

NTU-NUS/SMU PhD Student Exchange Programme
List of NTU Courses to be offered in Semester 2 AY2023-24

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)
ADM	AP7040	Exhibition Design	3			Letter Grade
ADM	AP7044	New Media History and Theory	3			Letter Grade
ADM	AP7055	Art in the Age of Creative Machine	3			Letter Grade
ASE	ES7012	Structural Geology (*cross list with UG ES3002)	4		Lecture Tuesday 9:30 - 12:20, Lab Friday 9:30 - 12:20	Letter Grade
ASE	ES7013	Climate and Climate Change (*cross list with UG ES5007)	3		Lecture Tuesday 9:30 - 12:20	Letter Grade
ASE	ES7020	Introduction to Geophysics (*cross list with UG ES3004)	4		Lecture Monday 9:30 - 12:20	Letter Grade
ASE	ES7022	Issues in Ecology (*cross list with UG ES3305)	3		Lecture Monday 11:30 - 12:20, Tutorial Friday 9:30 - 11:30	Letter Grade
ASE	ES7023	Fundamentals of Data Science for Earth and Environmental Systems Science (*cross list with UG ES0002)	3		Lecture (Wk 1- 12) Tuesday 13:30 - 15:00 Lab Friday 13:00 - 14:20 Lab (Wk 13) Tuesday 13:30 - 15:00	Letter Grade
CCEB	BG7002	Molecular Biophysics	3	https://www.ntu.edu.sg/cceb/admissions/graduate-students/course-information	To be confirmed	Letter Grade
CCEB	CM7002	Graduate Organic Chemistry	4	https://www.ntu.edu.sg/cceb/admissions/graduate-students/course-information	To be confirmed	Letter Grade
CCEB	CM7017	Advanced Analytical and Spectroscopic Methods in Materials Chemistry	2	https://www.ntu.edu.sg/cceb/admissions/graduate-students/course-information	To be confirmed	Letter Grade
CCEB	CM7018	Advanced Synthetic and Physical Approaches to Materials Chemistry	2	https://www.ntu.edu.sg/cceb/admissions/graduate-students/course-information	To be confirmed	Letter Grade
CEE	CV7002	Advanced Strength of Materials	3		Mon, 1.30PM - 4.30PM	Letter grade
CEE	CV7003	Advanced Engineering Mathematics	3		Fri, 6.30PM - 9.30PM	Letter grade
CEE	CV7501	Membrane Science and Technology	3		Wed, 2.30PM - 5.30PM	Letter grade
EEE	EE7602	Integrated Circuit Technology	3	https://www.ntu.edu.sg/eee/admissions/programmes/graduate-programmes/detail/master-of-science-in-electronics#curriculum	Every Monday, 6.30 pm to 9.30 pm	Letter grade
EEE	EE7603	Semiconductor Physics and Applications	3	https://www.ntu.edu.sg/eee/admissions/programmes/graduate-programmes/detail/master-of-science-in-electronics#curriculum	Every Friday, 6.30 pm to 9.30 pm	Letter grade
LKCMed	MD7107	Latest Developments in Infectious Disease Research	3		Wednesday 0930 - 1220	Letter Grade
LKCMed	MD7108	Neural Systems & Behaviour	3		Wednesday 1430 - 1720	Letter Grade
LKCMed	MD7115	Introduction to Biostatistics with R	3		Monday 0930 - 1220	Letter Grade
MAE	MA6502	Fundamentals & Advances In Additive Manufacturing	3	Available on website	Tuesday 7:00 PM - 9:50 PM	Letter Grade
MAE	MA6504	Management of Global Manufacturing	3	Available on website	Wednesday 7:00 PM - 9:50 PM	Letter Grade
MAE	MA6515	3D Printing of Electronics	3	Available on website	Wednesday 7:00 PM - 9:50 PM	Letter Grade
MAE	MA6702	Corporate Resource Planning	3	Available on website	Monday 7:00 PM - 9:50 PM	Letter Grade

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MAE	MA6731	System Reliability & Risk Analysis	3	Available on website	Friday 7:00 PM - 9:50 PM	Letter Grade
MAE	MA6741	Quality Engineering	3	Available on website	Thursday 7:00 PM - 9:50 PM	Letter Grade
MAE	MA6801	Advanced Thermal Engineering	3	Available on website	Monday 7:00 PM - 9:50 PM	Letter Grade
MAE	MA6802	Engineering Measurements	3	Available on website	Friday 7:00 PM - 9:50 PM	Letter Grade
MAE	MA6816	Laser Assisted Manufacturing	3	Available on website	Thursday 7:00 PM - 9:50 PM	Letter Grade
MAE	MA7111	Mechanics of Solids and Fracture	3	Available on website	Thursday 7:00 PM - 9:50 PM	Letter Grade; no examination
MSE	MS7140	Properties of Materials	2	Refer to MSE PG website.	Online course (asynchronous e-learning)	Letter grade
MSE	MS7220	Processing of Organic Materials	3	Refer to MSE PG website.	Online course (asynchronous e-learning)	Letter grade
MSE	MS7320	Physical Analysis of Materials	2	Refer to MSE PG website.	Online course (asynchronous e-learning)	Letter grade
MSE	MS7330	Electron Microscopy of Materials	4	Refer to MSE PG website.	Online course (asynchronous e-learning)	Letter grade
MSE	MS7340	Crystal Chemistry of Materials	4	Refer to MSE PG website.	Online course (asynchronous e-learning)	Letter grade
MSE	MS7410	Nanomaterials	3	Refer to MSE PG website.	Online course (asynchronous e-learning)	Letter grade
MSE	MS7430	Electronic Materials & Devices	3	Refer to MSE PG website.	Online course (asynchronous e-learning)	Letter grade
NBS	BR7311	Seminar in Capital Market Research in Accounting	3	The purpose of the course is to introduce various areas of accounting research so that students can broaden their horizon, understand popular concepts and commonly-used measures in accounting literature, and potentially develop an interest in one particular area. In addition, discussing the selected papers helps to illustrate the following crucial skills required for all successful researchers in the area of capital market research: a) How to judge the quality of a research idea; b) How to develop a research hypothesis; c) How to design an experiment to test a research hypothesis; d) How to interpret the results. Pre-Requisite: Basic knowledge of microeconomics and econometrics (esp. cross-sectional panel regression analysis).	To be confirmed	Letter grade
NBS	BR7326	Empirical Research I (Investment)	3	This course aims to provide students with working knowledge of the literature in empirical asset pricing and the most commonly employed empirical methods. Students will also learn to evaluate their own and other people's research. The ultimate goal is to help students generate their own independent ideas for empirical research in finance and furnish them with the tools to implement those ideas.	To be confirmed	Letter grade

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)
NBS	BR7331	Seminar in Information Systems Research	3	This course's main focus is understanding emerging research topics in Information Systems research. The learning goals of this course are to develop a range of competencies necessary for performing academic research in Information Systems. These competencies include literature syncretization, theorization, empirical operationalization, and data analyses. In-class discussions and drafting a research proposal will facilitate the internalization of these competencies. Upon successful completion of this course, participants will have gained competencies to identify research topics, theoretical conceptualization, and research proposal development.	To be confirmed	Letter grade
NBS	BR7332	Contemporary Issues in Information Systems	3	This course provides an opportunity to explore in depth one or more emerging or recent developments in information systems and to enable students to participate in the informed debate of contemporary issues in information systems while applying their knowledge gained. This course will focus on the in-depth study of one or more recent, emerging, or potentially important developments in information systems. The course involves defining an issue, researching information systems management, as well as analyzing and summarising current research results in IS.	To be confirmed	Letter grade
NBS	BR7343	Theoretical Foundations of Organisational Behaviour	3	This seminar focuses on the study of individuals within the context of an organization. The seminar centers on research in micro and meso levels of organizational behavior (OB) and covers less of macro organizational behavior. This seminar accomplishes these objectives. The seminar helps participants to (1) understand the contemporary theories and methods associated with the study of individual behaviors in organizations, including multi-level and cross-level OB theorizing; (2) develop meta-learning skills (learning how to learn) in constructive critiques of OB research; & (3) craft quality research proposals related to OB constructs.	To be confirmed	Letter grade
NBS	BR7347	Longitudinal Research, Theory, Design & Data Analysis	3	This course provides the knowledge and hands-on experience of the theory, design, and analyses of longitudinal research in organizational settings. This course is designed for doctoral students who intend to conduct empirical longitudinal research publishable in scholarly journals. The main objective of the course is to help you develop an understanding of the typical research questions that you can answer using longitudinal methods, the typical longitudinal methods that are used in the field of organizational behavior and human resources management, common issues related to longitudinal methods, and hands-on experience of analyzing longitudinal data using software SAS.	To be confirmed	Letter grade
NBS	BR7351	Seminar in Consumer Behaviour	3	The objectives of this course are: to familiarize students with classic and current consumer behavior research; to give students a strong foundation for critical thinking in the area of consumer behavior; and to enable students to conceptualize, operationalize, and develop their own research ideas. Therefore, the focus is on understanding current theoretical and methodological approaches to various aspects of consumer behavior, as well as advancing this knowledge by developing testable hypotheses and theoretical perspectives that build on the current knowledge base.	To be confirmed	Letter grade

