Curriculum: BSc (Hons) Secondary Maths (with QTS\*)

### (From first teaching September 2021)

AY 21/22



**Rationale of curriculum sequence**

**Course**: B.Sc. Secondary Mathematics Education with QTS

**Course Leader/Author**: Dr. Ghada Nakhla

Teaching in the mathematics schemes of learning has been mapped against the CCF and the ITE Pillars so that trainees would confidently progress as specialist teachers of mathematics. The curriculum is sequenced so that trainees would cumulatively build towards sufficient subject knowledge for their course going well beyond the CCF. The ITE Pillars have been reflected in the design of the curriculum sequence of the various modules across the programme and support its delivery.

The curriculum sequence designed in the subject application modules provides trainees with an understanding of the importance of mathematics in the curriculum (e.g. how teaching of mathematics for mastery programme is fundamental for curriculum design). In these modules, the curriculum sequence is designed to engage trainees in solving problems; enabling them to apply prior knowledge and develop understanding at a deeper level1. The curriculum sequence of these modules aims to help trainees demonstrate excellence in the craft of teaching mathematics education. It also enables trainees to creatively implement the techniques and ideas they have encountered, evaluating their effectiveness for pupils' understanding and progress. Both on placement and at university, trainees would demonstrate the qualities and transferable skills necessary for employment. As reflexive practitioners, trainees would critically analyse their placement school and the educational policies and practices in the light of recent research.

In line with the CCF and the ITE Pillars, the curriculum sequence of the generic modules across the programme is designed to address the four themes of studentship, educational research, learning environments and professional identity. These modules are all designed in order to provide trainees with the opportunity to develop critical and analytical skills in reviewing both the literature and the research methodologies in education; offering trainees the opportunity to draw on their subject knowledge and understanding to conduct a piece of self-initiated research. Furthermore, these equip trainees with the knowledge, understanding, critical skills, and self-awareness to develop convincing and complex critiques of where education appears to be heading. Collectively, the curriculum sequence across the programme contributes towards the development of mathematics practitioners who have sophisticated and robust opinions about education. This will help trainees to become agents of change in their future careers, and practitioners who would be able to create movements for positive change.

In line with the CCF and ITE Pillars there are nine subject study modules of mathematics on the course. These modules branch out into three strands and cover a range of pure mathematics and applied mathematics topics. These modules aim to provide the necessary subject knowledge of mathematics at degree level.

1 [Research review series: mathematics - GOV.UK (www.gov.uk)](https://www.gov.uk/government/publications/research-review-series-mathematics/research-review-series-mathematics)

