


<b>PROGRAMME SPECIFICATION (Taught Postgraduate)</b>	 <b>Newcastle University</b>
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<b>1</b>	<b>Awarding Institution</b>	Newcastle University
<b>2</b>	<b>Teaching Institution</b>	Newcastle University
<b>3</b>	<b>Final Award</b>	MSc Software Engineering
<b>4</b>	<b>Programme Title</b>	Digital and Technology Solutions Specialist Integrated Degree Apprenticeship — Software Engineering Specialist (February start)
<b>5</b>	<b>Programme Code</b>	5458P
<b>6</b>	<b>Programme Accreditation</b>	
<b>7</b>	<b>QAA Subject Benchmark(s)</b>	Computing
<b>8</b>	<b>FHEQ Level</b>	Level 7
<b>9</b>	<b>Last updated</b>	May 2023

#### **10 Programme Aims**

1. To develop the multi-disciplinary skills, essential to fulfil the role profile, skills, knowledge and behaviours defined in the DA standard ST0482
2. To produce apprentices who understand the theory and principles which underlie Computer Science and Software Engineering.
3. To give apprentices knowledge and experience of the fundamental techniques used in requirements analysis, specification, design, development, testing, validation, documentation, maintenance and evaluation of software systems in accordance with modern principles of Software Engineering. They will have skills in the application of these techniques in the development of systems software and software for a range of applications.
4. To provide apprentices with an understanding of the architectural concepts underlying the hardware systems on which such software is run.
5. To gain experience of a range of software and hardware systems in current use in the profession, an understanding of current trends in their development, and an appreciation of the professional, ethical and social dimensions of the subject.
6. To demonstrate the ability to apply the principles and practices of Computer Science in tackling a number of technical challenges; the solutions will typically demonstrate a soundly based vision of the direction of developments of Software Engineering
7. To provide leadership skills and behaviours as well as an understanding of technology & innovation management methods and approaches.
8. To develop and improve skills in the use of literacy resources and information technology
9. Apprentices will have a good understanding of issues at the forefront of Computer Science and will have a knowledge of up to date tools and techniques.
10. To provide a qualification that enhances employment prospects in software engineering

#### **12 Learning Outcomes**

The programme provides opportunities for apprentices to develop and demonstrate knowledge and understanding, qualities, skills and other attributes in the following areas.

The programme outcomes have references to the QAA benchmark statements for Computing and Business & Management.
<b>Knowledge and Understanding</b>
<p>On completing the programme apprentices should have:</p> <p>A1. An understanding of the lifecycle and the factors that affect when designing, developing and deploying a successful software engineering solution which should be secure and effective in delivering the requirements of stakeholders.</p> <p>A2. An understanding of the development of software solution architecture with business-focused internal interaction management.</p> <p>A3. A broad knowledge of the software platform development and solid methodology of evaluating with considering organisational context.</p> <p>A4. An understanding of the design of complex IT enabled business process, and the ability to design technology roadmaps, and transformation or change plans.</p> <p>A5. An understanding of leadership and change management approaches and values in the digital era.</p>
<b>Teaching and Learning Methods</b>
<p>Software engineering specialist knowledge (A1-A3) is imparted largely through direct apprentice contact (lectures and tutorials) and online blended delivery of content, supplemented by practical sessions that may take the form of computing sessions, problem solving and assessed coursework. Apprentice understanding and learning is enhanced by the use of computing and numerical exercises, problem solving, literature reviews, teamwork and practical work. Apprentice understanding and learning for A1-A3 is enhanced by the integration of the following in the lectures: case studies, seminars, expert discussions, company presentations and practical teamwork and practicals undertaken on an individual basis.</p> <p>Apprentices are expected to contribute to their own learning experience by independent reading. They are provided with references to books which are categorised as <i>essential</i>, <i>recommended</i>, and <i>background</i> reading, as well as scientific papers and other learning materials including appropriate web URLs as well as embedding learning in the workplace</p> <p>Core (professional) skills knowledge (A4-A5) is similarly imparted through direct apprentice contact (lectures), but with a yet stronger emphasis on online blended delivery of context, supplemented by problem solving, teamwork and project work.</p> <p>The dissertation will be integrated with the on-the-job DA capstone project of the degree apprenticeship and will enable apprentices to devote extensive time to developing a deep understanding of a practically important specialist area.</p>
<b>Assessment Strategy</b>
<p>A mix of formative and summative strategies are used to assess problem solving and programming skills, group work and research exercises. Additional formative feedback, provided both in-person and online, is included to provide apprentice feedback throughout the course, without contributing to module marks. Formal feedback is provided for each piece of assessed coursework in the form of an individual performance and a review session in subsequent lectures. Summative strategies, in the form of extended project work, are used to assess a apprentice's learning achievements, for key modules.</p> <p>Alongside module assessments, apprentice learning throughout the programme is tracked through evidence of apprentices' reflective practice. Apprentices will develop reflective logs and personalized action plans to articulate their personal development by mapping key learning outcomes embedded in assessed project work. Individual meetings between apprentices and the DA tutors will support apprentices in developing their reflective practice and will act as a common thread of dialogue between apprentices and the course team throughout the programme.</p>

