5.2 Description of courses

MAC810 Ethical, Legal and Professional Issues in Counselling
AUs: 3
The topics covered include professional roles and function, codes of ethics and standards of practice, legal matters and potential liabilities, safeguarding confidentiality, duty to warn, boundaries in therapeutic relationships, client rights, and value differences with clients in the Singapore context.

MAC811 Multicultural Counselling
AUs: 3
This course is about providing appropriate counselling services to people from diverse cultural backgrounds. Topics covered include cultural and historical origins of counselling, sense of self, indigenous therapies, culture-bound syndromes, culture and mental health, and counselling with specific populations in Singapore.

MAC812 Life-Span Developmental Psychology
AUs: 3
This course gives an overview of the development and disorders of child and adolescent. It discusses the main features of physical and psychosocial development of children and adolescents. Topics which will be covered include the role of self-concept and self-esteem, parent-child relationships, asperger, autism, ADHD, anger management and prevention of violence, creativity and emotional intelligence.

MAC813 Career Development and Counselling
AUs: 3
This course provides an understanding of the theories of career development and career counselling / guidance; acquire knowledge and skills in career guidance, assessment & counselling; know the development of career guidance & counselling in Singapore schools & community; know the trends and issues in workforce development in Singapore and beyond; mobilise / organise resources in and out of the school to facilitate the implementation of the programme; and design research to review / evaluate the programme for improvement.

MAC814 Theories of Counselling and Psychotherapy
AUs: 3
This course aims to help students develop an in-depth understanding of major current affective, cognitive, and behavioural models and skills in using these approaches in counselling. Specific orientations discussed include psychoanalytic therapy, Person-centered therapy, Reality therapy, Gestalt therapy, Rational-emotive-behavioural therapy and Cognitive-behavioural therapy.

MAC815 Advanced Counselling and Interviewing Skills
AUs: 3
This course examines the development of counselling skills through the counselling process involving phases of relationship building, problem exploration and identification, goal-setting, designing intervention strategies, evaluation outcomes and termination. This class is predominantly experiential. An emphasis is placed on the practice and demonstration of skills, development of counselling plans, and strategies for assistance.

MAC816 Group Process and Counselling
AUs: 3
Theory and practice of group counselling will be presented, discussed, and practiced in this course. Students will learn about the principles of group dynamics, process and counselling techniques. Application of groups
in community and educational settings for remedial and preventive purposes will be explored.

MAC817 Psychopathology and Appraisal
AUs: 3
Psychopathology provides an overview of the Diagnostic and Statistical Manual of Mental Disorders – Text Revised (DSM IV-TR) and how it can be used for the purposes of assessment and diagnosis of the individual client. The student will gain greater familiarity about the characteristics of various personality disorders, know how to assess these disorders within the parameters of the helping interview as well as know when to refer clients. Appraisal requires the examination of the nature and rationale of psychological measurement of the client. Course contents include: principles and procedures of standardised and non-

standardised appraisal, basic measurement and statistical concepts underlying the use and interpretation of instruments, limitations in human appraisal, ethical and legal controversies of assessment.

MAC818 Research Methodology and Statistical Analysis in Counselling
AUs: 3
This course covers the research designs and basic statistics. For research designs, topics covered include research problems and hypothesis formulation, the sampling and instrumentation, writing research reports, and evaluating research. For research statistics, students are exposed to the understanding of basic statistics and using statistical software (SPSS) in data analysis. Topics included are preliminary data analysis, descriptive and inferential analysis, parametric and non-parametric tests, univariate and multivariate tests.

MAC819 Programme Evaluation in Counselling and Guidance
AUs: 3
This course provides the students with the basic understanding of procedures for counselling programme development and accountability/evaluation. It focuses on the needs assessment, planning, development, design, implementation and evaluation of a comprehensive counselling and guidance programme. The community and school-related issues and management competency of the counsellor will be emphasised.

MAC820 Introduction to Family Counselling
AUs: 3
This course gives an introduction to family systems theories and investigates family issues that surface in counselling. Critical examination of systemic change, dysfunction, stages of family development, the dynamics of family interaction, problems associated with individual adjustments, adaptations and other reactions within family is included.

MAC821 Mental Health and Community Counselling
AUs: 3
This course introduces the students to the field of community mental health counselling. Topics covered include the roles of the community mental health counsellor, professional ethics, managed care, various contexts of practice and organisational structures, outreach, advocacy, mandated clients, crisis intervention services, prevention, consultation, and an understanding of how diversity influences the practice of mental health/community counselling.

MAC822 Addiction and Suicide Counselling
AUs: 3
This course provides an overview of two areas of concern: addictive behaviours and suicidal tendencies. For addiction counselling, the psychological concept of addiction, development of addictive behaviours as well as the assessment and treatment involve individual, group and family dynamics are addressed, with focus on substance abuse among youth, pathological use of the internet and digital games, gambling and co-dependency. For suicide counselling, the course covers risk assessment and suicide clues, intervention strategies in suicide prevention as well as suicide grief and bereavement. Students are also exposed to professional and community resources available, when and how to refer clients to the resources.

MAC823 Counselling Supervision
AUs: 3
This course is an introduction to the theory, research and practice of counselling supervision. The course is designed to help students understand the supervisory relationship, various models of supervision and how the models relate to the process of supervision. The differences between supervision and counselling/psychotherapy and consultation will be explored along with other topics including (a) the role of the supervisor (b) relevant ethical and legal issues related to supervision, (c) styles of supervision (d) methods in supervision.

MAC830 Practicum I & MAC831 Practicum II
AUs: 3
The principal goal of practicum is to provide an opportunity for integration and concrete practice of counselling theories, process and techniques leading to effective individual and group counselling. There will be close supervised counselling practice with clients in approved field sites such as schools or agencies which are consistent with the student's learning needs, career goals and area of interest. Demonstration of appropriate professional quality, social and ethical judgment and being receptive is expected.

MAC840 Dissertation
AUs: 3
The dissertation should be an organised scientific paper contributing to the field of counselling. The dissertation should be about 10,000 words in length, exclusive of appendices, tables and references. It should include the following sections: Title page, Acknowledgements, Table of Contents, List of Tables and Figures, Abstract, Introduction, Literature Review, Methodology, Results, Discussion and Implication, Conclusion, References and Appendices.

MAE610 Teaching English as a Second/Foreign Language
AUs: 3
The course will focus on the connections between current research on language learning theory and practical applications for ESL/EFL teaching. Objectives of the course will be to: identify current issues in language learning theory and teaching, critically examine theories about interaction, negotiation, and focus on form for second language learning, analyse the ways in which these theories do/do not apply to ESL/EFL classroom situations, evaluate and adapt methods, techniques, tasks, and materials for classroom teaching. Specific topics addressed (e.g. Writing instruction, task-based learning, classroom interaction) depends on student interests and is decided in consultation with class participants.

MAE612 Language Across the Curriculum
AUs: 3
This course draws from various fields of linguistics and education in order to focus on the central role of language in learning. It considers the ways in which school subjects across the curriculum are constructed in the classroom by teachers and students, and by writers of teaching materials, including textbooks, and emphasises the importance of the teacher's role as a facilitator of learning through language. The course aims to enable participants to develop critical awareness, knowledge and understanding of a variety of relevant theoretical, analytical and pedagogical perspectives and models, and of practical strategies for supporting and enhancing students' learning processes as they participate in school ways of knowing.

MAE613 Literacy Development
AUs: 3
This course presents a theoretical framework to understand children’s engagement with and acquisition of literacy in a variety of contexts. It includes a study of literacy practices across cultures and their impact on school type literacy. Participants will explore notions of biliteracy and the interconnectedness of home-school-popular culture literacies. Participants will be introduced to the role of multilingual and situated literacies and multimodalities in the creation of identity, gender stereotyping and critical discourse in literacy development. It will equip educators with the necessary knowledge base to harness children’s lived experiences to facilitate successful literacy learning.

MAE622 Literature in Language Teaching and Learning
AUs: 3
This course examines theories and resulting classroom practices that have advocated an integrated approach to the teaching of language skills. It examines the place of literature in language teaching and cultural understanding in the curriculum. It deals with general pedagogical issues as well as the relationship between literature and language use. Practical ideas for classroom teaching will also be explored.

MAE623 Computers in Language Study, Teaching and Learning
AUs: 3
Computers are used in diverse instructional contexts for studying language, increasing teaching efficiency and enhancing learning. This course develops a critical under-standing of pedagogical issues relating to these uses from both theoretical and practice-based perspectives. Participants will examine how computers can add value to the study and teaching of language, Topics include corpus-driven language analysis, using concordance-based task in the classroom and Computer Assisted Language Learning (CALL). The course will be useful for language educators who would like to improve their current knowledge of ICT applications in the classroom or identify key issues in the field for school-based investigation, or both.

MAE624 Curriculum and Materials Development
AUs: 3
This course examines the historical development of the language curriculum over the last four decades. It also provides course participants with insights into syllabus design choices and content conceptualization as

well as the tools for developing and evaluating language textbooks and other related language teaching-learning materials. At the more practical level, course participants will analyse some curriculum documents (e.g. the current English Language syllabus, a specific language program, and a language learning package) in the light of what has been covered in the course.

MAE800 Research Methodology in Applied Linguistics
AUs: 3
This course is an introduction to major research methodologies in applied linguistics. It aims to help participants: (1) understand fundamental principles and key issues in doing applied linguistic research; (2) become informed consumers of published research; and (3) develop the necessary abilities to conduct their own research. To these ends, the course covers both quantitative and qualitative research designs and data collection methods, and gives balanced attention to the knowledge base of applied linguistic research and hands-on experience with various components of the research process.

MAE801 Discourse Studies
AUs: 3
This course, through its lectures and hands-on work, is concerned with studying language across a variety of settings and for a wide range of purposes, and providing students with a meta-language for talking about such language and a toolkit for analyzing its patterns. It gives students an overview of a range of approaches to the analysis of spoken and written discourse but will emphasize those which have a more 'applied' orientation, especially those which can serve as a method of qualitative analysis that students may wish to do in their future coursework or research, or help those who are teachers to empower their learners through explicit instruction to handle the discourse demands of a wide range of situations, within school and beyond it.

MAE802 Language Acquisition Studies
AUs: 3
This course examines theories of language acquisition (first, second and bilingual) from psycholinguistic and sociolinguistic perspectives. Processes and contexts of acquisition and development are considered including discussion of information-processing approaches to language acquisition, development in skill areas of language use (e.g. oral, writing), and the possible impact of difference contexts of learning (e.g. home, school). Students will read a selection of research articles on current theories of language acquisition and examine data sets from language learners in order to better understand the theories and possible implications for classroom language teaching.

MAE803 Language Curriculum Development
AUs: 3
This course examines the historical development of the language curriculum from 1800 to the present time. It provides course participants with insights into how the theory of learning and methods of teaching influence language curriculum planning. It also looks into syllabus design choices and tools for developing and evaluating English Language textbooks and other related language teaching-learning materials. At the more practical level, during each tutorial session, course participants will interpret an aspect of curriculum development and use it to plan or analyse some curriculum document (e.g. an English Language syllabus, a specific English Language program, a language learning package, etc). Over time and by the end of the course, participants will be able to see a full picture of what language curriculum planning entails

MAE804 Sociolinguistic Perspectives on the Classroom
AUs: 3
This course explores major themes in sociolinguistics and their relevance to the classroom. It considers language use and language variation in social contexts based on factors such as geography, social class, and gender. It focuses on language use in multilingual communities, social reasons for language change, language planning and policy, pidgin and creole languages, and issues in cross-cultural communication with particular relevance to their impact on the English classroom.

MAE805 Classroom Discourse Analysis
AUs: 3
This course introduces students to the study of situated language use in the social setting of the classroom. Not only is language the basic medium through which teaching and learning take place, but it also has a powerful influence on older children's language development. The key questions raised are the following: How do interaction patterns and overall lesson structure affect the learning that happens and the quality of

knowledge? How can teachers structure interaction effectively to involve students actively in the construction of knowledge? How do teachers achieve the kind of connected learning and coherence across larger units than the lesson that allows their students' knowledge and understanding to be accumulated, modified and deepened? In what ways do patterns of classroom discourse vary across cultures of learning and across the key learning areas?

