

# PROGRAMME SPECIFICATION

## 1. Key Information

|   |  |
|---|--|
| <b>Programme Title:</b>   | BSc (Hons) Software Engineering<br>BSc (Hons) Software Engineering with Foundation Year    |
| <b>Awarding Institution:</b>  | Buckinghamshire New University   |
| <b>Teaching Institution(s):</b>   | Buckinghamshire New University   |
| <b>Subject Cluster:</b>   | Computing  |
| <b>Award Title (including separate Pathway Award Titles where offered):</b> | BSc (Hons) Software Engineering  |
| <b>Pathways (if applicable)</b>   | N/A  |
| <b>Other award titles available (exit qualifications):</b>                  | Certificate of Higher Education<br>Diploma of Higher Education<br>BSc Software Engineering |
| <b>FHEQ level of final award:</b>   | Level 6  |
| <b>Accreditation details:</b>   | N/A  |
| <b>Length of programme:</b>   | 3 years Full Time<br>4 years with Foundation Year  |
| <b>Mode(s) of Study:</b>  | Full-time  |
| <b>Mode of Delivery:</b>  | In person (on-site) delivery   |
| <b>Language of study:</b>   | English  |
| <b>QAA Subject Benchmark(s):</b>  | Subject Benchmark Statement: Computing 30 Mar 2022   |
| <b>Other external reference points (e.g. Apprenticeship Standard):</b>      | British Computer Society   |
| <b>Course Code(s):</b>  | BSSOFTFT / BSSOFTFY  |
| <b>UCAS Code(s):</b>  | 1300                      LL30   |
| <b>Approval date:</b>   | 01 December 2022   |
| <b>Date of last update:</b>   | March 2025   |

## 2. Programme Summary

The course aims to focus on the 3 key disciplines of large-scale software design, development, and delivery. It will provide you with the appropriate skills and knowledge based upon the most up-to-date tools, techniques, and methodologies. Furthermore, you will explore all aspects of the software lifecycle. This will cover both the technical aspects addressing the activities of procurement, requirements capture, design, testing and maintenance, as well as the nontechnical aspects of Project Management (scheduling, costing, risks), Quality Management (Standards, Inspections) and Configuration

Management. Within this course, you will see how the successful combination of these essential elements will impact upon the current Software Crisis, by producing quality software systems on-time, within budget and fulfilling the customer's needs.

*Why learners should choose this award:*

Although this course is intentionally broadly based, it nevertheless will teach you key vocational skills in-depth throughout your time with us, covering the various Software Lifecycle stages (with example content of each as follows): analysis (applying Use Cases, Sequence Diagrams), Design (covering Class Diagrams, Finite State Machines), programming (implementing code in C#, Java & C++) and testing (addressing Unit, Integration, System, Acceptance). In addition, the teaching staff have underpinned much of the material with 'first-hand' commercial experience (via Knowledge Based Transfer and/or previous IT careers) as well as being enhanced by their own research activities and professional certification programmes provided by Microsoft, HP, and Cisco. This latter element can optionally be taken by learners throughout the course, providing a considerable advantage when finally entering the jobs market.

### 3. Programme Aims and Learning Outcomes

#### Programme Aims

This programme aims to:

1. Provide learners with a deep understanding of the methodologies, technologies and techniques used within software development.
2. Enable learners to apply knowledge of computer science and engineering principles to the development of software for industrial, business, and personal applications
3. Build solutions using different technologies, architectures, and life-cycle approaches in the context of different organisational structures.
4. Enable learners to be flexible enough in the evaluation of different approaches to solving problems using computer systems, within a constantly changing professional environment.
5. Develop an appreciation of professional, moral, and ethical issues involved and a sensitivity to changes in computing and information technology.