|  |  | Trainees should… | Prior to PP | End of Introductory PP | Prior to Developmental PP | End of Developmental PP | Prior to Consolidation PP | End of Consolidation/Course |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| PILLAR 1 | Personal & Professional values, attitudes and beliefs | *Learn that:* | Teachers have a duty of care to all their pupils.  Child protection and safeguarding are the responsibility of all professional.  Strong beliefs about the value of mathematics as a subject and the ability to create a sense of mathematical curiosity in learners are the responsibility of all Mathematics teachers. | Developing themselves as reflective practitioners aid their professional development as teachers of mathematics.  Teaching Mathematics is a profession that comes with certain standards of conduct and behaviour. | Mathematics is a rich, diverse, and powerful subject which celebrates the creativity, intelligence and resilience of all cultures and societies across the world.  Mathematics is a universal language. | Mathematics teachers have a role in developing mathematical educational knowledge.  Self-development and reflection are crucial in developing themselves as teachers of mathematics and that creating a positive environment influences pupils’ learning. | The main objective of research in mathematics education is the generation and application of knowledge on learning and teaching. | Ongoing CPD through the NCETM and ATM is an essential component for creating a positive impact on their pedagogy and teaching practice. |
| *Learn how to:* | Conduct themselves as professional teachers of Mathematics (e.g. language used in the classroom and dress code). | Recognise and report safeguarding concerns to the designated person at the school.  Identify areas of improvement and set themselves SMART targets to improve their own practice as teachers of Mathematics.  Identify strategies to support SEND pupils and pupils with EAL in Mathematics. | Promote mathematical literacy, curiosity, and love for the subject in all learners irrespective of their background or previous experiences in mathematics. | Invoke mathematical curiosity in all learners.  Provide pupils with the opportunity of applying mathematics to a variety of real-life meaningful contexts and the misapplication of mathematics in news and media | Reflect on their effective use of strategies for improving mathematics learning and teaching.  Identify the next steps for improving their own practice. | Transit from a student teacher to ECT through the development of competencies required for Mathematics teaching.  Contribute to the local mathematics community, such as the Maths HUBS. |
| PILLAR 2 (Subject & Curriculum knowledge) | How learning occurs & progression | *Learn that:* | Mathematics is a compulsory subject in the national curriculum and that pupils’ prior knowledge plays an important role in how they learn.  Mathematics teachers should be aware of the current debates and national foci around mathematics as a subject. | Outstanding subject knowledge and awareness of the different pedagogical approaches are essential to teaching mathematics.  Mathematics teaching is informed by and informs educational policy.  The subject of Mathematics contributes to the development of literacy and numeracy across the curriculum. | Pupils’ misconceptions in mathematics are pivotal in planning for effective pupil progression.  A series of well-planned series of lessons that draws upon pupils’ knowledge retrieval enables pupils’ learning to occur in a meaningful way | Curriculum intent and implementation is driven by UK national Government policy and schools wrestle with balancing such policy with their own local context.  Teaching key mathematical concepts through modelling and intelligent practice should usually precede problem-solving. | Planned use of discourse can support pupils’ thinking and reasoning in Mathematics. | Reflection and metacognition are important factors for pupils’ progress in Mathematics teaching. |
| *Learn how to:* | Model mathematical techniques that develop pupils’ fluency in Mathematics. | Create various opportunities for all pupils to become more secure in their conceptual understanding of curriculum topics of Mathematics.  Design lessons which include opportunities for teaching, practice and assessment and build on prior subject knowledge.  Address and respond to common misconceptions in Mathematics. | Select and use appropriate pedagogies within their teaching of various mathematics topics within the curriculum. | Deliver a series of lessons that effectively build and link to pupils’ knowledge of mathematics and appropriate cross-curriculum links. | Carefully design and manage group work in a structured way to ensure mathematical understanding is developed.  Provide pupils with success criteria and appropriate support that assist in developing them as learners. | Contribute to curriculum and materials design that supports mathematical learning. |