MAE806 Language across the Curriculum
AUs: 3
This course examines the intersection of language, literacy, curriculum and classroom practice. It explores the way language affects all aspects of curriculum, and how success in schooling depends on students' ability to negotiate the language and literacy demands within and between various curriculum areas. It draws on a body of literature to pinpoint the specific language and literacy demands of key curricular areas like English, Literature, Humanities and Science, and how the features of these academic registers function to realize the purposes of these curricular courses. It also offers reflections on current practice in schools, where commonly it is the sole responsibility of the English teacher to manage this area of the curriculum, and makes a case for introducing students to a visible, explicit pedagogy that enables them to talk about and reflect on language, and achieve a better understanding of how knowledge in their various courses is constructed and presented through language.

MAE807 Language Teacher Education
AUs: 3
This course provides an introduction to current approaches to language teacher education. It is aimed at prospective and current language teacher educators who are interested in developing their skills and knowledge in teacher development. The course includes ways of helping pre-service and in-service teachers to develop their theories of language teaching, strategies for critical self-awareness, classroom observation and supervision, techniques, as well as develop strategies for managing and evaluating English Language programmes.

MAE808 Literature and Language Education
AUs: 3
Literature promotes engagement with language in use, critical reading practices, and enjoyment. This course examines socio-cultural, linguistic and textual theories advocating an integrated approach to language teaching. Practical pedagogical examples for employing literature in English language curriculum, teaching, and assessment at the primary and secondary level are demonstrated.

MAE809 Oracy Development and Research
AUs: 3
Speaking and listening are important skills for thinking, learning and communication. This course examines the concept of oracy by considering views of spoken English and discusses its role in first and second language learning. Through a critical reading of research and other scholarly discussions, participants will learn about speaking and listening development from cognitive, social and discourse perspectives. This knowledge will be applied in evaluating and improving current practices in the teaching and assessment of speaking and listening competence in first and second language classrooms. Implications of oracy for thinking and learning will also be discussed.

MAE810 Research in Teaching Written Discourse
AUs: 3
This course offers an opportunity to be acquainted with current theoretical models of reading and writing that have informed recent research in the teaching of reading, vocabulary, writing and grammar. There will be discussion on the implications of research for the teaching and learning of reading and writing in course participants' own professional situations. Discussion will include critical evaluation of common instructional and assessment practices with reference to the development of reading and writing competencies beyond the level of sentence decoding and production.

MAE811 Second Language Classroom Learning
AUs: 3
The course explores the connections between current research on language learning and practical applications for classroom teaching. The focus is on learners who do not use English as their dominant/ home language. The course identifies current issues in language learning theory and teaching, and critically examines theories on second language and bilingual learning in classroom settings, analyse the ways in

which these theories may or may not apply to classroom situations, evaluate and adapt methods, techniques, tasks, and materials for classroom teaching.

MAE812 Using ICT in the Language Classroom
AUs: 3
In recent years, information and communication technologies have been heralded as a solution in diverse language learning contexts. Computer-based courseware, multimedia and the Internet have all been applied to the problems of learning language – but have significant advances been made? This course is designed to foster a critical discussion of the pedagogical issues relating to these applications from a variety of theoretical and practice-based perspectives. At the end of the course, students will be able to explain to what extent such technologies have enhanced the teaching of languages, and give relevant examples from subject case studies. They will also be able to identify issues for further research and devise a preliminary plan for investigation.

MAE813 Critical Language Awareness
AUs: 3
This course aims to develop in students a critical awareness of how language works to empower as well as marginalise. It adopts the approach of Critical Discourse Analysis, which focuses on issues of power and ideology, and the ways by which they are concealed, reproduced and naturalised in discourse. The goal of this course therefore is to equip students with the analytic tools to uncover and interrogate the linguistic processes and social practices that underlie the construction of ideologies, assumptions and values in society, with a special focus on 'critical literacy' as a means not only to develop students' critical responses to texts but also critical awareness of literacy itself.

MAE814 Culture and Conventions of Academic Writing
AUs: 3
This course will familiarise students with the linguistic and cultural conventions of academic written discourse such as the thesis/ dissertation, research paper and research proposal. Participants will be guided to analyse texts from their own discipline to observe the discourse practices conventional to their disciplinary discourse community in organizing arguments, supporting claims, citing sources and projecting author persona. They will learn cognitive and metacognitive strategies for producing the expected discourse practices in their own writing. Grammar will be studied in relation to discourse practices in writer-reader interaction in academic discourse.

MAE815 Corpora in Applied Linguistics
AUs: 3
The course provides students with a broad survey of the methods and applications of corpus linguistics, with an emphasis on lexis and lexicography. Focusing on such areas as Sinclair's idiom principle and the phrasal nature of language, the role of lexis in text and Hoey's concept of lexical priming, the course also deals with lexical approaches to language teaching as well as innovations in dictionary production, and explores the impact and implications of these for vocabulary teaching. Students will be brought up to date with current research concerns in the analysis of large computerised collections of text and will develop a critical awareness of the debates on empirical and quantitative data for language description.

MAE816 Digital Literacy
AUs: 3
Digital literacy is the ability to use digital technology, communication tools or networks to locate, evaluate, use and create information in a variety of formats and contexts. This course critically explores two key aspects of language practice and linguistic research both in and beyond contemporary classrooms. Part 1 undertakes a theoretical and practical overview of the learning and literacy needs of students and teachers arising from the design, enactment and interpretation of multimodal texts. Part 2 examines emerging issues in digital information science from the perspectives of language teachers, learners and researchers. It also includes a component on digital civility.

MAE817 English as an International Language
AUs: 3
This course explores varieties of English around the world from a sociolinguistic perspective. It is designed to help students understand the social and historical contexts in which these varieties evolved, their status in relation to more established varieties of English, their role in forging national and community identities, and problems in standardizing these varieties. With reference to Singapore and other varieties of English, the

course places special emphasis on how these issues play out in the multilingual classroom. Students will explore these issues through critical reading of current literature and systematic collection and analysis of naturally occurring data.

MAE818 Literacy in Society
AUs: 3
This course introduces students to the ways in which definitions of and research on literacy have changed in recent years from monolithic understandings to views of literacy as plural and diverse in nature, as serving a variety of social functions, and as sets of situated social practices inextricably linked to culture and power structures within a given society. Reading and discussion focus on the diverse nature of literacy across time and space and different communities, the social, cognitive and linguistic aspects of becoming literate, the nature of, and differences between, school and out-of-school literacy, the variable access groups within societies often have to school literacy, and the dramatic shifts in the character of literacy, particularly with the impact of various late twentieth century technologies. In each area, the concepts and findings of the readings will be connected to literacy practices in the multiracial and multilingual Singapore context.

MAE819 Reading Across Media: Contemporary Approaches
AUs: 3
This course introduces participants to contemporary critical reading approaches to discourse across various media such as newspaper reports and commentary, speeches, films, songs, advertisements and literary texts. Both Structuralist and Post-structuralist reading approaches will be covered. The course aims at developing students' understanding of contemporary local and international cultural contexts by providing them with the critical equipment to think about representations and their histories. Such a course would be very relevant to the teaching and development of curriculum materials for national education and literature in schools. It would also strengthen teachers' abilities to impart critical reading/thinking skills in the language classroom.

MAE820 Systemic Functional Linguistics
AUs: 3
This course introduces participants to Systemic Functional Linguistics. It looks at how functional approaches to the study of language, and in particular, grammar, are crucial for an understanding of naturally occurring texts. This course will examine the functions of language and enable students to understand how grammar is a resource for meaning making. Participants will discover how the message structure, semantic roles, and interpersonal relations interact with formal grammatical categories to produce texts. Through hands-on activities in the analysis of texts, this course will equip participants with an understanding of the structure, meaning and function of language in a given social context.

MAE821 Theory and Research in Literacy Education
AUs: 3
This course provides an environment where students can explore issues related to many forms of literacy including functional literacy, situated literacy, bi-literacy, media literacy, family literacy, and multi-literacy. It examines how these forms of literacy are embodied and used in theory, research, methodological practices, and in the daily realities of teaching and learning. It aims at helping educators develop a deeper understanding of traditional literacy instruction (often seen as the acquisition and use of reading and writing skills in isolation) and the current challenges to it. These challenges are often grouped together under terms such as "new literacy," "multi-literacy," "multilingual literacy" and "critical literacy", and are based on socio-cultural perspectives.

MAE822 Translation
AUs: 3
This course will provide an overview of the principles of translation. Participants will be offered a hands-on approach to translating texts into English. Students will need to have reasonable competency in Mandarin Chinese, Malay or Tamil (though the actual languages that are offered will depend on demand and also on the availability of staff to teach them). At the end of the course participants will have a clear view of the fundamental principles of translation as well as the ability to translate texts into English. They will also be able to analyse translated texts based on solid appreciation of the principles of translation.

MAE823 Topics in Phonetics and Phonology
AUs: 3

This course focuses primarily on the historical as well as current developments in the field of phonetics and phonology. It aims to provide a very broad and thorough theoretical background for students who may be interested in attempting a postgraduate research topic in this field. A basic methodology for doing experimental work in phonetics and/or phonology will also be introduced. Topics include the relationship between phonetics and phonology, phonetic classification, prosodic prominence in speech: stress, rhythm and intonation and phonetic/ phonological description of English varieties.

MAE824 Topics in Pragmatics
AUs: 3
Students taking this course will gain a deeper understanding of some of the following key topics in pragmatics: the nature of reference, information structure, Speech Act Theory, Gricean pragmatics, Conversation Analysis, and common ground. Students will also learn to read a range of journal papers critically, analyse different sets of extended texts to test the explanatory power of different theories, and conduct an empirical study of their own.

MAE825 Cultural Perspectives on the Language Classroom
AUs: 3
This course is based on the assumption that an understanding of cultural diversity within a changing and increasingly globalised and multimediated world is important in helping us as language educators to better understand, and mediate between, different linguistic and cultural practices in a multicultural context. This course will examine various 'takes' on the notions of culture and intercultural communication, and ways in which cultural diversity may be most effectively understood. It will pay particular attention to areas of cross- and inter-cultural communication that influence the teaching of language and literacy, namely contrastive rhetoric, cross-cultural pragmatics, classroom cultures of learning, cultural content in language materials as well as increasing cultural diversity among students in our classrooms.

MAE826 English for Specific Purposes
AUs: 3
The course introduces participants to theoretical foundations and scope of English for specific purposes in tertiary and other post-secondary contexts. It examines the history of ESP and its development, approaches to course design and evaluation. Participants will design materials for English for specific purposes.

MAE827 Language Teaching Methodology
AUs: 3
Prerequisites: NIL
This course seeks to provide an overview of current approaches to the teaching of English as a second or foreign language. This course introduces participants to theoretical models for explaining language learning and examines the influences these models have on English language teaching approaches and methodologies.

MAE828 Language Testing and Assessment
AUs: 3
This course introduces fundamental principles of language testing and assessment. The course aims to equip participants with the necessary knowledge and understanding of language test development and validation to enable them to create, and interpret the results from, tests and assessment procedures designed for classroom use. The strong research orientation of the readings will also enable participants to develop a framework from which to analyse and critically evaluate standardised, high-stakes language tests currently used in the education system.

MAE829 Materials Design and Development
AUs: 3
This course will deal primarily with principles and techniques in materials design, development and evaluation in relation to recent innovations in language teaching. Course participants will be expected to develop instructional materials for the teaching of various skills and types of language content. They will have opportunities to apply knowledge from the core courses and courses in the specialisation strands.