#### Programme Learning Outcomes

##### Knowledge and Understanding (K)

On successful completion of the programme, you will be able to:

| ID | Learning Outcome   |
|----|--|
| K1 | Describe the software engineering management and practices employed within distributed software development. |
| K2 | Recognise the business, industrial and commercial context in which software systems are deployed.            |
| K3 | Explain the mathematical principles associated with Software Engineering.                                    |
| K4 | Demonstrate knowledge of the hardware on which software systems run.   |

### Analysis and Criticality (C)

On successful completion of the programme, you will be able to:

| ID | Learning Outcome  |
|----|---|
| C1 | Select appropriate methodologies and tools for the construction and testing of software.  |
| C2 | Solve software related problems in a logical and analytical manner.   |
| C3 | Plan, manage, undertake, and report on a significant project.   |
| C4 | Make informed design decisions and produce innovative plans, approaches, and solutions to software issues.                            |
| C5 | Analyse, design, build and deploy distributed computer systems using a variety of current application technologies and architectures. |

### Application and Practice (P)

On successful completion of the programme, you will be able to:

| ID | Learning Outcome  |
|----|---|
| P1 | Employ analytical techniques and design tools in the development of software artefacts.   |
| P2 | Apply sound programming principles to the construction and maintenance of software deployed on multiple platforms, using appropriate programming paradigms and languages. |
| P3 | Specify, design, implement and test computer-based information systems.   |

### Transferable skills and other attributes (T)

On successful completion of the programme, you will be able to:

| ID | Learning Outcome   |
|----|--|
| T1 | Employ information-retrieval skills.   |
| T2 | Demonstrate numeracy and literacy in both understanding and presenting cases involving a quantitative and qualitative dimension.   |
| T3 | Work as a member of a development team, recognising the distinct roles within a team and diverse ways of organising teams, whilst acknowledging and anticipating the professional, moral, and ethical issues involved. |
| T4 | Manage one's own learning and development including time management and organisational skills  |
| T5 | Appreciate the need for continuing professional development in recognition of the need for lifelong learning   |

### Graduate Attributes

The BNU (Buckinghamshire New University) Graduate Attributes of: Knowledge and its application; Creativity; Social and ethical awareness and responsibility; and Leadership and self-development focus on the development of innovative leaders in professional and creative capacities, who are equipped to operate in the 21st Century labour market and make a positive impact as global citizens.

On this programme, attributes are developed through the practical application of analysis skills, mathematical principles, algorithmic intricacy, and programming techniques in a variety of creative situations, including set real-world scenarios, and life-critical Case Studies. (C2, P3, K3, T3, P2, C1). Analysis, evaluation, and implementation are embedded throughout the course in both individual and group tasks and through the appraisal of current and past software engineering-based systems and in the way, feedback is given to your own personal work. (T1, T3, C4). An understanding and awareness of operational applications fostered with a strong focus given to applying and assessing a cross-section of life-cycle methodologies. (K3, T3). This nurtures the self-efficacy to develop your own work opportunities and to adapt to a constantly evolving technological work environment (C4, K1, K2, K4). Through analysing the historical, social, and cultural contexts of operational software engineering-based systems, together with a growing social awareness is formed to ensure professional and ethical values. These are developed alongside the confidence to specify, design, implement and manage new and existing real-world, life critical systems, whilst appreciating software engineering disciplines of quality control and configuration management. (C1, P3, T4, T5, C5).

#### 4. Entry Requirements

The University's [general entry requirements](#) will apply for admission to a BSc (Hons) Degree programme. For this course, you must also hold both GCSE English Language and GCSE Maths at Grade C/4 or above, or equivalent qualifications.

A typical offer for entry to the programme would be a UCAS tariff score of 104 – 128, with UCAS points being obtained through qualifications such as A Levels, BTECs and Access to Higher Education courses in appropriate subjects.

Where a candidate does not fully meet the defined entry requirements, they will be further assessed according to their previous study, professional and/or vocational experiences. An interview may be necessary in such cases.

The [accreditation of prior learning](#) (APL) process may be utilised to determine if any exemptions from studying modules, or direct entry to a higher level of the programme, are appropriate.