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)
NBS	BR7354	Advanced Seminar in Quantitative Marketing	3	The main purpose of this seminar is to introduce doctoral students to advanced research topics in quantitative marketing. Specifically, it will cover the methodologies of game theory and Bayesian statistics as well as their marketing applications. Coming out of this seminar, a student should be well-equipped to (1) understand and critique "methodology-heavy" papers in these areas and (2) develop sophisticated quantitative models to implement his/her original research ideas.	To be confirmed	Letter grade
NBS	BR7373	Organization Theory	3	This seminar introduces students to the foundational perspectives on organization theory. The main objective is to survey the major theoretical perspectives in organization theory research, including both classic and contemporary scholarship. By the end of the course, the students will be able to demonstrate knowledge of major perspectives in organization theory research, critically evaluate the merits of different perspectives, and develop research ideas to advance scholarship in organization theory.	To be confirmed	Letter grade
NBS	BR7374	Seminar in Entrepreneurship	3	This course introduces the key debates and perspectives in entrepreneurship research. The course will require critically evaluating, reviewing, and developing new ideas that advance entrepreneurship research. By the end of the course, students will apply what they have learnt and develop a research paper at a level that is adequate for submission to an international meeting.	To be confirmed	Letter grade
NIE	MCL902	Topics on Chinese Language and Its Teaching	4	Global developments in the teaching of Chinese require educators working in this area to further their understanding on the latest trends in of the teaching of Chinese as a second language. In addition, Chinese teachers should possess the ability to apply the latest methodologies and theories in the innovation of their pedagogy, on top of having a strong foundation in their knowledge of the Chinese language and its linguistics. This course focuses on the theories and methodologies in the teaching of Chinese as second language. The syllabus includes the teaching of Chinese phonics, characters, lexicon, grammar, rhetoric and other related knowledge. The course consists primarily of project-based learning. Depending on the needs of the class, the course instructor has the flexibility and discretion to plan and customize the teaching materials in order to underscore important learning points and to reinforce difficult concepts.	To be confirmed	Letter Grade
NIE	MCL903	The Instructional Use of Children and Young Adults' Literature in Chinese Language Teaching and Learning	4	As a Chinese language teacher in a primary or secondary school, it is imperative to understand the relationship between children and adults literature and pedagogies. This course will help to enhance the understanding of the applications in children and young adults literature, allowing teachers to hone their teaching pedagogies. This course will examine the instructional use of children and young adults literature in Chinese language teaching and learning.	To be confirmed	Letter Grade
NIE	MCL907	Chinese Language Curriculum Design and Instructional Materials Development	4	Language curriculum design and the development of instructional materials should cater to the differing learning needs of individuals in different regions. The Chinese language curriculum in Singapore uses a uniform set of syllabus and instructional materials for all students. Hence, during the teaching process, many teachers find that they need to adapt these to suit the varying abilities of their students.	To be confirmed	Letter Grade

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NIE	MCL911	Application of Information and Communication Technologies in Teaching and Learning of Chinese Language	4	Immersing Information and Communication Technologies (ICT) into Chinese Language classroom is not just about employing digital learning materials or references to aid traditional teaching. More in-depth professional development is required to improve teachers design capacity in engendering different forms of teaching enabled or enhanced by ICT, especially communicative approaches, socio-constructivist learning, and extending language learning beyond the classroom. Moreover, in the context of globalisation in the 21st century, the usage of languages in our daily lives and work environments differs from the past centuries. It is crucial to nurture the students new literacies in utilising Chinese Language for effective communication in the cyberspace, particularly in the new media environments. We need to have a closer link to the 21st century teaching and learning with ICT, providing the natural context for the development of the new literacies.	To be confirmed	Letter Grade
NIE	MCT901	Curriculum: Theories and Issues	4	The field of curriculum is characterized by a vigorous debate and a plethora of compelling arguments. This introductory course invites participants to examine major issues and debates in the field of curriculum studies, and to bring these ideas to bear on curriculum developments in Singapore. The course is structured around the following fundamental questions: How do we understand curriculum and the work it does? What knowledge is of most worth and what should schools teach? How should this be taught and for what reasons? How does the curriculum reflect a society's understandings of its past as well as visions and aspirations? Participants will be introduced to historical development, socio-economic assumptions, challenges of globalization and the implications of these and other factors on curricular reforms. As participants consider various approaches to exploring these questions, these insights will also guide their study of key curriculum issues in Singapore. The latter include the purposes of education, selection and organization of knowledge, access to knowledge, and methods of delivery in an increasingly global context. These analyses will be done in relation to both theory and practice, and with references to implementation issues in schools and classrooms.	16-Jan-24 Tuesday 1730 - 2030	Letter Grade

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)
NIE	MCT902	Crafting the Curriculum	4	<p>The process of analysis will reveal that curricula are by necessity always incomplete and imperfect everything that is included (topic, activity, question, component, material, assessment, etc.) means that something else has been excluded. This being the case, students will suggest refinements to the curriculum they have analysed, based on their understanding of the needs This course is an introduction to curriculum development. The underlying framework for the course is that curriculum building is a process that requires ongoing study and reflection about curriculum and the practice of teaching.</p> <p>Central and perennial curriculum questions explored are: What knowledge is of most value and worth? How is the learner and learning viewed? What is the role of teachers in creating and enacting curriculum?</p> <p>The process of analysis will reveal that curricula are by necessity always incomplete and imperfect everything that is included (topic, activity, question, component, material, assessment, etc.) means that something else has been excluded. Th is being the case, students will suggest refinements to the curriculum they have analysed, based on their understanding of the needs of learners, the socio-political milieu, and the moral and ethical dimensions of schooling.</p>	18-Jan-24 Thursday 1800 - 2100	Letter Grade
NIE	MCT903	Assessment in Education and Learning: Theories, Tensions and Issues	4	<p>Understand the central and pivotal role of assessment practices in constructing and enacting educational outcomes and experiences.</p> <p>Critically examine how assessment design, judgments and feedback practices construct the process and outcomes of learning.</p> <p>Develop an awareness of assessment as the primary mechanism for determining merit, and an important discourse for addressing social justice issues.</p>	17-Jan-24 Wednesday 1800 - 2100	Letter Grade

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)
NIE	MCT904	Understanding Teachers and Teaching: Theory and Practice	4	<p>This course explores two intertwining themes: (1) Teacher as the curriculum maker, which explores from the interpretive perspective on how teachers acquire the knowledge, skills, and values in forming their identity in situated teaching practices and curriculum making. How do we understand the composition of teachers knowledge, practice, and skills in making curriculum alive? What counts as teacher quality in an era of accountability? How do teachers provide and practice leadership in curriculum making? How do teachers learn at different points in the teachers professional continuum and in different contexts? (2) Teaching as a practice, one that has been historically understood by scholars, practitioners, and policy makers from a range of theoretical perspectives. What does it mean to conceptualize teaching as a practice situated in relation to curriculum, assessment and learning? What are the many ways people have thought about teaching as a practice, and what are the consequences of those perspectives for how we understand teaching? Who can create, evaluate, and critique knowledge about teaching? The course will introduce some major frameworks that have been used to guide research, policy recommendations, and the work of teachers and teaching.</p> <p>We consider the issues of teaching and teachers in an international context, drawing on research from Singapore and other countries. Some of our texts and video materials we will use will give us repeated opportunities to consider education in China, France, Japan, and the U.S. While they dont constitute a central focus of the course, they will give us some chance for shared discussion that draws on multiple and sometimes conflicting descriptions and interpretations of teaching and teacher in a particular setting. Thus, we further pursue the context-related questions when we make the familiar strange in such an international perspective: In what ways is teaching an embedded practice that is shaped by the many contexts in which it is situated? How is learning to teach a process of entering a particular culture? What does it mean to work as a teacher in response to the discourses prevalent in</p>	15-Jan-24 Monday 1800 - 2100	Letter Grade
NIE	MCT905	Theories and Perspectives of Learning	4	<p>This is a reflection-intensive, peer-learning course that offers opportunities for students to interpret and discuss some of the established theories and perspectives on how people learn. It will cover ideas from behaviorism, cognitivism, constructivism, and social-constructivism through key topics such as meaning-making, verbal understanding, inquiry learning, representations of knowledge, the process of knowing, situated cognition, and learning in community.</p>	16-Jan-24 Tuesday 1800 - 2100	Letter Grade