<b>Intellectual Skills</b>
<p>On completing the programme apprentices should be able to:</p> <p>B1. To develop the architecture for a scalable software platform and update, deliver this platform that conforms to industry standards and specific requirements including time efficiency and functionality.</p> <p>B2. Be accountable for the quality of deliverables from one or more software development teams and following company standard.</p> <p>B3. Making reasoned technology and development process recommendations for projects of varying scales with evaluating different design and implementation options.</p> <p>B4. Propose, carry out (lead) and write a technology transformation plan involving, where appropriate, a literature and information review, aim and objectives specification, design and assessment criteria. This includes technology review, business implication and change management approaches.</p>
<b>Teaching and Learning Methods</b>
<p>Intellectual skills are imparted by a combination of lectures, practicals, case studies, a group project and an in-depth capstone project tailored to individual interests.</p> <p>Practical sessions and problem-solving exercises are used to develop software engineering assessment and enhancement skills (B1-B3). Real-life case studies with a possible on-the-job element are used to develop strategic planning skills required in (B4). Tutorials support the interaction of the apprentice with a designated tutor (B1-B4).</p>
<b>Assessment Strategy</b>
<p>Intellectual skills are continuously assessed through written reports, practical write-ups, case study, discussions, literature and information projects, oral presentations and a capstone project. The assessment methods aim to evaluate the apprentices' understanding and ability to apply computational techniques that form the basis for the interdisciplinary occupation as software engineering specialist (B1-B3). It also aims to assess the ability to design and carry out strategic technology change programmes (B4).</p>
<b>Practical Skills</b>
<p>On completing the programme apprentices should be able to:</p> <p>C1. Conduct investigations using the technical and professional literature</p> <p>C2. Use and evaluate appropriate tools and techniques</p> <p>C3. Undertake critical evaluation (both theoretical and empirical) of alternative solutions</p> <p>C4. Formulate problems and identify suitable approaches to solving them</p> <p>C5. Reason abstractly about the structure and behaviour of computer systems</p> <p>C6. Plan, articulate, socialize and carry out strategic technology change efforts, including working in teams and with specialists, based on a critical appraisal of methods known in literature and the practical adoption of leadership and change management methods.</p>
<b>Teaching and Learning Methods</b>
<p>Critical evaluation of current techniques and methods (C1 and C3) will be developed through literature searching, searching through online sources, coursework exercises and in the capstone project. The ability to address software engineering challenges (C2) will be acquired through practical sessions and self-directed learning, as well as tutorials and group discussions. The practical skills associated with change management, and the leadership in technology transformation (C5), will be acquired through expert presentations, group discussions and practical projects associated with the change management and leadership modules.</p>
<b>Assessment Strategy</b>
<p>Practical skills (C1-C3) are primarily assessed continuously in the form of individual reports from practical studies, literature and information reviews, tutorial exercises, group project reports and the capstone project report. Data and information handling and interpretation (C2) are a strong component of many modules and are also assessed through continuously assessed problem solving exercises. Practical skills in leadership, change management and technology strategy are assessed through reports for case studies, with a potential on-the-job component.</p>