Applicants who do not satisfy the conditions to join the 3-year version of the Degree programme will be considered for the extended 4-year Degree including a Foundation Year.

## 5 Programme Structure

| Level                  | Modules (Code, Title, and Credits)   | Exit Awards  |
|------------------------|--|--|
| <b>Foundation Year</b> | <p><b>Core modules:</b><br/>                     COM0005 Introduction to Programming<br/>                     COM0006 Computing Essentials</p> <p>COM0007 Core Mathematics<br/>                     COM0008 Design Principles</p> <p>COM0009 Professional Skills Review<br/>                     COM0010 Final Project</p>   | <b>N/A.</b> No credit is awarded at this Level.  |
| <b>Level 4</b>         | <p><b>Core modules:</b><br/>                     COM4008 Programming Concepts (20)<br/>                     COM4009 Computer Architecture (20)</p> <p>COM4010 Networking (20)<br/>                     COM4013 Cyber Threat and Risk Management (20)</p> <p>COM4011 Web Development (20)<br/>                     COM4012 Computing Computational Fundamentals (20)</p>                            | <b>Certificate of Higher Education,</b> awarded on achievement of 120 credits at Level 4                                 |
| <b>Level 5</b>         | <p><b>Core modules:</b><br/>                     COM5006 Object Orientated Analysis &amp; Design (20)<br/>                     COM5013 Algorithms and Data Structures (20)</p> <p>COM5003 Research Methods (20)<br/>                     COM5012 Object Orientated Programming (20)</p> <p>COM5011 Software Engineering (20)<br/>                     COM5009 Web Application Development (20)</p> | <b>Diploma of Higher Education,</b> awarded on achievement of 240 credits, including a minimum of 120 credits at Level 5 |

|                       |  |  |
|-----------------------|--|--|
| <p><b>Level 6</b></p> | <p><b><u>Core modules:</u></b><br/>                 COM6023 Advanced Programming (20)<br/>                 COM6002 Critical Systems (20)<br/>                 COM6007 Software Testing and QA (20)<br/>                 COM6001 Project (40)</p> <p><b><u>Option modules (totalling 60 credits):</u></b></p> <p><i>Choose ONE x 20-credit module from:</i><br/>                 COM6005 Cloud Computing (20)<br/>                 COM6004 Design Patterns (20)</p> | <p><b>Ordinary Degree</b>, awarded on achievement of 300 credits, including 60 credits at Level 6 and 120 credits at each of Levels 4 and 5</p> <p><b>Honours Degree</b>, awarded on achievement of 360 credits, including 120 credits at each of Levels, 4, 5 and 6</p> |
|-----------------------|--|--|

Please note: Not all option modules will necessarily be offered in any one year. Other option modules may also be introduced at a later stage enabling the programme to respond to changes in the subject area.

## 6. Learning, Teaching and Assessment

### Learning and teaching

Teaching and learning styles in computing increasingly emphasise capability, competency, and performance. They can reflect traditional workplace environments – placements, and live projects with clients - as well as newer approaches like online evaluations, role-playing scenarios and gig-economy/commissioned work. Practical coursework, both individual and in group, features heavily.

Therefore, more focus has now been given to help learners better control their own learner journeys, giving them the tools and techniques to enable them to self-regulate and to optimise their personal performance: self-reflection, performance monitoring, evaluation, and feedback within learning to support a more personalised journey. Our teaching and learning approaches also aim to imbue the ability to work independently.

Hence, our programme provides opportunities for applied learning in authentic or simulated work contexts, such as industrial placements. Working in teams on bigger projects simulates real-world environments and exposes learners to complexity. Ideally, projects can collaborate with industrial partners or research groups, enhancing learning and self-regulation and can expose learners to legal or ethical issues.