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)
NIE	MCT911	Curriculum Implementation and Educational Change: Concepts and Issues	4	<p>The overarching purpose of this course is to provide a theoretical, analytical, and practical framework for understanding some of the key issues and debates surrounding the implementation of national and school-based curriculum improvement efforts, professional development and school change. A variety of factors for understanding the complexity of curriculum implementation will be presented: school culture, the complexities of roles and relationships in schools, and policy implications of change initiatives.</p> <p>It is designed to encourage teachers and school leaders to examine their assumptions about the nature of educational change and the complex process of implementing planned change at the school and classroom levels. Participants will be expected to review, critically analyse and relate relevant literature to their own experiences of working with innovation and change initiatives in Singapore schools.</p>	15-Jan-24 Monday 1800 - 2100	Letter Grade
NIE	MCT912	Curriculum and Programme Evaluation	4	<p>This course offers an introduction to key considerations in interpreting and designing evaluation studies in the educational context. Through considering the purposes of evaluations and exploring the nature of major evaluation approaches, participants will develop understanding of the key aspects of designing evaluation studies. The primary assessment project for all students will be to design (but not conduct) an evaluation for a curricular programme, project or product.</p>	16-Jan-24 Tuesday 1800 - 2100	Letter Grade
NIE	MCT913	Differentiating Curriculum and Teaching for Diverse Learners	4	<p>Contemporary deliberations about the school curriculum have tended to privilege other stakeholders and marginalize students. Unless teachers are able to take seriously what students already know and believe, any innovation in curriculum or pedagogy becomes futile. All students deserve rich learning experiences. This course is designed to encourage teachers and school leaders to examine their assumptions about curriculum, teaching and learning, and to develop a critical understanding of different student learning needs in the regular classroom.</p> <p>Participants will gain an understanding of the reasons and assumptions underlying differentiation. Through the readings and discussion, participants will develop an appreciation of the diverse characteristics of students who learn at different pace as well as study a variety of curriculum options such as those of content and implementation of differentiated units and lessons that optimize learning for students.</p> <p>This course will examine ways that classrooms can effectively differentiate curriculum and teaching to address the complex challenges of meeting the diverse learning needs of students. These will include notions of culturally responsive pedagogy, and the use of technology. Participants will learn to use research-based tools to uncover students experiences and challenges with the curriculum and use curriculum design models in planning appropriate and defensible differentiated curriculum units</p>	15-Jan-24 Monday 1800 - 2100	Letter Grade

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)
NIE	MCT922	Assessment for Learning in Singapore: Critical Perspectives of Theory and Practice	4	<p>Assessment for Learning (AfL) is recently referred to ubiquitously in some Singaporean classrooms, but its meanings, implications and applications in schools, and wider workplace learning contexts are less clear. This course first examines the discourse of AfL and formative assessment, against its varied and different theoretical constructions from Anglophone countries (e.g. USA and UK), before examining regional case studies from more recent times.</p> <p>If new AfL policies and practices purporting to support teaching and learning are to be taken up within current and future Singaporean classrooms or workplaces, one needs first to look critically within past and current entrenched conceptions and practices. In particular, the (re-) construction and replication of particular version of AfL as classroom assessment practices is problematized using social-cultural lens, while also situating it within subject specific (or work area) issues, school policy and wider societal realities in Singapore. Critical reading of formative assessment and AfL research (including a locally situated research) would span the entire course. Coupled with personal reflections of assessment policies and practices, this course encourages participants to critically examine and interact with their perceptions and practices of AfL, permeating day-to-day classroom work.</p>	18-Jan-24 Thursday 1800 - 2100	Letter Grade
NIE	MCT935	New Media and 21st Century Learning	4	This hands-on course aims to engage participants in examining the existing new media environment and provide an embodied new media experience for them. It addresses important, current issues in new media studies with in-depth discussion of popular perceptions/myths and implications to learning. Through the self-directed analysis of media content (critical media consumption) and production of media artefacts and participation in online communities (critical media prosumption), participants will gain a sense of new media culture and form their personal critique on the relationship between new media and 21st century learning for their refined practices.	17-Jan-24 Wednesday 1800 - 2100	Letter Grade
NIE	MEL901	Language and Literature Education	4	Historically, literature and language have not been dichotomous terms. Literature as a concept emerged in the fourteenth century and its latin root is littera denoting a letter of the alphabet. In this sense literature was tied to literacy or, more specifically, the ability to read. It was only later that literature became connected to the concept of taste involving the ability to read particular kinds of text and the discipline emerged in distinction from fields of language and linguistics. In this course, we seek to examine historically the disciplinary schism between English language and English literature and explore socio-cultural, linguistic and textual theories advocating an integrated approach to English language teaching. In the process, we aim to problematize the dichotomies between reading and writing, literacy and literariness, the functional and the aesthetic.	15-Jan-24 Monday 1800 - 2100	Letter Grade

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NIE	MEL902	Analyzing Literature and Language	4	This course introduces participants to the study and analysis of styles in canonical and non-canonical literary texts, as well as other similarly creative texts such as advertisements, using fundamental linguistic and literary tools. It is an interdisciplinary course spanning the borders of English language and English literature, which are presently framed in the school curriculum as two subjects even though they are mutually constitutive fields of inquiry. As education expands globally and exponentially, it is imperative that both language teachers and literature teachers promote learners who are able to systematically identify and critically evaluate or appreciate the qualities of language used for particular effects in a plethora of creative texts which exist around them. Participants in this course will have opportunities to examine and describe the forms of texts, interpret their communicative functions and offer evaluations of the textual effects created, supported by language-based evidence.	17-Jan-24 Wednesday 1330 - 1630	Letter Grade
NIE	MEL913	Materials Design in the Language Curriculum	4	The course will deal with principles and techniques in the evaluation, adaptation and development of English language teaching-learning materials for school-age learners. It will prepare students to understand the principles of materials design and think about the place of materials in course planning and teachers role in evaluating and adapting published materials, and selecting and designing supplementary materials. Systematic procedures for materials evaluation will be introduced and students will source, analyse and consider how to exploit supplementary materials that fulfill curricular objectives. Finally, since it is essential that teachers know how to design materials, students will be guided to develop their own materials for the teaching of language systems and skills, and for the promotion of higher-order thinking skills. Concepts such as differentiation, interdisciplinarity and learner involvement in materials selection and creation will be discussed.	18-Jan-24 Thursday 1800 - 2100	Letter Grade
NIE	MEL915	Language Assessment in the Classroom and Beyond	4	This module aims to teach theories and applications of language assessment in classrooms and beyond. Students will be introduced to (1) fundamental concepts, principles, and issues in language assessment; (2) approaches to and procedures for designing and constructing language tests, and (3) fundamental concepts in quantitative data analysis with specific focus on classroom applications. The module presents language assessment and data analysis in a pragmatic and easy-to-understand way and addresses some of the perpetuating misconceptions concerning language assessment.	17-Jan-24 Wednesday 1730 - 2030	Letter Grade

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NIE	MEL921	Literature, Culture and Education	4	This course attends to the theory and practice of English education in relation to literary studies, raising questions that resist simple answers: How are the aims and objectives of English studies bound up with the processes and practices of a given culture? How are English Literature curricula and pedagogy implicated in the ideological structures of formal schooling? To what extent should traditional notions of literature education change amid the realities of globalization in the digital age? How do English curricula valorize and/or marginalize students and teachers cultural identities on the basis of language, race, ethnicity, class, gender, and sexuality? Are English teachers complicit in privileging the cultural paradigms of a western literary education? How can literature education become a vehicle of cultural and political critique? These questions will be addressed in relation to the challenges of critically performing and conforming to the Literature Education curricula in Singapore schools.	15-Jan-24 Monday 1800 - 2100	Letter Grade
NIE	MEL928	Children's Literature for the English Classroom	4	This course offers an exploration into the world of childrens literature from different theoretical perspectives. It situates childrens literature as sites where issues of class, race, gender, ethnicity, nationality and identity are constructed. Through applications of literary theory, the course offers opportunities to engage critically with texts in relation to readers and contexts. The course will also introduce scholarship from critical discourse and cultural studies revealing childrens stories as not only a means of enculturation but also as a platform to develop the critical and creative imagination.	16-Jan-24 Tuesday 1800 - 2100	Letter Grade
NIE	MEM904	Principalship and Teacher Performance	4	Principals have a major remit for maintaining and improving the quality of their schools. They are responsible for ensuring that the schools basic requirements for competence are met and for helping the school and its professional workforce transcend competence by inspiring commitment, performance and educational excellence. The content covers the changing role of the principal, the key tasks of principalship and the educative leadership role of the principal in bringing about teacher learning and professional development.	18-Jan-24 Thursday 1730 - 2030	Letter Grade

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NIE	MEM912	Theory and Practice of Teachers' Professional Learning	4	In light of the demands for change, improvement and innovation in instruction and curriculum to achieve diverse learning outcomes, the importance of teacher professional development has now received increasing attention. This is consistent with the increasing importance placed on learning especially in view of the knowledge society and economy. Current literature on teacher professional development, or professional learning, suggests the need to go beyond traditional models of professional development which regard learning as special events that are restricted to three or four days during the school year, graduate courses and qualifications, and accumulation of time-based activities. New conceptions of teacher professional learning/development, along with their theoretical justifications, are now being considered. These include the notions of lifelong learning, job-embedded learning, inquiry-based learning, reflective-based learning, and community-based learning. Concomitantly, new models of teacher professional development have been proposed. These include reflective practice, professional learning communities, communities of practice, and action research. This course will provide the learning space for participants to consider, contextualise and critique the theory and practice of teacher professional learning/development. Participants will also become familiar with the concepts and current developments pertaining to teacher professional development, and appreciate the relationship between professional learning/development and school improvement.	17-Jan-24 Wednesday 1730 - 2030	Letter Grade