<b>Transferable/Key Skills</b>
<p>On completion of the programme apprentices should have the following skills:</p> <p>D1. Communicate complex matters orally successfully to a wide audience</p> <p>D2. Use written communication skills to communicate technology strategy to a wide audience</p> <p>D3. Use computer-based literacy resources</p> <p>D4. Work as part of a team and the ability to use leadership skills</p> <p>D5. Deploy skills to manage for change in a digital age</p>
<b>Teaching and Learning Methods</b>
<p>Oral presentation skills (D1) are exercised by group discussions in tutorial sessions, by communicating during group exercises (also D4) and by preparation of oral presentations on specific research topics. Written communication skills (D2) are developed during independent study, the preparation of coursework, the writing of essays, poster presentation and through the completion of group project report as well as capstone project report. Formal lectures and practicals address the use of online literacy resources, reinforced through the use of practice exercises (D3). Group project, on-the-job components of exercises and projects as well as apprentice-led tutorials are used to develop team skills (D4), while leadership skills (D4) are developed in addition through participation in lectures as well as exercises. Change management skills (D5) are developed through participation in projects, and during the capstone project.</p>
<b>Assessment Strategy</b>
<p>Written communication skills are assessed by report preparation, the capstone project report and literature reviews. Oral communication skills are assessed in oral presentations. The ability to use computer-based literacy resources is assessed through the preparation of literature and online information reviews. Teamwork is formally evaluated using group-based problem solving and technology exercises. Independent work is assessed in literature and information reviews and projects. Leadership as well as change managerial skills are assessed through exercises and as elements in the capstone project.</p>

## **12 Programme Curriculum, Structure and Features**

### **Basic structure of the programme**

The programme is centred in the School of Computing, where the apprentices will be based, and draws resources and leadership from Newcastle University's £2m strategic project 'Institute of Coding' (until July 31st, 2021) and from School of Computing thereafter. Due to the interdisciplinary nature of the course, some modules are delivered by members of Newcastle University Business School.

The programme consists of mandatory modules and the major capstone project and associated report. The programme provides comprehensive training in interdisciplinary aspects of Computing Science and Business. The taught component of the course accounts for 120 credits, the capstone project for 60 credits. Seven modules are delivered over the 4 semesters with the capstone project being delivered in semesters 2 and 3 of Year 2

S1	S2	S3	S1	S2	S3	S1
	<b>CSC8427 Intro to Software development (10 credits)</b>	<b>CSC8425 Business Applications (20 credits)</b>		<b>CSC8430 Ethics and Security (10 credits)</b>	<b>CSC8429 Capstone Project for SE (60 credits)</b>	
	<b>NBS8416</b>	<b>NBS8417</b>	<b>CSC8428</b>	<b>CSC8426 is Emerging</b>		

	<b>Digital Innovation Technology Management (20 credits)</b>	<b>Leadership and Change in a Digital Age (20 credits)</b>	<b>Software Development Lifecycle (20 credits)</b>	<b>Technologies (20 credits)</b>		
<p>S2/Y1 Introduction to Software Development (10 credits) CS8427 and Digital Innovation Technology Management NBS8416 (20 credits)</p> <p>S3/Y1 and S1/Y2 Business Applications (20 credits) CSC8425</p> <p>S3/Y1 Leadership and Change in a Digital Age (20 credits) NBS8417</p> <p>S1/Y2 Software Development Lifecycle (20 credits) CSC8428</p> <p>S2/Y2 Ethics and Security (10 credits) CSC8430</p> <p>S2/Y2 Emerging Technologies (20 credits) CSC8426</p> <p>S3/Y2/S1 Y3 Capstone Project (60 credits) CSC8429</p>						
<p><b>Key features of the programme (including what makes the programme distinctive)</b></p>						
<p>The DA in Software Engineering will deliver trained postgraduate apprentices who have advanced knowledge, skills and behaviours that will equip them for a career as software engineering developer. The participants of the programme will be non-computing graduates and therefore this programme will act as a conversion programme upskilling apprentices to be able to enter professions such as software engineering specialists. Particular features of the programme are:</p> <p><u>Industry participation:</u> DA apprentices are employed by industry, with a 20% off-the-job interaction with the degree programme. The participation of industry includes the provisioning of on-the-job project opportunities and hosting the capstone project of the apprentice. The apprentices will thus receive general disciplinary knowledge and skills as well as aspects of the course tailored to participants' interests. The employment of the apprentice ensures meaningful industry engagement for each apprentice.</p> <p><u>Flexible learning:</u> given the non-standard interaction of apprentices with the MSc, we are exploring and are investing in blended learning approaches to facilitate participation from a broad range of candidates. Novel assessment methods centred around extended project work and reflective interviews augment the Computer Science MSc that forms the basis of this L7 degree apprenticeship degree. These offer an alternative to written examination, more amenable to industry participation, and support apprentices to development of a rich portfolio in the area of Software Engineering.</p> <p><u>Tailoring provision of sectoral and organisational variations:</u> Our teaching provision is designed to be scalable, while accommodating tool preferences of apprentices, their employers and the broader sector. Taught concepts are situated in context, drawing on application areas relevant to participants.</p> <p><u>Project Work:</u> Every apprentice will conduct their capstone project within the company, while receiving input from tutors. These work-based capstone projects are tailored to the needs of the apprentice and the company, and participants will document a work-based project to apply their skills obtained during the course, for real problems faced by the employer. This will be underpinned by a portfolio of evidence, with supporting reflective accounts.</p>						
<p><b>Programme regulations (link to on-line version)</b></p>						
<p><a href="#">-R5458P.pdf (ncl.ac.uk)</a></p>						

