Programme Specification
BSc (Hons) Computing Science with Diploma in Industrial Studies

PLEASE NOTE. This specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he or she takes full advantage of the learning opportunities provided. More detailed information on the specific learning outcomes, content and the learning, teaching and assessment methods of each module can be found in the Module Handbooks.

1. AWARDING INSTITUTION/BODY: UNIVERSITY OF ULSTER
2. TEACHING INSTITUTION: UNIVERSITY OF ULSTER
3. LOCATION: JORDANSTOWN
4. COURSE ACCREDITED BY: BRITISH COMPUTER SOCIETY
5. FINAL AWARD: BSc (Hons) in Computing Science with Diploma in Industrial Studies
6. MODE OF ATTENDANCE: Full-time
7. SPECIALISMS: Computing
8. UCAS CODE: G400
9. QAA SUBJECT UNIT: Computing

10. EDUCATIONAL AIMS AND OBJECTIVES OF THE COURSE
The overall aim of the course is to provide a broadly-based education in computing science which will produce graduates equipped to apply best practice in software engineering to the development of a wide range of information systems in organizations.

In support of this, the course has the following objectives:

• to provide a systematic study of the theory and principles of programming and software engineering, computer hardware and software technologies, and the role of computing systems in organizations.

• to develop an ability to analyze computing problems and formulate practical solutions to these problems, coupled with the ability to critically evaluate the approach and techniques used.

• to provide opportunities for the development of practical skills in software development in a business/industrial context (DIS version only)

• to develop key skills and enterprise competencies to support the student’s progression into a career in the software industry or further academic study.
11. MAIN LEARNING OUTCOMES

The course provides opportunities for students to achieve and demonstrate the following learning.

(Reference points used in defining the learning outcomes were the QAA Computing subject benchmark statement (2000) (B) and The British Computer Society Guidelines on Course Exemption and Accreditation (2001)(P) ).

11A SUBJECT RELATED QUALITIES

Knowledge and Understanding of:

A1 Programming fundamentals, data structures and algorithms, databases, human-computer interaction and software engineering (B,P)
A2 Computer architecture, computer networks, systems software and web-based computing (B,P)
A3 An engineering approach to the development of information systems in organizations (B,P)
A4 Professional issues in information systems engineering (B,P)
A5 Current developments in a selection of advanced software techniques, technologies and applications (e.g. software engineering, computer networks, organizational computing, artificial intelligence) (B,P)

Learning and Teaching Methods: lectures, tutorials, laboratory practical classes, directed private study, video, individual and group-based coursework.

Assessment Methods: class-tests, assessed coursework assignments, written examinations.

11B INTELLECTUAL QUALITIES

The ability to:

B1 Abstract and model data and facts pertaining to the requirements of an information system for the purposes of comprehension, analysis, specification and communication (B,P)
B2 Formulate design specifications for constructing information systems and apply problem solving skills in their specification and implementation (B,P)
B3 Analyze and evaluate the extent to which an information system meets the criteria defined for its current use and future development (B,P)
B4 Relate professional, legal, moral and ethical issues to the engineering and use of information systems (B,P)
B5 Justify and communicate the technical and organizational rationale for a particular software solution (B)
B6 Apply computing science fundamentals to the comprehension and evaluation of advanced hardware and software technologies (P).

Learning and Teaching Methods: lectures, tutorials, laboratory practical classes, directed private study, individual and group-based coursework.
**Assessment Methods**: class-tests, coursework assignments, group-based coursework, individual project written reports and viva-voce examination, individual presentations, written examinations.

**11C PROFESSIONAL / PRACTICAL SKILLS**

The ability to:

C1 Specify, design, construct and test computer-based information systems (B,P)

C2 Deploy best practice engineering processes, techniques and tools for the development and documentation of information systems (B,P)

C3 Work as member of a team, recognizing the different roles within a team and the different ways of organizing teams (B,P)

C4 Communicate effectively technical information to technical, management, user, and academic audiences (B,P)

C5 Operate computing equipment effectively, based on an understanding of its hardware and software elements (B)

C6 Solve software problems in a business/industrial context. (DIS version only)

**Learning and Teaching Methods**: lectures, tutorials, laboratory practical classes, directed private study, individual and group-based coursework, industrial placement.