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NIE	MEM917	Policies and Leadership in Early Childhood Education	4	<p>Globalisation, technological advancements and research developments in early childhood education have garnered the attention of governments around the world. This results in an increasing awareness and emphasis on the early years as a critical period that lays the foundation for children's later learning trajectory and future outcomes.</p> <p>Research has shown that investments in the early years can yield greater returns and contribute to the overall welfare of societies. Quality early childhood education has also been proven to promote positive outcomes for children, thereby reducing socioeconomic inequalities.</p> <p>Over the years, governments around the world have prioritised early childhood education to create and ensure access to quality care and educational services for their people. Leadership, at both the political and educational levels, is a key driver for quality early childhood education. Leaders in preschool and primary school settings translate policies into practice and play a critical role in the delivery and provision of quality programs for children.</p> <p>Given the significant roles of policymakers and leaders in early childhood education, this course enables participants to understand, examine and analyse the dynamics and effects of an ever-changing early childhood landscape from the global to the local level.</p> <p>Based on a desktop review of Master programmes offering early childhood leadership at NIE, SUSS and AIC, there are no courses with this focus, which makes this course a valuable elective for NIE and NTU students who are interested in policies and leadership in early childhood education.</p>	16-Jan-24 Tuesday 1730 - 2030	Letter Grade
NIE	MID901	Instructional Design Models and Practices	4	In the new information age, many traditional classroom courses or training programmes need to be re-developed and conducted online to meet the needs of adult learners who often have to balance their work demands with their social lives. In this course, the participants will learn how to use web-based tools, e-learning authoring tools and produce videos so that they can easily develop and conduct e-learning sessions for teaching and training in practice.	15-Jan-24 Monday 1800 - 2100	Letter Grade
NIE	MID906	Training Methods and Strategies	4	Instructional designers need to have the knowledge of a wide repertoire of instructional theories, methods and strategies in order to address different types of performance gap. This course aims to provide conceptual understanding of the theoretical underpinnings of selected training / instructional methods and strategies. It aims to provide opportunities for students to explore concrete training / instructional design theories and to design appropriate strategies and / or activities to achieve the instructional objectives.	17-Jan-24 Wednesday 1800 - 2100	Letter Grade
NIE	MID917	Designing e-Learning	4	This course explores issues of design in the crafting of learning technologies (i.e., e-learning), activities that foster learning, and overall learning environments. The following topics will be covered: the use of IT tools to support e-learning systems, the design of various instructional strategies used in e-learning system, and e-learning issues.	18-Jan-24 Thursday 1800 - 2100	Letter Grade

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)
NIE	MID941	Evaluation Models and Methods	4	<p>This is a core course for MAIDT program. Program evaluation is important for instructional design as it 1) helps determine the merit and worth of an instructional package, and 2) helps identify the strength and area for improvement to assist decision making and program development.</p> <p>This course is intended to provide students with an understanding and awareness of the basic philosophical, procedural, and technical aspects of evaluation. The primary goal is to help students achieve a level of basic knowledge and skills in the application of acceptable and efficient models to the evaluation of programs. Students will systematically design an evaluation plan as the final project for the course.</p>	16-Jan-24 Tuesday 1800 - 2100	Letter Grade
NIE	MLS923	Separation and Analytical Chemistry	4	The discovery of new functional compounds often starts from the key step in the separation, purification, and qualitative/quantitative detection of the active component(s). The main goals of this course is to familiarise students with (i) state-of-the-art separation methodologies, (ii) development and applications of (bio)sensing/analytical instrumentations. The course topics include concept and trends in modern chemical analysis; various chromatographic and spectrometric methods; case study on separation of biomolecules and environmental samples; and fundamentals of (bio)sensing transducing techniques for the development of biosensors.	16-Jan-24 Tuesday 1830 - 2130	Letter Grade
NIE	MLS926	Bioactive Natural Products and their Derivatives	4	The purpose of the course on Bioactive Natural Products and their Derivatives is to provide participants with fundamental knowledge of natural product chemistry and the role natural products play in drug discovery and development. Topics such as the distribution and biosynthesis of natural products and their ecological function within biological systems, as well as knowledge of drugs, drug extracts and bioactive natural products from plants and microbes that are used for production of medicine and herbal remedies, will be covered. In addition, innovative analytical techniques used in natural products research will be emphasized.	18-Jan-24 Thursday 1830 - 2130	Letter Grade
NIE	MLS943	Photovoltaic Physics and Solar Cells	4	Today the traditional energy sources based on fossil fuels are depleting at an ever fast rate and will be exhausted in the next centuries. Photovoltaic solar energy becomes one of the most feasible alternative energy sources that will provides energy demand for mankind in the future. This course deals with the issues of an alternative sustainable energy source that relies on the direct conversion of sunlight into electrical energy in solar cells based on the photovoltaic effect.	15-Jan-24 Monday 1830 - 2130	Letter Grade

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)
NIE	MLS945	Plasma Physics and Fusion Energy	4	Nuclear Fusion has been identified as one of the clean and long term energy sources. Fusion is the process that powers our Sun and other stars and releases huge amount of energy when two light nuclei fuse together. Thermonuclear fusion is a way to achieve nuclear fusion by using extremely high temperatures. At high temperatures, the matter goes into the fourth state i.e. Plasma. Controlled thermonuclear fusion has two prime requirements: first - heat the fusion fuel plasmas to extremely high temperatures for high fusion reaction rates and second - confine this hot dense plasma for sufficiently long durations so that enough reactions can take place for useful energy output. Significant progress has been made in the field of fusion science and technologies. Two projects, the National Ignition Facility (NIF) and ITER (a massive 20 Billion international project) are hoping to achieve breakeven, that is, producing as much energy as was required to ignite the reaction. This course will highlight the comparative advantages of Fusion Energy source over other energy resources, fundamental of Fusion and Plasmas physics, Physics and technology of few of key fusion devices such as mirror machines, tokamaks, laser inertial fusion and dense plasma focus.	16-Jan-24 Tuesday 1830 - 2130	Letter Grade
NIE	MLS950	Applied Quantum Mechanics	4	Quantum mechanics is widely recognized as the basic law that governs all of nature, including all materials and devices. It has always been essential to the understanding of material properties, and as devices become smaller it is also essential for studying their behavior. This is an introductory course on quantum theory designed for students to understand the rudiments of the physics governing the atoms and molecules. There is an increasing need for professionals in clean energy to delve deeper and deeper into the laws of microscopic regime.	17-Jan-24 Wednesday 1830 - 2130	Letter Grade
NIE	MLS952	Nanotechnology	4	This is an elective course that is designed for students to understand the physics, technology and applications of nanoscaled materials and devices. These include quantum confinements in 0, 1, 2 and 3 D systems, assembly and characterization of nanostructures, nanofabrication and application of various functional devices.	18-Jan-24 Thursday 1830 - 2130	Letter Grade
NIE	MLS964	Global Environmental Change and Vulnerable Ecosystems	4	Accelerated change in the environment on a global scale has been observed in the Anthropocene. The drivers of these global scale changes are attributed to human activities that relate to an unsustainable rate of development. Natural ecosystems (both terrestrial and aquatic) are impacted by environmental change, particularly when the scale and intensity of change exceeds the natural resilience and tolerance states of these ecosystems. It is important to be able to monitor and understand the impacts of environmental change to whole systems, especially vulnerable tropical ecosystems which largely support more than half of the earths human populations. This course aims to look at global environmental change and their impacts on vulnerable ecosystems from a scientific perspective, utilising state of the science technologies and newly developing knowledge. The course will be delivered as a practice-based field-orientated programme, which will have an overseas field component.	18-Jan-24 Thursday 1830 - 2130	Letter Grade