MAE830 Media Resources in ELT
AUs: 3
This course examines various types of multimedia resources available to language teachers. Through lectures, discussions and 'hands-on' experiences, course participants will examine both principles and

techniques for applying the use of audio, video and computer technology to the English Language classroom. Participants will be asked to share their knowledge about current availability and use of these resources.
In addition participants have to do
(i) either a dissertation or
(ii) MMM800 (Critical Inquiry) plus one additional elective specialisation course[but not more than three from each of the specialisation strands of (a) language education research and (b) language studies, and not more than two from (c) the classroom applications strand}

MAP809 Theories and Techniques of Counselling
AUs: 3
This course examines the nature of the counselling relationship, different approaches to counselling and the role of the counsellor working in various settings. Topics include an overview to counselling, theoretical approaches to counselling, counselling processes and methods, ethical standards and professional issues in counselling. This course is the prerequisite for MCP818 Advanced Counselling Skills.

MAP810 Psychological Assessment
AUs: 3
This course provides basic assessment training for students from both the educational psychology track and the counselling psychology track. It examines theories and methods of psychological assessment in the context of education and counselling. Critical reviews and selection of standardised tests will be discussed. The course also provides guided practice in the administration of selected, commonly used tests and in the interpretation of psychological test results. This course is the pre-requisite for MEP 813 Psychological Testing.

MAP811 Research Methods in Applied Psychology
AUs: 3
This course examines the rationale and processes of research in Applied Psychology. Topics include the nature and purposes of educational and social research in the helping professions, research ethics and research design, the nature and process of conducting qualitative research, the nature and process of conducting quantitative research, single-subject research designs, survey and experimental design, sampling and instrumentation, evaluation research, quantitative and qualitative methods of data collection, writing research reports and evaluating research.

This course is normally taken before MAP 812 Statistics in Applied Psychology

MAP812 Statistics in Applied Psychology
AUs: 3
This course covers the principles and techniques in the use of statistics for helping professionals. Topics include variables, data and data organisation, the normal curve and levels of measurement, central tendency and variability, probability and sampling, correlation and measures of association, hypothesis testing, techniques for analysing categorical data, the use of computers in data analysis, summarising and presenting statistical results.

MAS800 Social Sciences in Space and Time
AUs: 3
This course provides a broad understanding of the ways in which the social sciences and the philosophies which have informed them, have changed in the twentieth century. The scope of the disciplines has broadened to incorporate the needs of people and radical changes in modern scholarship. The course begins with a brief survey of classical scholarship and how it evolved as further education became a norm in tertiary education in the late twentieth century. The radical changes in the 1960s are examined in detail to recognize how the disciplines have developed in Asia. The course will examine how regional political, socio-economic and cultural changes have influenced the ways in which the major disciplines are taught today. This course serves as an introduction to the Masters programme and provides a coherent framework for the main themes being covered in the programme. In brief the course provides an overview and grand perspective of the thrust of the programme.

MAS801 Critical Thinking and Writing Skills in Social Sciences
AUs: 3
This course will introduce students to the thinking and academic writing skills they need in history,

geography and the social sciences and the ways these can be applied in social studies teaching. The ways in which arguments are constructed and presented will be studied. The course provides a solid grounding in the basic elements of critical thinking and writing in the relevant disciplines through workshops and seminars in which the candidates are required to play an active role. The basic principles in critical thinking and writing are illustrated through practical examples prepared by the candidates, which will become the basis for continuous assessment for the course.

MAS802 Issues and Research in Social Studies Education
AUs: 3
The course considers the current state of research in social studies. It looks at current research foci such as, historical thinking, global education and IT. Students will complete an in-depth study of the education research in an area of their interest in order to develop an understanding of the issues concerned.

MAS810 Governance and Public Policy
AUs: 3
Studies of public policy have generally been conducted in political science or public administration courses. There has however, been a growing volume of cross-disciplinary interest including research in geography and other social science disciplines, about the role of the state in development as well as the way in which public policy is addressing territory and territorial matters in the context of an increasingly globalised world. With economic globalisation increasingly challenging the role as well as the relevance of nation-states and their governments, this course will consider the dynamics of public policy and policy impacts at different geographical scales from international to local as well as the outcome for society in terms of the spatial distribution of people and resources and the implications.

MAS811 Urban Environmental Planning and Management
AUs: 3
Focus is on current environmental planning concepts and the strategies associated with the management of the urban environment. The first part will deal with planning ideas and dynamics centred around the triangular interrelationship of social justice, need for economic growth and environmental sustainability. The nature of conflicts of these three mutually dependent components is examined. Part two covers the conceptual and practical aspects of environmental response to urbanization and anthropogenic activities. Specific references to management of accelerated soil erosion and urban slope stability are made. Management responses to adverse effects of urban land use change will be discussed, using local and regional case studies.

MAS812 Heritage, History and Culture
AUs: 3
This course provides a general survey of basic issues and methods in historical investigation. It explores the intellectual framework within which history has come to be written. This objective is achieved by considering simultaneously the history of historical writing and some urgent issues in current historical theory. Applied History is the application of history to a practical issue. The skills of historical training, such as research techniques, interpretation of sources, and writing skills are used to work on problem. The issues involved range from heritage studies, community and family history, oral history, and historical interpretations in museums and tourism. In the workaday world, history is now applied in various ways by teachers, librarians, archivists, conservationists, journalists, curators, civil servants, architects and scientists, as well as amateur and professional historians. This course concerns case studies of applied history used by these occupations in the areas of public history, popular culture, local history, and museology.

MAS813 Conflict and Cooperation in International Relations
AUs: 3
The course will provide an introduction to international relations and key issues governing world politics. The emphasis is on the three core international relations theories: realism, liberalism and globalism. Key issues and theories are analysed in relation to past and present events, and in relation to the themes of conflict, change and cooperation.

MAS814 Regime Change in Modern Southeast Asia
AUs: 3
This course examines the dynamics of political and socio-economic transformation in modern Southeast Asia. Southeast Asia comprises of a rich diversity of political practice and forms combined with different experience in economic growth and development. The course examines regional political problems such as

the consolidation of government, political integration and regional association, regime change, nationalist and ethnic dissent, political order and legitimacy and how individual countries conceive and manage their security concerns and challenges during and after the Cold War are major themes explored in this course. The course also explores economic growth and change in the region in the long run. We shall examine regional economic of growth and change in the context of global economic development before exploring various aspects of modern economic transformation with reference to specific countries in a comparative perspective.

MAS815 Multicultural Studies
AUs: 3
Our globalising world implies that dealing with multicultural contexts has become an inevitable part of modern life. This course will first examine the term 'multicultural' itself. What exactly is meant by the term and what are its origins? Does multiculturalism manifest itself in the same way from country to country? In Singapore the terms 'multicultural' and 'multiculturalism' have been used increasingly in recent years. What we should determine is whether the term to describe Singapore is 'multicultural' or whether it is 'multiracial'. 'Multiculturalism' has often also been assumed to speak only of race or ethnicity, but it is much more than that. 'Multiculturalism' also addresses class, gender and other social structures. It also speaks of a frame of mind, of whether a society is really open to and truly embraces diversity, of the multiplicity of voices that help to find a consensus that best guarantees equality and justice.

MAS816 Social Studies in Today's Schools
AUs: 3
Explores the history and theory of the idea of social studies as an interdisciplinary, social issues oriented course. Concepts such as citizenship, multicultural education and global education will be examined. A variety of approaches to using information from history and the social sciences in the exploration of social issues will be reviewed and analysed.

MAS817 Citizenship Education in a Global Age
AUs: 3
This course considers the implications for education of the young in a globalising world and the challenges posed to nationhood, nation-states and national identity as well as citizenship. In a context like that of Singapore's which emphasises economic success in a global stage and has introduced a foreign talent policy, the challenge is to develop in the citizenry the sense of citizenship, belonging and national identity particularly among the most mobile of the citizens – the young, brightest and most highly skilled.

MAS818 Social Studies and Curriculum Theory
AUs: 3
This course is a general overview of major modern curriculum theorists and the ways in which they have influenced the development of the social studies. Debates about the meaning of curriculum and various approaches to the development and understanding of curriculum will shed light on current social studies curriculum in Singapore. Students will become familiar with processes for the development and analysis of the planned curriculum in social studies.

MCL800 Chinese Educational Linguistics
AUs: 3
This course will focus on linguistic issues. Topics that will be included are:
(1) Forms and structures of the modern Chinese script and the teaching of Chinese characters and vocabulary;
(2) The study of the Chinese words and Chinese Language teaching: word frequency; relations of Chinese characters and words; structures of Chinese words and their categorization; formation and transformation of words; and the analyses of word meanings;
(3) The structure of the Chinese language and the teaching of sentences;
(4) Language styles, variations and genres and their significances in language teaching;
(5) Issues in the teaching of mother tongue, second languages and foreign languages; and
(6) The relationship between Language and other courses. (Taught in Chinese)

MCL801 Language Planning and Language Education
AUs: 3
This course will have four interrelated components:
(1) A study of the dimensions of language planning: status planning; corpus planning;

(2) The process of language planning: norm selection, codification, and implementation;
(3) Language standardization: normativism and prescriptivism; and
(4) Language acquisition and language education policy. (Taught in Chinese)

MCL802 Chinese Language Curriculum Design and Reform
AUs: 3
This course focuses on the discussion of rationales and fundamental concepts of Chinese Language curriculum design and development with special reference to Chinese Language education in Singapore. Topics include historical review of CL curriculum development in Singapore, basic elements in curriculum design, curriculum development theories, needs analysis for CL learners, setting of CL curriculum objectives by levels, multi-dimensional perspectives in CL curriculum design, developmental strategies for CL curriculum in Singapore, curriculum implementation and curriculum evaluation. (Taught in Chinese)

MCL803 Language Testing and Related Issues
AUs: 3
This course focuses on the objectives and issues in language testing with special reference to Chinese Language; theories of item analysis and their application; item analyses for MCQ and non MCQ questions in Chinese; the design of questionnaire for research purposes; and the interpretation and application of statistical data for research in Chinese Language. It will include a comparative study of the language testing methods in Singapore, Hong Kong, Taiwan and Mainland China. (Taught in Chinese)

MCL805 Classical Chinese Literature and Its Teaching
AUs: 3
This course will discuss the historical development of Chinese literature; stylistics features of various genres; major schools, writers and works. Comparisons between the curricula, syllabi and pedagogies of classical Chinese literature in Singapore, Hong Kong, Taiwan and Mainland China will be drawn. The infusing of thinking skills into the teaching of classical Chinese literature and how classical Chinese literary works can be used in the teaching of Chinese Language and moral/national education will be developed. (Taught in Chinese)

MCL806 Modern Chinese Literature and Its Teaching
AUs: 3
This course will focus on Chinese literature in China from the May-Fourth period to the post-Cultural Revolution era as well as modern Chinese literature in Singapore and Malaysia. Major schools, writers and works and comparative study of the curricula, syllabi and pedagogies of modern Chinese literature in Singapore, Hong Kong, Taiwan and Mainland China are included. Teaching of modern Chinese literature and infusing of thinking skills. The infusing of thinking skills into the teaching of modern Chinese literature and how classical Chinese literary works can be used in the teaching of Chinese Language and moral/ national education will be developed. (Taught in Chinese)

MCL807 Information Technology and Chinese Language Teaching
AUs: 3
This course is concerned with the theories and practices in the use of information technology in Chinese Language teaching. This includes the effective use of Chinese software for developing listening, speaking, reading and writing skills; and the use of information technology in Chinese Language testing and evaluation. Principles and practices of multi-media and web-based teaching are incorporated. The systematic evaluation of digital teaching tools will be discussed (Taught in Chinese).