Modules on this programme will be taught in line with best practice across the university and in the sector. A variety of approaches, and effective use of the latest technology, will be blended to engage learners in learning in class and beyond, and to encourage full learner participation. Meanwhile, the Course Team will strive to ensure that all modules embrace current industrial practice wherever possible. The teaching and learning strategies employed throughout the course are those judged to be the most appropriate for each module at each stage and level of the course. The strategies have been designed to ensure that there is progression from formal teaching through to learner centred independent learning as the learner progresses through the levels of the course(s).

A range of teaching methods will be used including:

#### **Lectures**

This is the most formal teaching strategy employed in teaching the modules. It is used to deliver a body of theoretical information to a large group of learners and is most effective when followed up by a seminar or tutorial session to consolidate learning.

The lecture format may be supported by written handouts, web or library references which serve to reinforce and expand the audio-visual information presented. In addition, staff will make appropriate use of the VLE (Blackboard) facilities. This should enable lecturers to enhance the traditional communication and learning mediums, as well as making material available to learners at home and university.

#### **Tutorials / Practical Sessions**

Often in smaller groups, tutorials are guided learning sessions, which can either support a formal lecture by learners working through tutorial sheets with the help of a lecturer or by learners working through practical exercises in say a computing room.

## **Seminars**

These can vary from large group seminars, which provide an opportunity for the learner-led formal debate of topic areas, to 'impromptu' discussion sessions with smaller groups, which may for example follow the showing of a video.

Other techniques such as industrial visits, guest lectures and computer aided learning tools will be used where appropriate. This variety of techniques is aimed at stimulating learner learning. The teaching and learning strategies for individual modules are detailed in the relevant module proforma.

## **Assessment**

The assessment of our Computing courses includes varied methods that are accessible to all learners. Assessments are, where possible, authentic, and tied to real-world contexts and constraints, allowing learners to practically demonstrate the skills they have developed.

We aim to incorporate, where appropriate, the use of capstone activities, when concluding the session. This brings together knowledge and practical and analytical skills that learners have developed throughout the course. This may take the form of a traditional project or end-point assessment, but other formats can be appropriate.

Where a learner may identify with disabilities that require further adjustments these will be handled, and adaptations made in accordance with the reasonable adjustment policy. The procedures used for assessment cover the subject knowledge, abilities and skills developed through the degree course.

Therefore, a variety of assessment vehicles will be used as appropriate to the module, including assignments carried out in the learner's own time, in-class assignment, workshops, presentations, and formal examination. The form of assessment has been chosen to motivate learners to achieve their best and create learning activities for the learner. The assessment vehicles for individual modules are detailed in the module descriptor.

Assessments will be appropriate to the task, achievable, motivating and vocationally focussed and will form a constructive part of the learning process.

Assessments will develop general transferable skills as well as academic skills.

Assessments will provide enough opportunity for the best learners to exhibit a level of innovation and creativity associated with excellence.

During the Foundation Year, learners will be exposed to a variety of summative and formative assessments whilst developing the academic skills to be a successful learner at university; course content and Learning Outcomes strongly relate to learners developing their knowledge and understanding of the subjects being studied and assessed.

Level 4 assessments will be primarily formative and will encourage the development of appropriate academic practice and concepts. The emphasis will be on frequent small-scale assessments wherever possible with a balance between formative and summative assessment. Level 5 assessments will be more demanding, with the emphasis still on development of knowledge, skills, and concepts but now encouraging learning at greater depth, emphasising the fundamental principles. There will be a shift towards summative assessment.

Level 6 assessments are designed to allow learners to demonstrate their knowledge and skills so that they have become effective, independent learners. The emphasis is on summative assessment.

## Advice, Feedback and Collaborative Learning

Assessment is an integral part of the education process, promoting learning by providing a focus for consolidating, applying, and demonstrating understanding of the subject matter. The listed summative assessment regime measures and grades learner development and achievement in relation to the intended Learning Outcomes. It also generates feedback information for learners about the strengths and weaknesses in their work, with tutors affirming what learners have done well whilst giving constructive and encouraging advice about areas requiring reflection and further improvement.

