Master of Education (Science)

Course Code	Course Title	Course Synopses	AU
MED900	Educational Inquiry	This course introduces participants to the fundamental processes involved in conducting research such as formulating research questions, writing a review of the literature by synthesizing empirical studies, understanding various methodological approaches, collecting and interpreting research data. Participants in this course will have opportunities to develop the skills, knowledge and strategies needed to read, interpret, and evaluate the quality of research reports. In addition, participants will gain a critical understanding of quantitative, qualitative, and combined research approaches.	4
MED902	Integrative Project	This capstone course requires participants to identify an education issue which forms the focus of inquiry, locate and read the most relevant literature to generate suggested potential solution to address the problem. The solution should show evidence that they are able to take the available information and restructure it in an appropriate way to deal with the issue.	2
MSC901	Foundations of Science & Science Education	This course provides an overview of the theoretical and research traditions in science education. It discusses the nature of science from historical, philosophical and sociological views of science, and introduces three dominant perspectives in science educational research: constructivist, sociocultural and critical. Participants will learn about the intellectual roots and assumptions of each perspective, understand their respective research goals and methods, and evaluate their views on improving science teaching and learning. Empirical studies that adopt these perspectives will also be examined and discussed. Above all, this course will prepare participants to appreciate the role of theories in science education and make connections between theories, research and classroom practices.	4

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Course Code	Course Title	Course Synopses	AU
MSC902	Science Curriculum Change and Curriculum Evaluation	The purpose of this course is to provide the participants with opportunities to examine key issues in conceptualisation, enactment and evaluation of the science curriculum, and their implications for research and development. The participants will learn about the history of changes to the science curriculum around the world. They will examine science standards documents from various countries and make connections to our Singapore science curriculum frameworks. They will unpack the term scientific literacy as discussed in 21 Century Competencies literature and understand its connections to PISA. With knowledge about the sociopolitical context of science curriculum reform and issues in science reform, course participants will appreciate the usefulness of understanding evaluation perspectives and methods and apply them to design an evaluation study of a school-based science curriculum or programme.	4
MSC903	Science as Practice	* To provide more science education courses for participants to choose in the MEd programme * To strengthen the theory and practice nexus of science as practice in science teaching * To enable participants to make connections between the ideas of science as practice to other classroom Practices	4
MSC904	Alternative conceptions and conceptual change in science learning	This course introduces constructive learning theories and conceptual change theories as well as methods to determine alternative conceptions in the context of science learning. It will create greater awareness of the difficulties in learning science, how to diagnose these difficulties, and how to design interventions to address them.	4

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MSC905	Science Discourse: Language, Literacy & Argumentation	Language plays an important role in science and in science teaching. Science teachers need to be cognizant of the nature and role of language in science, and how scientific language differ between everyday language. This will help teachers become more aware of the difficulties students have with learning the scientific language. Classroom talk plays an important role in socializing students into the language of science. A communicative framework will be introduced to help teachers understand the role of talk in science teaching and learning, and to analyse and orchestrate talk more effectively to support science learning. Argumentation, as an important scientific practice and discourse type, will be highlighted as a pedagogical approach and strategy in developing students scientific practices and conceptual understanding.	4
MSC906	Representations & New Media in Science Education	Learning science involves students making sense of and generating multiple modes of representations (e.g., written text, images and mathematical symbols) that characterise science. Classroom teachers also make use multiple media and forms of representations to present the subject matter and shape their students conceptual understanding. This course will offer participants an overview of the theories and analytical tools so that participants are able to examine representations and media that are used in research and in classroom practice. In addition, participants will apply the theories learned to analyse representational artifacts commonly used in the teaching of science (e.g., diagram, textbook), including the use of new media such as simulation and video to determine their efficacy in supporting student learning.	4

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Course Code	Course Title	Course Synopses	AU
MSC907	Critical Studies in Science Education	In this course, participants will learn about critical theory and examine issues in science education with a critical lens. They will learn about what it means to teach science with critical praxis and be a reflexive science practitioner. They will acquire the vocabulary used in critical science education research. Specifically, multiculturalism and gender issues in science education will be discussed and pedagogies that enhance student participation in science. Critical methodologies and validity issues in critical research will also be discussed. During this course, they will discuss taken-for-granted assumptions about schooling, curriculum, teaching, and learning. Then, they will apply the theories learned to design culturally relevant science activities.	4
MSC908	STEM Education History, Policies, and Research Trends	This course provides an overview of the history of STEM education, including the emergence of STEM and STEM education in the US and its development in other regions, such as Europe and Asia. STEM education policies in selected countries, including Singapore, will be examined and discussed. Empirical studies will be analyzed and discussed to highlight trends in STEM education research. Differences in interpretation of STEM education will be highlighted in light of the STEM education policies and research discussed.	4
MSC908	STEM Curriculum and Instruction	This course interconnects the teaching, learning, and assessment aspects of an integrated STEM curriculum. Various models of integration (e.g., disciplinary, multidisciplinary, interdisciplinary, or transdisciplinary) will be discussed. The S-T-E-M Quartet developed by members of the meriSTEM@NIE will be introduced to facilitate students' design and evaluation of STEM activities and curricula. Various modes of assessments targeting conceptual, epistemic, and social goals of STEM education will be highlighted to facilitate design of assessing learning in STEM activities.	4

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Course Code	Course Title	Course Synopses	AU
MSC910	Assessment in Science Education	Classroom assessment has experienced a major reconceptualisation in the past two decades. Rather than just a means of evaluating or grading, its formative, synchronous functions for advancing learning are increasingly being promoted to teachers. This course brings principles of assessment to bear on science teaching and learning and attempts to narrow the theory-practice gap that often obstructs (science) teaching. International and local policies relevant to science education are examined together with the targets of assessment in science, namely, cognitive, skills and affective knowledge. The critical examination of assessment strategies/methods for science classrooms will also be covered.	4