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)
NIE	MLT908	Design of Interactive Learning Environments	4	Topics include: * ILEs and Key findings from the Learning Sciences * Critical Perspectives on Educational Technologies * Design of Learning Environments Orchestration * Design of Scaffolding for Learning * Design of Learning Experiences with New Media * Design of Learning with Collaborative Technologies * Design of Learning with Mobility * Educational Games * Design of Learning Spaces * Assessment of Collaborative Learning * Scaling educational innovations	16-Jan-24 Tuesday 1800 - 2100	Letter Grade
NIE	MLT909	Research Methodologies for the Learning Sciences	4	1. Concept, purpose and process of conducting research 2. Research and ethics 3. Identifying research problem 4. Conducting critical literature review 5. Writing research questions 6. Designing surveys and interviews 7. Collecting quantitative data 8. Collecting qualitative data 9. Analysing quantitative data 10. Analysing qualitative data 11. Reporting research	15-Jan-24 Monday 1800 - 2100	Letter Grade
NIE	MME906	Curriculum Studies in Mathematics	4	This is a specialisation elective course for the MEd (Mathematics) programme. The course contributes to the following programme objectives particularly in the area of curriculum studies in mathematics: (1) develop the participants competencies in conducting educational research; (2) provide participants with the knowledge and skills related to specific ideas in mathematics education.	15-Jan-24 Monday 1800 - 2100	Letter Grade
NIE	MME913	Algebra and the Teaching of Algebra	4	This is a specialisation elective course for the MEd (Mathematics) programme. This course contributes to the following programme objectives particularly in the area of algebra and its teaching: (1) build the participants knowledge of the mathematics subject matter; (2) develop the participants competencies in conducting educational research. In addition, the course also addresses teachers and students misconceptions in the learning of algebra in support of another programme objective of providing participants with knowledge related to specific ideas in mathematics education.	17-Jan-24 Wednesday 1800 - 2100	Letter Grade
NIE	MME917	Problem Solving and the Teaching of Problem Solving	4	This is a specialisation elective course for the MEd (Mathematics) programme. This course contributes to the following programme objectives particularly in the area of mathematical problem solving and its teaching: (1) provide participants with the knowledge and skills related to specific ideas in mathematics education; (2) develop the participants ability to relate the theoretical ideas in mathematics education to the authentic problems of practice faced by teachers in the classroom. In addition, the course also serves to develop the participants critical, reflective, and creative thinking when solving mathematics problems.	16-Jan-24 Tuesday 1800 - 2100	Letter Grade
NIE	MML904	Features of the Malay Language in Singapore	4	Geographically, Singapore is in the midst of the Malay archipelago, comprising Malaysia, Indonesia and Brunei Darussalam, whose lingua franca is Malay language. However, over the years, Malay language in each country has gone through various development and changes due to its unique locality and socio-cultural experiences, and thus, developed new forms of language varieties. This course primarily highlights that these distinct features should not be perceived as imperfect uses of Bahasa Malaysia, Bahasa Melayu or Bahasa Indonesia.	15-Jan-24 Monday 1830 - 2130	Letter Grade

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)
NIE	MML915	Assessment for Learning in Malay Language Classroom	4	This course aims to explore the theoretical understanding, issues and complexities of authentic and alternative assessments within the classroom context and alongside the traditional examinations practices. The course highlights the three principles of Assessment for Learning. Firstly, the principle of Making Learning Explicit focuses on the role of the teacher to make learning and assessment meaningful for the learner. The second principle, Promoting Learner Autonomy focuses on the role of the teacher in developing independent learners. Finally, the third principle, Focusing on Learning {Not Performance} aims to get participants to focus on their roles as teachers to challenge traditional assessment attitudes in favor of assessment that is more formative and focused on the learning process.	17-Jan-24 Wednesday 1830 - 2130	Letter Grade
NIE	MSC902	Science Curriculum Change and Curriculum Evaluation	4	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.	16-Jan-24 Tuesday 1730 - 2030	Letter Grade
NIE	MSC904	Alternative conceptions and conceptual change in science learning	4	This course introduces constructivist 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.	18-Jan-24 Thursday 1730 - 2030	Letter Grade
NIE	MSE911	Learning Disabilities	4	This course introduces students to the nature and cause of learning disabilities, and their assessment and intervention. Students will also have the opportunity to examine the research literature on the effectiveness of various practices as well as learn about the issues and debates in the field. This course provides an in-depth study on learning disabilities to equip students with relevant content knowledge and selected intervention skills to work with learners with learning challenges.	TBC	Letter Grade

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)
NIE	MSL903	Learning Analytics for Science of Learning	4	<p>Learning analytics is an emerging field of study that has been gathering broad interests in educational research and practices; recent research has harnessed the power of learning analytics to enhance understanding of learning processes.</p> <p>Learning analytics can be a game-changer that creates more effective learning environments by providing useful insights that help us to understand, visualize and predict learners performance, provide learners with personalized learning, and increase retention and success rates.</p> <p>As a relatively new field of study, there is no such course offered in NIE. Learning analytics can bolster the scientific bases of learning through making visible empirical evidences of learning. Hence it is timely to introduce this course as a new and relevant specialized elective for the MSc (Science of Learning) programme.</p>	18-Jan-24 Thursday 1800 - 2100	Letter Grade
NIE	MSL904	Educational Neuroscience: Principles, Perspectives, Practices	4	<p>Advances in imaging techniques, behavioural and psychological research enable the integration of disciplines that investigate human learning, opening up possibilities for the enhancement, update and eventually the reform of educational theories and practices. The field of educational neuroscience and its potential contributions to educational research is now more pronounced than before. Apart from shedding light on brain mechanisms that underpin cognitive and social learning development, research on brain science is also contributing towards neurobiological evidence-based interventions that are addressing educational concerns. These include issues such as i) early learning struggles and early intervention, ii) challenges that individual differences pose, iii) effectiveness of educational and treatment approaches to cognitive struggles and deficits, iv) widening possibilities that brain plasticity brings to normal (e.g. life-long learning) and more. Such a neuroscience and education convergence not only carry multiple implications for educational policy but at the same time, foregrounds the mutual benefits of the interaction between neurobiology and education, as education may also conceivably offer a naturalistic framework for research on the brain.</p> <p>This course is designed to follow the Foundations in Science of Learning course, and although it is not necessary to have taken this course previously, students will be expected to undertake some specified pre-reading.</p>	17-Jan-24 Wednesday 1800 - 2100	Letter Grade
NIE	MSM903	Algebra	4	<p>This course in abstract algebra aims to introduce you to rings, groups, and possibly other algebraic structures such as modules, and to present a range of examples to facilitate the understanding of the abstract theory so that you have a good grasp of the fundamental concepts in abstract algebra. This course is intended for educators, especially secondary and post-secondary school teachers, to help them to have an in-depth conceptual understanding of some topics in school mathematics such as number systems, polynomials, from an advanced and structural perspective of abstract algebraic systems. This course will also lay a foundation for students who plan to pursue a PhD in areas related to abstract algebra.</p>	17-Jan-24 Wednesday 1800 - 2100	Letter Grade

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)
NIE	MSM905	Data Science	4	This course is designed to introduce you the basics of data science methodology and let you be able to apply such methodology to real problems. This course is intended for educators, to empower them to perform data visualization, data preparation and prediction tasks. This course will also lay a foundation for students who plan to pursue a PhD in areas related to data science/statistics.	19-Jan-24 Friday 1800 - 2100	Letter Grade
NIE	MSM906	Discrete Mathematics	4	This course aims to expose mathematics educators to counting principles which will enhance their content knowledge of teaching permutations and combinations, as well as elementary probability. Additionally, this course introduces a useful branch of discrete mathematics called graph theory which has many applications in modelling real-life contexts. This course also lays a foundation for students who plan to pursue a PhD in the area of discrete mathematics.	18-Jan-24 Thursday 1800 - 2100	Letter Grade
NIE	MSM911	Ring Theory for Educators	4	<p>Algebra is one of the broad parts of mathematics, together with number theory, geometry and analysis. The central spirit of algebra is the use of mathematical symbols and rules for manipulating them. Thus, in its most general form, algebra becomes a unifying tool in most fields of mathematics. For Singapore Mathematics curriculum, algebra is taught to students in its most elementary form progressively from as early as in Primary Six through the solution of polynomial equations in the Secondary to obtaining the solution set of a system of linear equations using matrices at the Pre-university levels. In order to understand and appreciate the deeper structural meaning of school algebra, teachers of algebra must be equipped with the knowledge of algebra at an even higher level of abstraction. This is precisely where abstract algebra fits into the picture.</p> <p>This course is intended for educators who have never had a course in modern abstract algebra. The set of integers, rational numbers, polynomials and matrices, which are mathematical entities studied in school mathematics, are concrete examples of rings with respect to the operations of addition and multiplication. This course will help high school educators to have an in-depth conceptual understanding of some topics in school mathematics such as number systems, polynomials, from an advanced and structural perspective of abstract algebraic systems.</p>	17-Jan-24 Wednesday 1800 - 2100	Letter Grade

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)
NIE	MSM912	Discrete Mathematics for Educators	4	<p>Discrete Mathematics is a branch of mathematics which deals with finite or countable elements or processes. Discrete mathematics, together with calculus and abstract algebra, is one of the core components of mathematics at the undergraduate level. The mathematics of modern computer science is built almost entirely on discrete mathematics, in particular, combinatorics and graph theory. Discrete mathematics, in particular counting and probability, allows students to explore non-trivial real world problems that are challenging and interesting. Even students at A-level are exposed to basic counting principles and combinatorics; and thus, it is essential that mathematics teachers have a firm grounding in Discrete Mathematics.</p> <p>This course aims to expose mathematics educators to counting principles which will enhance their pedagogical content knowledge of teaching permutations and combinations, as well as the elementary probability. Additionally, this course introduces a useful branch of discrete mathematics called graph theory which has many applications in modelling real-life contexts.</p>	18-Jan-24 Thursday 1800 - 2100	Letter Grade
NIE	MSM914	Statistical Theory for Educators	4	<p>This course aims to develop an understanding of the statistical theory underlying important key concepts in the school probability and statistics curriculum, and extend the knowledge beyond school level in both theory and applications. Topics will be selected from exploratory data analysis, probability distributions, statistical inference and simple regression.</p> <p>These are some questions that a statistics educator may ponder when teaching z-test and t-test. Answers to these and other higher-order questions require a good understanding of the underlying statistical theory, and this course can help to bridge the gap in understanding.</p>	19-Jan-24 Friday 1800 - 2100	Letter Grade

