Mathematical thinking in schools **(ME620)** content listing

Unit 1 *Working mathematically*	The module triad: learner, teacher, mathematics; content / processes in mathematics The do–talk–record (DTR) framework for analysing learners' activity Guidance on reflective writing Mathematical tasks involving counting and organising
Unit 2 *Specialising and generalising*	Specialising and generalising Responses to 'Being stuck' Finding patterns in examples and expressing them in words The specialise-generalise-conjecture-verify (SGCV) framework for analysing mathematical reasoning Mathematical tasks involving number patterns
Unit 3 *Learning differently*	Approaches to learning mathematics: Chinn's inchworm / grasshopper approaches Bruner's enactive / iconic / symbolic modes The see–experience–master (SEM) framework for analysing learning over time Exploring dynamic representations using prepared GeoGebra files Mathematical tasks involving geometric constructions and proofs
Unit 4 *Switching on*	Comparing different representations of a single concept Creating GeoGebra files Motivation Rich mathematical tasks Content, process and context Mathematical tasks involving linear relations
Unit 5 *Understanding learning*	Finding patterns in mathematical structure and expressing them in words The manipulate–get a sense of–articulate (MGA) framework for analysing mathematical thinking Manipulating numbers, picture and symbols Expressing problems algebraically Theories of learning (behaviourism, constructivism) and teaching (connectionist / transmissionist /discovery) Mathematical tasks involving structure and algebra
Unit 6 *Communicating mathematics*	Communication through language Learning through communication Codes and symbols Communicating unknowns and generality Communicating with a spreadsheet Mathematical tasks involving communication
Unit 7 *Opening up and applying*	Opening up tasks Creativity and mathematics Teacher interventions The modelling cycle Modelling with graphs Modelling with data Mathematical tasks involving functions, families of graphs and modelling
Unit 8 *Preparing to teach*	Six aspects of preparing a topic in order to teach Mathematical task involving probability and simulations
Unit 9 *Investigating practice*	Time for reflection: noticing your own learning; being open to notice others' learning Guidance for reflective writing