| Curriculum & subject knowledge | *Learn that:* | The mathematics curriculum includes a coherent programme of content and opportunities for children to develop their reasoning, problem-solving and fluency.  Mastery in mathematics is based on the 5 ‘big ideas’ that promote conceptual understanding. | Sequencing of subject knowledge in mathematics is an important aspect of pupils’ learning.  Promoting literacy within mathematics can contribute to the way in which pupils develop their learning.  Sharing mathematics resources/activities with experienced colleagues is an effective way of developing curriculum subject knowledge and can reduce workload where relevant. | Supporting pupils’ learning involves self-auditing their own subject and curriculum knowledge; identifying potential gaps; and using mathematical definitions and terminology in a meaningful way. | Effective use of mathematical vocabulary and terminology promotes links to reading and literacy in mathematics.  Continuing to develop subject knowledge allows for more secure understanding of alternative mathematical methods. | Mathematical problem solving can be used to challenge and extend pupils’ thinking.  The curriculum intent and implementation in mathematics is driven by national and local stakeholders who may have competing interests. | The ECT period will provide them with opportunities to develop knowledge and skills that will broaden their teaching approaches.  A range of mathematical approaches should be applied to enable an inclusive curriculum. |
| *Learn how to:* | Audit their own mathematics subject knowledge and devise an action to address gaps of knowledge. | Develop cross-curricular links between mathematics and other subjects.  Identify essential concepts, knowledge and skills within a coherent curriculum.  Anticipate, plan for and address mathematical misconceptions. | Make effective links between existing and new mathematical knowledge.  Draw upon appropriate mathematical topics and concepts that permeate other subject specialism. | Contribute to departmental planning and development of resources in Mathematics. | Design medium -term plans that demonstrate appropriate coherence within the curriculum.  Contribute to departmental planning and designing of resources within mathematics. | Craft a mathematics curriculum which helps pupils apply their subject knowledge and skills to other subject areas.  Enhance their subject and pedagogical knowledge in preparation for teaching a range of key stages and levels. |
| PILLAR 3 (The craft of teaching & pedagogy) | Assessment | *Learn that:* | Assessment of learning in mathematics is a critical part of the teaching and learning cycle. | The planning of assessment tasks should be linked to learning outcomes.  Modelling and scaffolding contributes to assessment in Mathematics. | Pupils’ assessment and marking informs future lesson planning.  Pupils respond to feedback in different ways. | Planning formative assessment tasks is linked to lesson objectives.  Quality feedback can take a variety of forms and may be verbal as well as written. | Pupils’ data can be used carefully to inform future planning and assessment of their mathematical skills.  Quality feedback can take a variety of forms and may be verbal as well as written. | Departmental standardisation can help aid the accuracy of assessment.  Providing feedback takes into account the range of factors which can impact on pupils’ understanding of the feedback. |
| *Learn how to* | Build assessment tasks into lesson plans to help inform future learning. | Structure assessment tasks to check for prior knowledge, gaps and mathematical misconceptions.  Plan to support and challenge pupils in mathematics.  Adapt their assessment techniques to meet the needs of SEND pupils and be inclusive of all learners. | Develop a range of questioning approaches that assess pupils’ current understanding.  Provide specific and helpful feedback. | Provide effective feedback to pupils.  Plan for pupils’ response and question time within lessons.  Use self and peer assessment in a structured manner. | Provide accurate assessment and feedback to pupils in line with department policy, and examination specifications and mark schemes of mathematics. | Identify effective and accurate approaches to marking and alternative approaches to providing feedback.  Design formative and summative assessment opportunities within the curriculum using assessment boards mark schemes to guide their marking. |
| Adaptive Teaching | *Learn that:* | Pupils learn at different rates and hence the need for adaptive teaching. | Adaptive teaching does not mean more of the same task; it is designing mathematical activities that aim to develop deeper mathematical thinking in all pupils. | Pupils learn mathematics in different ways and that student teachers needs to be aware of appropriate mathematical explanations that will encourage and support all learners. | Adaptative teaching should be at the centre of learners-focussed activity rather than extensions of different tasks for specific groups. | Inclusive teaching should reflect on the ability of all learners.  Designing practice tasks can provide the appropriate level of support to all pupils.  Reframing questions provide greater scaffolding and greater challenge. | Intervention work with small groups within a lesson is more effective than planning different lessons for different groups of pupils.  Teaching should not take a homogenous approach but should take into account the individual needs of all pupils. |
| *Know how to* | Use faded worked examples to provide a scaffold of mathematical methods. | Provide scaffolding when breaking down new mathematical concepts into smaller accessible steps.  Support pupils with a range of educational needs. | Support pupils with a range of educational needs including pupils with EAL and SEND. | Address a variety of mathematical misconceptions and insecure knowledge. | Adapt their teaching and pedagogical approaches in mathematics to respond to the needs of all pupils.  Adapting mathematics teaching resources to scaffold and address misconceptions in mathematics. | Plan opportunities to stretch and challenge pupils of all ability in mathematics.  Apply a range of research-informed strategies into their mathematics teaching. |
