# **Primary Initial Teacher Education: Curriculum Plan**

# **Subject/Strand Computing Postgraduate Programmes**

# **Links to Practical knowledge, Substantive/theory, Disciplinary**

**Curriculum Vision:**

*Through our Initial Teacher Education Curriculum, it is our intention that trainees:*

* *receive sufficient grounding in subject knowledge to be able to teach KS1 and KS2 National Curriculum Computing three strands of Computer Science, Information Technology, Digital Literacy*
* *develop an understanding of why Computing is in the National Curriculum and why it is important to provide this opportunity for children to learn about Computing, and that children are able to achieve well in Computing*
* *apply their subject knowledge to planning, teaching, learning and assessment for classroom practice for training and beyond to ensure appropriate progression.*
* *develop knowledge and understanding of pedagogical approaches for teaching Computing at KS1 and KS2 and adopt a critical approach towards these.*

| **Phase 1** |
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| **University Based Learning** |
| **Learn That** | **Learn How** |
| **Component Knowledge** | Computing is important in society and provides a range of opportunities to children. Their role as teachers is to open these opportunities for all children. Computing is integrated into society and there are significant opportunities for those who can work in this field. Computing requires a more diverse workforce | Computational thinking can be taught through a range of pedagogical approaches, including unplugged pedagogies, and should become embedded in practice as children design and program their own systems (**LH3.5, LH3.6, LH3.7**) | Intent |
| The fundamentals of what a computer is, how it works, how it stores, processes and sends information | Read code and predict what it will do using logical reasoning. **(LH4.2, LH4.4, LH4.5, LH4.12, LH4.14)** |  |
| Computational thinking is a way of thinking, specific to computing, to make it easier to solve problems, think through solutions and create systems. Computational thinking underpins computer science: problem solving, design and implementation of computer systems (virtual and physical devices). CT includes decomposition, algorithms, pattern recognition, abstraction and logical thinking | Modify and debug programs **(LH4.2, LH4.4, LH4.5, LH4.12, LH4.14)** |  |
| The programming concepts sequence, selection, repetition and variables. | Evaluate a Computing lesson sequence which demonstrates progression for all learners. (**LH2.3, LH2.4, LH2.7, LH3.20, LH4.2, LH4.4, LH4.5, LH4.12, LH4.14**) |  |
| Programming, and related activities, require resilience, perseverance, risk-taking, innovative-thinking, collaboration and recognition that we will probably not get it right the first time; debugging and testing are essential parts of the process. (**LT4.5, LT7.4**) | Use software beyond typical office applications which can be used for creative computing, for example: animation, sound editing, collaborative tools (Google docs, OneDrive). |  |
| E-safety education is part of safeguarding expectations and key resources for teaching are available from Project Evolve, ChildNet, ThinkUKnow, UKCCIS, etc. |  |  |
| Information Technology should be selected on the basis of the task which is to be performed and different tools (hardware/ software) are suitable for different tasks. Information Technology use (including Internet searching) should be appropriate and efficient. |  |  |
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| **Assessment** | **Assessment** |  |
| * Modify a programming project (tutor observation);
* Creating an IT project (tutor observation).
* Participate in group/ class discussions and Q&A
* Complete an end of phase computing test (online formative test)
 | Impact |
| **Composite Knowledge** | **Composite knowledge/understanding/skills** |
| *By the end of this phase trainees will* ***know:*** | *By the end of this phase trainees will* ***understand:*** | *By the end of this phase trainees will* ***be able to:*** |
| * how to read code;
* how to modify a program; and
* pedagogical strategies for teaching computer science to KS1 and KS2 children
 | * Computing is a separate discipline which is still relatively new and developing, although the underlying principles remain the same.
* Computational thinking underpins computer science and problem solving within computing.
* Testing, debugging and collaboration are fundamental aspects of computing. Computing teaches children they cannot always get learning right the first time, so they need resilience, perseverance, creativity and a willingness to collaborate with others. (**LH1.3**)
 | * plan appropriate lessons to teach Computing component and composite knowledge.
* reflect on their subject knowledge development and plan appropriate targets for their future developmental needs.
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| **Research** | **KEY RESEARCH****That Trainees will know that informs teaching and learning in Computing**  |
| Bagge, P., 2022. Code-IT [online]. Available from: <http://code-it.co.uk/> Computing at School, 2022. Barefoot Computing [online]. Available from: <https://www.barefootcomputing.org/> Department for Education, 2013. National Curriculum for Computing. London: HMSO. Available at: <https://www.gov.uk/government/publications/national-curriculum-in-england-computing-programmes-of-study> National Centre for Computing Education, 2022. Teach Computing [online]. Available from: <https://teachcomputing.org/> Ofsted, 2022. Research review series: Computing. Ofsted Available at: <https://www.gov.uk/government/publications/research-review-series-computing/research-review-series-computing> Raspberry Pi Foundation, 2022. Hello World [online]. Available from: <https://helloworld.raspberrypi.org/>  |