**Assessment Methods**: class-tests, coursework assignments, group-based coursework, individual project written reports and viva-voce examination, software demonstrations, individual presentations, poster presentations, placement reports from students and supervisors.

**11D TRANSFERABLE/KEY SKILLS**

The ability to:

D1 Learn in both familiar and unfamiliar situations making effective use of information retrieval skills and learning resources (B)

D2 Communicate effectively using various media and with a variety of audiences (B)

D3 Apply numeracy in both understanding and presenting cases involving a quantitative aspect (B)

D4 Effectively use general information technology facilities (B)

D5 Manage one’s own learning and development including time management, organizational skills and awareness of entrepreneurship issues (B,P)

D6 Appreciate the need for continuing professional development in recognition of the need for life long learning (B,P)

**Learning and Teaching Methods**: lectures and tutorials, laboratory practical classes, directed private study, individual and group-based coursework, industrial placement.

**Assessment Methods**: class-tests, coursework assignments, group-based coursework, individual project written reports and viva-voce examination, software demonstrations, individual presentations, poster presentations, placement reports from students and supervisors.
## MODULE OUTCOME MAP (COURSE SPECIFICATION DRAFT)

**Please Note:** The matrix displays only the main measurable outcomes. There may be other outcomes detailed in the module descriptions (e.g. attitudes and behaviours) which are not assessed.

<table>
<thead>
<tr>
<th>Modules</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Title</strong></td>
<td><strong>Year/Sem.</strong></td>
</tr>
<tr>
<td>Programming I</td>
<td>1/1</td>
</tr>
<tr>
<td>Systems Analysis</td>
<td>1/1</td>
</tr>
<tr>
<td>Mathematics for Computing</td>
<td>1/2</td>
</tr>
<tr>
<td>Programming II</td>
<td>1/2</td>
</tr>
<tr>
<td>Introduction to Databases</td>
<td>1/1,2</td>
</tr>
<tr>
<td>Computer Technology</td>
<td>1/1,2</td>
</tr>
<tr>
<td>Algorithms and Data Structures</td>
<td>2/1</td>
</tr>
<tr>
<td>Networks and Data Communications</td>
<td>2/1</td>
</tr>
<tr>
<td>Professional Issues &amp; Entrepreneurship</td>
<td>2/1</td>
</tr>
<tr>
<td>Web Application Development</td>
<td>2/1</td>
</tr>
<tr>
<td>Systems Development</td>
<td>2/2</td>
</tr>
<tr>
<td>Systems Software</td>
<td>2/2</td>
</tr>
<tr>
<td><strong>Year 2 options</strong></td>
<td></td>
</tr>
<tr>
<td>Advanced Programming</td>
<td>2/2</td>
</tr>
<tr>
<td>Introduction to Knowledge Based Systems</td>
<td>2/2</td>
</tr>
<tr>
<td>Industrial Placement</td>
<td>3</td>
</tr>
<tr>
<td>Software Systems Engineering</td>
<td>4/1</td>
</tr>
<tr>
<td>Project/Dissertation</td>
<td>4/1,2</td>
</tr>
<tr>
<td><strong>Final Year Options</strong></td>
<td></td>
</tr>
<tr>
<td>Advanced Database Systems</td>
<td>4/1</td>
</tr>
<tr>
<td>Formal Requirements Specification</td>
<td>4/1</td>
</tr>
<tr>
<td>Information Systems Strategic Management</td>
<td>4/1</td>
</tr>
<tr>
<td>Intelligent Systems</td>
<td>4/1</td>
</tr>
<tr>
<td>Interactive Computing</td>
<td>4/1</td>
</tr>
<tr>
<td>Advanced Computer Networks</td>
<td>4/2</td>
</tr>
<tr>
<td>Concurrent and Distributed Systems</td>
<td>4/2</td>
</tr>
<tr>
<td>Natural Language Processing</td>
<td>4/2</td>
</tr>
<tr>
<td>Software Engineering Management</td>
<td>4/2</td>
</tr>
</tbody>
</table>

Please Note: The matrix displays only the main measurable outcomes. There may be other outcomes detailed in the module descriptions (e.g. attitudes and behaviours) which are not assessed.
12. **COURSE STRUCTURE AND REQUIREMENTS FOR THE AWARD**

The course is of four years duration. Years 1, 2 and 4 are spent at university and year 3 is a period of industrial placement.