| Behaviour | *Know that:* | Attitudes to mathematics can impact on the behaviour of pupils. | Creating a positive and respectful learning environment, one that promotes ‘can do’ attitude to learning mathematics and where making mistakes is a natural part of the learning process, can impact on pupils’ behaviour. | Schools and departments have developed bespoke behaviour policies to ensure effective learning in their context.  Consistency of application of departmental and school behaviour policies is an important ingredient in planning for good pupil behaviour | Pupils are provided with an effective learning community based on teacher implementation of school and departmental policies  Mathematics teachers have a responsibility to ensure school and departmental policies are followed and expectations are made clear to all pupils. | Engaging with parents, carers and colleagues is essential in supporting and managing pupils’ behaviours. | Building good student-teacher relationships help in managing behaviour effectively within lessons.  The pastoral system of the school plays a critical part in supporting pupils, including the roles of form tutors, pastoral support staff and members of the leadership team. |
| *Know how to:* | Set high behavioural expectations in relation to pupils’ outcomes by designing engaging and challenging mathematical learning experiences. | Establish clear behavioural expectations and routines which create a consistent and inclusive learning environment.  Apply rules, sanctions, rewards, and praise in line with the school’s policy.  Establish and build positive and professional relationships which assist with managing behaviour. | Plan individual and a sequence of lessons that minimise opportunities for pupils to be off task leading to poor behaviour. | Use effective language that encourage, support and reward good behaviour and hard work modelled on Rosenshine’s Principles. | Develop their own approaches that motivates all pupils and manage pupils’ behaviour.  Utilise research-informed practice of behaviour management into teaching and learning of mathematics. | Reflect on the effectiveness of different approaches to managing behaviour in relation to a particular setting.  Take pastoral responsibility for a group of pupils to assist their experience in the mathematics classroom environment. |
| SFE PRIORITIES AY 21/22 | English as an Additional Language (EAL) | *Know that:* | * Jim Cummins framework is essential for pupils with EAL esp. with a focus on context embedded, cognitively demanding. * CALP and BIC skills are important for language acquisition and teachers need to plan for them. * It is important to include context embedded and cognitively demanding work for all pupils but especially those with EAL. | * It is important to address misconceptions such as learners with EAL have an additional need not special need. * EAL learners are not a homogenous group. * How context embedded and cognitively demanding is simply good teaching and useful for all learners. | * The Jim Cummins Iceberg model – that language 1 and language 2 are interdependent. * Children with EAL need extra support with colliquations, vocabulary depth and vocabulary breadth and the teacher needs to consider this at the planning stage. * There are stages of progression to language development and relate to Hilary Hester’s BEL stages. * Group work and discussion are essential for language acquisition in all subject disciplines. | * There are various approaches within all subject disciplines that support all children with context embedded and cognitively demanding work. * It is important to understand how to manage children’s behaviour and recognise whether the behaviour is related to feelings of isolation and/or language barriers. | * Pupils with EAL may have additional barriers to their learning such as experiences of being a refugee or external pressures such as the need to be the translator for their family. * It is important to use the BEL stages for assessment but that there are other models. * The importance of avoiding cultural appropriation. | * Jim Cummins framework is essential for pupils with EAL especially those with a focus on context embedded, cognitively demanding * CALP and BIC skills are important for language acquisition and teachers need to plan for them. * It is important to include context embedded and cognitively demanding work for all pupils but especially those with EAL. |
| *Know how to* | * Adapt teaching to include dual language cards or text to support language acquisition in their subject discipline. * Identify key vocabulary that will be needed in their subject discipline. | * Ask the teacher questions about their practice. * Ask questions about the rationale for grouping children with EAL especially if they observe a pupil with EAL in a lower competency group. * Adapt their teaching and standard schemes of work so that they can offer context embedded and cognitively demanding activities that support language acquisition. | * Use dual language books, flashcards, and visual aids to support reading comprehension. * Evaluate resources and activities related to their discipline that may be suitable for pupils with EAL including visits to museums and outdoor learning spaces. * Recognise the 4 BEL stages of development and identify some of the approaches that may be suitable for specific stages of language acquisition. | * Use the BEL stages for assessment. * Celebrate culture, languages and difference in all classes and throughout the school. * Be sympathetic to the needs of pupils with EAL and those who are refugees. * Address ways of supporting families who have EAL. | * Assess the stage of language development through assessment stages and consider support strategies. * Evaluate (and if necessary, challenge) any poor EAL practices in the school. | * Adapt teaching to include dual language cards or text to support language acquisition in their subject discipline. * Identify key vocabulary that will be needed in their subject discipline. |
