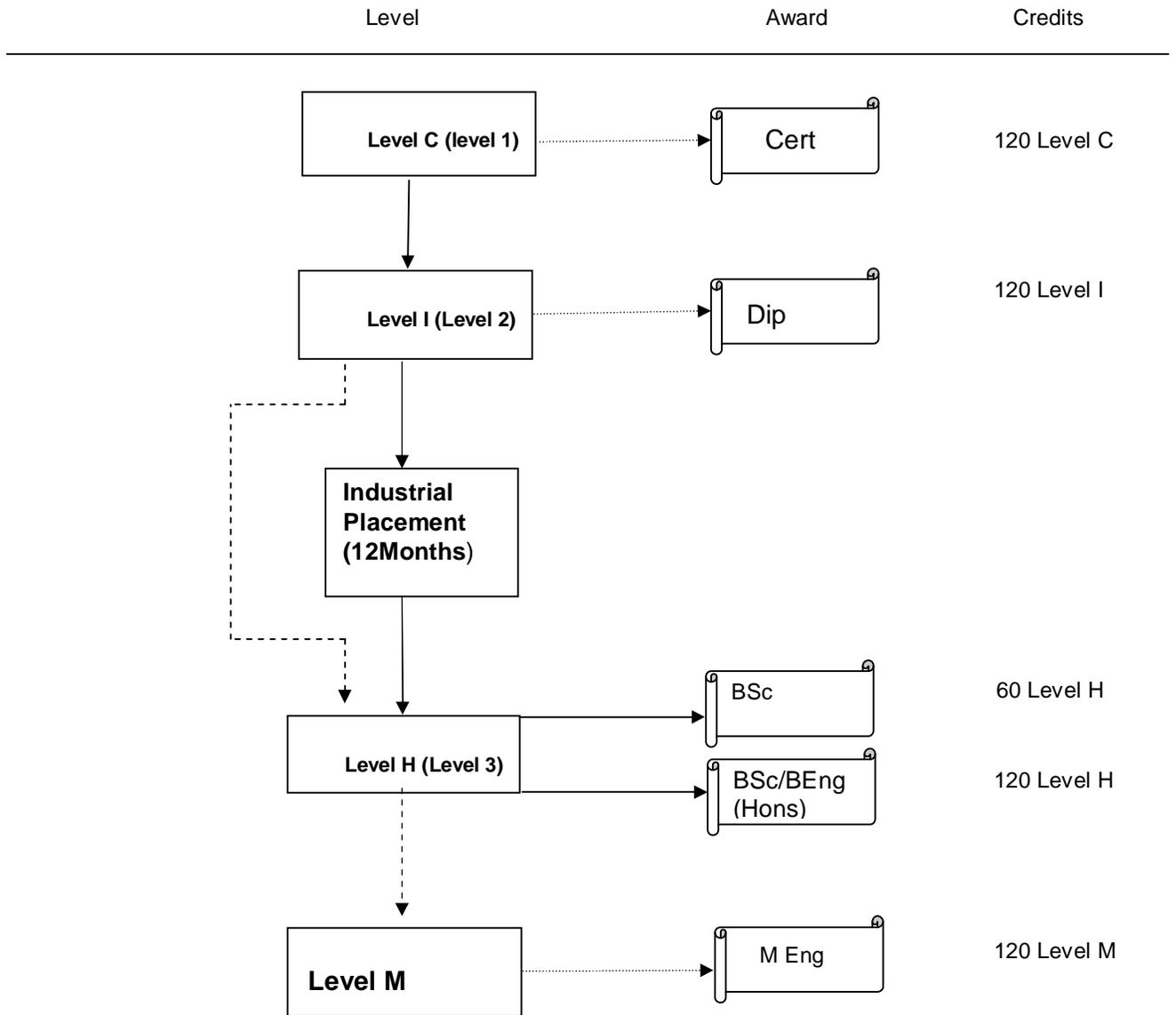
4   Programme Structure and Requirements

The Computer Science and Software Engineering awards are offered on a full time and a part time basis. In the case of the full time award, the course takes three years to reach BSc/BSc(Hons) level. The duration is increased by a year if an industrial placement year is taken between the second and third years of the award, or if a placement is taken after the end of level H. The MEng award takes four years full-time without a placement, and five years with a placement.

Intermediate awards of Certificate of Higher Education and Diploma in Higher Education are available to you if you do not wish to proceed beyond levels C (Certificate) and I (Intermediate) respectively, provided you meet the qualification requirements. The Certificate of Higher Education is restricted to the Computing Science title.

An ordinary degree is offered for each award title in the Scheme. This is to enable you, if you have difficulty in completing the Honours degree due to academic or other problems, to transfer onto a degree that will make it easier to complete an award successfully. However, if a you successfully complete an ordinary degree, you may at a later date apply to return as a direct entrant onto level H to complete an Honours degree. The ordinary degrees are unclassified and are available as sandwich or non-sandwich awards. You need to be aware, however, that an ordinary degree is a lower award than an Honours degree, although it is a higher award than a Diploma of Higher Education.

You may enrol onto a sandwich or non-sandwich version of any of the award titles. We strongly encourage you to enrol onto a sandwich version. This is because the Faculty believes that students gain great benefit from the completion of an industrial placement and wish to reflect that belief by a giving students a strong recommendation to pursue a sandwich version. Transfer between sandwich and non-sandwich versions of award titles is covered in detail in Section 13. The main principles are that transfer from a non-sandwich version to a sandwich version is relatively unrestricted (but see Section 13), transfer from a sandwich to a non-sandwich version is only unrestricted during level C, after which it becomes subject to the student meeting various qualifying criteria (these criteria are set out in detail in Section 13).

Level	Award	Credits

Level C (level 1) ┈┈┈> **Cert** 120 Level C

Level I (Level 2) ┈┈┈> **Dip** 120 Level I

Industrial Placement (12Months)

Level H (Level 3) ──> **BSc** 60 Level H

BSc/BEng (Hons) 120 Level H

Level M ┈┈┈> **M Eng** 120 Level M

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5   LEARNING OUTCOMES.

The degrees on the CSSE Scheme provide you with opportunities to develop and demonstrate knowledge, understanding, cognitive and practical skills, within the discipline of computing. Learning outcomes identify the nature of the abilities and skills you are expected to achieve by the time you graduate.

The University has adopted a framework for specifying learning outcomes. Eight categories of learning outcomes have been identified and exemplar indicative descriptions of learning outcomes within each category appropriate to the given level of study have been produced as guidance. These categories and the exemplar indicative descriptions of learning outcomes map directly onto the requirements of the National Qualifications Framework. This is to ensure that any award the produces learning outcomes that can be mapped onto the eight categories and are consistent as to level with the exemplar indicative descriptions of learning outcomes will consequently conform to the requirements of the National Qualifications Framework (NQF).

Therefore, following the University framework, the following table defines eight learning outcomes per award level with each learning outcome falling wholly into one of the categories of learning outcomes specified in the framework. For the Ordinary Degree, the level at which the learning outcomes are achieved conform to a level intermediate between a Diploma in Higher Education (NQF level I) and an Honours Degree (NQF level H). The relevant learning outcomes for the Ordinary Degree are therefore taken as the level I learning outcomes with the addition of some elements of the learning outcomes from level H (those achievable through the successful completion of 60 Credits of non-project study at level H). The Ordinary Degree additions are indicated by underlined portions in the level H learning outcomes.

On completion of each level of study, a Computing Science student will be able to:

Common learning outcome headings	CERTIFICATE [Benchmark Statement mapping]	INTERMEDIATE (ORDINARY DEGREE is Intermediate learning outcomes with the addition of the _underlined_) [Benchmark Statement mapping - cumulative]	HONOURS (additional BEng learning outcomes shown _italicised_) [Benchmark Statement mapping - cumulative]
Knowledge and Understanding	Demonstrate knowledge of underlying computing concepts and principles: • Programming fundamentals • Basic computing algorithms and algorithmic strategies • Techniques for computer system development, including requirements elicitation and analysis, logical and physical design, system implementation, and testing • Structure and operation of hardware and software systems and networks • Mathematical foundations for computing [SRCA 1, 2, 3, 4, 6; ATS 2]	Demonstrate knowledge and critical understanding of computing concepts and principles that extend those covered at Certificate Level, in particular: • New application domains such as database systems • Further software development tools and techniques • The issues, context and practices involved in working as a computing professional. • For Ordinary degree, at least some of this knowledge will be at, or informed by, the forefront of computing research and development. [SRCA 1, 2, 3, 4, 6, 8; ATS 2]	Demonstrate a systematic understanding of computing concepts and principles, building on those covered at Certificate and Intermediate Level, showing the acquisition of coherent and detailed knowledge, at least some of which is at, or informed by, the forefront of computing research and development. [SRCA 1, 2, 3, 4, 6, 8; ATS 2] _In addition for the BEng:_ • _Understand the organisational and administrative principles of running a business and of systems of communication and control within organisations._