The course structure is centered on three broad themes: programming and software engineering, hardware and software technologies, and computing in organizations, with an emphasis on software engineering topics. Years 1 and 2 consist of a set of modules addressing these themes, enabling students to achieve the basic competencies in software development and equipping them for a period of industrial placement. Year 1 consists of 120 credit points (20 at level A, the remainder at level 1) and year 2 120 points at Level 2.

All students normally spend year 3 on placement, working in some aspect of the software industry for a minimum period of 30 weeks. On satisfactory completion of the placement period the student is eligible for the award of Diploma in Industrial Studies.

Year 4 consists of two compulsory modules and four optional modules, all at Level 3. The compulsory modules (Software Systems Engineering and Project) reflect the core theme of the course at an advanced level. A range of optional modules are offered. Students may elect to do a broad range of topics or specialize in one or two designated areas, such as computer networks, software engineering, computing in organizations or artificial intelligence.

Satisfactory completion of each pre-final year of the course is normally a pre-requisite for progression to the subsequent year. Satisfactory completion of year 4 leads to the award of the degree with Honours. Pass requirements and honours classifications are detailed in section 16 below.
### Year 1

<table>
<thead>
<tr>
<th>Sem</th>
<th>Module Title</th>
<th>Credit Level</th>
<th>Points</th>
<th>Contribution to Classification</th>
<th>Module Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Programming I</td>
<td>A</td>
<td>20</td>
<td>-</td>
<td>Core</td>
</tr>
<tr>
<td>1</td>
<td>Systems Analysis</td>
<td>1</td>
<td>20</td>
<td>-</td>
<td>Core</td>
</tr>
<tr>
<td>2</td>
<td>Mathematics for Computing</td>
<td>1</td>
<td>20</td>
<td>-</td>
<td>Core</td>
</tr>
<tr>
<td>2</td>
<td>Programming II</td>
<td>1</td>
<td>20</td>
<td>-</td>
<td>Core</td>
</tr>
<tr>
<td>1,2</td>
<td>Introduction to Databases</td>
<td>1</td>
<td>20</td>
<td>-</td>
<td>Core</td>
</tr>
<tr>
<td>1,2</td>
<td>Computer Technology</td>
<td>1</td>
<td>20</td>
<td>-</td>
<td>Core</td>
</tr>
</tbody>
</table>

### Year 2

<table>
<thead>
<tr>
<th>Sem</th>
<th>Module Title</th>
<th>Credit Level</th>
<th>Points</th>
<th>Contribution to Classification</th>
<th>Module Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Algorithms and Data Structures</td>
<td>2</td>
<td>20</td>
<td>-</td>
<td>Core</td>
</tr>
<tr>
<td>1</td>
<td>Networks and Data Communications</td>
<td>2</td>
<td>20</td>
<td>-</td>
<td>Core</td>
</tr>
<tr>
<td></td>
<td>Professional Issues and Entrepreneurship</td>
<td>2</td>
<td>10</td>
<td>-</td>
<td>Core</td>
</tr>
<tr>
<td>1</td>
<td>Web Application Development</td>
<td>2</td>
<td>10</td>
<td>-</td>
<td>Core</td>
</tr>
<tr>
<td>2</td>
<td>Systems Development</td>
<td>2</td>
<td>20</td>
<td>-</td>
<td>Core</td>
</tr>
<tr>
<td>2</td>
<td>Systems Software</td>
<td>2</td>
<td>20</td>
<td>-</td>
<td>Core</td>
</tr>
<tr>
<td>2</td>
<td>Advanced Programming</td>
<td>2</td>
<td>20</td>
<td>-</td>
<td>Optional</td>
</tr>
<tr>
<td>2</td>
<td>Introduction to Knowledge-based Systems</td>
<td>2</td>
<td>20</td>
<td>-</td>
<td>Optional</td>
</tr>
</tbody>
</table>