In fact, tutor feedback on formal assessment elements is just part of the ongoing dialogue with learners about their learning and personal development. Tutors will offer learners frequent opportunities to discuss their progress, where their work can be examined and reviewed, including the evaluation of plans and drafts for assignments prior to submission. This supportive engagement helps to clarify what “good performance” is, with reference to published criteria and expected standards; it also encourages, motivates, and directs learners towards achieving their full potential.

Different strategies for timely advice and effective feedback will be adopted, according to what is fit-for-purpose for learners and modules. For instance: good or bad examples of previous learner work not only give learners clues about appropriate content, structure and presentation of assignments but also highlight common mistakes and omissions; mock exam papers and formative tests; work portfolios represent a collection of structured activities completed over a period of time with regular interactions with the tutor; individual and group tutorials; practising presentations with other learners can invite peer review; model answers can supplement and extend the feedback given on assessments; group discussions can promote reflection and collaborative learning; audio and video recordings can be used at various points to explain topics and to give guidance; other technology (such as the VLE) can facilitate information sharing, and support learning and collaboration.

## Contact Hours

One unit of credit is broadly equivalent to ten notional learning hours. Full time undergraduate learners will normally study 120 credits per year on their programme (1200 notional learning hours), noting that a Foundation Year is not formally described in terms of credits. The combination of scheduled teaching (contact) activities, guided independent study and any opportunities for placement or work-based learning, will be defined at Module level.

## 7. Programme Regulations

This programme will be subject to the following assessment regulations:

- *Regulations for Taught Degree Programmes (2023)*

## 8. Support for learners

The following systems are in place to support you to be successful with your studies:

- The appointment of a personal tutor to support you through your programme
- A programme handbook and induction at the beginning of your studies

- Library resources, include access to books, journals, and databases - many of which are available in electronic format – and support from trained library staff
- Access to Blackboard, our Virtual Learning Environment (VLE), which is accessible via PC, laptop, tablet, or mobile device
- Access to the MyBNU portal where you can access all University systems, information, and news, record your attendance at sessions, and access your personalised timetable
- Academic Registry staff providing general guidance on university regulations, exams, and other aspects of learners and course administration
- Central learners' services, including teams supporting academic skills development, career success, learners finance, accommodation, chaplaincy, disability, and counselling
- Support from the Bucks Learner's Union, including the Learners' Union Advice Centre which offers free and confidential advice on university processes.

## 9. Programme monitoring and review

BNU has several ways for monitoring and reviewing the quality of learning and teaching on your programme. You will be able to comment on the content of their programme via the following feedback mechanisms:

- Formal feedback questionnaires and anonymous module 'check-ins'
- Participation in external surveys
- Programme Committees, via appointed learner representatives
- Informal feedback to your programme leader

Quality and standards on each programme are assured via the following mechanisms:

- An initial event to approve the programme for delivery
- An annual report submitted by the External Examiner following a process of external moderation of work submitted for assessment
- The Annual Monitoring process, which is overseen by the University's Education Committee
- Review by the relevant PSRB(s)
- Periodic Subject Review events held every five years
- Other sector compliance and review mechanisms

## 10. Internal and external reference points

Design and development of this programme has been informed by the following internal and external reference points:

- The Framework for Higher Education Qualifications (FHEQ)
- The QAA Subject Benchmark Statement - see detailed mapping below
- The BNU Qualifications and Credit Framework
- The BNU Grading Descriptors
- The University Strategy