MCL810 Regional Diversity of the Chinese Language and Culture – Comparative Study and Exploration into Implications in Teaching
AUs: 3
This course deals with the variant aspects of the Chinese language and culture in mainland China, Hong Kong, Taiwan, Malaysia and Singapore and their implications in the teaching of Chinese. Analyses of the Chinese language used in newspapers, magazines, advertisements, television serials and films in the region will be made. This course also covers the principals in selection and design of Chinese language materials for use in teaching as well as other related issues in the teaching of Chinese language and culture in Singapore. (Taught in Chinese)

MCL811 Design and Analysis of Teaching Materials for Chinese as a Second Language
AUs: 3

This course focuses on theories and strategies for designing materials in teaching Chinese as a second language. The main topics that will be covered by this course includes fundamentals of teaching materials design, the development of Chinese Language teaching materials in Singapore, fame-work for materials development, organisation and design of teaching units, selection and process of source materials, tailoring and trimming of teaching materials, design of assessments, difficulty analysis for textbooks, evaluation of drafts. (Taught in Chinese)

Note: The completion of MCL802 prior to taking MCL811, though not compulsory, is preferable.

MCL812 The Modern Chinese Script – Applied Studies and Special Issues Related to the Teaching of Chinese Characters
AUs: 3
This course focuses on important aspects of the Modern Chinese Script in special reference to the teaching of Chinese characters. Topics to be discussed include: data statistics; key elements of the Chinese script; recognition and discrimination of the complex and simplified forms; error analysis; sound of the words; varied methods of teaching of Chinese characters; reading, writing and recognition of Chinese characters. (Taught in Chinese)

MCL813 Teaching of Listening and Speaking of Chinese - Theories and Applications
AUs: 3
This course focuses on major topics in relation to the acquisition of listening and speaking skills in Chinese as well as the applications of relevant theories in teaching. It covers such topics as language acquisition; process of listening and speaking; development of listening and speaking competence; varieties and types of learning materials; instructional design; assessment and research; as well as latest researches and practices in the teaching of listening and speaking of Chinese. (Taught in Chinese)

MCL814 Teaching of Reading and Writing of Chinese – Theories and Applications
AUs: 3
This course focuses on teaching of reading and writing of Chinese. It deals with such topics as strategies and processes in reading and writing; development of students' written language competence; different language backgrounds of students and implications; modular approach and differentiated approach in teaching; instructional patterns; meaningful, functional and genuine activities; as well as latest researches and practices in the teaching of reading and writing of Chinese. (Taught in Chinese)

MCL815 English-Chinese Translation: Theories, Practices and Its Use in the Teaching of Chinese in Singapore
AUs: 3
This course explores into the theoretical and practical aspects of the use of English-Chinese translation in the teaching of Chinese. It covers such topics as major theories of translation; issues concerning the use of English-Chinese translation in teaching of Chinese; contrastive study of English and Chinese syntaxes; major text-types in English and Chinese and their text-linguistic features; students language backgrounds and their English and Chinese vocabularies and implications in the use of translation in teaching. Participants are required to do numerous exercises. (Taught in Chinese)

MCP 812 Group Dynamics and Counselling
AUs: 3
This course examines the psychological processes underlying human interactions in groups. Current theories applicable to group work in counselling are considered. Students will be expected to develop a repertoire of skills and ideas and to develop communication skills essential to group counselling.

MCP 814 Counselling: Applications across Cultures
AUs: 3
This course examines dimensions of culture that may affect the receptivity of various populations to counselling, the effectiveness of alternative approaches to counselling, training requirements and desirable personal characteristics of counsellors working in multicultural settings. The final aim is to delineate the implications of the multi-ethnic population in Singapore for evolving effective, indigenous approaches to counselling, appropriate modes of service delivery, professional development of counsellors and research on counselling in Singapore.

MCP 815 Family and Marital Counselling
AUs: 3
This course covers the theoretical bases as well as practical aspects in working with couples and families. Major theories for assessment and intervention including the systems, structural and ecological framework will be discussed. Various approaches, techniques and skills in clinical work with families will be examined.

MCP 817 Vocational Assessment and Career Counselling
AUs: 3
This course aims at preparing the counsellor for an expanded role in career guidance. Topics include: social and economic contexts, theories of career development, the role of information, assessment of career development, career guidance programme in schools, models in career counselling and current issues in career counselling.

MCP 818 Advanced Counselling Skills
AUs: 3
The pre-requisite course is MAP809 Theories and Techniques of Counselling. The aim of this course is for students to develop an in-depth understanding of current therapeutic models and skill in using these approaches in counselling. On completion of the course students should be able to demonstrate competency in a range of practical interviewing and counselling skills. They will also be able to explain the theoretical models that underpin various clinical intervention skills, describe the strengths and weaknesses of various clinical intervention techniques, and demonstrate knowledge about and skills in intervention techniques from several different perspectives. Students will also be able to recognise the influence of multicultural factors in the etiology and treatment of psychological disorders.

MCP 819 Psychological Disorders across the Life Span
AUs: 3
This course provides an overview on the assessment and treatment of various psychological disorders in childhood, adolescence, adulthood and old age. Examples of psychological disorders covered are school phobia and separation anxiety, attention deficit hyperactivity disorder (ADHD), conduct disorder and delinquency; eating disorders and sleep disorders, stress and stress reactions, anxiety, depression and mania, suicide and attempted suicide, drug and alcohol dependence. The interplay of biological, psychological, family and social determinants will be discussed.

MCP 833 Practicum in Counselling Psychology I (200 hours)
MCP 833 Practicum in Counselling Psychology II (200 hours)
AUs: 6 for each course
Each course provides for practice in counselling. In addition to seminar participation on campus, students are required to undergo a period of supervised field work of 400 hours to obtain hands-on experiences in counselling. The first practicum may be undertaken in the NIE Psychology Clinic and the second will be undertaken in the field.

MCT801 Introduction to Curriculum Theory and Design
AUs: 3
This course deals with the theory and practice of curriculum design. Curriculum theory and design is a vibrant field full of contradictions, challenges, uncertainties and directions. It is a critical field, the outcome of which does matter, because curriculum theory and design is designed to explore issues such as what we teach, why we teach it, and how we teach it. The course will look at the theoretic underpinnings which inform the practical problems of making curriculum.

MCT802 The Curriculum in Singapore: A Critical Perspective
AUs: 3
This course will focus on current curriculum initiatives within the Singapore context. It will consider the theoretical underpinnings of these initiatives and explore the issues associated with their implementation within the Singapore context. It will investigate these issues through an analysis of the appropriate literature and how it relates to the initiatives and the Singapore educational context.

MCT803 Crafting the Curriculum: From Theory to Practice
AUs: 3
Curriculum planning and design are essential ingredients in the curriculum development process. The focus is two-fold. The first part will introduce participants to the nature of the design process, and considers

principal forms or types of commonplace curriculum designs found in schools and educational systems. Participants will also learn the key principles of effective curriculum design and be introduced to some ways by which curriculum designs may be created. Amongst others, the concept of constructive alignment, the process of aligning learning intentions with the curriculum, teaching, learning and assessment processes and resources to support learning will be critically considered as an alternative and possible model for curriculum design. The second part will focus on applying the principles learnt in the first part. Participants will be required to design a curriculum, or an aspect of the curriculum for their organisations in a chosen disciplinary.

MCT804 Curriculum Implementation: Major Concepts and Issues
AUs: 3
This course focuses on the implementation issues associated with curriculum in specific subject areas. Participants will investigate the issues as they relate to different school subject areas. They will be expected to review the relevant literature, critically analyse it and relate it to implementation in the local context.

MCT805 Differentiating Curriculum and Teaching for Diverse Learners
AUs: 3
Engaging learning requires a renewed focus on the learner to understand and provide for diverse needs, abilities and backgrounds so as to optimise learning for all students. This course aims to assist participants in developing a critical understanding of the diversity of learning needs in regular classrooms. It will enable participants to use a variety of research-based curriculum design models to develop appropriate curricula and teaching approaches, review, adapt and differentiate existing curricula to meet varied learning needs, as well as evaluate the effectiveness of the designed curricula.

MCT806 Curriculum Development for Early Years of Schooling (3 – 8 year olds)
AUs: 3
This course will focus on curriculum issues and trends for the early childhood years, from 3 to 8 year olds from a critical lens perspective. Discussions will include developmentally appropriate practices, the value of play in the early years, emergent curriculum, cooperation as a value, integrated curriculum, learning centres and the holistic development of the child in the context of current research and various curriculum models in terms of their philosophical and theoretical foundations. Applications to pre-school and lower primary settings in Singapore schools will be explored.

MCT809 History and Reform in Curriculum
AUs: 3
This course will reexamine the historical changes of curriculum to problematise and reconstruct the nature of curriculum reform. The historicising of curriculum will allow us to rethink curriculum change as a non-linear and uneven transformation contingently formed by the complexity of power relations which draw from different historical trajectories. The amalgamation of multifarious discourses makes impossible the logical and causal history of curriculum that has been taken for granted before.

MCT811 Teacher Knowledge and Teacher Development: Rethinking Professional Learning Opportunities for Teachers
AUs: 3
This course focuses on the research on teacher learning and teacher development in the past two decades. It starts with a brief discussion on the movement of professionalisation of teaching and the research on the knowledge base of teaching as a response to this movement. It then introduces the social, cultural, and political contexts of teaching and the organisation of teachers' work in a few East Asian countries and the United States. These comparative case studies aims at promoting understanding about the nature of resources and constraints for teacher learning and professional development in the schools and education systems in these societies. To deepen this understanding, two recent social cognitive theories – situated and distributed perspectives are studied and used to analyse the context and organisation of teachers' work conducive to teacher learning in different cultural settings, including Singapore in its current education reform and school change.

MCT812 Issues in Research on Teaching
AUs: 3
This course focuses on some thorny issues in research on teaching that are of immense concern to classroom teachers, educators, curriculum developers and policy makers in recent years. These issues, ranging from the conceptions of curriculum, generic and specific teaching approaches and learning

strategies, to the use of information technologies and media resources, are often debated in consideration of their contribution to learning at different levels of education. This course also deals with arguments for different research methodologies to be used for different contents and contexts of teaching, and the implications of such research for policy formulation and implementation in Singapore and other countries.

MCT821 Mastering the Art of Authentic Assessments
AUs: 3
This course aims to provide students with different authentic assessment tools necessary to enhance their teaching and assessment practices as well as students' learning in the day-to-day classroom setting. It will address strategies to assess deep understanding, higher order thinking skills, real-world problem solving, and other high authentic intellectual quality so that these important skills can be incorporated into the classroom teaching and learning. Theoretical discussions and hands-on activities that enhance understanding of various types of authentic assessments, assessment task design, lesson plans, rubrics development, and the alignment between assessment, curriculum, and pedagogy will be included. Toward the end of the course, students are expected to develop one type of the alternative assessments in a complete unit lesson plan to enhance their students' learning, communicate the assessment results with students and parents, defend their own assessment practices, and create change about the community's views toward authentic assessment.

MCT831 Citizenship Education: Trends and Issues
AUs: 3
This course introduces participants to the major concepts, perspectives and models of citizenship education. Key issues such as the contested nature of citizenship education, the democratic ideal, impact of globalisation, citizenship education in the school curriculum will be examined. The major cross-cultural and national studies in citizenship education will be critically analysed for their findings, methodologies and implications. Case studies of citizenship education in the different types of democracies, such as western democracies, 'Asian' democracies, and newly emerging democracies, will be discussed. Special attention will also be given to the development of citizenship education in Singapore. The role of the teacher as a citizenship educator will be addressed.

MCT851 Arts Curriculum Development
AUs: 3
This course focuses on issues pertaining to learning and assessment in the arts. Selected writings of Dewey, Eisner, and Greene, among others, provide a basis for discussion about the theory and practice of contemporary arts education. Current curriculum models are analysed and critiqued; as are issues surrounding the problematic topic of 'integration'. This course facilitates students towards an understanding of the practical and theoretical complexities of the field through the creation of a curriculum document applicable to their own situation.