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)
NIE	MTC901	Nurturing Learners and Learning	4	<p>In this course, participants will be introduced to:</p> <p>1) The art and science of positive education to encourage and support students thriving and flourishing. Participants will be introduced to the concepts of flourishing and well-being and gain an overview of the principles of Positive Education and how it can help school communities to flourish. This course explores the benefits of Positive Education, the underlying research that guides teaching practice and interventions drawn from successful frameworks of social-emotional learning, mental health and positive psychology. Participants will have the opportunity to reflect on how the concepts in the domain areas of positivity, positive relationships, positive engagement and positive accomplishment can be nurtured and embedded in classroom and school contexts.</p> <p>2) The science of positive psychology to encourage and support schools and individuals to flourish. Participants will be introduced to the concept of wellbeing and its constituent components, with specific focus on Character Strengths and Mindfulness. Hence, participants will have the opportunity to develop and practice the skills, knowledge and strategies needed to enhance their students, childrens or employees well-being, while developing their character strengths and mindfulness.</p> <p>3) The concept of motivation and the various approaches to motivational studies, namely the behaviourist, humanistic, cognitivist and socio-cultural perspectives. They will explore the factors influencing learner motivation, and the reasons why some learners are more motivated than others. Finally, they will have the opportunity to develop and apply the skills, knowledge and strategies needed to enhance their students, childrens or employees motivation to learn.</p>	16-Jan-24 Tuesday 1730 - 2030	Letter Grade
NIE	MTC902	Designing Curriculum: Theory and Practice	4	<p>A good understanding of the elements of curriculum and the complex factors and relationships that contribute to or otherwise influence curriculum design and enactment can provide educators with new insights into their relationship with curriculum and the roles they do and can play in curriculum design and enactment. This course expands participants understanding of curriculum beyond the narrow conception of curriculum as a plan that teachers simply deliver and invites them to use different conceptual tools and perspectives to examine their personal experiences with curriculum. In this way, the course helps participants to reconsider teachers agency and responsibilities in curriculum designing and enactment and bring about improvements in curriculum practice.</p>	18-Jan-24 Thursday 1730 - 2030	Letter Grade

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)
NIE	MTC905	Understanding and Developing Pedagogical Content Knowledge	4	<p>Among the various aspects of teacher knowledge (e.g., content or subject matter knowledge, pedagogical knowledge, knowledge of students, instructional knowledge, knowledge on assessment, curriculum knowledge), pedagogical content knowledge (PCK) has been proposed to pull together these knowledges. Hence, its relevance to educators, especially teachers (or pedagogues) is of high importance. The need to be highly skilled in PCK become very salient in the context of the demands placed on professionals to bring about effective learning in learners in order to nurture competencies required for the future society and economy.</p> <p>In the context of the programme, this course will bring together the interconnections of learning of the four courses: curriculum designing, assessment for learning, and learning using technology. This course allows participants to understand the concepts of PCK, and identify and explore a topic within the curriculum that are of key interest and relevance in their respective subject disciplines. For each created topic, the constituent knowledge domains of curricular knowledge, knowledge of representations i.e. teaching strategies for teaching the topic, and knowledge of student conceptions and assessment will be included.</p>	17-Jan-24 Wednesday 1800 - 2100	Letter Grade
NIE	MTC906	Educational Inquiry into Teaching and Learning	4	A strong foundational knowledge of research methods is generally essential for all masters students doing research work even inquiring into specific areas such as teaching and learning. This course will sensitize and familiarize participants with the understanding of the research process and the key concepts, principles and techniques of both quantitative and qualitative research paradigms. Specifically, course participants will be introduced to the fundamental processes of research work (e.g. formulating research questions, literature review, designs and approaches, data collection, data analysis, and interpreting research data).	18-Jan-24 Thursday 1800 - 2100	Letter Grade
NIE	MTCL901	Language Code: Theory and Practice	4	As Chinese characters are ideographic in nature, the phonetic functions are weak. Furthermore, the structure of Chinese characters are complex and difficult to recognize, to read as well as to write. Therefore, phonetic system, Hanyu Pinyin was developed to aid in learning Chinese. Chinese characters and Chinese phonics operates with two different set of rules. Chinese characters represent single syllables while Hanyu Pinyin operates with a set of standard basic rules in relation to different forms of Chinese words. As instructors of TCIL, it is important to understand the characteristics of these two codes in order to effectively teach Chinese as an international language.	To be confirmed	Letter Grade
NIE	MTCL902	Vocabulary and Grammar: Theory and Practice	4	The fundamental purpose of learning any language is for communication purpose. Be it in spoken or written communication, vocabulary and grammar are two of the most important components in any language learning, as they play a vital role in building up language proficiency. In teaching Chinese as an international language, instructors must understand the grammatical rules and its effect on vocabulary on the target language to bring about effective teaching. Hence, this course will lay a good foundation in Chinese vocabulary and grammar basics, so as to effectively teach Chinese as an international language.	To be confirmed	Letter Grade

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)
NIE	MTCL903	Chinese-English Contrastive Analysis & Its Application	4	The use of translation in learning a foreign language is widely used as a teaching and learning strategy to help students remember, comprehend and acquire the use of the target language. The influence of the learners first language, however, will have substantial impact in the language acquisition process. Hence understanding the major difference between Chinese-English through contrastive analysis in theories and practice of translation and its application in TCIL is necessary to equip TCIL instructor with the fundamental understanding to implement the bilingual model in TCIL.	To be confirmed	Letter Grade
NIE	MTCL904	Teaching of Listening & Speaking Skills in TCIL	4	Listening and speaking are two important skills required in any language learning. They are complex skills that need to be developed consciously. In any interaction, comprehending the language used is necessary for effective communication. Hence, as instructors for TCIL, it is important to acquire the various communicative language teaching pedagogical approaches in order to teach effective communication skills. Besides acquiring pedagogical approaches in teaching non-native learners, keeping abreast with recent developments and research on the teaching of Chinese language listening and speaking content and skills are also essential to build the competencies to effectively TCIL to the 21st century learners.	To be confirmed	Letter Grade
NIE	MTCL905	Teaching of Reading And Writing Skills In TCIL	4	Reading and writing are two important literacy skills one requires to function effectively in everyday life. These two skills are interconnected and can be developed together. With global economies and emerging new technologies, new literacies are already becoming part of the educational landscape. Hence, as instructors for TCIL, it is important to understand the various teaching pedagogical approaches to engage learners of this new age. Besides acquiring pedagogical approaches in teaching non-native learners, keeping abreast with recent developments and research on the teaching of Chinese language reading and writing content and skills are also essential to build the competencies to effectively TCIL to the 21st century learners.	To be confirmed	Letter Grade
NIE	MTCL906	Application of Information Technology in TCIL	4	In todays 21st century education, the use of ICT for teaching and learning had infiltrated schools at a rapid pace. To ensure that todays digital learners are future-ready for the workforce of tomorrow, educators must understand and embrace the need to employ the use of ICT to create a 21st century learning environment. A 21st century educator must be competent to use technology with ease in teaching and learning, be it in the classroom or out of classroom where learning takes place anytime, anywhere. Hence, as TCIL instructors, it is important to understand the application of technological tools with content and pedagogical approaches, and appreciate how ICT can create an effective learning environment for TCIL.	To be confirmed	Letter Grade

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)
NIE	MTCL907	Language Testing & Assessment in TCIL	4	Testing and assessment is an integral part of the learning process, and must be closely aligned with curricular objectives, content and pedagogy. It serves as the central function of getting the best possible evidence on what the students have learned. Teachers and students can then use this information to decide what to do next in the teaching and learning process. It is important that TCIL instructors be equipped with the necessary assessment competencies, so that quality teaching and learning can be achieved in all TCIL classrooms, bearing in mind the varied language backgrounds and proficiency levels of TCIL learners.	To be confirmed	Letter Grade
NIE	MTCL908	Analysis & Development of Instructional Materials for TCIL	4	Over the last three decades, there are many TCIL curriculums and instructional materials developed for non-native learners globally. However, TCIL instructors find it challenging to identify proper instructional materials for learners of differing abilities. This course aims to enhance the knowledge and skills of TCIL instructors in analysing the instructional materials developed by different editors and publishers. In addition, through better understanding of principles of the curriculum design and instructional materials development for TCIL, instructors will be well equipped in developing instructional materials for different learners.	To be confirmed	Letter Grade
NIE	MTCL911	Professional English for TCIL Instructors	4	All teachers need to possess skills that enable them to communicate effectively with a range of stakeholders in the educational settings. Being able to apply these skills in a second language is all the more critical for Chinese language teachers who will need to fulfill school related tasks and communicate with other members of staff, students and their parents in the English medium. This course helps to prepare participants who will be working in international settings as they move through their careers.	To be confirmed	Letter Grade
NIE	MTCL912	Early Childhood Education in TCIL: Theory and Practice	4	Early childhood education is crucial as it has direct impact on the development of learning skills, social and emotional abilities of a child. It is during the early childhood years that we should accentuate the development of language, speech and literacy, as it will significantly enhance the child's learning in the later years. Educators should leverage on the varied learning styles and characteristics of early childhood learners, from infancy to the age of eight, apply corresponding learning theories into practice, to bring about effective teaching and learning of Chinese as an international language.	To be confirmed	Letter Grade