### Year 3

<table>
<thead>
<tr>
<th>Sem</th>
<th>Module Title</th>
<th>Credit Level</th>
<th>Points</th>
<th>Contribution to Classification</th>
<th>Module Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,2,3</td>
<td>Placement</td>
<td>2</td>
<td>60</td>
<td>-</td>
<td>Core</td>
</tr>
</tbody>
</table>

### Year 4

<table>
<thead>
<tr>
<th>Sem</th>
<th>Module Title</th>
<th>Credit Level</th>
<th>Points</th>
<th>Contribution to Classification</th>
<th>Module Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,2</td>
<td>Project/Dissertation</td>
<td>3</td>
<td>30</td>
<td>1/4</td>
<td>Core</td>
</tr>
<tr>
<td>1</td>
<td>Software Systems Engineering</td>
<td>3</td>
<td>10</td>
<td>1/12</td>
<td>Core</td>
</tr>
<tr>
<td>1</td>
<td>Advanced Database Systems</td>
<td>3</td>
<td>20</td>
<td>1/6</td>
<td>Optional</td>
</tr>
<tr>
<td>1</td>
<td>Formal Requirements Specification</td>
<td>3</td>
<td>20</td>
<td>1/6</td>
<td>Optional</td>
</tr>
<tr>
<td>1</td>
<td>Intelligent Systems</td>
<td>3</td>
<td>20</td>
<td>1/6</td>
<td>Optional</td>
</tr>
<tr>
<td>1</td>
<td>Interactive Computing</td>
<td>3</td>
<td>20</td>
<td>1/6</td>
<td>Optional</td>
</tr>
<tr>
<td>1</td>
<td>Info. Systems Strategic Management</td>
<td>3</td>
<td>20</td>
<td>1/6</td>
<td>Optional</td>
</tr>
<tr>
<td>2</td>
<td>Advanced Computer Networks</td>
<td>3</td>
<td>20</td>
<td>1/6</td>
<td>Optional</td>
</tr>
<tr>
<td>2</td>
<td>Concurrent &amp; Distributed Systems</td>
<td>3</td>
<td>20</td>
<td>1/6</td>
<td>Optional</td>
</tr>
<tr>
<td>2</td>
<td>Natural Language Processing</td>
<td>3</td>
<td>20</td>
<td>1/6</td>
<td>Optional</td>
</tr>
<tr>
<td>2</td>
<td>Software Engineering Management</td>
<td>3</td>
<td>20</td>
<td>1/6</td>
<td>Optional</td>
</tr>
</tbody>
</table>
13. **SUPPORT FOR STUDENTS AND THEIR LEARNING**

Students and their learning are supported in a number of ways:

- Induction programme in year 1
- Year 1 tutorial system
- Studies Advice system
- Personal Development Planning
- Course web site, course handbook and module booklets
- Extensive library and other learning resources
- Computer laboratories with a wide range of software
- Intranet containing learning support material
- Student e-mail accounts and full access to the Internet
- Placement preparation sessions dedicated to preparing students for placement and providing support in finding placement opportunities
- Academic staff visit students during placement
- Advertised availability hours for academic staff in addition to email contact

14. **CRITERIA FOR ADMISSION TO THE COURSE**

Applicants must satisfy the University’s general entry requirements. Specific requirements for admission to the course are detailed below:

**Year 1**

- Typical GCE/VCE ‘A’ Level requirements: BBC
- Typical Irish Leaving Certificate requirements: BBBBCC (420-480 points)
- Other qualifications deemed equivalent, e.g. National Diploma, Higher National Diploma, International Baccalaureate
- APEL

Normally GCSE passes of at least grade C in English and grade B in Mathematics are required.