Mapping of Subject Benchmark Statement and any relevant Apprenticeship Standard to Programme Learning Outcomes

| Subject Benchmark Statement / Apprenticeship Standard:  | Knowledge and understanding (K)  |    |    |    | Analysis and Criticality (C) |    |    |    |    | Application and Practice (P) |    |    | Transferable skills and other attributes (T) |    |    |    |    |    |
|---|----------------------------------|----|----|----|------------------------------|----|----|----|----|------------------------------|----|----|--|----|----|----|----|----|
|   | Benchmark / Standard requirement | K1 | K2 | K3 | K4                           | C1 | C2 | C3 | C4 | C5                           | P1 | P2 | P3   | T1 | T2 | T3 | T4 | T5 |
| <b>Subject knowledge understanding and skills/</b> Demonstrate an exceptional understanding of the main body of knowledge for their subject and be able to exercise insightful and critical judgement in the use of that knowledge. Be creative and innovative in the application of the principles covered in the curriculum, and be able to go beyond what has been taught in classes | X                                | X  |    |    | X                            | X  |    | X  | X  |                              | X  | X  | X  |    |    |    | X  | X  |
| <b>Intellectual skills/</b> Critically analyse and apply a wide range of concepts, principles and practices of the subject in the context of  | X                                | X  | X  | X  | X                            |    | X  | X  |    |                              | X  | X  | X  | X  | X  | X  | X  | X  |

| Subject Benchmark Statement / Apprenticeship Standard:  | Knowledge and understanding (K)  |    |    |    | Analysis and Criticality (C) |    |    |    |    | Application and Practice (P) |    |    | Transferable skills and other attributes (T) |    |    |    |    |    |
|---|----------------------------------|----|----|----|------------------------------|----|----|----|----|------------------------------|----|----|--|----|----|----|----|----|
|   | Benchmark / Standard requirement | K1 | K2 | K3 | K4                           | C1 | C2 | C3 | C4 | C5                           | P1 | P2 | P3   | T1 | T2 | T3 | T4 | T5 |
| open scenarios, showing refined judgement and adaptability in the selection and use of tools and techniques   |                                  |    |    |    |                              |    |    |    |    |                              |    |    |  |    |    |    |    |    |
| <b>Computational problem-solving/</b> Be able to demonstrate sophisticated judgement, critical thinking, research design, and well-developed problem-solving skills with a high degree of autonomy, and to create highly effective computational artefacts across complex and unpredictable circumstances | X                                | X  | X  |    |                              | X  | X  | X  | X  |                              | X  | X  | X  | X  | X  | X  | X  | X  |
| <b>Practical skills across the computing lifecycle/</b> Demonstrate the ability to undertake problem  | X                                | X  |    | X  | X                            | X  | X  | X  | X  |                              | X  | X  | X  | X  | X  | X  | X  | X  |

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|--|----------------------------------|----|----|----|------------------------------|----|----|----|----|------------------------------|----|----|--|----|----|----|----|----|
|  | Benchmark / Standard requirement | K1 | K2 | K3 | K4                           | C1 | C2 | C3 | C4 | C5                           | P1 | P2 | P3   | T1 | T2 | T3 | T4 | T5 |
| identification and analysis to appropriately design, develop, test, integrate or deploy a highly complex computing system and any associated artefacts; deeply understand the relationship between stages and be able to demonstrate related sophisticated problem-solving and evidence-informed evaluative skills |                                  |    |    |    |                              |    |    |    |    |                              |    |    |  |    |    |    |    |    |
| <b>Interpersonal and team working Skills/</b> Demonstrate the ability to work in a highly proactive and accomplished manner, including as a leading member of a team, making excellent use of tools and techniques to proficiently communicate, manage tasks and plan projects with minimum guidance               | X                                | X  |    | X  | X                            | X  | X  | X  | X  | X                            | X  | X  | X  | X  | X  | X  | X  | X  |

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|---|---------------------------------|----|----|----|------------------------------|----|----|----|----|------------------------------|----|----|--|----|----|----|----|
|   | K1                              | K2 | K3 | K4 | C1                           | C2 | C3 | C4 | C5 | P1                           | P2 | P3 | T1   | T2 | T3 | T4 | T5 |
| <b>Professional practice covering Equality, diversity and inclusion, Sustainability and Entrepreneurship and enterprise education/</b><br>Identify best-of-kind practices and effect highly principled solutions within a professional, legal and ethical framework to consistently address a wide breadth of relevant considerations – including data management and use, security, equality, diversity and inclusion (EDI) and sustainability – in the work that they undertake | X                               |    |    |    | X                            | X  | X  |    |    | X                            |    | X  |  | X  | X  | X  | X  |