### 13 Support for Student Learning

Generic information regarding University provision is available at the following link.

[Generic Information](#)

**14 Methods for evaluating and improving the quality and standards of teaching and learning**

Generic information regarding University provision is available at the following link.

[Generic Information](#)

*Accreditation reports*

The School of Computing's degrees are typically accredited by British Computer Society, and feedback of the BCS on the degree will assist in improvements. Accreditation is not essential, and will be pursued at a much later date, in synchrony with accreditation of other programmes. The overall Degree Apprenticeship is subject to follow the Quality Assurance Agency for High Education (QAA) code of practice for assurance of academic quality and standards in higher education.

*Additional mechanisms*

*Module reviews*

All modules are subject to review by questionnaires which are considered by the Board of Studies. Changes to, or the introduction of new, modules are considered at the Board of Studies. Student opinion is sought at the Student-Staff Committee and/or the Board of Studies. The introduction of new modules and major changes to existing modules are subject to approval by the Faculty Learning, Teaching and Student Experience Committee (FLTSEC)

*Programme reviews*

The Board of Studies conducts an Annual Monitoring and Review of the degree programme and reports to FLTSEC. The FLTSEC takes an overview of all programmes within the Faculty and reports any Faculty or institutional issues to the Taught Programmes Sub-Committee.

*External Examiner reports*

External Examiner reports are considered by the Board of Studies. External Examiner reports and the response to the External Examiner from the Board of Studies are shared with institutional student representatives, through the Student-Staff Committee.

*Student evaluations*

All modules, and the degree programme, are subject to review through questionnaires managed by the Module Leader. Informal student evaluation is also obtained at the Student-Staff Committee, and the Board of Studies. The Postgraduate Taught Experience Survey is sent out every year to eligible taught postgraduate students and consists of a set of questions seeking students' views on the quality of the learning and teaching. The results from student surveys are considered as part of the Annual Monitoring and Review of the programme and any arising actions are captured at programme and School / institutional level and reported to the appropriate body.

*Mechanisms for gaining student feedback*

Feedback is channelled via the Student-Staff Committee, Apprenticeship Tutors/Lecturers, Skills coach, University Degree Apprenticeship Manager, Faculty Degree Apprenticeship Manager and the Board of Studies. Feedback is obtained at monthly review meetings between the Lecturer/apprenticeship tutor/skills coach and the apprentice. Employer feedback is gathered at three monthly tri-partite meetings with the Lecturer/apprenticeship tutor, employer and apprentice.

*Faculty and University Review Mechanisms*

Every six years degree programmes in each subject area undergo Learning and Teaching

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Review. This involves both the detailed consideration of a range of documentation, and a review visit by a review team (normally one day in duration) which includes an external subject specialist and a student representative. Following the review a report is produced, which forms the basis for a decision by University Learning, Teaching and Student Experience Committee on whether the programmes reviewed should be re-approved for a further six-year period.

*Additional mechanisms*

Turnitin and MOSS are routinely used by the School to detect plagiarism where appropriate. JPlag is also used for Java Programming.

**15 Regulation of assessment**

Generic information regarding University provision is available at the following link.

[Generic Information](#)

In addition, information relating to the programme is provided in:

The University Prospectus: <http://www.ncl.ac.uk/postgraduate/>

Degree Programme and University Regulations: <http://www.ncl.ac.uk/regulations/docs/>

Please note. This specification provides a concise summary of the main features of the programme and of the learning outcomes that a typical apprentice might reasonably be expected to achieve if she/he takes full advantage of the learning opportunities provided.