Learning	Develop lines of argument and evaluate possible approaches, tools, techniques, platforms and solutions based on knowledge of underlying computing concepts and principles. [SRCA 4, 6; SRPA 2]	• Develop lines of argument and evaluate possible approaches, tools, techniques, platforms and solutions based on knowledge of underlying computing concepts and principles, while understanding the limits of the student's knowledge and the consequences this has. • <u>Understand the uncertainty, ambiguity and limitations of this knowledge</u> [SRCA 4, 6; SRPA 2]	Develop lines of argument and evaluate possible approaches, tools, techniques, platforms and solutions based on knowledge of underlying computing concepts and principles, while understanding the uncertainty, ambiguity and limitations of this knowledge [SRCA 4, 6; SRPA 2]
Enquiry	• Present, evaluate and interpret qualitative information and quantitative data. • Recognise the nature and extent of information needed, and be able to find it effectively and efficiently. [ATS 1, 2]	• Use recognised literature searching and requirements elicitation techniques to gather information about computer-based problems. • Critically evaluate and manage the information collected. • <u>Use, evaluate and manage information from a range of sources, acknowledging the cultural, ethical, economic, legal, and social issues surrounding the use of information.</u> [SRCA 4; ATS 1, 2]	• Initiate and carry out projects within computing • Ethically gather information pertaining to computing problems, possible solutions, and the success of these solutions, from existing or potential users and/or organisations using software engineering techniques • Find, critically evaluate, manage, apply, and understand information from a range of sources, acknowledging the cultural, ethical, economic, legal, and social issues surrounding the use of information. [SRCA 4; ATS 1, 2]

			In addition for the BEng: • *Critically evaluate current good practice, the roles of financial control, costing and marketing, and the relation of costing, investment and resources to company and market environments* • *Show initiative in the identification of problems, market opportunities and techniques and solutions.*
Analysis	• Evaluate and interpret the fundamental computing concepts and principles introduced at this Level. • Evaluate the appropriateness and functional qualities of computer-based systems [SRCA 1; SRPA 2]	• Use established investigation techniques to analyse information pertaining to computing systems and computing problems. • test and evaluate computer-based systems • *Critically discuss current practices in computing* [SRCA 1; SRPA 2; ATS 1]	Critically discuss current research in computing, and evaluate arguments, assumptions, abstract concepts and data (that may be incomplete) to draw conclusions [SRCA 1; SRPA 2; ATS 1] *In addition for the BEng:* • *Critically analyse data relating to costing, investment, and resources*
Problem Solving	Select and apply appropriate theory, practices and tools to develop computing-based solutions to problems. [SRCA 6; SRPA 1, 3, 5; ATS 3]	• Assess critically the appropriateness of different approaches to solving computing-based problems. • Propose and develop solutions following analysis of computing-based problems. [SRCA 5, 6; SRPA 1, 2, 3, 5; ATS 3]	• Develop appropriate questions and strategies to achieve a solution (or identify a range of solutions) to a computing-based problem. • Plan and carry out a large and complex computing project

			[SRCA 5, 6; SRPA 1, 2, 3, 5; ATS 3]
Communication	• Communicate ideas and information accurately and reliably • Document the development, design and testing of computer-based solutions in a structured manner. [SRCA 5, 7; SRPA 4]	• Communicate information effectively in a variety of forms • Communicate information effectively to specialist audiences using appropriate documentation techniques and report formats [SRCA 5, 7; SRPA 4]	• Communicate ideas, problems and solutions to both specialist and non-specialist audiences in a variety of forms • Write a structured formal report using appropriate referencing, and techniques for documentation. [SRCA 5, 7; SRPA 4] *In addition for the BEng:* • *Communicate effectively (and critically reflect on that communication) to develop and maintain both good teamwork and management functions.*
Application	Apply fundamental computing concepts and principles in the process of solving mathematical and computing-based problems [SRCA 6; SRPA 1, 5; ATS 2, 3]	Apply, in previously unseen contexts, appropriate concepts, principles and techniques (including quantitative techniques) in the process of solving computing-based problems • *For Ordinary degree some of these concepts and principles should be at the forefront of computing knowledge* [SRCA 6; SRPA 1, 5; ATS 2, 3]	Apply computing concepts, principles and techniques, including those at the forefront of computing knowledge, in the process of solving complex computing-based problems [SRCA 6; SRPA 1, 5; ATS 2, 3]

| Reflection | Demonstrate:
• the ability to take responsibility for learning
• the ability to work both independently and as team member.
[ATS 4, 5] | • Demonstrate an understanding of professional responsibility (including quality and safety issues) and the ethical, legal and social context in which computing-based solutions are developed and operate
• Critically evaluate one's work, what has been learned from it, and how the knowledge and experience gained might be used in the future
[SRCA 8; ATS 4, 5, 6] | Building on the understanding of professional and self-development issues gained at Certificate and Intermediate Level, work in a professional manner, recognising the legal, social, ethical and professional issues involved in the exploitation of computer technology, being guided by the adoption of appropriate professional, ethical and legal practices.
[SRCA 8; ATS 4, 5, 6]
In addition for the BEng:
• *Appreciate the need to take responsibility for the long-term effects of the engineering processes involved in the production of a product to defined quality criteria*
• *Critically appraise technical and managerial contributions within an engineering project* |

Computing Benchmark skills and abilities mapped: SRCA 1-8; SRPA 1-5; ATS 1-6.

On completion of each level of study, a Software Engineering student will be able to:

Common learning outcome headings	CERTIFICATE [Benchmark Statement mapping]	INTERMEDIATE (ORDINARY DEGREE is Intermediate learning outcomes with the addition of the _underlined_) [Benchmark Statement mapping - cumulative]	HONOURS (additional BEng learning outcomes shown _italicised_) [Benchmark Statement mapping - cumulative]
Knowledge and Understanding	Demonstrate knowledge of underlying computing concepts and principles: • Programming fundamentals • Basic computing algorithms and algorithmic strategies • Techniques for computer system development, including requirements elicitation and analysis, logical and physical design, system implementation, and testing • Structure and operation of hardware and software systems and networks • Mathematical foundations for computing [SRCA 1, 2, 3, 4, 6; ATS 2]	Demonstrate knowledge and critical understanding of computing concepts and principles that extend those covered at Certificate Level, in particular: • Database systems and applications • Further software development tools and techniques • Advanced use of programming language constructs and libraries. • The issues, context and practices involved in working as a software engineering professional. • <u>For Ordinary degree, at least some of this knowledge will be at, or informed by, the forefront of software engineering research and development.</u> [SRCA 1, 2, 3, 4, 6, 8; ATS 2]	Demonstrate a systematic understanding of computing concepts and principles, building on those covered at Certificate and Intermediate Level, showing the acquisition of coherent and detailed knowledge, at least some of which is at, or informed by, the forefront of software engineering research and development, in particular • software engineering paradigms, algorithms, language principles, and techniques and their role in the creation of complex or large-scale software systems [SRCA 1, 2, 3, 4, 6, 8; ATS 2] _In addition for the BEng:_ • _Understand the organisational and_

			administrative principles of running a business and of systems of communication and control within organisations.
Learning	Develop lines of argument and evaluate possible approaches, tools, techniques, platforms and solutions based on knowledge of underlying computing concepts and principles. [SRCA 4, 6; SRPA 2]	• Develop lines of argument and evaluate possible approaches, tools, techniques, platforms and solutions based on knowledge of underlying computing concepts and principles, while understanding the limits of the student's knowledge and the consequences this has. • Understand the uncertainty, ambiguity and limitations of this knowledge [SRCA 4, 6; SRPA 2]	Develop lines of argument and evaluate possible approaches, tools, techniques, platforms and solutions based on knowledge of underlying computing concepts and principles, while understanding the uncertainty, ambiguity and limitations of this knowledge [SRCA 4, 6; SRPA 2]
Enquiry	• Present, evaluate and interpret qualitative information and quantitative data. • Recognise the nature and extent of information needed, and be able to find it effectively and efficiently. [ATS 1, 2]	• Use recognised literature searching and requirements elicitation techniques to gather information about computer-based problems. • Critically evaluate and manage the information collected. • Use, evaluate and manage information from a range of sources, acknowledging the cultural, ethical, economic, legal, and social issues surrounding the use of information.	• Initiate and carry out projects within computing • Ethically gather information pertaining to computing problems, possible solutions, and the success of these solutions, from existing or potential users and/or organisations using software engineering techniques • Find, critically evaluate, manage, apply, and understand information from a range of sources,

