

NTU-NUS PhD Student Exchange Programme
List of NTU Courses to be offered in Semester 2 AY2021-22

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)	Language Medium	Pre-Requisites
SCSE	DM6103	Virtual Reality	3		Thursday, 6.30pm-9.30pm	Formal exam		
SCSE	DM6121	Human Computer Interaction and Theory & Practice	3		Friday, 6.30pm - 9.30pm	No formal exam		
MSE	MS711M	History of Materials	1	PLEASE CHECK AND REFER TO NTU MSE WEBSITE	online via NTULearn	Graded		
MSE	MS722M	Processing of Organic Materials	3	PLEASE CHECK AND REFER TO NTU MSE WEBSITE	online via NTULearn	Graded		
MSE	MS733M	Electron Microscopy of materials	4	PLEASE CHECK AND REFER TO NTU MSE WEBSITE	online via NTULearn	Graded		
MSE	MS714M	Properties of Materials	2	PLEASE CHECK AND REFER TO NTU MSE WEBSITE	online via NTULearn	Graded		
MSE	MS734M	Crystal Chemistry of Materials	4	PLEASE CHECK AND REFER TO NTU MSE WEBSITE	online via NTULearn	Graded		
MSE	MS732M	Physical analysis of materials	2	PLEASE CHECK AND REFER TO NTU MSE WEBSITE	online via NTULearn	Graded		
SCBE	BG7002	Molecular Biophysics	3	This is an advanced course in molecular biophysics. The topics covered in the course include: structure and physics of biomolecules, biophysical methods to study the structure, properties, dynamics or function of biomolecules at an atomic or molecular level, electrophysiology technique to study ionic currents in isolated living cells, ligand binding assay, cell signalling and random walk	Friday, 9.30am-12.20pm	Grading		
SCBE	CH7102	Cell Therapeutics Engineering	3	This course focuses on the principles and approaches of regenerative medicine. Topics to be covered will include the objectives and fundamentals of regenerative medicine, cell and tissue properties, cell-extracellular matrix interactions, host reactions to tissue-engineered implants, cell-implant interactions, practical approaches & experimental techniques commonly used in regenerative medicine, stem cell engineering, biomaterials & scaffold design, controlled drug/gene delivery.	Thursday, 12.30pm-3.20pm	Grading		
MAE	L6003	Corporate Resource Planning	3		MONDAY 7pm-950pm			
MAE	L6102	Procurement & Supplier Devt	3		TUESDAY 7pm-950pm			
MAE	M6141	Quality Engineering	3		THURSDAY 7pm-950pm			
MAE	M6301	Advanced Metrology and Sensing Systems	3		FRIDAY 7pm-950pm			
MAE	M6423	Prototype and Rapid Prototyping	3		WEDNESDAY 7pm-950pm			
MAE	M6551	Machine Learning and Data Science	3		THURSDAY 7pm-950pm			
MAE	M6801	Advanced Thermal Engineering	3		TUESDAY 7pm-950pm			
MAE	M6802	Engineering Measurements	3		MONDAY 7pm-950pm			

NTU-NUS PhD Student Exchange Programme
List of NTU Courses to be offered in Semester 2 AY2021-22

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)	Language Medium	Pre-Requisites
MAE	M6816	Laser Assisted Manufacturing	3		THURSDAY 7pm-950pm			
MAE	M6931	System Reliability & Risk Analysis	3		FRIDAY 7pm-950pm			
MAE	MA6535	Management of Global Manufacturing	3		TUESDAY 7pm-950pm			
MAE	MA7111	Mechanics of Solids and Fracture	3		THURSDAY 7pm-950pm	No examination		
MAE	MA7932	Air Transportation Systems	3		WEDNESDAY 7pm-950pm	No examination		
SBS	BS7001	Foundation Course in Molecular & Cell Biology	3	SBS website	To be confirmed	With formal exam		
SBS	BS7005	Practical Course in Multidimensional NMR spectroscopy	3	SBS website	To be confirmed	With formal exam		
SBS	BS7016	Bioentrepreneurship	3	SBS website	To be confirmed	No formal exam		
SBS	BS7019	Fundamentals of Immunology - Concepts and Experiments	3	SBS website	To be confirmed	No formal exam		
NIE	MCL904	Chinese Literature and Culture and Its teaching	4	As a Chinese literature teacher in a secondary school or junior college, this course is helpful in enhancing understanding the developments in Chinese literature and culture and allowing teachers to hone their teaching pedagogies. This course will examine the historical regularity and characteristics of Chinese literature and culture, and related pedagogical theory and practice based on the development of Chinese literature and culture.		LetterGrade	CHINESE	
NIE	MCL909	Teaching of Reading and Writing of Chinese: From Theory to Practice	4	Reading and Writing forms part of the key components of Chinese language teaching in the 21st century globally. Chinese language learners are expected to be able to read and write in order to comprehend information presented in the Chinese language. As a result, Chinese language educators must keep abreast with recent developments and research in Chinese language reading and writing, and be equipped with the ability to teach reading and writing skills effectively.		LetterGrade	CHINESE	
NIE	MCL912	Chinese-English Translation and Chinese Language Teaching: From Theory to Practice	4	Being a multilingual nation, Singapore is unique in its language environment, providing a rich linguistic context for students learning the Chinese language. Our youth today are widely exposed to the Chinese and English languages, using them in their translations. These rich materials should be harnessed for formal language learning. This course will help to equip MEd students with the pre-requisite understanding.		LetterGrade	CHINESE	
NIE	MED901	Academic Writing for Postgraduate Students	4	This course will guide postgraduate students in studying the discourse and linguistic conventions of academic writing in their own discipline so that they can better manage the writing of their thesis/research paper. In addition to studying the discourse practices of academic writing, students will also examine the thinking processes underlying the production of those practices.	Tuesdays, 18:00 - 21:00	LetterGrade	ENGLISH	