MDP801 Child and Adolescent Cognitive Development
AUs: 3
The course examines the development of cognitive understanding and cognitive processes from infancy through adolescence. The main goals of this course are to promote your understanding of the development of basic cognitive abilities during childhood and adolescence, to introduce you to the use of research methods in studying cognitive development, and to teach you how to apply newly learned concepts to novel and meaningful settings. Topics covered include the role of working memory in education, the information-processing approach to understanding learning, the role of motivation in cognitive development, and application of cognitive strategies to enhance learning.

MDP802 Social and Emotional Development of Children and Adolescents
AUs: 3
Upon completion of the course, participants will be able to: 1) explain the main features in the social and emotional development of children and adolescents; 2) discuss current issues and research related to child and adolescent development; and 3) identify research questions relevant to social and emotional development in the Singaporean context. Topics covered include the development of self-concept and self-esteem, moral development, resilience, the role of parents and peers, delinquency, the impact of Internet and videogaming, and sexuality issues.

MDP803 Counselling Children and Adolescents
AUs: 3

The aim of the course is to provide students with an understanding of major current affective, cognitive, and behavioural models and how these approaches are used in counselling children and adolescents. The course also examines the development of counselling skills through the counselling process involving phases of relationship building, problem exploration and identification, goal-setting, intervention, and termination. Ethical and professional practice issues will also be discussed.

MDR810 Performance, Play and Performativity
AUs: 3
This course examines the continuities between theatre and drama in education in terms of performance process. Students will examine theatre performance in its aesthetic, historical, socio-political and theoretical contexts, exploring concepts of performance, play, ritual, performativity and performance processes. Theatre is a discipline that integrates several aspects of the embodied arts, from movement and music, to ceremony and parade.

MDR811 Present-Day Performance Practice
AUs: 3
This course focuses on practical, collaborative theatre making. Students will participate in practical workshops in selected skills, and the course will culminate in a performance. It will explore contemporary modes of performance and the deployment of theatre for social understanding and action. The choice of projects will consider multi-disciplinary performance (integrating theatre skills) and "performance in context" (social and educational).

MDR812 Theatre Making: Vision, Context, Process and Collaboration
AUs: 3
This course will examine the relationships between theatre, performance and cultural theory. It will explore some of the challenges that arise in dealing with the discourse and will aim to examine the influence of socio-political and cultural theories (e.g. gender, postmodernism, intercultural) in the development of 20th century theatre. Watching recorded and live performances will be a required part of the course. Important collaborative, contemporary theatre directors will be the focus of the course.

MDR813 Aesthetics and Performance in South East Asian Theatre
AUs: 3
This course will examine theories of aesthetics with specific relevance to theatre in the South East Asia. It will consider aspects of traditional performance in a South East Asian socio-cultural context and consider how contemporary theatre in the region embodies aspects of these ideas and to what effect.

MDR814 The Forms of Applied Theatre and Applications in the Local Context
AUs: 3
Applied Theatre is a term pertaining to drama/theatre practices which focus on participation and transformation. Theatre in Education (TIE), Theatre in Health Education (THE), and Theatre for Development (TFD) as well as Process Drama are all forms of Applied Theatre. This course aims to introduce the theoretical and philosophical underpinnings of these approaches and apply selected approaches practically in the Singapore context.

MDR815 Independent Study
AUs: 3
This course develops advanced skills in the independent study of an area of drama. Students may take the opportunity to extend their understanding of one of the previously studied subjects or investigate another area of interest. Modes of inquiry may include a residency or internship, an external course, detailed application of theory to an actual area of practice, an analytical report on existing practice in a school or a theatre company or a review of the literature on a topic of current importance.

MDR816 Learning In, Through and About Drama
AUs: 3
This course will introduce students to the philosophy and practice of drama in education. A key focus will be the use of elements and conventions of drama within the classroom and across the curriculum. Current international trends in the development of drama curricula will also be addressed.

MDR 817 Advanced Process Drama
AUs: 3

This course develops a deeper practical and theoretical understanding of process drama. Prior study in the area is an advantage but not essential. Students will create a process drama for their own context, and critically analyse its implementation.

MDR818 Text to Performance
AUs: 3
This course will equip students with the basic skills of creating performance from scripted text. A variety of forms will be explored in this practical module. Students will be expected to apply developing skills to create a polished performance text.

MEA801 Research and Issues in Art Education
AUs: 3
This course examines the history of the discipline and explores various methodologies, critical theory, and resource material for art educational research. This involves techniques of scholarly and critical writing and evaluation of bibliographic sources. The intention is to assist candidates locate their own approaches to art education within the context of ideas and to understand the orientation and significance of contemporary art education theory and practice.

MEA802 Art and Technology
AUs: 3
The different technologies of image-making, past and present, have offered various possibilities (and constraints) for the manipulation of imagery, the expression of ideas and the representation of the world. This course will consider a range of technologies available in past and present times for the making of art, including some traditional art materials, the technologies of print, and also electronic media. In both theoretical and practical work, students will consider the variety of ways technologies have shaped the expression of ideas and emotions.

MEA803 Visual Arts and Creativity
AUs: 3
This course explores and considers recent research on creativity in relation to art educational practices. The contribution that art education plays in the development of cognition is generally little understood. This course describes recent research which shows that within children's exploration of art media children form, in addition to aesthetic understandings, linguistic and logicomathematical thinking. Given the opportunities and appropriate teaching, young children's art is a forum for an investigation of visual structure in relation to their ideas and feelings about the world. This investigation serves as a template for many later kinds of creative thinking.

MEA804 Visual Literacy: Teaching and Learning
AUs: 3
The course aims to demonstrate and explore, through analysis of works of art, the precepts of "Visual Literacy". The lectures, discussion papers and tutorials elaborate how works of visual imagery are imbedded with information. Moreover, it is demonstrated how visual literacy is radically different from textual literacy.

MED833 Assessments: Issues and Research
AUs: 3
This course will discuss the concepts of assessment, measurement, evaluation and testing; and the integral part that assessments play in the teaching and learning process. Formative and summative evaluation will be considered. Different ways of assessing students' work and grading will be discussed together with consideration for the broader issues of validity, reliability and objectivity. Problems, issues and research related to assessment will be discussed.

MED838 Motivation and Instruction
AUs: 3
The purpose of this course is to examine recent literature related to enhancing the motivation and instruction of students in pre-school to postsecondary classes. Cognitive strategy instruction should not be seen as and "add-on", but rather should be routinely included in ongoing instruction and that the specific strategies that are taught should be address academic tasks that children are currently confronting in schools. Thus, well-validated strategies that fit well with the curriculum will be explored with emphasis on long-term and thorough teaching in these procedures.

MED841 Individual Differences and Learning
AUs: 3
This course aims to familiarise students with current research issues in the field of educational and cognitive psychology. Focus is on the concept of intelligence, the identification of individual differences and dynamic-interactive approaches to assessment of individual learning potential in the areas of cognitive, social and emotional development. Several intervention programs designed to modify the cognitive structure of students in classrooms and individually with diverse populations will be introduced. Hands-on sessions and case studies will be discussed and interpreted.

MED871 Educational Inquiry I
AUs: 3
This is an introductory course on research methods in educational enquiry. At the end of this course, students are expected to have some understanding of processes involved in generating and interpreting research data. This course is designed to provide skill and knowledge in the utilisation and evaluation of research. Students will be exposed to the fundamentals of research methodology. Issues involved in formulating research questions, conducting literature review, selecting research methodologies, and report writing will be introduced.

Given its introductory nature, the course is not designed to equip students with the necessary skills to conduct their own empirical research studies. For students who are thinking of enrolling in the thesis option, further studies in qualitative and quantitative data analyses are encouraged.

This course is not suitable for students with undergraduate training in research methodologies or for higher degree research students, that is, those enrolled in the MA, MSc, or PhD programme. It is a pre-requisite for MEd872, which will introduce different types of research methodologies designed for the collection of both qualitative and quantitative data.

MED872 Educational Inquiry II
AUs: 3
The aim of this course is to equip students with the abilities to understand and evaluate educational research. Students will be exposed to introductory material on study design, data evaluation, and analysis. Different types of research methodologies, designed for the collection of both qualitative and quantitative data, will be introduced. The focus this semester is on various methods in qualitative designs and aspects of experimental and quasi-experimental designs.

MEL810 English Language Teaching Approaches
AUs: 3
This course introduces participants to theoretical models for explaining first and second language learning and examines the influences these models have on English language teaching approaches and methodologies. Communicative language teaching, strategy-based instruction, task-based learning and genre-based learning are discussed.

MEL811 Developing Competence in Writing and Grammar
AUs: 3
This course introduces participants to genre-based approaches to teaching writing and contextualised functional models for teaching grammar. Participants will also develop principles and procedures for evaluating the social and cognitive processes involved in writing and use of grammar.

MEL812 Developing Reading Competence and Vocabulary
AUs: 3
This course introduces participants to theoretical and pedagogical concepts in early literacy development and advanced reading skills. Participants will learn methods for teaching reading and vocabulary, planning extensive reading programmes and evaluating reading development.

MEL813 Developing Competence in Listening and Speaking
AUs: 3
This course examines the social and cognitive processes involved in oral communication. It introduces participants to approaches and methods for teaching listening and speaking in expressive, interactional and transactional contexts, and principles and procedures for evaluating oral communication competence.

MEL814 Language Testing
AUs: 3
This course examines theoretical principles for language testing and explains procedures in test development. It offers participants the opportunities to evaluate different types of language test as well as construct their own tests. The course will cover testing of all language skills, grammar and vocabulary. Alternative modes of assessment are also discussed.

MEM801 Organisational Learning and Development
AUs: 3
This course explores some of the basic concepts that explain how organisations and individuals develop and learn. It draws upon recent research from different countries to illustrate contemporary educational practices.

MEM802 Human Development and Learning Theories
AUs: 3
Stages of human development and the ways people learn through these stages are examined using different learning theories. A psycho-social, cognitive, moral and ecological interdisciplinary approach is adopted in order to construct an effective learning environment. Implications for training and learning systems are explored, given both the exponential increase of knowledge and informational technology.

MEM803 Assessment Quality and Standards
AUs: 3
The course aims to create constructive, high-quality assessments that meet targets which improve performance. It focuses on developing criteria and standards to ensure valid and reliable outcome measures of performance and management.

MEM804 Supervisory Leadership and Curriculum Design
AUs: 3
The field of curriculum design and supervision is dynamic and ever-changing. For practitioners especially, it represents a challenging and creative endeavor. There are issues in supervisory leadership and curriculum design which when placed in the context of design, delivery and evaluation are contradictory, confusing, and paradoxical. Further, the discrepancies between the planned curriculum, the enacted curriculum and the experienced curriculum often create misunderstandings about the nature of the educational enterprise.

This course will engage you in a personal dialogue in which you will continuously weigh alternative approaches to curriculum design and supervision and the ongoing issues that these alternatives involve. The purpose of this course is therefore to provide you, the educational leader, with an opportunity to successfully interface curriculum, supervision theory and practice in educational institutions.

MEM807 Principalship and Teacher Performance
AUs: 3
Principals have a major remit for maintaining and improving the quality of their schools. They are responsible for ensuring that the school's 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.

MEM812 Finance and Resource Management
AUs: 3
The course addresses macro and micro concepts relating to the provision and management of resources for educational purposes. The course considers why and how education is funded. It focuses on theoretical and practical aspects of developing and managing resources in an organisation.

MEM821 Managing Competitive Learning School Organisations
AUs: 3
As Singapore moves rapidly forward, a new type of school leader is needed, one who can cope proactively with a dynamic, complex and sometimes uncertain context. Indeed, knowledge work, by its very nature, contains complexity, ambiguity and uncertainty. In such a context, the leader must design an 'innovation architecture' that enables the organisation to do new things, continuously learn, and change things for the better. This new leader invests resources in innovation during the period of incubation in order to enjoy the

fruits of outcomes that are well received by the school's external environment. This leader exposes assumptions about key strategic issues and harnesses the knowledge derived from multiple mental models. The leader, as a 'system thinker', interprets complexity as a force for organisational excellence and identifies the areas of highest leverage.