		[SRCA 4; ATS 1, 2]	acknowledging the cultural, ethical, economic, legal, and social issues surrounding the use of information. [SRCA 4; ATS 1, 2] *In addition for the BEng:* • *Critically evaluate current good practice, the roles of financial control, costing and marketing, and the relation of costing, investment and resources to company and market environments* • *Show initiative in the identification of problems, market opportunities and techniques and solutions.*
Analysis	• Evaluate and interpret the fundamental computing concepts and principles introduced at this Level. • Evaluate the appropriateness and functional qualities of computer-based systems [SRCA 1; SRPA 2]	• Use established investigation techniques to analyse information pertaining to software systems and computing problems. • Test and evaluate software systems • Critically discuss current practices in software engineering [SRCA 1; SRPA 2; ATS 1]	Critically discuss current research in software engineering, and evaluate arguments, assumptions, abstract concepts and data (that may be incomplete) to draw conclusions [SRCA 1; SRPA 2; ATS 1] *In addition for the BEng:* • *Critically analyse data relating to costing, investment, and resources*
Problem Solving	Select and apply appropriate theory, practices and tools to develop computing-based solutions to	• Assess critically the appropriateness of different approaches to solving computing-based problems.	• Develop appropriate questions and strategies to achieve a solution (or identify a range of solutions) to a

	problems. [SRCA 6; SRPA 1, 3, 5; ATS 3]	• Propose and develop software solutions following analysis of computing-based problems. [SRCA 5, 6; SRPA 1, 2, 3, 5; ATS 3]	computing-based problem. • Plan and carry out a large and complex software engineering project [SRCA 5, 6; SRPA 1, 2, 3, 5; ATS 3]
Communication	• Communicate ideas and information accurately and reliably • Document the development, design and testing of computer-based solutions in a structured manner. [SRCA 5, 7; SRPA 4]	• Communicate information effectively in a variety of forms • Communicate information effectively to specialist audiences using appropriate documentation techniques and report formats [SRCA 5, 7; SRPA 4]	• Communicate ideas, problems and solutions to both specialist and non-specialist audiences in a variety of forms • Write a structured formal report using appropriate referencing, and techniques for documentation. [SRCA 5, 7; SRPA 4] *In addition for the BEng:* • *Communicate effectively (and critically reflect on that communication) to develop and maintain both good teamwork and management functions.*
Application	Apply fundamental computing concepts and principles in the process of solving mathematical and computing-based problems [SRCA 6; SRPA 1, 5; ATS 2, 3]	Apply, in previously unseen contexts, appropriate concepts, principles and techniques (including quantitative techniques) in the process of solving computing-based problems • For Ordinary degree some of these concepts and principles should be at the forefront of software engineering knowledge [SRCA 6; SRPA 1, 5; ATS 2, 3]	Apply computing concepts, principles and techniques, including those at the forefront of Software Engineering knowledge, in the process of solving complex software development problems [SRCA 6; SRPA 1, 5; ATS 2, 3]

| Reflection | Demonstrate:
• the ability to take responsibility for learning
• the ability to work both independently and as team member.
[ATS 4, 5] | • Demonstrate an understanding of professional responsibility (including quality and safety issues) and the ethical, legal and social context in which software systems are developed and operate
• Critically evaluate one's work, what has been learned from it, and how the knowledge and experience gained might be used in the future
[SRCA 8; ATS 4, 5, 6] | Building on the understanding of professional and self-development issues gained at Certificate and Intermediate Level, work in a professional manner, recognising the legal, social, ethical and professional issues involved in the development and use of software systems, being guided by the adoption of appropriate professional, ethical and legal practices.
[SRCA 8; ATS 4, 5, 6] *In addition for the BEng:*
• *Appreciate the need to take responsibility for the long-term effects of the engineering processes involved in the production of a product to defined quality criteria*
• *Critically appraise technical and managerial contributions within an engineering project* |

Computing Benchmark skills and abilities mapped: SRCA 1-8; SRPA 1-5; ATS 1-6.

On completion of each level of study, a Computer Science student will be able to:

Common learning outcome headings	CERTIFICATE [Benchmark Statement mapping]	INTERMEDIATE (ORDINARY DEGREE is Intermediate learning outcomes with the addition of the underlined) [Benchmark Statement mapping - cumulative]	HONOURS (additional BEng learning outcomes shown italicised) [Benchmark Statement mapping - cumulative]
Knowledge and Understanding	Demonstrate knowledge of underlying computing concepts and principles: • Programming fundamentals • Basic computing algorithms and algorithmic strategies • Techniques for computer system development, including requirements elicitation and analysis, logical and physical design, system implementation, and testing • Structure and operation of hardware and software systems and networks • Mathematical foundations for computing [SRCA 1, 2, 3, 4, 6; ATS 2]	Demonstrate knowledge and critical understanding of computing concepts and principles that extend those covered at Certificate Level, in particular: • Database systems and applications • Further software development tools and techniques • The issues, context and practices involved in working as a computing professional. • The structure and function of computer systems, and their hardware and software components • For Ordinary degree, at least some of this knowledge will be at, or informed by, the forefront of computer science research and development. [SRCA 1, 2, 3, 4, 6, 8; ATS 2]	Demonstrate a systematic understanding of computing concepts and principles, building on those covered at Certificate and Intermediate Level, showing the acquisition of coherent and detailed knowledge, at least some of which is at, or informed by, the forefront of computer science research and development, in particular: • techniques for the design and implementation of complex hardware and software systems, including real-time systems [SRCA 1, 2, 3, 4, 6, 8; ATS 2] In addition for the BEng: • Understand the organisational and administrative principles of running a business and of systems of communication and control within organisations.

Learning	Develop lines of argument and evaluate possible approaches, tools, techniques, platforms and solutions based on knowledge of underlying computing concepts and principles. [SRCA 4, 6; SRPA 2]	• Develop lines of argument and evaluate possible approaches, tools, techniques, platforms and solutions based on knowledge of underlying computing concepts and principles, while understanding the limits of the student's knowledge and the consequences this has. • Understand the uncertainty, ambiguity and limitations of this knowledge [SRCA 4, 6; SRPA 2]	Develop lines of argument and evaluate possible approaches, tools, techniques, platforms and solutions based on knowledge of underlying computing concepts and principles, while understanding the uncertainty, ambiguity and limitations of this knowledge [SRCA 4, 6; SRPA 2]
Enquiry	• Present, evaluate and interpret qualitative information and quantitative data. • Recognise the nature and extent of information needed, and be able to find it effectively and efficiently. [ATS 1, 2]	• Use recognised literature searching and requirements elicitation techniques to gather information about computer-based problems. • Critically evaluate and manage the information collected. Use, evaluate and manage information from a range of sources, acknowledging the cultural, ethical, economic, legal, and social issues surrounding the use of information. [SRCA 4; ATS 1, 2]	• Initiate and carry out projects within computing • Ethically gather information pertaining to computing problems, possible solutions, and the success of these solutions, from existing or potential users and/or organisations using software engineering techniques • Find, critically evaluate, manage, apply, and understand information from a range of sources, acknowledging the cultural, ethical, economic, legal, and social issues surrounding the use of information. [SRCA 4; ATS 1, 2] *In addition for the BEng:* • *Critically evaluate current good practice,*

			the roles of financial control, costing and marketing, and the relation of costing, investment and resources to company and market environments • *Show initiative in the identification of problems, market opportunities and techniques and solutions.*
Analysis	• Evaluate and interpret the fundamental computing concepts and principles introduced at this Level. • Evaluate the appropriateness and functional qualities of computer-based systems [SRCA 1; SRPA 2]	• Use established investigation techniques to analyse information pertaining to computing systems and computing problems. • Test and evaluate computer-based systems • *Critically discuss current practices in Computer Science* [SRCA 1; SRPA 2; ATS 1]	Critically discuss current research in Computer Science, and evaluate arguments, assumptions, abstract concepts and data (that may be incomplete) to draw conclusions [SRCA 1; SRPA 2; ATS 1] *In addition for the BEng:* • *Critically analyse data relating to costing, investment, and resources*
Problem Solving	Select and apply appropriate theory, practices and tools to develop computing-based solutions to problems. [SRCA 6; SRPA 1, 3, 5; ATS 3]	• Assess critically the appropriateness of different approaches to solving computing-based problems. • Propose and develop solutions following analysis of computing-based problems, including those that exploit the facilities of the underlying hardware and system software [SRCA 5, 6; SRPA 1, 2, 3, 5; ATS 3]	• Develop appropriate questions and strategies to achieve a safe, reliable, effective and user-friendly solution (or identify a range of solutions) to a computing-based problem • Plan and carry out a large and complex computing project which may involve computing hardware, system software, communication and interfaces [SRCA 5, 6; SRPA 1, 2, 3, 5; ATS 3]