NTU-NUS PhD Student Exchange Programme

List of NTU Courses to be offered in Semester 2 AY2021-22

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)	Language Medium	Pre-Requisites
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.	Wednesdays, 18:00 - 21:00	LetterGrade	ENGLISH	
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.	Tuesdays, 18:00 - 21:00	LetterGrade	ENGLISH	
NIE	MML902	Critical and Creative Thinking to Enhance Learning	4	Critical and creative thinking skills are important components of education. Singapore education places these skills as prerequisites which must be acquired by learners in order to prepare them to face the challenges of the 21st century and beyond. This course invites teachers/the participants to revisit and update themselves with the latest development in critical and creative thinking theories, to plan and apply creative teaching pedagogies that will enhance pupils learning.		LetterGrade	MALAY	
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.		LetterGrade	MALAY	

NTU-NUS PhD Student Exchange Programme

List of NTU Courses to be offered in Semester 2 AY2021-22

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)	Language Medium	Pre-Requisites
NIE	MSM910	Calculus and Analysis for Educators	4	Calculus is the mathematical study of continuous change. Its importance is witnessed by its ubiquitous uses in science, engineering and economics. Whence, Calculus has long become part of modern mathematics education a course in calculus is a gateway to more advanced courses in mathematics. In Singapore secondary schools and junior colleges, both differential and integral calculus are topics in the Additional Mathematics and H2 Mathematics syllabi. While learners of calculus, at this level, are only expected to be conversant with the algebraic processes of differentiation and integration and some simple applications, their teachers must possess a deep understanding of the two fundamental principles that underpin the central ideas of calculus, that of functions and limits. The rationale of this course is to equip teachers of calculus with rigorous understanding of: - functions and their properties; - concept of limits; - concepts of differentiation and integration; - applications of differential and integral calculus based on first principles, e.g., maximization/minimization problems, elemental strip, disc and shell methods, simple ordinary differential equations. This course aims to equip calculus teachers with a rigorous understanding of important pre-calculus and calculus concepts by making an intentional link with those concepts taught in school calculus.	Mondays, 18:00 - 21:00	LetterGrade	ENGLISH	
NIE	MSM911	Ring Theory for Educators	4	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. 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.	Thursdays, 18:00 - 21:00	LetterGrade	ENGLISH	