### Mapping of Programme Learning Outcomes to Core Modules

| Programme Learning Outcome           | Knowledge and understanding (K) |    |    |    | Analysis and Criticality (C) |    |    |    |    | Application and Practice (P) |    |    | Transferable skills and other attributes (T) |    |    |    |    |
|--------------------------------------|---------------------------------|----|----|----|------------------------------|----|----|----|----|------------------------------|----|----|--|----|----|----|----|
|                                      | K1                              | K2 | K3 | K4 | C1                           | C2 | C3 | C4 | C5 | P1                           | P2 | P3 | T1   | T2 | T3 | T4 | T5 |
| <b>Level 4</b>                       |                                 |    |    |    |                              |    |    |    |    |                              |    |    |  |    |    |    |    |
| Programming Concepts                 | X                               | X  | X  | X  | X                            | X  |    | X  |    | X                            | X  | X  | X  | X  |    | X  | X  |
| Computer Architecture                |                                 | X  |    | X  | X                            | X  |    | X  | X  |                              |    |    |  | X  |    | X  |    |
| Networking                           | X                               | X  |    | X  | X                            | X  |    | X  | X  | X                            | X  | X  | X  |    |    | X  | X  |
| Web Development                      |                                 | X  |    | X  |                              |    | X  |    |    |                              | X  | X  |  | X  | X  | X  |    |
| Computing Computational Fundamentals | X                               | X  | X  | X  | X                            |    |    | X  | X  |                              |    | X  |  | X  |    | X  |    |
| Cyber Threat and Risk Management     |                                 | X  |    | X  |                              |    |    |    | X  |                              |    | X  | X  |    |    | X  | X  |
| <b>Level 5</b>                       |                                 |    |    |    |                              |    |    |    |    |                              |    |    |  |    |    |    |    |
| Object Oriented Analysis and Design  | X                               | X  |    | X  | X                            | X  | X  | X  | X  | X                            |    | X  | X  | X  | X  | X  | X  |
| Algorithms and Data Structures       | X                               | X  |    |    | X                            | X  |    | X  |    | X                            | X  |    |  |    |    | X  | X  |
| Research Methods                     | X                               | X  | X  | X  | X                            | X  | X  | X  | X  | X                            | X  | X  | X  | X  |    | X  | X  |
| Object Oriented Programming          | X                               | X  |    |    | X                            | X  |    | X  |    | X                            | X  |    |  |    |    | X  | X  |
| Software Engineering                 | X                               | X  | X  | X  | X                            | X  | X  | X  | X  | X                            | X  | X  | X  | X  | X  | X  | X  |

| Programme Learning Outcome | Knowledge and understanding (K) |    |    |    | Analysis and Criticality (C) |    |    |    |    | Application and Practice (P) |    |    | Transferable skills and other attributes (T) |    |    |    |    |    |
|----------------------------|---------------------------------|----|----|----|------------------------------|----|----|----|----|------------------------------|----|----|--|----|----|----|----|----|
|                            | Module Code (Core)              | K1 | K2 | K3 | K4                           | C1 | C2 | C3 | C4 | C5                           | P1 | P2 | P3   | T1 | T2 | T3 | T4 | T5 |
|                            |                                 |    |    |    |                              |    |    |    |    |                              |    |    |  |    |    |    |    |    |
| <b>Level 6</b>             |                                 |    |    |    |                              |    |    |    |    |                              |    |    |  |    |    |    |    |    |
| Advanced Programming       | X                               | X  |    | X  | X                            | X  |    | X  | X  | X                            | X  | X  | X  | X  | X  | X  | X  | X  |
| Project (40 credits)       | X                               | X  | X  | X  | X                            | X  | X  | X  | X  | X                            | X  | X  | X  | X  | X  |    | X  | X  |