Communication	• Communicate ideas and information accurately and reliably • Document the development, design and testing of computer-based solutions in a structured manner. [SRCA 5, 7; SRPA 4]	• Communicate information effectively in a variety of forms • Communicate information effectively to specialist audiences using appropriate documentation techniques and report formats [SRCA 5, 7; SRPA 4]	• Communicate ideas, problems and solutions to both specialist and non-specialist audiences in a variety of forms • Write a structured formal report using appropriate referencing, and techniques for documentation. [SRCA 5, 7; SRPA 4] *In addition for the BEng:* • *Communicate effectively (and critically reflect on that communication) to develop and maintain both good teamwork and management functions.*
Application	Apply fundamental computing concepts and principles in the process of solving mathematical and computing-based problems [SRCA 6; SRPA 1, 5; ATS 2, 3]	Apply, in previously unseen contexts, appropriate concepts, principles and techniques (including quantitative techniques) in the process of solving computing-based problems • For Ordinary degree some of these concepts and principles should be at the forefront of Computer Science knowledge [SRCA 6; SRPA 1, 5; ATS 2, 3]	Apply computing concepts, principles and techniques, including those at the forefront of Computer Science knowledge, in the process of creating complex hardware and software systems. [SRCA 6; SRPA 1, 5; ATS 2, 3]
Reflection	Demonstrate: • the ability to take responsibility for learning • the ability to work both independently and as team	• Demonstrate an understanding of professional responsibility (including quality and safety issues) and the ethical, legal and social context in which computing-based solutions are developed and operate	• Building on the understanding of professional and self-development issues gained at Certificate and Intermediate Level, work in a professional manner, recognising the legal, social, ethical and

	member. [ATS 4, 5]	• Critically evaluate one's work, what has been learned from it, and how the knowledge and experience gained might be used in the future [SRCA 8; ATS 4, 5, 6]	professional issues involved in the exploitation of computer technology, being guided by the adoption of appropriate professional, ethical and legal practices. [SRCA 8; ATS 4, 5, 6] *In addition for the BEng:* • *Appreciate the need to take responsibility for the long-term effects of the engineering processes involved in the production of a product to defined quality criteria* • *Critically appraise technical and managerial contributions within an engineering project*

Computing Benchmark skills and abilities mapped: SRCA 1-8; SRPA 1-5; ATS

MEng learning outcomes

Upon entry to the MEng year you will already have completed the equivalent of a BEng(Hons) award with a classification of at least a lower second. Thus you would have already met the requirements of the award learning outcomes at the Honours level, and thus would also have met the requirements of the Computing Benchmark Statement. The central core competency for anyone completing an MEng in the computing area is the ability to develop computing-based solutions to problems within the discipline of professional product development. The learning outcomes thus do not directly extend or further develop the Level H learning outcomes. Although the MEng permits you to express and further develop the expertise achieved at the Honours level, the specific subject content of that development is unspecified and moreover individual expertise is expressed and developed largely within the context of specific product development as part of the project, and thus cannot be relied upon to support content specific, rather than process oriented learning outcomes.

The MEng learning outcomes thus only address the discipline of professional product development of computing based products as solutions to problems, and do not address the further development of content specific expertise, but only its professional contextualisation and rigour of application.

The MEng learning outcomes must not be taken in isolation from the BEng learning outcomes for the appropriate award, which specify content specific expertise.

On completion of level M of the MEng, Staffordshire University students will be able to:-

Common learning outcome headings	Level M
Knowledge and Understanding	Demonstrate a systematic understanding of knowledge which is at the forefront of a given subject area of computing, as it pertains to the development of computing-based solutions to problems within the discipline of professional product development.
Learning	Demonstrate the independent learning ability required to advance knowledge and understanding, and to develop new skills to a high professional level.
Enquiry	Demonstrate a comprehensive understanding and critical evaluation of methodologies and techniques and the use of information from a range of sources applicable to research or advanced scholarship within a given subject area of computing, as it pertains to the development of computing-based solutions to problems within the discipline of professional product development.
Analysis	Demonstrate a critical awareness and evaluation of current research, advanced scholarship, contemporary problems and/or new insights within a given subject area of computing, as it pertains to the development of computing-based solutions to problems within the discipline of professional product development.
Problem Solving	Apply professional judgement systematically and creatively (often

	in the absence of complete data) and employ appropriate decision-making to solve complex problems required in the development of computing based systems.
Communication	Demonstrate effective and efficient use of communication skills to communicate conclusions clearly to specialist and non-specialist audiences.
Application	Apply good practice, and established and novel techniques within a given subject area of computing, based on critical awareness and evaluation of current research, and advanced scholarship in the planning and development of computing based solutions to problems.
Reflection	Demonstrate the qualities and transferable skills necessary for employment requiring the exercise of initiative and personal responsibility, self-direction and originality in tackling and solving problems, and act autonomously in planning and implementing tasks at a professional level and be able to critically evaluate their own contribution within the product development cycle and use that criticism effectively.

6 Computer Science, Computing Science & Software Engineering Award Structures

Each Award has its own individual structure as given in the following pages. You can obtain details of all modules referred to in the following diagrams by logging into the Faculty of Computing, Engineering and Technology home page on the Internet - www.fcet.staffs.ac.uk
Please note that modules are updated frequently and you should check on line for the latest information.

6.1 Computing Science.

LEVEL C	Introduction to Software Development	Hardware, Software Systems & Graphics[1]	Maths & Statistics for Computing Students[2]	Computing Technologies Option
	Object Oriented and Event Driven Programming	System Modelling[3]	Computing Option	General Option

COMPUTING TECHNOLOGIES OPTION [taken in either semester depending on module choice] one from:

Semester 1

Introduction to Computer Games and Graphical Systems
Introduction to Security Technologies
Introductory Business Concepts

Semester 2

Introduction to Artificial Intelligence
Introduction to Multimedia Applications
Introduction to Operating Systems
Introduction to Mobile and Wireless Technology
Introduction to Logistics and Database Technology

Semester 1 and 2

Introduction to Networking with LANs and WANs
Web Design and Development

[1] Students transferring into the Computing Science degree with a pass in Hardware, Networks and Servers for Interactive Computing are not required to take Hardware, Software Systems & Graphics

[2] Students transferring into the Computing Science degree with a pass in Mathematics for Interactive Computing are not required to take Maths & Statistics for Computing Students

[3] Students transferring into the Computing Science degree with a pass in System and Database Analysis are not required to take System Modelling.

Please note that the following are disbarred combinations:

You cannot study Hardware, Software Systems & Graphics AND Hardware, Networks and Servers for Interactive Computing

You cannot study Maths & Statistics for Computing Students AND Mathematics for Interactive Computing

You may study System and Database Analysis AND System Modelling but this combination is under review and you are advised against choosing this combination of modules.

	Professional & Enterprise Development	Database Systems[4]	Computing Option	Computing Option
LEVEL I	Software Development Option	Computing Option	Computing Option	General Option

SOFTWARE DEVELOPMENT OPTION [taken in either semester depending on module choice]
    one from:

Semester 1

Further Programming Concepts in C++
Further Object-Oriented Programming
Computer Graphics
Windows Game Programming
Further Programming for 3D Applications
Web Database Programming

Semester 2

System Programming and Computer Control Systems
Software Development for Mobile Computer Applications
Graphical User Interfaces: Design and Implementation
Web Media Programming
Web Applications
Network and Grid Computing

Dynamic Data Interchange
Imaging and Special Effects

[4]Students transferring into the Computing Science degree with a pass in System and Database Analysis are not required to take Database Systems Analysis, Design and Implementation, although this is not a disallowed combination. Such students who do not take Database Systems Analysis, Design and Implementation must take another Computing Option at Level 2.

If you are registered for a sandwich degree you must do an industrial placement between levels I and H, usually lasting one year.

LEVEL H	Project: Planning, Management, Communication & Appraisal	Computing Option [Information Systems Engineering in Industry]**	Computing Option	Computing Option
	Project: Research, Analysis & Artefact Design	Project: Artefact Realisation, Testing & Evaluation	Computing Option	General Option

**BEng level 3 structure has additional core in []

LEVEL M	MEng Project	MEng Project	Personal Development and Research Methods	Negotiated Study
	MEng Project	MEng Project	Negotiated Study	Negotiated Study

6.2   Software Engineering.

LEVEL C	Introduction to Software Development	Hardware, Software Systems & Graphics	Maths & Statistics for Computing Students	General Option
	Object Oriented and Event Driven Programming	Algorithms and Data Structures in C	System Modelling	Introduction to Operating Systems

LEVEL I	Professional & Enterprise Development	Database Systems	Further Object-Oriented Programming	Further Programming Concepts in C++
	Principles & Practices of Software Production	Computing Option	Computing Option	General Option

If you are registered for a sandwich degree you must do an industrial placement between levels I and H, usually lasting one year.