NTU-NUS PhD Student Exchange Programme

List of NTU Courses to be offered in Semester 2 AY2021-22

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)	Language Medium	Pre-Requisites
NIE	MSM921	Real Analysis	4	The rationale of this real analysis course is solely for deepening the understanding of the concepts of continuity and integrability of functions and their connections via measure theory. Extending from a typical foundational course on Calculus calls for an in-depth study of the property of continuity of functions in relation to the sets inhabiting in the real-line. The technicalities of continuity, uniform continuity, Lipchitz continuity all center around the Euclidean topology on the real line, i.e., roughly speaking, the structure of the open intervals of the real line. More precisely, a function is continuous if the inverse image of an Euclidean open is still Euclidean open. Another important area of in-depth study is that of the Riemann integral. The technicalities of this Riemann integrability center around the concept of measure. Like in the case of the Euclidean topology on the real line, the salient subsets in measure theory are exactly the measurable sets. The parallel notion of continuous functions in measure theory is that of measurable functions, i.e., a function is measurable if the inverse image of a measurable set is still measurable. This course aims to give an in-depth treatment of functions, touching on the basic Euclidean topology of the real line, its connection with the concept of continuity, uniform continuity, and different variants of continuity. It also introduces measure theory as a fundamental study of the aspects of integration of real-valued functions. The most basic concept of integrability, i.e., Riemann integrability, will be studied thoroughly, and its connection with sets of measure zero will be made explicit. Parallel to the concept of continuous functions is that of measurable functions. The course brings the students deeper to the core of integration theory via the measure-theoretic approach. The ultimate learning objective will be that the student is able to look at calculus concepts learnt and taught in schools at a higher vantage point.	Fridays, 18:00 - 21:00	LetterGrade	ENGLISH	

NTU-NUS PhD Student Exchange Programme

List of NTU Courses to be offered in Semester 2 AY2021-22

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)	Language Medium	Pre-Requisites
NIE	MSM924	Euclidean and non-Euclidean Geometry	4	Geometry is one of the most fundamental and important topics in mathematics. The modern Euclidean geometry was built as an axiomatic system. Most learners of geometry do not have the opportunity to learn geometry from the axiomatic approach and as a result, they do not have a clear view of the hierarchical structure of geometry. Because of this, they do not know the correct definitions of many of the basic geometric concepts (they may take an equivalent condition as the definition) and are not clear which results/theorems are dependent on which other results/theorems which sometimes lead to circular reasoning. This course will present a complete rigorous axiomatic system of Euclidean plane geometry and present the rigorous definitions of all the fundamental geometric concepts. The proofs of the fundamental theorems, equivalence of triangle congruency/similarity tests will be given. Non-Euclidean geometries will also be briefly introduced. This course presents a complete axiomatic system for Euclidean geometry. By taking this course, students will gain a clear picture of the whole hierarchical structure of geometry. They will learn the rigorous definitions of the fundamental geometry concepts, such as angles, triangles, rays, congruent/similar triangles. They will also learn the formal proofs of the fundamental results in geometry, such as the equivalence of various different triangle congruency (similarity) tests, Angle Sum Theorem and Exterior Angle Theorem as well as the Midpoint theorem. The course will also cover briefly the non-Euclidean geometries so that students can see the major difference among the different types of geometries	Tuesdays, 18:00 - 21:00	LetterGrade	ENGLISH	
NIE	MSM941	Selected Topics in Graph Theory	4	Graph Theory is an area in Discrete Mathematics which studies configurations involving a set V and set E, where each member of E is a pair of members in V. Graph Theory and its applications can be found not only in other areas of Mathematics, but also in scientific disciplines such as engineering, computer science, operational research, management sciences and life sciences. It has become an essential and powerful tool for engineers and applied scientists, especially, in the area of designing and analyzing algorithms for various problems. This course is aimed at providing the mathematics educators an opportunity for a more in-depth study of graphs as a mathematical object. This deepening is enabled by an introduction, followed by more advanced graph theoretic concepts.	Wednesdays, 18:00 - 21:00	LetterGrade	ENGLISH	

NTU-NUS PhD Student Exchange Programme

List of NTU Courses to be offered in Semester 2 AY2021-22

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)	Language Medium	Pre-Requisites
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.		LetterGrade	CHINESE	
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.		LetterGrade	CHINESE	
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.		LetterGrade	CHINESE	
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.		LetterGrade	CHINESE	

NTU-NUS PhD Student Exchange Programme

List of NTU Courses to be offered in Semester 2 AY2021-22

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)	Language Medium	Pre-Requisites
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.		LetterGrade	CHINESE	
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.		LetterGrade	CHINESE	
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.		LetterGrade	CHINESE	
NIE	MTCL909	Global Chinese and Contemporary China	4	The rapid rise of China as a global economy has driven an increase to the educational and pragmatic value of learning Chinese language globally. Understanding the history and development of Chinas rise and economic globalization is essential to TCIL instructors as they thread beyond the grounds of China in TCIL to non-native learners.		LetterGrade	CHINESE	

NTU-NUS PhD Student Exchange Programme

List of NTU Courses to be offered in Semester 2 AY2021-22

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)	Language Medium	Pre-Requisites
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.		LetterGrade	ENGLISH	
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.		LetterGrade	CHINESE	
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 programmes. 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.		LetterGrade	CHINESE	
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.	Thursdays, 18:00 - 21:00	Pass/FailGrade	ENGLISH	