MEM822 Marketing and Strategic Choice
AUs: 3
Marketing in the education sector, when it is handled positively, leads to more productive relationships between the school's workforce and those it serves. It intensifies understanding and moves a school towards cooperation and collaboration rather than insularity. There are many issues that marketing might address at a time of immense change in a competitive environment: issues about increasing the numbers of students who make a given school their first choice; about identifying who makes choice decisions and on what basis; and about developing sustainable relationships with the school's community. These issues lead to a need to understand the value of market research and how it supports relationship development; and to considerations of such matters as corporate image and identity, product development and promotional strategies. There is now a wider acceptance of the notion of education 'marketization', since it clearly leads to positive image creation and the building of productive and collaborative relationships with the users of the service. However, if these relationships are to be optimized, there has to be an understanding of strategic choice and how it impacts on the school's positioning. Thus, school leaders need to clarify where they intend to direct themselves in relation to providing highly efficient, conventional products; being state-of-the-art in terms of curriculum advances and school provision generally; and providing individual care and attention for students on a 'tailored' basis. These are just some of the possible strategic foci that can lead schools down some paths and not down others.

MEM823 Strategic Information Technology Integration in Schools
AUs: 3
Schools are constantly under pressure to take on board the latest technological innovations, many of which are exciting and attention-grabbing, but which can also be quite intimidating. Simply acquiring such technologies, however, is no guarantee they will be effectively used to solve learning problems. It is important that school leaders are able to evaluate the worth of such innovations, and to plan for how they can be integrated into a school culture with the purpose of helping students to learn effectively. These innovations cost money and time, not only in terms of hardware and software, but also in relation to the human resources that have to implement them. With such resource implications, it becomes even more vital that school leaders have the capability to evaluate such developments. But how do school leaders plan the effective use of technologies when they seem to change radically even every few months? Technologies are constantly changing: that is true. But the general principles for using any technology in education do not. School leaders need to have a vision and understanding of the learning process to see how new technologies might be applied. First, though, they need to be up-to-date and knowledgeable about how IT promotes the type of learning that will help develop students to become workers in a knowledge-based economy. This course will look at some trends in innovations in the use of IT in teaching and learning, and explore how leaders can create an environment for innovations to work. Participants will explore how new teaching techniques can be infused with the use of technology. Various technology adoption models will be explored, as well as the importance of priority-setting in school management, and some ways to address the barriers to technology implementation.

MEM824 Achieving Excellence in Teaching and Learning
AUs: 3
Principals and teachers are responsible for designing and building the climate and programs that define teaching and learning in schools. In order to realize the vision of 'thinking schools' and an ability-driven education system in Singapore, they must be prepared to question deeply held assumptions about existing school structures, curriculum, teaching, learning and assessment practices and their effects on learners. For serious school reform to take place, school leaders must lead with beliefs about what schools can become as learning organisations. They must learn how to draw upon networks of support and resources for reform work, seek to expand the leadership capacity of teachers and understand the conditions that promote authentic learning in the school. This course thus seeks to provide participants with the theoretical foundation for understanding the change process in teaching and learning and how they, as architects, can apply it to design appropriate learning environments in the school.

MEM825 Building Human and Intellectual Capital
AUs: 3

School leaders' capacity to tap, develop and harness teachers' human and intellectual capital is crucial to meeting the challenges of a changing and competitive environment. Leaders assume a major role in identifying and expanding the workforce's intellectual capacity in order to underpin their strategic moves towards a designed and desired future for the school. In this context, school leaders need to have the capability to create a learning environment for the staff and for themselves to expand their capacity. Such a capacity serves several basic purposes, including acquiring the capability to tackle difficult problems; overcoming hindering factors in school development; and designing strategies for fulfilling the school's vision.

MEM826 Leadership for the New Millennium
AUs: 3
Just as efficiency-driven education has given way to ability-driven education, so also the work of school leaders has and must change. From an industrial age metaphor, where schools are seen as machines for 'manufacturing' people to meet manpower requirements, the paradigm has shifted to one of 'cultivating' change. Today, leaders no longer control or drive change: they must learn how to cultivate change, how to work together with others to create and fashion new realities. This new paradigm is manifesting itself in the classroom, where the emphasis is not on teaching but on learning; not on parts but on wholes; not on the teacher as the information giver but as a co-learner and facilitator. Furthermore, our school leavers are faced with the challenges of living in an environment of constant change, of ambiguities and uncertainties, and of increasing global competition. What has changed is the speed of change. How, then, can our school leaders prepare themselves to meet such an awesome task? Deming has claimed that the prevailing system of management has destroyed people. To him people are born with intrinsic motivation, with a thirst to learn and a joy in learning. Therefore, we need to develop leaders who will not kill the joy of learning, but who will build learning schools, for the rate at which organisations learn may be the only competitive advantage. Thus, a key characteristic of organisations in the future is the ability to learn. Leaders in the future will thus become designers, teachers and stewards. These demands require new thinking, new skills and, with those, new tools.

MEM828 Contemporary Issues in School Marketing
AUs: 3
The interest in marketing is growing as more organisations in the business sector, the nonprofit sector, and the global sector recognize how marketing contributes to improved performance in the competitive marketplace. The result is that organisational leaders are re-evaluating various marketing concepts and tools that focus on relationships, databases, communications and channels of distribution, as well as marketing outside and inside the organisation.

MEM829 Mentoring for Professional Development, Leadership Succession and its Impact on Educational Organisations
AUs: 3
This course offers educators working in schools and other organisational settings a solid foundation on a variety of issues pertaining to mentoring. In preparing participants for current research in the field, this course explores traditional and new approaches in workplace mentoring. It will benefit participants who are holding leadership positions or who aspire to become leaders. Leaders or aspiring leaders at various levels of the educational hierarchy are inevitably expected or required to mentor others. Mentoring is also an integral aspect of the recent Ministry of Education's move to appoint master teachers and increase the number of senior teachers in school. Beyond formal mentoring, informal mentoring in professional development and leadership succession permeates the education system. This course provides participants with a better understanding and prepares them for the creation of new knowledge in leadership mentoring. The course aims to prepare students for the creation of new knowledge in mentoring. In the process of preparing students for current research in the field, there is exploration of traditional and new approaches in mentoring.

MEM831 Quantitative Research Methods
AUs: 3
This course provides a variety of methods applicable to the educational management setting. It is designed for participants who have limited knowledge of research methods and provides basic understanding of what research is about, including definitions and meanings of keywords such as hypothesis, theory, variables, and constructs. The various sampling procedures will be introduced, and this will be related to the understanding of research validity, both internal and external. Research designs covered will include pre-experimental and experimental designs, quasi-experimental designs, as well as the correlational and

factorial designs. Hypothesis testing will include parametric tests such as t-tests and ANOVA and some nonparametric tests such as the chi-square test.

MEM832 Qualitative Research Methods
AUs: 3
This course seeks to cultivate and nurture skills of observation and interviewing, which are essential for the holistic and contextual analysis of social and psychological processes in natural settings. The primary purpose is to facilitate the ability to carry out field action research in the style, form and discipline of anthropological, phenomenological and naturalistic inquiry. In addition, the skills of analysis of qualitative data and the capability to prepare 'instruments' for testing 'generalizations' or confirming 'transferability' in small and contrasting settings are emphasized. The ultimate application of these skills is the enrichment of the knowledge base for those aspects of learning, teaching, leading and managing classrooms, schools and cyber space.

MEM833 Identifying, Formulating and Developing a Research Problem
AUs: 3
This is a core course designed to guide participants in the identification, formulation, and development of research questions. Topics in this course include the Identification of Research Questions, Literature Review, Hypothesis Formulation, Review of Existing Research, and the Applications of Research Designs, Reporting and making Presentations. The emphasis of this course is critiquing the various stages in the development of a piece of research, using existing research reports. Also covered under report writing will be writing styles with a focus on that of the American Psychological Association (APA) writing style. This course will be conducted in a seminar format.

MEM835 Globalisation, Educational Change and Pedagogical Reform
AUs: 3
This course is an introduction to cultural and economic globalisation, its impacts on educational policy and practice, and related issues of school change, curriculum reform and new pedagogy. It provides students with a conceptual and analytic understanding of cultural and economic globalisation, an understanding and engagement with practical educational issues and problems that face Singapore and other countries as a result of globalisation. The course discusses curriculum and policy reform strategies that are seek to respond to current and emergent conditions.

MEM836 School and Organisational Effectiveness
AUs: 3
The course aims to explore school effectiveness, development planning, school improvement, quality schools, and the appraisal and evaluation of schools from a historical perspective, drawing on research in the field. It will provide a review of international literature and will discuss the value, purpose, issues and research practice associated with this course. School effectiveness and improvement in different countries and new directions for research in this field will be presented. The appraisal system in Singapore will be discussed in the light of all these developments.

MEM837 Comparative Issues in Education
AUs: 3
This course offers participants the chance to explore key educational issues from a macro and international perspective. It will arouse their awareness that critical issues and policy dilemmas facing education systems around the world are quite often similar. Examples include the role of education in development, financing and control of education, questions of equality and equity, education and political transition, the politics of curriculum policy making. The course will highlight the major developments and issues pertaining to a particular topic in comparative perspective, and then proceed to examine how the Singapore case can be better understood within the larger international context.

MEM838 Ethics and Leadership in Education
AUs: 3
Teaching has often been characterised as a noble profession, and perhaps rightly so. As such teaching would seem to entail an ethical or moral commitment. But it is not clear if the concept of leadership entails a similar ethical or moral commitment, even in the context of actual educational practice. Leadership may be seen as the intelligent or rational use of authority to manipulate human relations in order to deliver on key performance indices for the sake of personal gain. From this perspective, ethics does not feature at the core of leadership or it serves only as an instrument to achieve other, non-ethical objectives. In other words, the

role that ethics plays in the actual practice of school leadership is an open question. On the other hand, even if ethics is not central to leadership, it often falls on the leader to address and resolve situations that are ethically sensitive. For this reason it would be in the interest of leaders to develop the ability to recognize and address ethical issues with a view to their resolution. This course is offered as an invitation to actual or aspiring school leaders to clarify the relation between ethics and leadership in the context of educational practice in the Singapore school system. As the course does not assume prior knowledge of the literature, it will devote considerable time covering basic concepts and theories through a critical survey of both historical and contemporary accounts of ethics and leadership.

MEM839 Teacher Knowledge, Learning and Development
AUs: 3
This course introduces students to the research on teacher education and teacher development in the past two decades: the knowledge base that informs teaching practice, how teachers learn and develop professionally, in responding to educational reform policies and change. It focuses on three major strands. First, Shulman's (1987) concept of pedagogical content knowledge (PCK) and its decade-long impact on research in teacher education and professional development. The second strand examines the impact of new cognitive perspectives, such as situated and distributed cognition, on research in teacher learning and teacher development. The third strand looks into teacher development – the emotional cost and teacher identity formation in learning to process new content and perform new roles. A major goal of this course is to help prospective teachers and administrators understand how research makes sense of the knowledge, skills and dispositions that an effective teacher possesses, what it takes to teach and develop in ways expected by reforms and how to best support them in carrying out reforms.

MEM840 Assessment and Learning
AUs: 3
In recent years, there has been renewed interest, and a growing body of literature and research, on assessment for learning, sometimes referred to as formative assessment or classroom assessment. At the same time, there is a growing awareness of the confluence of assessment and learning and the tensions between assessment and learning as a dialectic. This course is designed to provide educators occupying strategic and management positions with a theoretical framework and a informed understanding of the assessment and learning dialectic in various issues so that they can evaluate assessment practices and policies in their own context. Participants are then able to systematically and critically reflect on assessment practices in their own context and to learn from the experiences and contexts of others.