LEVEL H	Project: Planning, Management, Communication & Appraisal	Algorithmics	Design Patterns	Software Engineering Option [Information Systems Engineering in Industry]**
	Project: Research, Analysis & Artefact Design	Project: Artefact Realisation, Testing & Evaluation	Software Engineering Option	General Option

**BEng level 3 structure has additional core in []

LEVEL H SOFTWARE ENGINEERING OPTIONS [taken in either semester depending on module choice] two from:

Semester 1
Real-Time Systems
Enterprise Applications with Java Enterprise Edition

Semester 2
Advanced Programming Language Concepts
Project Management
Safety-Critical and Embedded Systems

LEVEL M	MEng Project	MEng Project	Personal Development and Research Methods	Negotiated Study
	MEng Project	MEng Project	Negotiated Study	Negotiated Study

6.3   Computer Science.

LEVEL C	Introduction to Software Development	Hardware, Software Systems & Graphics	Maths & Statistics for Computing Students	General Option
	Object Oriented and Event Driven Programming	Algorithms and Data Structures in C	System Modelling	Introduction to Operating Systems

LEVEL I	Professional & Enterprise Development	Database Systems	Computer Science option	General Option
	Principles and Practices of Software Production	Hardware & Software Systems & Networks	Systems Programming and Computer Control Systems	Computer Science option

LEVEL I COMPUTER SCIENCE OPTION [taken in either semester depending on module choice] two from:

Semester 1

Further Object-Oriented Programming
Fundamentals of Mobile Computing
Further Programming Concepts in C++
LAN Switching and WAN Networks
Web Database Programming

Semester 2

Computer Systems: Low Level Techniques
Software Development for Mobile Computing Applications
Network and Grid Computing

				Computing Option
LEVEL H	Project: Planning, Management, Communication & Appraisal	Real-Time Systems	Computer Science Option	[Information Systems Engineering in Industry]**
	Project: Research, Analysis & Artefact Design	Project: Artefact Realisation, Testing & Evaluation	Computer Science Option	General Option

**BEng level 3 structure has additional core in []

LEVEL H COMPUTER SCIENCE OPTIONS [taken in either semester depending on module choice] two from:

Semester 1

Computer Systems Security
Algorithmics
Design Patterns
Enterprise Applications with Java Enterprise Edition
Further Programming for Mobile and Handheld Devices

Semester 2

Safety-Critical and Embedded Systems
Distributed Computer Systems
Advanced Programming Language Concepts

LEVEL M	MEng Project	MEng Project	Personal Development and Research Methods	Negotiated Study
	MEng Project	MEng Project	Negotiated Study	Negotiated Study

6.4   Ordinary Degrees.

This award is intermediate between the Diploma in Higher Education and a BSc(Honours) degree. It is intended to enable those of you who have difficulty in completing the Honours degree due to academic or other problems, to be successful in completing a degree. However, if you are awarded the Ordinary degree, you may at a later date apply to return as direct entrants onto level H of the Computing Science and Software Engineering Scheme to complete an Honours degree.

The Ordinary degree is available with any title within the Scheme.   The structure of the focused Ordinary award, by including all level 3 core modules, excepting the final year project, and all level 3 award specific option groups of the corresponding honours degree, guarantees that the award specific learning outcomes at level H are satisfied. The Ordinary degree is unclassified and is available as a sandwich award or non-sandwich award.

An ordinary degree will require the study of 60 level H credits. The structure of those credits is given by the 60 credits, after the 45 credit project and the 15 credit general option have been excluded, that remain from the structure of the honours degree that corresponds to the named ordinary degree they are registered on. Thus those credits studied will include all level 3 core modules, excepting the final year project, and all award specific option groups of the honours degree that corresponds to the named ordinary degree you are registered on. The only exception to this is the ordinary degree in Computing Science (the general award) which may include a 15 credit level H general option.

7   PROFESSIONAL ACCREDITATION AND CERTIFICATION.

In general the awards in the scheme are accredited both by the British Computer Society (BCS) and by the Institute for the Management of Information Systems (IMIS). This means that the education and the awards offered by the Scheme are recognised as preparing you for careers as computing professionals.

The BCS accreditation means that if you achieve an honours degree within the Scheme, you will be exempted from the Part 1 and Part 2 examinations, and the Project, components of BCS membership qualification. However, to be eligible for the Project exemption you must pass the components of the final year project without any referrals. Further information about the BCS is available from http://www.bcs.org/. The IMIS accreditation means that if you achieve an honours degree within the Scheme, you will be eligable for Associate membership of IMIS. Further information about the IMIS is available from http://www.imis.org.uk/

There are a number of modules that you can take as part of the Scheme which together prepare you for examinations that lead to CISCO Certified Network Associate (CCNA) and CISCO Certified Network Professional (CCNP) qualifications.

For CCNA these are:

> Introduction to Networking with LANs and WANs (level 1) - preparation for CCNA 1 & 2.
> LAN Switching and WAN Networks (level 2) - preparation for CCNA parts 3 and 4.

For CCNP these are:

> Advanced Routing (level 2) – preparation for CCNP part 1.
> Converged Networks (level 2) – preparation for CCNP part 2.
> Advanced Switching (level 3) - preparation for CCNP part 3.
> Network Service Quality (level 3) - preparation for CCNP part 4.

8   INDUSTRIAL PLACEMENT

If you are enrolled on a sandwich award you must undertake a period of industrial work experience, where you will be expected to engage in professionally valid work. This is usually during the third year, following completion of level I studies. This is normally a salaried year, the company employer you for your work.

During this period, you will obtain considerable experience of the practical application of the theoretical topics underpinning your award. This direct and responsible experience of work greatly enhances your employability. You are expected to reflect upon that experience to enhance your general as well as specific employment skills. The process of finding a placement involves you in the completion of CVs, applications, interviews and the whole employment selection process, thus providing excellent experience ahead of the final year. For details of the placement process, please go to the placements site:
http://www.fcet.staffs.ac.uk/placements/students.html

There are hundreds of companies who have links with the University. Some are large blue chip companies others are small independent firms which are spread all over the country. There are a few placements in Europe. Over the years students have managed to find work all over the world. The Faculty has a Placements Office that will help you to get your placement organised. The Placements Office acts as a link between you and organisations that are willing to take students on a placement. Placements staff advertise vacancies and will advise you on your CV, etc. You must contact them to apply for any position that they advertise. Firms have their own methods for dealing with applications. You will be invited for interview and may find yourself competing not only with your fellow students, but also with students from other institutions. Obviously, it is up to you to get the job! The majority of these placements are paid so you will be earning a decent salary perhaps for the first time. You have to work for at least 48 weeks in continuous employment and are required to produce a report at the end of your placement which forms part of your assessment. You are allocated a Faculty tutor who will visit you normally twice a year to keep track of your progress.

Industrial placement learning outcomes
The role of the placement is to provide those of you who undertake it with an opportunity to broaden and deepen your experience of the development of computing-based solutions to

problems and to do so in a professional context. This permits you to consolidate a number of level I learning outcomes and thus improve your preparedness for level H.

The placement does not have an identified credit level or credits associated with it. Thus the learning outcomes for the placement do not relate to a credit level. The learning outcomes for the industrial placement focus on the organisational and professional context of the placement, rather than on the development of subject specific expertise.

The following are the industrial placement learning outcomes:

1. Understand and apply the methods employed in, and the constraints and requirements imposed on, the development and use of computing systems within an organisation.
2. Exercise professional judgement based on an understanding of both technical and non-technical issues relevant to the development and use of computing based systems in an organisation
3. Understand the need for, and develop proper, professional inter-personal relationships and comply with the work discipline and legitimate expectations of an organisation.
4. Relate the practices of a real organisation to the principles and concepts of computing.

Assessment of the industrial placement

In order to qualify for the award of a sandwich degree the industrial placement period must be passed. Failure in the industrial placement will require a repeat of an industrial placement as a referral. Only one referral attempt is allowed and must normally occur within 18 months.

To pass the industrial placement you must have,
1. completed, normally, 48 weeks of relevant work experience (32 weeks for Bridging course students),
2. achieved at least 40% in the placement report,
3. achieved an aggregate mark of 40% or more.

Where the aggregate mark achieved by a student is >= 40%, but either of the pass criteria 1 or 2 above are not fulfilled, then the grade point recorded will be a 3.

The industrial placement cannot be subject to compensation.

Progression and the industrial placement.