NTU-NUS PhD Student Exchange Programme
List of NTU Courses to be offered in Semester 2 AY2021-22

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)	Language Medium	Pre-Requisites
CEE	CV6107	Behaviour & Design of Steel and Composite Structures	3 AU		Mon, 6.30PM - 9.30PM			
CEE	CV6108	Analysis & Design of Tall Buildings	3 AU		Fri, 6.30PM - 9.30PM			
CEE	CV6312	Slope Stability and Ground Improvement	3 AU		Tue, 6.30PM - 9.30PM			
CEE	CV6313	Shallow and Deep Foundation	3 AU		Thu, 6.30PM - 9.30PM			
CEE	CV6314	Excavation & Earth Retaining Systems	3 AU		Wed, 6.30PM - 9.30PM			
CEE	MT6103	Strategic Planning (BI)	3 AU		Tue, 6.30PM - 9.30PM			
CEE	MT6104	Cross Cultural Management	3 AU		Wed, 6.30PM - 9.30PM			
CEE	MT6202	Shipping Management II (BI)	3 AU		Thu, 6.30PM - 9.30PM			
CEE	MT6204	Ship Operations, Brokering and Chartering	3 AU		Fri, 6.30PM - 9.30PM			
CEE	MT6301	Maritime Logistics	3 AU		Mon & Sat. Time TBA			
CEE	CV7002	Advanced Strength of Materials	3 AU		Mon, 1.30PM - 4.30PM			
CEE	CV7003	Advanced Engineering Mathematics	3 AU		Fri, 6.30PM - 9.30PM			
CEE	CV7501	Membrane Science & Technology	3 AU		Wed, 3PM - 6PM			
EEE	EE7205	RESEARCH METHODS	3	Pls refer to website	Wednesday, 6.30pm to 9.30pm	NA		
EEE	EE7602	DESIGN, FABRICATION AND ANALYSIS OF ELECTRONIC DEVICES	3	Pls refer to website	Monday, 6.30pm to 9.30pm	NA		
EEE	EE7603	SEMICONDUCTOR PHYSICS AND APPLICATIONS	3	Pls refer to website	Friday, 6.30pm to 9.30pm	NA		
SPMS	PAP777	Graduate Quantum Mechanics	4	Available on website	To be confirmed			
SPMS	PAP723	Advanced Numerical Methods for Physicists	4	Available on website	To be confirmed			
SPMS	PAP732	Nonlinear Optics	4	Available on website	To be confirmed			
SPMS	PAP750	Quantum Information Theory	3	Available on website	To be confirmed			
SPMS	PAP742	Optical Design Theory	3	Available on website	To be confirmed			
SPMS	CBC723	Graduate Organic Chemistry	4	Available on website	To be confirmed			
SPMS	CBC739	Graduate Basic and Technical Inorganic Chemistry	2	Available on website	To be confirmed			
SPMS	CBC741	Advanced Analytical and Spectroscopic Methods in Materials Chemistry	2	Available on website	To be confirmed			
SPMS	CBC742	Advanced Synthetic and Physical Approaches to Materials Chemistry	2	Available on website	To be confirmed			
SPMS	MAS710	Continuous Methods	4	Available on website	To be confirmed			
SPMS	MAS723	Topics in Probability and Statistics I	4	Available on website	To be confirmed			
SPMS	MAS790	Graduate Seminar – Discrete Mathematics I	4	Available on website	To be confirmed			
SPMS	MAS794	Graduate Seminar – Pure Mathematics I	4	Available on website	To be confirmed			

NTU-NUS PhD Student Exchange Programme

List of NTU Courses to be offered in Semester 2 AY2021-22

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)	Language Medium	Pre-Requisites
NBS	AC9101	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.	T3/AY2021 - TBA (Feb 2022)	Graded		Pre-Requisite: Basic knowledge of microeconomics and econometrics (esp. cross sectional panel regression analysis).
NBS	BR7401	Longitudinal Research: Theory, Design, and Data Analysis	3	This course provides the knowledge and hands-on experience of the theory, design, and analyses of longitudinal research in organizational settings. The main objectives 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.	T3/AY2021 - TBA (Feb 2022)	Graded		
NBS	BR7701	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.	T3/AY2021 - TBA (Feb 2022)	Graded		