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)
NIE	MTCL913	Chinese Language Education for International Schools	4	According to the study by International School Consultancy Research (2017), there is a rapid surge in the growth of international schools globally. With a growth in expatriate families and an increase in enrolment within the schools host country, the increasing trend is expected to continue in the next ten years. This growing demand corresponds to the need to develop professionally-trained Chinese language educators for International schools. Language offerings in international schools are unique and vary over different school programme. However, each aims to provide students with an edge in this competitive and ever-changing world. Hence, this course will broaden participants knowledge of teaching Chinese language in international school settings and provides constructive career development opportunities to participants.	To be confirmed	Letter Grade
NIE	MTD908	Training Methods and Strategies	4	Instructional designers need to have the knowledge of a wide repertoire of instructional theories, methods and strategies in order to address different types of performance gap. This course aims to provide conceptual understanding of the theoretical underpinnings of selected training/instructional methods and strategies. It aims to provide opportunities for students to explore concrete training/instructional design theories and to design appropriate strategies and/or activities to achieve the instructional objectives. Given a performance problem, the students will be able to apply the instructional theories and approaches to address the needs of the learners and the performance gap.	17-Jan-24 Wednesday 1800 - 2100	Letter Grade
NIE	MTD912	Programme Evaluation Models and Methods	4	This course is intended to provide participants with an understanding basic theoretical, procedural, and technical aspects of evaluation. The goal is to help participants develop some basic knowledge and skills in the application of evaluation models to various training programmes.	16-Jan-24 Tuesday 1800 - 2100	Letter Grade

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)
NIE	MTD913	Teaching and Learning in Higher Education	4	<p>The Teaching and Learning in Higher Education (TLHE) course aims to provide a structured environment for early career faculty, within which they can develop their practical skills and understanding of teaching in higher education. This course begins by exploring learning theories, course design, evidence-based teaching approaches, assessment, and communication with students within the context of their own teaching. Then, learners are provided with opportunities to sharpen their understanding by putting theory into practice. Through this course, they will have opportunities to develop their confidence in the teaching practice through reflection and participation in a community of practice, and as a result, develop a critical mindset that will continue to challenge the way they teach.</p> <p>Content Topics: Teaching in specific higher education contexts, e.g. NTU, Poly, etc. Learning theories Teaching in your discipline Course design Constructive alignment Assessment Designing learning activities Planning a lesson Facilitating Learning Evaluating your teaching Increasing your impact in teaching Showcasing your teaching Blended learning</p>	To be confirmed	Letter Grade
NIE	MTD914	Facilitate teaching and learning with technology	1	<p>Integrating technology to facilitate teaching and learning in Higher Education is a complex endeavour that requires careful consideration of technology and pedagogy. Using the technological pedagogical content knowledge (TPACK) framework, the course will discuss the types of knowledge that educators/ trainers needed in order to enhance learning with technology. It will engage educators/ trainers to review their lessons and facilitate the re-design of lessons through the TPACK framework. At the end of the course, the participants will be able to draw from various sources of knowledge to create technology integrated lesson.</p>	To be confirmed	Letter Grade
NIE	MTL902	Tamil Literature in Education	4	<p>The course aims to provide a comprehensive coverage to develop various theories and theoretical approaches through the study of Tamil literature. Introduction and history and components of new poems and drama in Tamil Language. An in-depth study of selected topics on Tamil history and culture in Sangam poems, medieval and modern literature will be taught. By studying Singapore Tamil literature, teachers would be able to comprehend the educational, historical and social changes in Tamil culture and its relevance in today's society. For example, teachers would be able to perform a critical analysis on the readings of curriculum literary texts.</p>	To be confirmed	Letter Grade

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)
NIE	MTL908	An Introduction to Sociolinguistics and Bilingualism for Tamil	4	This module aims to widen students knowledge on Language acquisition theories and background theories on monolingual, bilingual and multilingual contexts. This module also covers the key concepts of Sociolinguistics and bilingualism policy in Singapore. This module will provide additional understanding on student profiling and learning strategies for effective learning acquisition. Creating content and language development lessons to students. The module elaborate on the importance of Standard Spoken Tamil and its development in Singapore.	To be confirmed	Letter Grade
NIE	MUE901	Issues in Music Education	4	This course focuses on the historical, psychological and sociological foundations of teaching and learning music. The course also explores in depth current curricular thinking and issues in music education. By the end of the course, students should be able to: i) Articulate the historical underpinnings of music education in Singapore ii) Relate current thinking about the teaching and learning of music from an international perspective to the local context iii) Identify current issues within music education with theoretical and pedagogical understanding.	16-Jan-24 Tuesday 1730 - 2030	Letter Grade
NIE	MUE903	Popular Culture and ICT in Music Education	4	This course consists of two main components. Firstly, it examines the development and practice of popular musics through practical sessions and critical review, and explores fundamental concepts and issues on their applications and implications in the music classroom. Secondly, it provides a theoretical basis for developing music curriculum and pedagogy for schools by examining ways in which ICT is used in music and music education. * Popular musics and their significance in music education. * Development of popular musics from its Anglo-American Roots; development of vernacular pop musics in Asia such as J pop, K pop, Bhagra, Mat-Rok and Canto-Mando pop. * Exploring musical genres: Rhythm Blues, Funk, Soul, Blues, Rock Roll, Rock, Fusion Rock, Heavy Metal and standard Top 40s pop and media music charts. * Learning to Perform in a real music setting; practical sessions on the basic techniques of various pop instruments. * Popular music pedagogical practices and their applications in the music classroom. * Theoretical survey of ICT applications and platforms and their practical applications in music teaching and learning.	17-Jan-24 Wednesday 1730 - 2030	Letter Grade

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NIE	SA830	Writing and Communication Skills for PhD Students	3	This course aims to improve the academic writing and oral communication skills of PhD students. Participants will learn about the concept of an academic discourse community, learn to negotiate the expectations of this community, consider the discourse practices and linguistic conventions of academic writing and academic presentations in their own disciplines, and come to understand the thinking processes underlying those practices and conventions. A range of topics will be explored in the course, including writing different sections of a thesis/research paper (introduction, literature review, methodology, findings and discussion, conclusion, and abstract); conceptualising research writing as argument; avoiding plagiarism; using language and visual resources for effective communication; preparing for PhD confirmation seminars and oral examinations; presenting research at academic conferences; and understanding the Three-Minute Thesis (3MT) genre. In order for students to benefit most from this course, it is recommended that they enrol after having completed at least the first semester of their PhD candidature.	To be confirmed	Pass / Fail Grade
RSIS	IP6026	Introduction to the Political Economy of Southeast Asia	2	This course is an introduction to the political economy of Southeast Asia. Southeast Asia is defined to include all current members of the Association of Southeast Asian Nations (ASEAN). Through the lens of political economy, this course gives an overview of Southeast Asian countries' economic performance, examines the variations among their strategies and policy responses and how regional economies are governed. The class begins by introducing alternative theoretical frameworks useful for the understanding of Southeast Asian political economy and discussing the history of Southeast Asian economies since the colonial era. This course then scrutinizes specific issue areas (e.g. trade, finance, development) to examine the interactions between economics and politics accounting for countries' policies and economic governance. The future prospects of the Southeast Asian economies such as ASEAN Economic Community and how regional economic governance could unfold are also discussed.	Trimester 2 13 Nov - 22 Dec 8 Jan - 23 Feb Every Tuesday 9:30am - 12:30pm	Letter Grade
RSIS	IR6025	Global Governance	2	Global governance is a form of government on a planetary scale that is either very old or very new. Across time, it might retrospectively refer to the federation of sovereign nation-states under a centralized, world government, or a federation of kingdoms under a common supranational religion. Since the late 1990s, the term has referred to a process of cooperative leadership that brings together national governments, intergovernmental organizations, and civil society to achieve commonly accepted goals. It provides strategic direction and then marshals collective energies to address global challenges. This is the International Monetary Fund's definition biased in favour of attributing a consultative process. In reality, global governance is a series of political contestations between states, non-state actors and intergovernmental organizations over the nature of democracy, development, the environment, communications, culture, and above all the meaning of sustainable humane society on a planet faced with permeable geographical and social borders.	Trimester 2 13 Nov - 22 Dec 8 Jan - 23 Feb Every Tuesday 9:30am - 12:30pm	Letter Grade
SBS	BS7001	Foundation Course in Molecular & Cell Biology	3	https://www.ntu.edu.sg/sbs/admissions/programmes/graduate/research/curriculum-courses/bs7001---foundational-course-in-molecular-cell-biology	To be confirmed	Letter grade