If you are registered on a sandwich award then normally, in order to progress onto level H you must pass the industrial placement, in addition to fulfilling any other criteria specified by the University Undergraduate Modular Framework regulations. However, exceptionally you may be allowed to proceed onto level H without completing an industrial placement. You will still be required to pass an industrial placement before you can be awarded a sandwich degree. For more detail on the requirements and processes involved in finding and undertaking a placement see the placement website at
    http://www.staffs.ac.uk/faculties/comp_eng_tech/placements/index.jsp

9   FINAL YEAR PROJECT

The final year project is seen as a very significant component of your final year studies. As such the Award Board tends to treat the project modules differently from other modules at level H. There are programme specific regulations governing the project (see Section 13). In particular, these programme specific regulations mean that Award Boards will limit the maximum degree classification that you can achieve on a resit if you were to fail some of your project modules and will apply compensation to project modules less generously than it might do elsewhere. You should read the regulations that relate to the project and you need to bear this in mind when allocating your effort between your final year modules.
All information regarding the Final Year Project can be found on

http://www.fcet.staffs.ac.uk/projector/

You are able to choose your project and wherever possible an appropriate supervisor, with whom you will arrange regular (normally weekly) progress meetings. Projects are second assessed by another academic to ensure consistency. The FYP project manager will provide advice and guidance should problems arise that cannot be solved between yourself and your project supervisor or second assessor. Project proposals must be approved by the award manager to ensure that the project will meet the requirements of your degree.

Although it is appreciated that students will come to the project with varying levels of previous knowledge and skills, work on the production of the project artefact and the project documentation (including artefact support documentation) will only be credited if it is carried out while you are registered for the project modules. Any such work should be referenced in the normal way. So for example code that was developed prior to the commencement of the project modules (even if developed by yourself and hence not plagiarism) will receive no marks – you can use the code, but you must make it clear that it is code that you developed previously which you are re-using.

General requirements and expectations of the project.

The development and expression of a computing based solution to a problem
The project requires the development of a computing based solution to a problem. Some form of implementation is, therefore, essential; for a computing student the implementation of a computing based solution to a problem involves expressing that solution (or significant parts of it) in the form of an algorithm encoded in whatever language is suitable. The language may be of whatever generation and include scripting languages, macro languages and declarative/functional or graphical languages, as long as the language permits the expression of algorithms of appropriate generality and complexity.

What makes a solution computing based is not the medium on which the implemented solution (the artefact) exists i.e. it is not a computing based solution to a problem simply because the artefact runs on a computer. Simply constructing an artefact by using packages is not sufficient; there must be evidence of specification and solution design and engineering. It should be noted

that the requirements for the project expected within the scheme, is independent of any expectations that accrediting bodies such as the British computer Society may have.

The level of intellectual demand required
For the project, the problem and the computing based solution need to be appropriate for level H in terms of the intellectual skills required to complete it i.e. it has to be of sufficient complexity for an honours project. As a guide, it is reasonable to say that the project should be something in terms of difficulty that someone could only be expected to start after having studied computing for 2 years full-time at a University, and requires from such a person 45 Credits worth of work to complete.

10   SCHEME MANAGEMENT

To understand the Scheme and to know where you fit in, you need to know how it is managed. Students are represented so that they may contribute to decisions that are made. Your input is just as vital as the academics and managers, indeed over the last few years changes have been made to the Scheme, to modules, assessments etc. as a direct result of student opinion. At the beginning of each Academic Year, the Scheme leader will ask for volunteers to be Student Representatives; these volunteers will then be elected by the students. Student Representatives are there to represent the views of the students in their year.

As well as voicing your opinions to your student representative you can also talk to your scheme leader directly. In addition, your scheme leader will hold, at least twice a year, an open forum to which all students on a given level are invited to attend in order to raise any issues and provide feedback concerning any aspects of the Scheme or its management.
The day to day running of the Scheme is the responsibility of the Level leaders, but there are other academics also involved. These are:

- Module leaders
- Industrial placement tutors
- Industrial tutors
- Personal Tutors
- Project Manager
- Project Supervisors

All modules have an individual module leader who is responsible for the delivery and assessment of the module. Any problems at module level should be referred to them. At the end of Level C, presentations from the industrial placement tutors will tell you how to complete your CV and how to apply for placements. They will arrange your interviews as appropriate and will help you look for a placement. An industrial tutor will be allocated to supervise you during the placement.

The project manager will implement project development policy and will co-ordinate the selection and supervision of Level 3 projects within your chosen Award.

11   TEACHING, LEARNING AND ASSESSMENT IN THE SCHEME

11.1   Study Skills.

This Handbook cannot act as a manual on study skills. However, the following books are recommended to you:

Rowntree, Derek, *Learn How To Study: A Guide for Students of All Ages*, Time Warner Paperbacks, 1998, ISBN: 0751520888.

Cottrell, Stella, *The Study Skills Handbook*, Palgrave Macmillan, 2003, ISBN: 1403911355. The University also has a website that contains useful information and links to other resources.

http://www.staffs.ac.uk/uniservices/infoservices/studyskills/

11.2   Organisation of independent study time.

Each module has a total number of learning hours associated with it. For a 15 Credit module this is 150 hours (it is worked out at 10 hours per credit). These learning hours are intended to give an indication of the total number of hours that are likely to be involved in studying and completing the assessment for a given module. However, some of you may need to spend more time than the hours indicated (some may spend need to spend less), largely depending on your prior familiarity and level of competence with the skills and knowledge required as an admission's requirement for the module, or actually covered by the module. Out of this total learning hours some of the hours will have been allocated to class contact (lectures, tutorials, practicals, etc.). However, the bulk of the learning hours will be given over to independent (non-class contact) learning activity (which includes assessments and preparation for them). It is up to you to plan the time available and allocate appropriate amounts of time to the various activities you must do for the module.

Example time allocation:

The following is intended to be an example of how you could allocate time among the different activities for a typical 15 Credit module (with 36 hours of class contact at 3 per week, 50% assignment, 50% 2 hour exam). However, the exact allocation of hours is dependent upon you and the module you are taking.

Total learning hours = 150 hours. Subtracting 36 hours for class contact, gives 114 hours for independent activity. 2 hours is given to the exam, leaving 112 hours which you need to allocate between,
i)   exam preparation;
ii) assignment completion;
iii) weekly lecture/tutorial/practical preparation, reading and exercise completion.

Please note that in the following work hours are taken as hours of productive work and not total elapsed time between starting and finishing some task e.g. coffee, meal, comfort and relaxation breaks and breaks for any other activity are not included.

You could allow 48 work hours in total for the weekly work on the material covered in the lectures, tutorials, practicals for that week – associated reading, note-taking, completion of
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tutorial/practical exercises, etc. This gives you 4 work hours to be spent each week (in addition to the class hours) working on the material being covered that week.

This leaves 64 hours for the assessment. This could be divided into 32 work hours of exam revision (= 4 ½ days of full-time work on revision) and 32 work hours spent on the assignment (= 4 ½ days of full-time work on the assignment).

There is of course a trade-off in the allocation of time between the various different activities. To a large extent if you decide not to give much time to the weekly lecture/tutorial/practical material, then your level of understanding of the material will be much poorer when it comes to the revision for the exam. This would require you to spend many more hours in exam revision to achieve the same level of preparedness as you would have achieved had you spent some significant proportion of your time on the weekly work. Similarly, the completion of the assignment activities would normally be facilitated by having achieved a foundation of knowledge, understanding and skills in the weekly work. Thus if you were to allocate 0 hours to the weekly work in addition to the class contact time, then it may be possible that you would need to spend an additional 24 work hours on revision for the exam (= almost 3 ½ days of full-time exam revision) and 24 work hours on the assignment (= almost 3 ½ days of full-time assignment work) in order to achieve the same level of exam preparedness and assignment completion as under the allocation of time given above as an example. Given the limited total time available, it is likely that there would be insufficient actual time available for you to complete either the exam preparation or assignment work to a standard that you might otherwise be capable of. Thus time spent on lecture review and doing associated reading, completion of weekly tutorial/practical exercises and note-taking are all very well worth activities.

Also it should be noted that attendance at timetabled classes is not only a requirement placed on you by a regulation of the university, but it is also very time-effective. If you attend a lecture for example, then subsequent review of the lecture and reading associated with it will be much easier than attempting to understand the lecture notes/slides without having attended the lecture. It will probably take you more than 1 work hour to achieve the same level of understanding as someone who has attended the lecture. Thus non-attendance at classes is actually only increasing your total workload.