NTU-NUS PhD Student Exchange Programme

List of NTU Courses to be offered in Semester 2 AY2021-22

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)	Language Medium	Pre-Requisites
NBS	FN9103	Empirical Research I (Investment)	3	This course offers an introduction to empirical research in investment as exemplified by publications in peerreviewed journals. Topics include asset pricing and anomalies. The objective of this course is to prepare students for doing empirical research in finance by giving them the necessary cultural background about the literature and by teaching them the techniques that they will need to use.	T3/AY2021 - TBA (Feb 2022)	Graded		Pre-Requisite: doctoral-level classes in finance theory, economics, and econometrics. Students who do not have these pre-requisites can enroll in the class if they are willing to do the extra work that will bring them up to date with the knowledge contained in the pre-requisites.
NBS	IS9201	Contemporary Issues in Information Systems	3	The course introduces the PhD participants to major topics in the field of Information Systems. The lessons will be taught by Information Systems Faculty who will expose students to topics in their areas of research.	T3/AY2021 - TBA (Feb 2022)	Graded		
NBS	MG9003	Theory Construction and Experimental Methods in Behavioural Research	3	Aim of the course is to provide the students with the conceptual tools, methodology and critical thinking skills to evaluate, prepare and conduct research that satisfies the highest scientific standards. Key topics include epistemological concepts; validity and reliability; theory construction; questionnaire design and scale construction (general). The course will cover ethical research and students will be required to obtain the related on-line certification. The main focus will be on lab-based experimental approaches, including research / experimental designs, hypothesis construction, inference considerations, the concept of control groups.	T3/AY2021 - TBA (Feb 2022)	Graded		

NTU-NUS PhD Student Exchange Programme

List of NTU Courses to be offered in Semester 2 AY2021-22

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)	Language Medium	Pre-Requisites
NBS	MG9103	Advanced Topics in Strategic Management	3	This course involves a critical review of topical areas of strategic management research, including but not limited to the following domains: corporate strategy, international strategy, corporate governance, top executives, etc. We will also identify key research questions and trends in these topics. Each week we will discuss and examine in depth each topic and its related empirical works. The course is ideal for doctoral students whose primary research is in strategic management or related areas such as organizational behaviour, marketing, corporate finance and accounting.	T3/AY2021 - TBA (Feb 2022)	Graded		
NBS	MG9105	Advanced Topics in Organisational Behaviour	3	The primary focus of the course is to provide the participants with the foundational understanding of the multilevel analytical methodology. Once equipped with the appropriate analytical tools, the students will be able to apply them to their own research that involves data from different levels of theory, constructs and analysis. The aim of this course is to equip participants with the conceptual understanding and application of the multilevel methodology to the team context. At the end of the course, the students should: (a.) know the conceptual foundations of multilevel methodology; (b.) be able to conduct data analysis for two-level and three-level models using SPSS mixed –effects program (MIXED); (c.) have a basic understanding of the team effectiveness literature; (d.) know the measurement issues in team research Pre-Requisite: Regression or equivalent course (in the last 5 years)	T3/AY2021 - TBA (Feb 2022)	Graded		Pre-Requisite: Regression or equivalent course (in the last 5 years).
NBS	MK9101	Seminar in Consumer Behaviour	3	Consumer behaviour is one of the most interesting and important aspects of marketing. Virtually all decisions involved in product development, pricing, promotion and distribution rely on intimate knowledge of the target consumers. Understanding the behaviour of the consumer therefore helps marketers anticipate reactions to introductions of and changes in the marketing mix, or the adoption of new products. This is a participative graduate seminar. There will be assigned readings for each class where students will be set regular tasks of leading discussions, providing explanations and critiques of academic papers, and any other activities determined along the way.	T3/AY2021 - TBA (Feb 2022)	Graded		
NBS	MK9105	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.	T3/AY2021 - TBA (Feb 2022)	Graded		

NTU-NUS PhD Student Exchange Programme

List of NTU Courses to be offered in Semester 2 AY2021-22

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)	Language Medium	Pre-Requisites
NBS	MK9201	Seminar in Marketing Modelling	3	The main purpose of this seminar is to introduce students to significant research in the major areas of marketing modeling. Coming out of this seminar, a student should have (a) a sense of the current topics and issues being studied in marketing, and (b) an understanding of some theoretical frameworks and empirical tests used in marketing modeling research.	T3/AY2021 - TBA (Feb 2022)	Graded		
NBS	ST9007	Advanced Research Methods: Meta-Analysis	1.5	This course equips participants with statistical methods for literature review and research synthesis. This course addresses the theoretical and methodological issues in the review and synthesis of results from multiple primary studies. As research synthesis is an integral part of the scientific process, it demands the same high standards of rigor that apply in all primary research. Rigorous literature reviews must attend to the same details of problem formulation, data collection and cleaning, data analysis and interpretation that are addressed in primary research. This course imparts the knowledge and skills required to implement such rigor using statistical methods specifically developed for research synthesis, i.e. meta-analysis.	T3/AY2021 - TBA (Feb 2022)	Graded		Pre-Requisite: an understanding of univariate and multivariate statistics; familiarity with statistical analysis in SPSS and/or R; should have one or more potential literature reviews they intend to conduct for their dissertation.