| **Phase 2** |
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| **School Based Learning – Introduction/Developmental** | **University Based Learning** |
| **Learn That** | **Learn How** | **Learn That** | **Learn How** |
| **Component Knowledge** | Learning experiences should build upon prior learning by using components which lead to composite knowledge | **Either**:* Plan and teach a computing lesson using the school’s medium-term plan; or
* Discuss with the Computing subject lead the curriculum and curriculum sequencing for Computing. Observe a Computing lesson noting scaffolding, fading, use of groups/ pairs and adaptive teaching approaches.
 | The programming concepts sequence, selection, repetition and variables can apply in different programming contexts | Program a physical computing device using KS2 programming concepts and different input and output devices | Intent |
| Regular formative assessment as a lesson progresses is important for the develop for children’s knowledge and understanding, application of practical skills and to promptly address misconceptions in the subject.  | Identify opportunities for Computing learning from school’s long- and medium-term plans | Physical devices such as robots or microprocessors can be programmed including the use of sensors, motors, LEDs, buzzers, etc (e.g. Ozobots, Codebug, Microbit, Crumble). | Routines and expectations for using physical computing devices (LH7.4, 7.5, 7.7, 7.9; LT1.1, LH1.6, 1.7. 1.8) |
| **Assessment** | **Assessment** | **Assessment** | Impact |
| Assessed throughout Professional Practice through lesson observations, weekly development summaries and weekly tasks. Feedback provided by mentor, class teacher, link tutor and other qualified staff.  | * Complete programming task with physical computing (tutor observation);
* Participate in group/ class discussions and Q&A
 |
| **Composite Knowledge** | **Composite knowledge/understanding/skills** |
| *By the end of this phase trainees will* ***know:*** | *By the end of this phase trainees will* ***understand:*** | *By the end of this phase trainees will* ***be able to:*** |
| how to design and write a program using a physical computing device how computing fits within the wider school curriculum | * computers can be programmed to use inputs to determine a course of action (condition & decision) and output
* how schools plan and teaching computing
 | * plan for appropriate progression through the computer science strand of the curriculum
* identify opportunities for learning computing within school plans
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| **Research** | **KEY RESEARCH****That Trainees will know that informs teaching and learning in Computing**  |
| Bagge, P., 2022. Code-IT [online]. Available from: <http://code-it.co.uk/> Computing at School, 2022. Barefoot Computing [online]. Available from: <https://www.barefootcomputing.org/> Department for Education, 2013. National Curriculum for Computing. London: HMSO. Available at: <https://www.gov.uk/government/publications/national-curriculum-in-england-computing-programmes-of-study> National Centre for Computing Education, 2022. Teach Computing [online]. Available from: <https://teachcomputing.org/> Ofsted, 2022. Research review series: Computing. Ofsted Available at: <https://www.gov.uk/government/publications/research-review-series-computing/research-review-series-computing> Raspberry Pi Foundation, 2022. Hello World [online]. Available from: <https://helloworld.raspberrypi.org/>  |

| **Phase 3** |
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| **School Based Learning – Consolidation** |
| **Learn That** | **Learn How** |
|  | through conversations with school colleagues (mentor, class teacher or subject lead), that schools use varied approaches to assessing children in Computing and that pupils’ progression can be assessed using the guidance in the Teacher’s Guide from NCCE (<https://teachcomputing.org/curriculum/key-stage-1>), the Computing at School’s progression pathways document ([https://community.computingatschool.org.uk/resources/1692/single)](https://community.computingatschool.org.uk/resources/1692/single%29), code-it progression grid (<http://code-it.co.uk/assessment-progression/>) or other appropriate resources. While there are no nationally recognised progression frameworks for Computing in England, the progression is monitored through the intended school’s curriculum. | Either: Plan, teach and assess a sequence of lessons for Computing based on the school’s medium-term plans; or Annotate a medium-term plan from school and discuss with a member of staff how you might use this to plan a sequence of lessons for Computing.  | Intent |
|  | Examine the school curriculum plans for computing to identify how learning is transferred or linked across different subjects, e.g. use of coordinates to direct a sprite in Scratch, and discuss these with a member of staff (mentor, class teacher or subject lead) |
|  | Discuss with the subject leader for computing progression across the year group in the three strands of computing (computer science, information technology and digital literacy). |
| **Assessment** | **Assessment** | Impact |
| Assessed throughout Professional Practice through lesson observations, weekly development summaries and weekly tasks. Feedback provided by mentor, class teacher, link tutor and other qualified staff.  |
| **Composite Knowledge** | **Composite knowledge/understanding/skills** |
| *By the end of this phase trainees will* ***know:*** | *By the end of this phase trainees will* ***understand:*** | *By the end of this phase trainees will* ***be able to:*** |
| * How progression is monitored across the school curriculum for Computing, across a year group and across strands.
 | * that planning for progression across a series of lessons is key to children’s learning
 | * plan, teach, assess and reflect upon a sequence of Computing lessons within the school's planned curriculum
 |
| **Research** | **KEY RESEARCH****That Trainees will know that informs teaching and learning in Computing** |
| Bagge, P., 2022. Code-IT [online]. Available from: <http://code-it.co.uk/> Computing at School, 2022. Barefoot Computing [online]. Available from: <https://www.barefootcomputing.org/> Department for Education, 2013. National Curriculum for Computing. London: HMSO. Available at: <https://www.gov.uk/government/publications/national-curriculum-in-england-computing-programmes-of-study> National Centre for Computing Education, 2022. Teach Computing [online]. Available from: <https://teachcomputing.org/> Ofsted, 2022. Research review series: Computing. Ofsted Available at: <https://www.gov.uk/government/publications/research-review-series-computing/research-review-series-computing> Raspberry Pi Foundation, 2022. Hello World [online]. Available from: <https://helloworld.raspberrypi.org/>  |