11.3   Approaches to teaching and Assessment

We recognise that your ability to manage your own learning will improve as you progress through the levels of your award. As a result the class contact hours decrease from level C (typically 48 hours per 15 credits) to level I and H (with typically 36 hours per 15 credits). Also the nature of the class contact is tailored to the nature of the learning activities required from you. Knowledge and the introduction of concepts, theories, principles and techniques/methodologies occurs in lectures, whereas the testing of understanding and application of concepts, theories, principles and techniques/methodologies to the solution of various problems occurs in tutorials and laboratory based practical classes. This is reflected in the comparative proportions of lecture to tutorial/practical in the modules. Typically a very practical and skill oriented subject, such as learning to express conceptual understanding of processes through the application of a programming language has a much greater proportion of tutorial or laboratory based work, whereas a module that focuses more on the development of fundamental conceptual understanding has a larger proportion of lectures.

The development of the learning outcomes of the modules was guided by the need to ensure that where a module is core to an award title the learning outcomes of the module are designed so that completion of the module learning outcomes manifests the achievement of the relevant award learning outcomes.

Assignment guidelines where written reports are produced

Weighting of assignment component	Length of assignment component (calculated on the basis of 200 words per 1 credit of weighting) – these are typical
100%	3000 words
50%	1500 words
30%	1000 words

11.4   Preparation for examinations and tests.

As well as ensuring that you allocate sufficient time for exam/test revision, there are a number of other activities you would be well advised to do in preparation for the exam:

- Attend any revision classes and take due note of any information and advice given.
- Make sure you understand the format of the exam and conditions under which the exam is to be taken i.e. how many questions of various types you are expected to complete, exam length, any materials you are allowed/provided with or not allowed e.g. calculator or mathematics equation sheet, etc.
- Find out when and where the exam is to be held and produce a revision timetable and stick to it.
- Read through the lecture notes, tutorial/practical work and any model answers that might have been provided in order to make sure that,
  o you understand the content of the lectures, tutorials, practical work, etc. If you don't understand then you will need to do additional work with background reading and asking colleagues and members of staff for additional explanation.
  o make revision notes of your own which re-expresses the content of the module in your own words – these may be very summary if you understand the concepts covered very well. Remember the revision notes should cover the tutorial work as well as the lectures.
- Review your revision notes regularly ideally until you no longer need to consult them i.e. you can run through the revision notes accurately without looking at them.
- Do not become discouraged if you do not understand something the first time you look at it. It is very common that something will need to be reviewed several times before you understand it.
- Try to explain some idea/concept to another person or even to yourself. Does it appear to make sense the way you have explained it? If it doesn't then you probably need to do some more work on your understanding.
- Try and relate what has been covered to other things you already understand.
- Obtain and work through any past papers if you can hold of them – it is best to do so only after you have done some revision.

- Work through the tutorial exercises without looking at any model answers to see if you can solve them for yourself. If you can't then you need to extra work until you can.
- Try and make up your own exam paper – think of possible questions that could be asked and try to produce a marking scheme (how many marks to be given for each point someone might correctly cover/explain in an answer). Then try and answer your questions. You can do this under exam conditions and then check your answers i.e. mark them for yourself. See how you do. Then revise further your weak points.

12   PERSONAL DEVELOPMENT PLANNING (PDP) WITHIN THE SCHEME.

Personal Development Planning (PDP) is a set of activities and an approach to your studies which the University wants to encourage all students to engage in. It encourages you to reflect on your life and career goals and expectations, in order to analyse what skills and knowledge you need in order to accomplish those goals. It encourages you to try to integrate your academic studies with the rest of your life and aims to try to help you appreciate the relevance and context of your studies. PDP equips you with the skills to develop a more proactive approach to your life and the place of academic study and lifelong learning within it. Personal Development Planning (PDP) has been embedded within the award in a number of different ways:

- At level C it is largely embedded in the personal tutor's role. It is coupled with the process of induction and later in the year with the need to firm up on the choice of modules for the second year.
- At level I, the Professional and Enterprise Development module explicitly requires you as part of your developing professionalism, to reflect upon your career/life goals and what actions and learning objectives you need to pursue in order to facilitate the achievement of those goals.
- In the industrial placement there is an explicit requirement to reflect upon the placement experience and relate it to your personal development.
- Finally, at level H, the project supervisor's role will include facilitating your reflection upon your development in the final year ahead of progression into employment, research or training.

Please refer to the materials and resources you were introduced to during your induction period for additional practical advice.

13   PROGRAMME SPECIFIC REGULATIONS.

Programme specific regulations are regulations which are in addition to those specified in the University Undergraduate Modular Framework Regulations. They allow for award and Schemes to have regulations that are specifically tailored for them.

MEng

The level M of the MEng is governed by the postgraduate academic award regulations. These may also be found at *http://www.staffs.ac.uk/current/regulations/academic/index.php* .
It is of note that these regulations differ from the Undergraduate Regulations in a number of significant ways. Of particular note is that the pass for a module is set at grade point 7 (50%) rather than grade point 4 (40%) for undergraduate modules. Also of note is that compensation can not be applied to grade points 0, 1, 2, or 3 i.e. only grade points 4, 5, or 6 are eligible for compensation. For a full description of the regulations see the web link above.

Minimum Threshold marks

In order to achieve a pass in an undergraduate module, a minimum of 30% is required in each component of assessment (separate components being those identified in the weighting between assessments shown in the module descriptor). If less than 30% is achieved in a given component of assessment and an aggregate mark is achieved, over all assessments, of >= 40%, then the grade point given for the module is a 3. Where the aggregated mark is less than 40%, then the grade point given for the module is that normally associated with the given mark. Failure of a module due to failure to achieve >= 30% in each component of assessment, may still be subject to compensation and condonement.

Industrial placement

The responsibility for finding a suitable placement rests with the student. While the Faculty will support a student in finding a placement through its placement unit, it does not guarantee that a placement will be found for every student who wants one. This reflects the reality that placements involve a third party, the placement employer, who is under no obligation to offer a placement or take any specific students on as placement students. Ultimately such decisions reside with the employer and thus cannot be mandated by the University.

The industrial placement normally requires the completion of 48 weeks in relevant supervised work experience. Normally a student enrolled on a sandwich award must pass the sandwich year to progress to level H. However, in exceptional circumstances the completion of the industrial placement may be deferred until after the completion of level H. Where this occurs such students will still be required to pass an industrial placement before they can be awarded a sandwich degree.

A student who fails the industrial placement period will only be allowed one further attempt. The referral attempt must normally occur within 18 months. Failure at the second attempt will mean that the student cannot further progress on a sandwich award. The student would have to transfer onto an appropriate non-sandwich full-time award in order to continue on the Computer Science and Software Engineering Degrees Scheme.

To be eligible for the award of either an Honours degree, or an ordinary degree, with a sandwich, a student must pass the industrial placement period.

Transfer between a sandwich award and a non-sandwich award
Students may opt to transfer from a non-sandwich award to an appropriate sandwich award at any time.

Students may transfer from a sandwich version of their award to a non-sandwich version at any time up until the end of week 4 of level I. However, after week 4 of level I, the transfer is only permitted if one or more of the following criteria are met,

1) a student is unable, for valid reasons e.g. extenuating circumstances, to undertake or complete an industrial placement;
2) a student, having attempted the industrial placement, has failed it;
3) a student has BOTH been unable to secure a placement 12 months after the start of level I i.e. by the end of the September following level I (for September entrants) or the start of January (for January entrants) AND has a portfolio of evidence, agreed with the Placements Unit, that shows that the student has made a bona fide attempt to obtain a placement.

Final year project

In order to qualify for the award of an Honours degree all 3 project modules must be passed (this includes passes by compensation and/or referral). A maximum of one project module may be compensated and normally compensation will only be applied if the project module to be compensated has a grade point 3. A grade point 1 or 0 will never be compensated.
If, at the first attempt one or more of the project modules are failed and have not been compensated (subject to the compensation regulation above), then upon successful completion of referrals in those modules, the maximum degree classification that can be awarded is limited to the base classification the student achieved as a result of their first attempt at level H, except where the overall score is less than 4, in which case a third class honours degree is specified as the maximum.

Note that referral does not refer to re-assessment that is being undertaken as if for the first time.

Progression from level H to level M

The MEng level is only available to students who are registered on a BEng(Hons) award. The award board will consider progression at the end of level H. Progression from level H to level M is subject to the provision that the student has met the criteria for the award of a BEng (Hons) degree with a level of performance at least equivalent to BEng(Hons) lower second classification. However, a classification equivalent to at least an upper second would normally be expected.
If a student is eligible for the award of a BEng/BEng(Hons), but has not met the criteria for progression to level M, then the student will be awarded the BEng/BEng(Hons) as appropriate and will not be permitted to progress to level M.

Award of BEng on failure of the MEng

A student having progressed to level M but failing to achieve 120 credits points at level M on completion of referral opportunities will be awarded the BEng with Honours at the level determined by the award board at the end of their level H studies.