NTU-NUS PhD Student Exchange Programme

List of NTU Courses to be offered in Semester 2 AY2021-22

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)	Language Medium	Pre-Requisites
RSIS	AS6023	India's Foreign and Security Policy	3	The course introduces the ideological and geopolitical drivers of India's foreign and security policy. The first part delves into the sources of India's conduct by focusing on the ancient origins of its strategic culture and the enduring legacy of the British security structures. The second part analyses the evolution of India's policies in the three concentric circles that surround it— the immediate neighbourhood, the extended neighbourhood and the Indian Ocean, and the global system. The final section focuses on the new policy challenges to India as a rising power. The emphasis will be on understanding the India's difficult transition from a weak third world state to a potential great power that can shape the regional and international system.	Trimester 2 8 Nov - 17 Dec 3 Jan - 18 Feb Every Tuesday 9:30am - 12:30pm			
RSIS	S6029	Nuclear Politics in Asia	3	Asia is the location of several existing and potential nuclear powers. This course is designed to develop an advanced understanding of the politics of nuclear weapons in East, South and West Asia within a comparative framework. Drawing on the experiences of the Cold War era and more recent nuclear relationships in Northeast and South Asia, it develops the student's capabilities to anticipate the future of nuclear politics across Asia. Strategic politics is usually studied from the standpoint of the apparently distinct disciplines of strategic studies and international relations theory. Here, the relationship between the two is treated as integral in order to encourage a more holistic and critical understanding of nuclear politics. The course examines central issues about why states want nuclear weapons (motivations); how nuclear-armed states think (concepts and doctrines); how they interact (crises and cooperation; the termination of rivalries); efforts to manage nuclear weapons (arms control, nonproliferation); and the impact of non-state actors (nuclear/radiological terrorism).	Trimester 2 8 Nov - 17 Dec 3 Jan - 18 Feb Every Wednesday 9:30am - 12:30pm			
RSIS	IP6026	Introduction to the Political Economy of Southeast Asia	3	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 8 Nov - 17 Dec 3 Jan - 18 Feb Every Tuesday 9:30am - 12:30pm			

NTU-NUS PhD Student Exchange Programme

List of NTU Courses to be offered in Semester 2 AY2021-22

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)	Language Medium	Pre-Requisites
RSIS	IR6025	Global Governance	3	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 8 Nov - 17 Dec 3 Jan - 18 Feb Every Tuesday 2:00pm - 5:00pm			
LKC Medicine	MD9108	Neural Systems and Behaviour	3	The course aims to give students an introduction to systems neuroscience, including sensory and motor systems, behaviour, memory and cognition. Students will understand conceptual foundations of systems neuroscience via textbook readings, lectures, class discussions and in-depth analysis of important research papers in the field.	Wednesdays, 2.30pm – 5.20pm, Location will be 4th floor conference room in the EMB.			
LKC Medicine	MD9114	Neuroengineering	3	The course will introduce PhD students to various concepts from engineering that are used in neuroscientific research. In addition to providing a strong theoretical framework, the course will give students an opportunity to perform laboratory measurements of human kinematics.	Location will be at EMB. More details soon.			
LKC Medicine	MD9107	Latest Development in Infectious Disease Research	3	This course is intended to students interested by the latest development in infectious diseases research. Learning objectives: critical assessment and debate on cutting-edge articles; analyse diagnostic approaches and new therapeutic strategies for viral, bacterial and fungal infections; discuss the global danger and challenges of antimicrobial resistance; discuss and propose solution for current global health challenges in communicable diseases; develop and defend research global health challenges; analyse the clinical relevance of microbiomes and redefine the Koch postulates.	Class of 6, Location will be at EMB & CSB on Wednesdays at 9.15am			

NTU-NUS PhD Student Exchange Programme
List of NTU Courses to be offered in Semester 2 AY2021-22