The aim of this course is to examine the growing literature and the myriad issues in assessment and learning in a broad range of contexts. Participants are introduced to the discursive constructions of assessment and of learning and exposed to the growing research on formative assessment. The notion of assessment as a dialectic is then studied in diverse areas such as alternative assessment, plagiarism, assessment rubrics and feedback practices. Underpinning issues of assessment and learning such as power and autonomy, student involvement in assessment and sustainable assessment are explored to challenge participants to question the underlying assumptions of their personal theories of assessment and learning. At the end of the course, participants are expected to formulate a coherent and informed assessment and learning policy that addresses the issues addressed in their seminar discussions and readings.

MEM841 Contemporary Issues in Strategic Educational Management
AUs: 3
In this dynamic, global environment, managing people and systems effectively is a critical challenge in organisations. As a matter of fact, eighty percent of managers' time is spent in face-to-face interaction with people within the workplace. A manager's effectiveness is dependent upon what happens during this time in particular, how she or he organizes, motivates and directs people. This course is oriented towards helping participants appreciate the concepts and theories in organisational management and development, and explore skills necessary to act upon organisational challenges. The aim of this course is to examine ways in which organisational effectiveness and success can be sustained within the complexity of changing human and organisational systems. Thus, this course is directed toward the attainment of three interdependent objectives: (1) to develop an appreciation of the rationale for effective management and development in complex organisations; (2) to understand how structure and system, managerial processes and human capital are interdependent and critical to successful organisation operations; and (3) to develop a sensitivity to strategy implementation in contemporary organisations.

MEM842 Critical Perspectives of Assessment Policy and Practice
AUs: 3
There has been an emergence of formal assessment policies in recent years to shape the nature and judgment of student learning in educational programs. There is also a growing recognition of the role that assessment practices play in constructing and dismantling practices of power on candidates. This course examines the interplay of assessment and power as a dialectic and explores its consequential implications in a wide range of contexts such as plagiarism, long term learning and student reflection. The course is designed to provide educators occupying strategic and management positions with a theoretical framework and a informed understanding of the assessment/power dialectic in different contexts so that they can evaluate assessment practices and policies in their own context.

MEM843 Philosophy of Education
AUs: 3
The aim of this course is to provide candidates with the understanding of the role that philosophy plays in educational thought and practice. The course will begin with a critical survey of enduring classical teachings on the philosophy of education and will then proceed with the rigorous examination of major issues such as the question of social justice in education, the place of culture and values in the school curriculum, as well as the impact of science and technology on education and society. At the end of the course candidates would gain an appreciation of the role that philosophy plays in helping to clarify the complexities and challenges of contemporary education.

MEP813 Psychological Testing
AUs: 3
The pre-requisite course is MAP810 Psychological Assessment.
This course provides students with knowledge relating to the theory and practice of psychological testing. It also gives intensive training in the administration of intelligence testing and personality assessment. Opportunities for hands-on experience in the administration and interpretation of selected individual and groups tests will be provided.

MEP820 Psychoeducational Interventions for Special Needs
AUs: 3
This course gives an overview of the nature and range of Special Educational needs of children and adolescents, how these can be identified and assessed. Types of assessment methods include psychometric assessment, screening, curriculum-based assessment, task analysis and observation methods. The course will examine the role of the Educational Psychologist in working with children with special needs, their teachers and parents. It will also discuss issues and problems related to meeting Special Educational Needs of children and adolescents.

MEP821 Cognitive-Behavioural Management and Interventions
AUs: 3
The pre-requisite course is MAP809 Theories and Techniques of Counselling. This course aims to provide students with a basic understanding of the theories, principles, procedures and practice of behavioural and cognitive-behavioural management. The basic assumption of the behavioural approach is that both desirable and undesirable behaviour are learned and the best strategy for remediation of problem behaviour is to structure the environment to reward desirable behaviour and extinguish maladaptive behaviour. In the cognitive approach, behaviour and emotions are viewed as resulting from cognitive processes and maladaptive behaviour and emotions are changed by correcting dysfunctional beliefs and helping clients to develop new cognitive and behavioural patterns. Both approaches can be applied to a range of real-life issues and problems of children, adolescents, and adults.

MEP 832 Practicum in Educational Psychology I (200 hours)
MEP 833 Practicum in Educational Psychology II (200 hours)
AUs: 6 for each course
Each course examines professional relations in schools, models of psychological service delivery, and ethical considerations as well as strategies of applying psychological principles to educational problems in the school. In addition to seminar participation on campus, students are required to undergo a period of supervised field work of 400 hours (over both practica) to obtain hands-on experiences in providing school psychological services.

MES803 Managing Sport and Exercise Organisations in Singapore
AUs: 3
This course will link the essential concepts of organisational theory to the management of sport organisations. Initially, an introduction will provide common terminology, historical precedents and conceptual framework for sport delivery systems in Singapore. The legal nature and some common legal issues of sport management will be covered. Discussions will centre on the goals of sport organisations and the strategies they take to accomplish them. The environmental factors that affect the effectiveness of the sport organisation will be examined. Issues of leadership and decision making within the organisation will also be discussed. Participants will be required to do an internship with a sport organisation of their choice to better understanding the management of the organisation.

MES804 Project Management in Sport: Theory, Methods and Issues
AUs: 3
This course deals with the application of project management theory and methodology to sport. Discussion will be centered on the strategic issues of project management, organisation and planning, resourcing, and control of the project. Communicating the project through public relations and marketing could also be covered.

MES806 Research on Teaching in Physical Education
AUs: 3
This course will cover a range of topics relevant to the teaching of physical education in schools. Two areas of research discussed will include teaching effectiveness and teaching strategies most appropriate for particular objectives within a lesson. Students will then use this knowledge base to analyse a real-life case study. Socialization issues ranging from recruit status to induction in the teaching profession will be examined. Finally, several observer systems will be discussed and utilized in live teaching settings as a way to demonstrate to students their effectiveness as a teacher/student behavior analysis tools.

MES808 The Theory and Practice of Coaching
AUs: 3
The purpose of this course is to explore the complexity of coaching at the elite level. Units will be team taught by participating faculty and will include both social science and bioscience topics pertinent to the development of the elite athlete. Students will be required to attach themselves to an elite team and to a designated master coach in a sport of their choosing.

MES810 Applied Sport Psychology Interventions
AUs: 3
This course has an applied orientation. It is designed to train the physical educator/coach in the development of comprehensive psychological skills training programmes for performance enhancement with their student/athletes. First a theoretical basis for each psychological skill will be examined, followed by practical training in the design and implementation of each mental skill. Laboratory experiences will enable each student to experience various psychological skills training interventions and to implement these interventions themselves in a controlled environment.

MES812 Physical Activity and Lifestyle Behaviour
AUs: 3
This course provides knowledge in physical activity and lifestyle behaviour research with aspects of study pertaining to Wellness, physical activity patterns, and behavioural choices of children, adolescents, adults and athletes within the community and in a sporting context. Participants develop strategies in gathering information, presenting material, identifying problems in physical activity and Wellness, as well as lifestyle choices.

MES813 Exercise, Nutrition and Obesity
AUs: 3
This course will take an in depth look at the major factors influencing obesity with particular emphasis on diet and exercise. The course will start by examining the evidence linking obesity to increased risk of all cause morbidity and mortality. It will then examine the physiological, psychological and genetic causes of obesity before focusing on the interactions between diet, exercise and obesity. Following this the effectiveness of diet, exercise and drug treatments for obesity will be assessed. The course will end by making recommendations for the use of diet and exercise in the treatment of obesity. Laboratory sessions will be

conducted throughout the course to equip students with the skills necessary for measuring energy intake and energy expenditure. Additionally, students will be shown how to plan obesity treatment programmes.

MES815 Sport Biomechanics
AUs: 3
This course provides a detailed mechanical analysis of sporting actions through lecture and laboratory based work. High-speed video techniques and dynamometry will be used to collect kinematic and kinetic data to allow the determination of joint forces and muscular actions responsible for the production of movement. Data will also be used for the optimisation and simulation of sporting actions.

MES816 Motor Control
AUs: 3
This course provides an overview of various neural subsystems involved in controlling human motor behavior. Brain structures specifically involved in motor function include sensory-motor cortex, basal ganglia, cerebellum and spinal cord. Anatomy and function of these structures will be discussed in the class. Lesions on specific locations in the brain and resulted movement change serve as a guide to infer the roles of the involved brain structures. Therefore, the main focus of this course will be placed on describing and interpreting observed behavioral changes in relation to their structural changes.

MES824 Exercise Psychology: Psychology of Physical Activity
AUs: 3
This course aims to provide an understanding and application of the psychology of exercise and physical activity from a health-related perspective. The content areas will cover the three main areas: (a) motivation and psychological determinants in physical activity, (b) relationships between exercise and domains of psychological well-being, and (c) interventions and exercise promotion for groups and individuals.

MES830 Independent Project in Physical Education or Sports Science
AUs: 3
This course explores a specific issue, or topic which a student or groups of students negotiate and contract with a relevant lecturer. Emphasis is on needs analysis, reviewing literature, project design, trialing procedures and report writing. Methods of instruction include: individual consultation (face-to-face, phone, on-line), independent library research/field/laboratory practice and process writing. Assessment: project design 40%; project report 60%. Teaching staff: PESS academic staff on a needs basis and as negotiated.

MES832 Constructivist Approaches to Teaching Physical Education
AUs: 3
This course examines an array of 'constructivist' physical education teaching approaches. Topics include definitions and forms of constructivism with related learning theory, historical and social origins in physical education curriculum, conceptual and thematic approaches to teaching and learning. The course will be presented through lecture, seminar, workshop and project. Assessment modes are written analysis and critique (40%) and school site project (60%).

MID801 Instructional Design Models and Practices
AUs: 3
This course provides students with the understanding of the major instructional design models useful in school and training contexts. Major topics covered include the analysis of performance and instructional problems, instructional design processes, and issues and processes of development, implementation and evaluation. Emphasis will be given to how to identify and solve learning and performance problems.

MID803 Effectiveness of Instructional Technologies: Research Paradigms and Findings
AUs: 3
As IT leaders, participants should be able to interpret research findings found in the literature, and use them to inform their instructional practices. This course provides students with the theoretical foundations, as well as practical guides to the interpretation and evaluation of research findings in the field. Topics include: human-computer Interface issues, effectiveness of technology on achievement and attitudes. Both qualitative and quantitative paradigms will be explored.

MID805 Foundations of Learning and Instruction
AUs: 3

How do people learn? How do I teach to help learners acquire knowledge and skills? Various theoretical principles and models of learning will be discussed to show how learning takes place and how these could be applied to the design of instruction and training solutions.

MID806 Training Methods and Strategies
AUs: 3
The course will familarise participants with various training methods such as role-playing, simulation, cooperative and collaborative learning, group discussion, gaming, lecture presentation, and technology-based training methods. The pedagogical principles behind each training method and the pros and cons of each method will be analysed and discussed.

MID809 Designing, Conducting, and Reporting Investigations
AUs: 3
This course will cover major topics related to the preparation of a needs assessment, evaluation report, action research paper, or other document which involves the systematic posing of questions, collection of data, and drawing conclusions. Among the topics covered are methods of surveying the relevant literature, the construction of guiding questions, critical elements in data gathering methods, practical data analysis, and report writing.

MID811 Cognition, Learning and Technologies
AUs: 3
This course is intended to improve the participants' understanding and creative response to teaching and learning issues that emerge in our rapidly changing information and technological society. The course deals with the latest developments in: cognitive theories of learning and research into social construction of knowledge and multiple intelligences; constructivist approaches, the situated nature of learning and its implications; and the use of technology to facilitate effective thinking skills and attitudes that foster lifelong learning and solving of real-world problems.

MID813 Management of Instructional Development Projects
AUs: 3
This course addresses the key processes which managers of instructional technology projects typically encounter. Particular topics addressed include: marketing, budgeting, rapid prototyping, planning for personnel and scheduling, pilot testing, and other important project management tasks.

MID814 Training and Organisational Development
AUs: 3
This course addresses the design and implementation of larger training and development programmes to address employee performance issues and further goals of the organisation. The focus here is on curriculum development in the workplace, and the design of larger instructional and evaluation systems to support that curriculum.