**Year 2**

Direct entry to year 2 for suitably qualified candidates. For students entering from Associate Bachelor Degree in Computing Science: normally 65% overall average in final year.

15. **EVALUATING AND IMPROVING THE QUALITY AND STANDARD OF LEARNING AND TEACHING**

Mechanisms for the review and evaluation of teaching, learning, assessment, the curriculum and outcome standards:

- Module reviews (include student input)
- Annual course review prepared by the course committee
- Peer teaching observations and feedback
- Annual staff reviews
Committees with responsibility for monitoring and evaluating quality:

- Staff Student Consultative Committee
- Course committee
- Board of Examiners
- Faculty Teaching and Learning Committee
- Faculty Quality Assurance and Enhancement Committee
- University Teaching and Learning Committee.
- University Quality Assurance and Enhancement Committee

Mechanisms for gaining student feedback on the quality of their learning experience:

- Staff-Student Consultative Committee
- Student representatives on School and Faculty boards
- Module evaluation - questionnaires / module forum / module freeform responses
- Student questionnaires on each lecturer
- Placement reports

Staff development includes:

- Updating in the subject through research and scholarship
- Membership of the Higher Education Academy (ILTM)
- Consultancy
- Technology transfer
- University Staff Development programme
- Staff activity in Faculty hosted Learning and Teaching Support Network (LTSN) Centre for Information and Computer Sciences.

16. **REGULATION OF STANDARDS**

**Assessment rules**

The pass mark for each module in years 1, 2 and 4 is 40%. The pass mark for each assessment element in a module (coursework, examination) is 40%. There is limited provision both for the condonement of failed modules having no assessment element mark below 35% and for the resitting of failed assessment elements. To pass each year of the course candidates must obtain either a pass or an eligible condoned failure in each module taken.

In year 3 Industrial Placement, the following rules apply:

- At least 70% award DIS with commendation
- At least 50% and less than 70% award DIS
- At least 40% pass year 3 and progress to final year.
The following percentages are used for determining candidates’ overall gradings of Honours degree courses:

<table>
<thead>
<tr>
<th>Class</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class I</td>
<td>At least 70%</td>
</tr>
<tr>
<td>Class II (division i) (IIi)</td>
<td>At least 60% and less than 70%</td>
</tr>
<tr>
<td>Class II (division ii) (IIii)</td>
<td>At least 50% and less than 60%</td>
</tr>
<tr>
<td>Class III</td>
<td>At least 40% and less than 50%</td>
</tr>
</tbody>
</table>

Consistent with the University’s approach for honours degree assessment, only year 4 level 3 modules contribute to the honours classification. All modules contribute equally according to their points weighting (20 point modules contribute one sixth, 10 point modules one twelfth and 30 point modules one quarter.)

**External examiners**

The course has one External Examiner. His/her role is to consult, through the Course Director, with the internal examiners on the approval and moderation of examination papers and other forms of assessment. He/she approves the examination papers for year 4, and reviews all the assessment marking and results for years 1 - 4. In addition, the External Examiner ensures comparability with similar courses at other institutions as regards course content and the standard of marking of examination papers and other forms of assessment. He/She provides valuable feedback to the Course Committee by submitting annual reports outlining any strengths or weaknesses of the course and the assessment procedures. The External Examiner may assist the Course Committee in reaching decisions on borderline candidates, and may subject such candidates to viva-voce examination.

17. **INDICATORS OF QUALITY RELATING TO LEARNING AND TEACHING**

- The Faculty was given a satisfactory rating by the QAA subject review process for its provision of Computing Science Teaching (1994) and attained 22 in the QAA Subject Review of Mathematics, Statistics and Operational Research (2000).
- Some Faculty members are also members of the Higher Education Academy
- A number of the current Faculty staff have received the University’s Distinguished Teaching Award.
- External funding for learning and teaching initiatives.
- All new staff and some existing staff have attained the Postgraduate Certificate in University Teaching.
- Selected courses have been accredited by The British Computer Society.