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)	Language Medium	Pre-Requisites
SoH	HC7006	Topics on Modern/Contemporary Chinese Literature	3	Available on website	Friday, 9.30am -12.20pm	-		
SoH	HC7015	Study of Text and Image and East Asian Cultural Interaction	3	Available on website	Tuesday, 2.30pm-5.20pm	-		
SoH	HC7888	Directed Reading	3	Available on website	Check with course instructor This is a one-to-one course, schedule is arranged between faculty member and student.	-		
SoH	HL7110	Graduate Seminar in Contemporary Literature & Culture	3	Available on website	Tuesday, 2.30pm-5.20pm	-		
SoH	HL7114	Graduate Seminar in Cultural Studies	3	Available on website	Wednesday, 2.30pm-5.20pm	-		

NTU-NUS PhD Student Exchange Programme

List of NTU Courses to be offered in Semester 2 AY2021-22

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)	Language Medium	Pre-Requisites
SoH	HL7205	Graduate Seminar in Creative Writing: Place & Time	3	Available on website	Wednesday, 9.30am-12.20pm	-		
SoH	HL7888	Directed Study in Literature	3	Available on website	Check with course instructor This is a one-to-one course, schedule is arranged between faculty member and student.	-		
SoH	HH7888	Directed Reading in History	3	Available on website	Check with course instructor This is a one-to-one course, schedule is arranged between faculty member and student.	-		

NTU-NUS PhD Student Exchange Programme

List of NTU Courses to be offered in Semester 2 AY2021-22

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)	Language Medium	Pre-Requisites
SoH	HH9016	Advanced Directed Readings in History	3	Available on website	Check with course instructor This is a one-to-one course, schedule is arranged between faculty member and student.	-		
SoH	HH9019	Archives	3	Available on website	Friday, 10.30am-1.20pm	-		
SoH	HG7005	Advanced Readings in Sociolinguistics	3	Available on website	Monday, 2.30pm-6.20pm	-		
SoH	HG7012	Topics in Theoretical Syntax	3	Available on website	Wednesday, 10.30am-2.20pm	-		
SoH	HG7015	Topics in Psycholinguistics	3	Available on website	Tuesday, 1.30pm- 5.20pm	-		
SoH	HG7020	Readings in Linguistics Research	3	Available on website	Check with course instructor This is a one-to-one course, schedule is arranged between faculty member and student.	-		
SoH	HG7029	Advanced Semantics	3	Available on website	Thursday, 10.30am-2.20pm	-		
SoH	HG7038	Origins & Evolution of Language: Biological, Computational, & Cultural Foundations	3	Available on website	Monday, 10.30am-2.20pm	-		

NTU-NUS PhD Student Exchange Programme

List of NTU Courses to be offered in Semester 2 AY2021-22

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)	Language Medium	Pre-Requisites
SoH	HG7041	The Anatomy & Physiology of Speaking & Hearing	3	Available on website	Thursday, 2.30pm-6.20pm	-		
SoH	HY7002	Graduate Seminar II	3	Available on website	Thursday, 2.30pm-5.20pm	-		
WKWSCI	A9107	Advanced Quantitative Analysis for Communication and Information Research	3		Wednesday 6.30pm to 9.30pm			
WKWSCI	A9109	Advertising Theory and Consumer Psychology	3		Thursday 6.30pm to 9.30pm			
ADM	AP9040	Exhibition Design	3	This course will present and discuss current issues and concepts in exhibition-making with a particular focus on design approaches and interpretative techniques that communicate knowledge and engage the audiences. Exhibition-making means the creation of innovative structures for the presentation of cultural artefacts through interdisciplinary collaboration. There will be a critical discussion on the latest design trends in the context of museum exhibitions helping the students to reflect on the relationship between the narrative, the space and the visitor experience. As exhibition concepts and agendas largely reflect the hosting institutions' mission, students will be exposed to a variety of exhibitions: historical, cultural, scientific, permanent and temporary. The course approaches the definition of the exhibition space as a "narrative environment" and the evolving notion of interpreting and displaying cultural artifacts, analyzing the physical, sensorial and conceptual dimension of the museum space. Exhibition environments today can be enlightening, immersive, interactive, and use different kinds of media: video projections, historical objects, specimens, hands-on exhibits, innovative technologies. The course will provide a historical overview and offer a structured platform to discuss how museographic solutions has evolved to become more engaging and participatory.	Wed, 1.30pm to 4.20pm	Letter grading		

NTU-NUS PhD Student Exchange Programme

List of NTU Courses to be offered in Semester 2 AY2021-22

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)	Language Medium	Pre-Requisites
ADM	AP9052	New Media Art: From Analog to Digital	3	This course introduces key theories and histories of new media art and culture, examining how critical methodologies developed for analog media may expand our understanding of new media. In order to identify the specificities of digital media art, concepts of materiality, ephemerality, and authorship will be explored, in addition to space and place within the history of new media art. The course will survey various media in order to develop diverse conceptual approaches to new media art and technology, from reflecting on video, performance, and environmental art to approaches to interactive narrative and urban media art. During the semester, students will make oral presentations on assigned readings and develop a final research project for an original work of digital scholarship that will be presented at the end of the term.	Tues, 1.30pm to 4.20pm	Letter grading		