14   CRITERIA FOR APEL AND TRANSFER WITHIN THE SCHEME.

If you wish to transfer from one award to another within the Scheme or between sandwich and non-sandwich, or honours and ordinary degrees or wish to apply to have prior learning accredited, then you should talk to your scheme leader for guidance and they will take you through the process involved. The following section sets out the award specific rules governing such admission and transfers.

Transfer between award titles within the Scheme.

You may transfer between different awards within the Scheme provided that the set of modules that you have passed match the award structure of the award onto which you wish to transfer and provided that you are able to demonstrate that you will be able to study at the level required by your new award. Transfers between awards are subject to the approval of the scheme leader. Where your set of modules does not match the requirements of your new award then your scheme leader will advise you which modules you will be required to pass in order to qualify for the award to which you wish to transfer. You may be allowed to transfer onto the new award before you have a complete set of modules that map onto the new award structure. However, any such transfer is strictly on the condition that you should complete such modules as are necessary in order to make your set of modules conform to the requirements of the award structure of the award you have transferred onto.

Application for APEL

In general terms the University is willing to give appropriate exemptions to some of its modules if a you are able to demonstrate that the learning outcomes of the module have been achieved by some accredited study or experience elsewhere. There are limits placed on the amount of exemptions that may be granted. The procedure for making an application for APL and the policy governing APL is available at
http://www.staffs.ac.uk/images/apel_pol_student_hbook_tcm68-12705.pdf

15   COMPUTING MODULES

Full list of modules including all core and computing option modules for this Scheme.
For details of the module specifications for these modules please see the University website
http://www.staffs.ac.uk/current/student/modules/

Level C (level 1) Modules

Teaching block 1

CE00371-1	Introduction to Software Development
CE00842-1	Hardware, Software Systems and Graphics
CE61014-1	Mathematics and Statistics for Computing
CE00369-1	Introduction to Computer Games and Graphical Systems
CE00398-1	Introduction to Security Technologies
CE00126-1	Introduction to Networking with LANs and WANs [CCNA 1&2]
CE00301-1	Web Design and Development
CE00830-1	Introduction to Knowledge Management
CE00826-1	Business Analysis and Modelling
CE00367-1	Introductory Business Concepts

Teaching block 2

CE00839-1	Systems Modelling
CE00853-1	Systems and Database Analysis
CE00882-1	Object Oriented and Event Driven Programming
CE00855-1	Introduction to Operating Systems
CE00370-1	Introduction to AI
CE00291-1	Introduction to Multimedia Applications
CE61001-1	Applied Quantitative Methods
CE00869-1	Algorithms and Data Structures in C
CE00056-1	Introduction to Programming 3D Applications
CE00462-1	Introduction to 3D Modelling
CE00601-1	Introduction to Mobile and Wireless Technology
CE00126-1	Introduction to Networking with LANs and WANs [CCNA 1&2]
CE00301-1	Web Design and Development
CE00833-1	Web Design and Development 2
CE00872-1	Introduction to Logistics and Database Technology
CE00868-1	Introduction to Forensic Tools and Techniques

Level I (level 2) Modules

For details of the module specifications for these modules please see the University website
http://www.staffs.ac.uk/current/student/modules/

Teaching block 1

CE00321-2	System Development Methods
CE00315-2	Professional and Enterprise Development
CE00856-2	Database Systems
CE00125-2	Introduction to IP Telephony
CE00881-2	LAN Switching and WAN Networks [CCNA 3&4]
CE00314-2	Further Programming Concepts in C++
CE00377-2	Computer Graphics
CE00386-2	Windows Game Programming
CE00353-2	User Centred Systems Development
CE00821-2	Learning and Innovation
CE62022-2	Mathematics Software with Applications
CE00840-2	Media for the Web
CE00375-2	Fundamentals of Mobile Computing
CE00399-2	Biometrics I
CE62020-2	Business Forecasting and Planning
CE00849-2	Further Programming for 3D Applications
CE00884-2	Data Recovery, Tracing and Evidence Gathering in Computer Systems
CE00843-2	Web Database Programming
CE00317-2	Management and Planning
CE62024-2	Questionnaire and Data Analysis
CE00527-2	Further Object Oriented Programming

Teaching block 2

CE00804-2	Hardware and Software Systems and Networks
CE62027-2	Mathematics and Algorithmics
CE00373-2	Computer Systems: Low Level Techniques
CE00352-2	System Programming and Computer Control Systems
CE00883-2	Principles and Practices of Software Production
CE00463-2	Object-Oriented System Development
CE00376-2	Imaging and Special Effects
CE00851-2	Programming Physics and AI Engines for Games
CE62023-2	Probability and Statistical Modelling
CE00880-2	Web Applications
CE00719-2	Multimedia Animation
CE00844-2	Web Media Programming
CE00341-2	AI Methods
CE00864-2	Introduction to Network Security
CE00343-2	Software Development for Mobile Computing Applications

CE00374-2	Graphical User Interfaces: Design and Implementation
CE62025-2	Spreadsheet Modelling Techniques
CE00306-2	HCI and Usability
CE00828-2	Interface Design and Interactions
CE00850-2	Web Programming with Servlets and JSP
CE00861-2	Advanced Routing [CCNP 1]
CE00863-2	Converged Networks [CCNP 2]
CE00379-2	IT Systems for Business
CE00417-2	Enterprise Information Systems
CE00409-2	Practical Systems Management
CE00526-2	Concurrent Programming in C#
CE00405-2	Data Management Not running 2009/10
CE00406-2	Dynamic Data Interchange
CE00866-2	Database Security Not running 2009/10
CE00596-2	Investigating Operating Systems
CE00823-2	Service Management and Service Oriented Architecture
CE00854-2	Network and Grid Computing

Level H (level 3) Modules

For details of the module specifications for these modules please see the University website
http://www.staffs.ac.uk/current/student/modules/

Project modules

CE00835-3	Project: Planning, Management, Communication and Appraisal
CE00836-3	Project: Research, Analysis and Artefact Design
CE00837-3	Project: Artefact Realisation, Testing and Evaluation

Teaching block 1

CE00879-3	Information Systems Engineering in Industry
CE00870-3	Real-Time Systems
CE00360-3	Computer Systems Security
CE00333-3	Algorithmics
CE00362-3	Design Patterns
CE00364-3	3D Computer Graphics
CE00336-3	Image Processing, Computer Vision and Pattern Recognition
CE00332-3	Advanced Database Systems
CE00346-3	Strategic Information Management
CE00822-3	Service Science
CE00307-3	Simulation, Visualisation and Virtual Reality
CE00334-3	Further AI
CE63033-3	Operational Research
CE00860-3	Advanced Wireless Networks
CE00355-3	Advanced HCI and Usability
CE63025-3	Spreadsheet Automation with VBA
CE00313-3	Ubiquitous Computing
CE00720-3	Multimedia Systems
CE00847-3	Further Media for the Web
CE00846-3	Building Web Applications
CE00841-3	Web Standards and Semantic Web
CE00722-3	Further Web Applications
CE00874-3	Enterprise Applications with Java Enterprise Edition
CE63024-3	Survey Design and Analysis
CE00337-3	Learning Technology through Project-Based Learning
CE00385-3	AI Engines for Games
CE00852-3	Practical Games Strategies
CE00383-3	Advanced Programming for 3D Applications
CE00461-3	On-Line Gaming
CE00862-3	Advanced Switching [CCNP 3]
CE00303-3	Critical Issues in Managing Information Systems
CE00397-3	Forensic Data Gathering, Reconstruction and Analysis
CE00403-3	Biometrics II

CE00925-3	Further Programming for Mobile and HandHeld Devices

Teaching block 2

CE00871-3	Safety Critical and Embedded Systems
CE00329-3	Distributed Computer Systems
CE63030-3	Chaos and Fractals
CE00339-3	Information Systems Development Trends
CE00389-3	Real-Time Rendering and Animation
CE00331-3	Advanced Programming Language Concepts
CE63032-3	Mathematical Modelling
CE63031-3	Financial Modelling with Decision Making
CE00349-3	E-Commerce/M-Commerce Systems: Strategy and Management
CE00340-3	Legal and Evidentiary Aspects of Forensic Computing
CE00348-3	Project Management
CE00831-3	Knowledge Management in Organisations
CE00845-3	Web Services
CE00721-3	Multimedia Development
CE00461-3	On-Line Gaming
CE00363-3	Further Programming for Mobile Devices
CE00391-3	Advanced Windows Game Programming
CE00875-3	Character AI
CE00876-3	Low Level Graphics Concepts
CE00865-3	Network Service Quality [CCNP 4]
CE00404-3	Malicious Software and Security Programming
CE00407-3	Management of Database Systems

The following modules can NOT be taken by on campus students i.e. only by those following a Work Based Learning or distance version of a computing award.

CE00316-3	XML and Web Services
CE53005-3	Residential Case Study