| Relationship & Sex Education (RSE) | *Know that:* | * The goals/aims for RSE are very different to the aims or goals of other curriculum subjects and these should be recognised and foregrounded when teaching it. * There are 4 core areas to the statutory secondary RSE curriculum: Identity, gender and sexuality, Consent and healthy relationships, Anatomy, sexual health and fertility, and RSE in a digital context. * Ground rules in RSE teaching are important. | * In the RSE classroom, consciously ensuring pupil safety is paramount given the often-sensitive nature of the subject matter and the goals of the curriculum. * Awareness and the use of language in RSE is important e.g., heteronormative, cis-normative etc. * The RSE classroom is not the place to debate their morality but to provide non-judgemental information about how to access services etc. | * SRE should Provide information which is realistic and relevant, and which reinforces positive social norms * Lessons should start where students are, find out what they already know, understand, are able to do and are able to say. | * Importance of avoiding making any assumptions about pupils, taking a measured, rather than value-laden approach. * RSE dovetails with foundational knowledge for understanding other compulsory topics such as fertility, sexual health, FGM and menstruation (which is technically part of health education). | * RSE includes planning to teach explicit life skills (e.g., planning, decision-making skills), specific skills (e.g., communication, sexual negotiation skills) and promote resilience. * Distancing techniques which will enable learners to depersonalise the topic being discussed, should be incorporated. | * The goals/aims for RSE are very different to the aims or goals of other curriculum subjects and these should be recognised and foregrounded when teaching it. * There are 4 core areas to the statutory secondary RSE curriculum: Identity, gender and sexuality, Consent and healthy relationships, Anatomy, sexual health and fertility, and RSE in a digital context. * Ground rules in RSE teaching are important. |
| *Know how to* | * Reflect what the new guidance means for their own teaching practice. * Appreciate the role, purpose and value of RSE in the curriculum. * Create a classroom environment which encourages explorative learning, questioning and development while ensuring safety. | * Gently challenge misconceptions and misuse of language which emerge. * Model acceptance and celebration of differences in sexual orientation, sex preference and decisions (while always championing consensual relationships). | * Ensure that any bi/homophobia, bullying, offensive language is challenged in the classroom, whatever the basis of the viewpoint. * Take a positive approach which does not attempt to induce shock or guilt but focuses on what students can do to keep themselves and others healthy and safe and to have positive, healthy relationships. | * Respond to challenges that they might encounter in the RSE classroom. * Avoid pedagogy that may be misleading and contribute to shame and stigma. * Apply a wide variety of approaches to teaching and learning, with an emphasis on interactive learning and the teacher as facilitator. | * Ensure that students are informed, empowered and safe as they develop and grow through secondary school and beyond. * Develop strategies and resources for teaching RSE, relating specifically to Identity, gender and sexuality, Consent and healthy relationships, Anatomy, sexual health, and fertility, and RSE in a digital context. | * Reflect what the new guidance means for their own teaching practice. * Appreciate the role, purpose and value of RSE in the curriculum. * Create a classroom environment which encourages explorative learning, questioning and development while ensuring safety. |
| Safeguarding & digital wellbeing | *Know that:* | * Safeguarding and Digital Wellbeing is an essential part of ITE and looking after pupils, colleagues and themselves. Inclusive of their conduct when learning and teaching online. * All professionals have a responsibility and duty of care for the pupils, colleagues and themselves in relation to the Recognise, Respond and Report (3R’s). * Keeping Children Safe in Education (2021) and Working together to safeguard children (2018) are of fundamental importance and a valuable source of guidance for all educational professionals. * Settings have their own Safeguarding Policies which must be followed by all in that setting. * Every setting should have a Designated Safeguarding Lead (DSL) who is the first point of contact for any safeguarding concerns. * Safeguarding pupils involves not promising confidentiality, sharing pertinent information and reassuring the pupil of their disclosure. | * Every setting has their own safeguarding policy and all professionals