NTU-NUS PhD Student Exchange Programme

List of NTU Courses to be offered in Semester 2 AY2021-22

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)	Language Medium	Pre-Requisites
ADM	AP9053	Practice as Research	3	This course analyses literature that defines practice as research—understood as practice-based research, practice-led research, among other denominations in use. During the course, practice will be investigated not only as a form of representation but as a method of inquiry. Thus, you will examine and critically interrogate how practice, research and knowledge production are intertwined and recognized. The former will be achieved through readings, in class-discussions, case study analysis, forums, round tables, field trips, written and visual reports, practice-as-research project development, and presentations. During the course, you will also be able to effectively visualize data and information gathered throughout your research. You will analyze, organize, and synthesize the literature review and your research inquiry by translating cognitive information into perceptual systems that facilitate the comprehension of the first. Examples range from information visualization to exhibition design proposals.	Mon, 1.30pm to 4.20pm	Letter grading		

NTU-NUS PhD Student Exchange Programme

List of NTU Courses to be offered in Semester 2 AY2021-22

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)	Language Medium	Pre-Requisites
ADM	AP9054	Experiencing Art & Technology	3	The body is individual, social, subjective and relational. The body is a representation, an experience, a technology and a site. Bodies can aggregate into spectacles, rituals, political entities and social constructs. The lived experience is deeply rooted in our bodies, it is a continuous occurrence of our body interacting with the environment. You will gain exposure of understanding the body when considered by philosophy, neurology, anthropology, psychology, performance theory, social robotics and artificial intelligence. In turn, these exposures will equally fuel your appreciation of experiencing art & technology and impact your very own processes of making art. This course will especially be relevant for students that have an artistic practice empowering human-centric technologies. The analytical and theoretical aspects of embodiment have gained a vast interest in research over the past decades. Nowadays, embodiment has become important facet of research methodologies found in interaction design, human-machine interfaces, immersive environments, experiential design, spatial and exhibit design and creative robotics to name a few. This course invites graduate students to develop and articulate a component of their artistic research as an investigation on contemporary issues of embodiment. A semester project shall demonstrate this discourse and the format of the project is open to match your practice. It could either be a comprehensive essay or a hybrid that intermixes a prototype with a shorter essay.	Tues, 4.30pm to 7.20pm	Letter grading		
SSS	HE9001	Mathematical Economics	3	https://www.ntu.edu.sg/sss/graduate-education/graduate-research/economics#Content_C047_Col00	Day: Friday Time: 2 to 5pm Venue: LHS-TR+24 (The Hive)	100% Continous Assessment Module. Letter Graded.		
SSS	HE9003	Econometrics II	3	https://www.ntu.edu.sg/sss/graduate-education/graduate-research/economics#Content_C047_Col00	Day: Monday Time: 3 to 6pm Venue: LHS-TR+27 (The Hive)	100% Continous Assessment Module. Letter Graded.		
SSS	HE9106	Topics In Mathematical Econometrics & Microeconomics	3	https://www.ntu.edu.sg/sss/graduate-education/graduate-research/economics#Content_C047_Col00	Day: Wednesday Time: 2.30 to 5.30pm Venue: LHS-TR+37 (The Hive)	100% Continous Assessment Module. Letter Graded.		

NTU-NUS PhD Student Exchange Programme

List of NTU Courses to be offered in Semester 2 AY2021-22

School	Course Code	Course Title	Course AU	Course Description (if not available on website)	Class Timetable	Others (e.g. Pass/Fail grading)	Language Medium	Pre-Requisites
SSS	HP7218	Language In Perception and Thought	3	https://www.ntu.edu.sg/sss/graduate-education/graduate-research/psychology#Content_C004_Col00	Day: Monday Time: 3.30pm to 6.20pm Venue: LT18	100% Continous Assessment Module. Letter Graded.		
SSS	HP7205	Special Topics In Developmental Psychology	3	https://www.ntu.edu.sg/sss/graduate-education/graduate-research/psychology#Content_C004_Col00	Day: Thursday Time: 9.30am to 1220pm. Venue: HSS AUDITORIUM (SHHK/HSS-B1-14) Venue may change.	100% Continous Assessment Module. Letter Graded.		