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)
SBS	BS7005	Practical Course in Multidimensional NMR spectroscopy	3	https://www.ntu.edu.sg/sbs/admissions/programmes/graduate/research/curriculum-courses/bs7005---practical-course-in-multidimensional-nmr-spectroscopy	To be confirmed	Letter grade
SBS	BS7016	Bioentrepreneurship	3	https://www.ntu.edu.sg/sbs/admissions/programmes/graduate/research/curriculum-courses/bs7016---bioentrepreneurship	To be confirmed	Letter grade
SBS	BS7019	Fundamentals of Immunology-Concepts and Experiments	3	https://www.ntu.edu.sg/sbs/admissions/programmes/graduate/research/curriculum-courses/bs7019-fundamentals-of-immunology-concepts-and-experiments	To be confirmed	Letter grade
SBS	BS7107	Special Topics in Computational Biology & Modeling	3	https://www.ntu.edu.sg/sbs/admissions/programmes/graduate/research/curriculum-courses/bs7107---computational-biology-modelling	To be confirmed	Letter grade
SCSE	CE6121	Human Computer Interaction :Theory and Practice	3		Friday, 6.30pm - 9.30pm	No formal exam
SCSE	CE7404	Virtual Reality	3		Thursday, 1.30pm-4.30pm	No formal exam
SoH	HC7003	Special Topics in Chinese Overseas & Their Relations with China	3	https://www.ntu.edu.sg/soh/admissions/graduate/graduate-course-descriptions/chinese#Content_C002_Col02	Thursday, 11.30am-2.20pm	Nil
SoH	HC7006	Special Topics in Modern/Contemporary Chinese Literature	3	https://www.ntu.edu.sg/soh/admissions/graduate/graduate-course-descriptions/chinese#Content_C002_Col02	Friday, 9.30am-12.20pm	Nil
SoH	HC7013	Translation & Modern China	3	https://www.ntu.edu.sg/soh/admissions/graduate/graduate-course-descriptions/chinese#Content_C002_Col02	Thursday, 4.30pm-7.20pm	Nil
SoH	HC7015	East Asian Cultural Interaction: Text & Image Studies	3	https://www.ntu.edu.sg/soh/admissions/graduate/graduate-course-descriptions/chinese#Content_C002_Col02	Wednesday, 2.30pm-5.20pm	Nil
SoH	HH7109	Special Topics in Historiography	3	https://www.ntu.edu.sg/soh/admissions/graduate/graduate-course-descriptions/history#Content_C006_Col02	Monday, 10.30am-1.20pm	Nil
SoH	HH7113	Advanced Directed Readings in History	3	https://www.ntu.edu.sg/soh/admissions/graduate/graduate-course-descriptions/history#Content_C006_Col02	Check with course instructor	This is a one-to-one course. Student must look for a faculty member from the History programme and obtain agreement from the faculty member to teach this course HH7888.
SoH	HH7114	Archives	3	https://www.ntu.edu.sg/soh/admissions/graduate/graduate-course-descriptions/history#Content_C006_Col02	Tuesday, 2.30pm-5.20pm	Nil
SoH	HH7888	Directed Reading in History	3	https://www.ntu.edu.sg/soh/admissions/graduate/graduate-course-descriptions/history#Content_C006_Col02	Check with course instructor	This is a one-to-one course. Student must look for a faculty member from the History programme and obtain agreement from the faculty member to teach this course HH7888.
SoH	HL7110	Graduate Seminar in Contemporary Literature & Culture	3	https://www.ntu.edu.sg/soh/admissions/graduate/graduate-course-descriptions/english-(creative-writing)#Content_C003_Col02	Tuesday, 2.30pm-5.20pm	Background in Literature
SoH	HL7204	Graduate Seminar in Creative Writing: Voice	3	https://www.ntu.edu.sg/soh/admissions/graduate/graduate-course-descriptions/creative-writing#Content_C003_Col01	Wednesday, 2.30pm-5.20pm	Nil

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SoH	HY7011	Directed Reading in Philosophy	3	https://www.ntu.edu.sg/soh/admissions/graduate/graduate-course-descriptions/philosophy#Content_C003_Col02	Check with course instructor	This is a one-to-one course and there is a list of course instructors. Student must obtain approval of the specific course instructor.
SoH	HY7012	Independent Study for Thesis Preparation	3	https://www.ntu.edu.sg/soh/admissions/graduate/graduate-course-descriptions/philosophy#Content_C003_Col02	Check with course instructor	This is a one-to-one course and there is a list of course instructors. Student must obtain approval of the specific course instructor.
SoH	HY7013	Independent Study on Special Topics	3	https://www.ntu.edu.sg/soh/admissions/graduate/graduate-course-descriptions/philosophy#Content_C003_Col02	Check with course instructor	This is a one-to-one course and there is a list of course instructors. Student must obtain approval of the specific course instructor.
SoH	HY7021	Directed Reading in Philosophy II	3	https://www.ntu.edu.sg/soh/admissions/graduate/graduate-course-descriptions/philosophy#Content_C003_Col02	Check with course instructor	This is a one-to-one course and there is a list of course instructors. Student must obtain approval of the specific course instructor.
SPMS	MH7001	Continuous Methods	4		Wednesday 9:30am – 11:20am Friday 9:30am – 11:20am	Letter grade
SPMS	MH7009	Topics in Probability and Statistics I	4		Tuesday 9:30am – 11:20am Thursday 9:30am – 11:20am	Letter grade
SPMS	MH7014	Graduate Seminar – Discrete Mathematics I	4		Monday 2:30pm – 4:20pm	Letter grade
SPMS	PH7013	Advanced Numerical Methods for Physicists	4		Tuesday 10:30am – 12:30pm Friday 10:30am – 12:30pm	Letter grade
SPMS	PH7015	Advanced Optics	4		Monday 3:30pm – 5:20pm Thursday 3:30pm – 5:20pm	Letter grade
SPMS	PH7020	Spintronics for Information Technology	4		Monday 1:30pm – 3:20pm Thursday 1:30pm – 3:20pm	Letter grade
SPMS	PH7021	Quantum Information Theory	4		Monday 10:30am – 12:20pm Wednesday 10:30am – 12:20pm	Letter grade
SPMS	PH7024	Graduate Quantum Mechanics	4		Thursday 10:30am – 12:20pm Friday 2:30pm – 4:20pm	Letter grade

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SSS	HE7001	Mathematical Economics	3	<p>The aim of this course is to provide the graduate students with advanced mathematical background needed in economic research. Topics covered will be a balance between the conventional mathematical economics and the new developments in the frontier of computational economics, which include the advanced matrix analysis and qualitative analysis, optimization with or without constraints, discrete and continuous dynamic optimization, continuous and the discrete dynamic processes, nonlinear analysis and chaos, delayed-differential systems. Introductions to Singular and non-singular perturbation theory, Wavelet analysis, Genetic algorithm, Neural network and their applications in economic analysis will be also provided.</p> <p>Website: https://www.ntu.edu.sg/sss/graduate-education/graduate-research/economics#Content_C047_Col00</p>	To be confirmed	Letter Grade
SSS	HE7003	Econometrics II	3	<p>This course provides a detailed treatment of models for analyzing both cross-sectional and time series data. The course emphasizes application rather than theory; hence, the models introduced are illustrated with examples using real-life data. In general, theoretical developments are often carried to the extent that they enhance understanding of the model.</p> <p>Website: https://www.ntu.edu.sg/sss/graduate-education/graduate-research/economics#Content_C047_Col00</p>	To be confirmed	Letter Grade
SSS	HE7106	Topics In Mathematical Econometrics & Micro	3	<p>This course intends to equip the postgraduate students with advanced mathematical theories, methodologies and computational algorithms that are widely applied both in economic analysis and financial analysis. Topics include but not limit to Log-Concave Distributions, Optimization of Submodular Functions, Genetic Algorithm, Artificial Intelligence, Neural Network, Wavelet Analysis, Support Vector Machine, Perturbation Theory, Agent-based Modelling, and Qualitative Comparative Statistics etc. It will not only update the researchers with most recent advances but also let the students have hands-on experience on the relevant applications in economic modeling, simulation and forecasting.</p> <p>Website: https://www.ntu.edu.sg/sss/graduate-education/graduate-research/economics#Content_C047_Col00</p>	To be confirmed	Letter Grade

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SSS	HP7303	Seminar On Computational Social Science &	3	<p>Big Data presents unprecedented opportunities to study human behaviour on a very large scale. It has been increasingly used in social science to reveal individual differences and group dynamics. This course will introduce students to methods and tools for using Big Data to conduct social science research. Topics include characteristics of Big Data, forecasting and nowcasting, text mining, digital field experiments, human computation, ethical frameworks, etc.</p> <p>Website: https://www.ntu.edu.sg/sss/graduate-education/graduate-research/psychology#Content_C004_Col00</p>	To be confirmed	Letter Grade