in that setting should uphold its content and ethos. * Pupils are not a homogenous group and therefore support for safeguarding needs to be individualised whilst also still following all safeguarding procedures * Peer on Peer abuse and sexual harassment are current priorities for all settings. * The following are requirements to know and implement as a teacher: * 1) they are essential part of the safeguarding system for children. * 2) To identify concerns early, provide help, promote welfare and prevent concerns from escalating. * 3) Providing a safe learning environment for all pupils and young adults. * 4) Be prepared to identify children / young adults who may benefit from early help * 5) Safeguard children’s and young people wellbeing and maintain public trust in the teaching profession as part of their professional duties | * Safeguarding relies on a wider network of support and intelligence sharing, such as across a school or LEA setting. * Bullying, including Cyberbulling is wrong and can take many forms. * Safeguarding involves promoting the welfare of children and colleagues within the school and wider community. | * The adverse experiences of pupils can have an affect upon learning and progress * The wider impact of safeguarding of pupils, vulnerable young people in relation is linked to Child Criminal Exploitation (CCE) and Child Sexual Exploitation (CSE). * A high quality RSE curriculum can assist n safeguarding pupils by embedding knowledge and understanding and empowering teachers to provide/recognise safeguarding concerns. | * Safeguarding is everyone’s responsibility and that a child centred approach will ensure this is as essential. * Consistent awareness and professional development will ensure the protection and care in a proactive way for all pupils, colleague and themselves.   . | * Safeguarding and Digital Wellbeing is an essential part of ITE and looking after pupils, colleagues and themselves. Inclusive of their conduct when learning and teaching online. * All professionals have a responsibility and duty of care for the pupils, colleagues and themselves in relation to the Recognise, Respond and Report (3R’s) * Keeping Children Safe in Education (2021) and Working together to safeguard children (2018) are of fundamental importance and a valuable source of guidance for all educational professionals. * Settings have their own Safeguarding Policies which must be followed by all in that setting. * Every setting should have a Designated Safeguarding Lead (DSL) who is the first point of contact for any safeguarding concerns. * Safeguarding pupils involves not promising confidentiality, sharing pertinent information and reassuring the pupil of their disclosure. |
| *Know how to:* | * Undertake an Audit of safeguarding knowledge and understanding underpinned by KCSIE (2021) online resource to identify their readiness for professional practice. * Engage with further CPD development undertaken through Prevent training (Government link) * Identify the signs of possible abuse * Report disclosures to the necessary DSL including the DSL at Edge Hill * Keep themselves safe online and in settings by, for example, ensuring they do not promise confidentiality, only share information with key staff (e.g. DSL), and not prompting the pupil during their disclosure. | * Confidently and competently report safeguarding concerns in their setting and at University. * Conduct themselves in a professional and safe manner in educational Setting. * Respond to a pupil’s disclosure and act immediately adhering to the necessary steps.eg. recognising signs of abuse / knowing what County lines involves and the impact on the school / community. * Implement procedures and processes in line with an educational setting including reporting incidents/concerns to the DSL | * Identify how a safe and secure environment is established for pupils. * Identify the importance and essential approach to ensuring the welfare of pupils both in school and their community. * Seek advice and guidance for professional colleges on sensitive issues regarding welfare and safeguarding eg. Inclusive of FGM and Prevent and other essential areas of safeguarding. | * Identify symptoms and situations related to safeguarding within a school and wider context. Supporting and reinforcing focus from the RSE curriculum involving essential topics such ‘Sexual Harassment’ and ‘Peer on Peer Abuse in school’ * Recognise the impact of Adverse childhood experiences and different forms this can take upon their learning and education. | * Become a confident and competent advocate regarding safeguarding and digital wellbeing within a school and wider context. * Identity when to act upon situations and the professional manner this must uphold. * Undertake further professional awareness and understanding through continual updates provided by the DfE, Designated Safeguarding Lead (setting they are employed in), NSPCC updates and policy guidance aligned to DfE. | * Undertake an Audit of safeguarding knowledge and understanding underpinned by KCSIE (2021) online resource to identify their readiness for professional practice. * Engage with further CPD development undertaken through Prevent training (Government link) * Identify the signs of possible abuse * Report disclosures to the necessary DSL including the DSL at Edge Hill * Keep themselves safe online and in settings by, for example, ensuring they do not promise confidentiality, only share information with key staff (e.g. DSL), and not prompting the pupil during their disclosure. |