MID815 Training Needs Assessment and Solutions
AUs: 3
Is training the answer to the organisation problems? What kinds of training does the organisation require? How does one determine the type of training most suitable to help improve productivity? This course will look into various training issues such as non-training determinants of performance, assessment of sub-skills, determination of entry behaviours and identification of training objectives. Possible training solutions will then be suggested.

MID816 Advanced Computer-Based Systems for Education and Training
AUs: 3
Advanced technologies are developed daily which could have an impact on the development of instructional systems. This course explores some visions and insights into creative and yet practical vanguard computer based systems suitable for education and training. Implications of educational use of Internet technology will be discussed. Opportunities will be provided for participants to design and develop web-based learning objects.

MID817 Designing e-Learning Systems
AUs: 3

There is growing interest by educationists and administrators in developing systems for delivering instruction without students having to be physically present at a common site. This course provides students with an understanding of various instructional approaches and activities used in distance learning, in particular how to develop and use the newer e-learning systems. Additionally, the use of appropriate technologies to deliver distance education, and practical issues and concerns behind the creation and implementation of distance learning systems will be addressed.

MID822 e-Learning Tools for Training
AUs: 3
Participants will explore various kinds of web-based e-learning tools that will provide solutions to a variety of training and performance problems. Among the innovative technologies which are particularly useful within a corporate training environment are audio and video streaming technologies, synchronous and asynchronous communication tools, and interactive multimedia support. Participants will have hands-on experience using many of these tools, and become aware of how they can be cost-effectively employed in training situations.

MID823 Perspectives on Adult Learning
AUs: 3
This course will investigate the important and unique characteristics of adults as learners, as compared with school-age learners. Additionally, this course will explore the various cognitive frameworks which describe adult learning, a range of effective instructional strategies, and how assessment can be adapted for adult learners. This course will support a variety of training environments in the corporate and business world, including both traditional and e-learning delivery systems.

MID832 Analysing and Assessing Learners
AUs: 3
This course has relevance to professionals in both school and corporate environments. For school personnel, issues will be explored relating to how to adapt instructional strategies to match the particular cognitive and motivational processes required for tasks specifically within different curricular areas, professionals in a corporate environment will discuss the benefits of knowing workers' styles of thinking and how they might work together more efficiently and effectively. Other current approaches to understanding the role of learning characteristics will also be discussed.

MID839 Designing School Learning Environment
AUs: 3
Situated within the social-constructivist paradigm, this module provides opportunities for participants to engage in the knowledge construction of models and issues of designing school learning environment for effective ICT integration. It covers 5 interrelated ideas of designing school learning environment to take up the educational opportunities of ICT.

MID841 Evaluation Models and Methods
AUs: 3
The focus of this course is on specific techniques commonly employed to evaluate the efficacy and effectiveness of training and instructional programmes and projects. Typical evaluation models and procedures are reviewed. The discussion will focus on helping participants to understand and evaluate "real-world" problems which occur during the design development, implementation and maintenance of educational innovations.

MID842 Multimedia Design
AUs: 3
Computer-based instruction allows the possibility of delivering lessons to students which employ multiple information representation modes (text, graphics, sounds, etc.) within a non-linear structure and different forms of learner interactions. This course explores the major conceptual, theoretical, and empirical bases for the creation of multimodal learning environments. A particular focus will be given to information design and representation, developing interactive sequences and temporal displays of concepts.

MID843 Research Methods for Professional Practice
AUs: 3
The course will focus on practical research methods in investigating the effects of innovative practices conducted in schools or in the workplace. An overview of various qualitative and quantitative research methods applicable to small scale research studies will be discussed. The course will explore in greater

detail the foundations, assumptions, methods, designs, and data collection approaches for action research to enable participants to conduct an action research study.

MID844 Tech Studio
AUs: 3
Innovative Technologies and Applications for Learning Learners will survey currently available platforms and other emerging technologies for learning, with the goal of being able to demonstrate their knowledge and skills in the development and management of learning environments.

MID845 Design Studio – Creating and Designing Learning Solutions
AUs: 3
Learners will be able to demonstrate their knowledge and skills in instructional design to address learning problems and create appropriate solutions across a variety of learning environments and technologies, and for different types of learners.

MLE801 Developing Reading Skills in the Literature Classroom
AUs: 3
This course introduces teachers to reading strategies offered by contemporary literary-critical approaches. These may include raising awareness of a text's ideological situatedness; its constructions of identities and its intertextualities; its historical contexts; and a critical awareness of form - for example, of the meaning effects of certain modes of narration and of gaps and elisions in texts. Consideration will be given to how such reading skills complement a Language Arts approach to studying English language and Literature in English. The course also examines ways of engaging such strategies in the Literature classroom.

MLE802 Literature, Culture and Education
AUs: 3
This course explores the relationship between Literature Education and contemporary society. It will examine and draw together various paradigms of literary study as they 'express' society's varied expectations of itself and its value systems: for example, Literature as ideology; Literature as educational curriculum; and Literature as manifestation and agent of culture. Such areas of literary study may then be related to other topics in social and cultural studies pertinent to the challenges of developing effective secondary school Literature Education in the present 'globalising' context: for example, youth culture; capitalist consumerism; and cyber-literacy.

MLE806 Texts in the Literature Classroom
AUs: 3
The literary texts selected in this course will be studied with a view to their respective social and historical contexts as well as their relevance in our classrooms. The texts chosen for the course will include representative texts taught for the Singapore 'O' Level and 'A' Level syllabi. This course will show how the study of Literature in our classrooms can go beyond the prescriptive.

MLE807 Teaching Shakespeare
AUs: 3
This course considers various theoretical approaches to the reading and teaching of Shakespeare. Such approaches may include historical materialist, new historicist, feminist and post-colonialist understandings of texts. A range of the plays will be read, taking into consideration the conditions of production of these texts and the performance conditions in Elizabethan and Jacobean society. The implications of adapting Shakespeare into different cultural contexts and different media will also be examined.

MLE808 Literary Theory and Teaching
AUs: 3
The course introduces participants to some of the key recent developments in literary theory as well as critical and cultural theories and examines how such theories have affected the way we understand Literature as a field of study and, more broadly, humanistic education in general. The course will then investigate how such recent approaches may affect the manner in which the reading and teaching of Literature in larger context may be undertaken in the Singapore context. It will build upon the required course 'Developing Reading Skills in the Literature Classroom'.

MLE809 Creative Writing in the Classroom
AUs: 3

The aims of this course are two-fold: one is to deal with what might be considered 'creative writing' - the elements which are essential in the crafting of a story or a poem; the other is a focus on how 'creative' elements might be infused into the teaching of Literature and the teaching of writing in general.

MLE810 World Literatures
AUs: 3
This course will extend and deepen teachers' understanding of present Anglophone writing and the issues that may be raised in relation to teaching such Literature. The course may link the study of a diasporic society's Anglophone writing to influences from parent Literatures; or offer a platform for the comparative study of a post-colonial nation's various Literatures. It may also examine writing in English within the framework of non-Anglophone regional contexts.

MLE811 Teaching Literature in the Digital Age
AUs: 3
This course approaches the many ways that the interaction between printed Literature and digital media - such as the Internet, music files, presentation applications and online 'classrooms' - can further the teaching of Literature. Topics may include how to find and evaluate sources on the Internet; printed versus digital texts; the use of hypertext and web-based writing; and distance learning.

MLE812 Literature and Visual Culture in the Classroom
AUs: 3
This course will explore how visual culture can be used in the teaching of Literature. 'Visual culture' refers to a wide a range of materials, including but not limited to paintings; photographs; film adaptations of literary texts; digital media; and television programmes. Particular attention will be paid to the interaction between Literature and visual culture both as historical phenomenon and sociological representation.

MLE813 Adolescent Literature
AUs: 3
This course looks at the Literature prescribed for and chosen by adolescents themselves. It considers the construction of identities and values created by such texts. Recurrent themes that are found in these texts include: the quest for identity; the exploration of personal and social ideals; and the awakening to their attendant complexities at this period of adolescents' maturity level. Canonical texts set in secondary and junior college syllabi, along with popular texts commonly read by adolescents will be discussed. The aim is to extend critical understanding of the forms of adolescent Literature and the issues related to this genre.

MLE814 Literature Assessment: Issues in Approach and Design
AUs: 3
This course will explore traditional and contemporary philosophies and principles of Literature assessment in the classroom so that students will gain a wider perspective of curriculum, policy and political issues involved in school assessment practices. Strategies for designing Literature assessment for other specific purposes will be considered. These include assessment for the diagnostic analysis of students' needs and the formative evaluation of students' learning. The encouragement of diversity and multi-dimensional perspectives through alternative assessment modes such as portfolio assessment, rubrics-based assessment, authentic problem-based assessment and enquiry-based assessment will also be considered.

MLS801 Science: Development, Aims and Role in Society
AUs: 3
What is science, and what separates science from non-science? Given that scientific advances have a great impact on everyday life, why is there an underlying mistrust of science by the public in many countries? In this course we will look at science from several points of view: its history and development, the basic philosophies underlying science, and the need and means by which the aims, discoveries, and the role of science can be communicated effectively to a wide audience. Although these various elements may seem unrelated to each other, each forms an integral part of an expansive discipline which has many bioethical and economic impacts -- Science.

MLS802 Advanced Plant Physiology
AUs: 3
The purpose of this advanced plant physiology course is to ensure that students obtain substantive understanding of the physiological processes controlling plant behaviour and productivity both at the biochemical as well as molecular levels. Particular emphasis will be on current research into plant nutrition

and water relations; plant metabolism including photosynthesis, respiration, carbohydrate metabolism with an emphasis on regulation and the interaction among metabolic pathways; plant growth regulation; hormone metabolism and action. Group discussion of selected recent publications with reference to the use of plant physiology in improving crop production and horticulture will also be emphasised. The purpose of this activity is to introduce students to critical use of scientific papers published within the various fields of interest.

MLS803 Plant Molecular Genetics
AUs: 3
This is an advanced course in plant molecular genetics. Topics include: molecular marker generation, genetic applications of molecular markers, quantitative trait loci (QTLs), development of transgenic plants for basic and applied research, and plant functional genomics. Emphasis will also be given to understanding how genetic, physiological, biochemical and molecular attributes of individual plants contribute to their fitness in agriculture and natural ecosystems.

MLS804 Cellular and Molecular Biology of Plant Development
AUs: 3
Topics in this course include: principles of genomic equivalence, differential gene expression, cytoplasmic localization, cell-cell communication and paragenetic information in generating cellular differentiation and specialisation. Detailed discussion of specialised topics in embryogenesis and vegetative to reproductive state transition and development will be conducted.

MLS805 Global Change Science and Ecophysiology
AUs: 3
This course focuses on understanding the natural and social science aspects of the current global climate change issue. The course participants will be introduced to relevant ongoing national and international discussions. The second key theme in this course is to understand photosynthetic carbon gain in relation to growth, respiration, decomposition and water use, all in the context of global change. There will also be a detailed study of selected topics in plant eco-physiology with an emphasis on the concept of "plant water-carbon dioxide dilemma", environmental perturbations on plant growth, plant and microclimatic measurements, the use of stable isotopes in interpreting plant performance and plant functional types.

MLS806 Plant-microbe interactions
AUs: 3
The study of plant-microbe interactions involves approaches from many biological sub-disciplines that include plant, bacterial and fungal genetics, molecular and cellular biology and microscopy. In this course, particular emphasis will be given to exploring, at the cellular and molecular level, sequential stages that typify the establishment of interactions that have evolved between terrestrial plants and microorganisms. This will include both reciprocally beneficial relationships and pathogenic interactions. Highlighted will be current research on deciphering what is the molecular dialogue between plants and microorganisms, what controls the dialogue and the possibilities of manipulating these interactions.

MLS809 Advanced Biostatistics and Experimental Design
AUs: 3
Some common univariate and multivariate analyses suitable for EIA work (e.g., ANOVA, MANOVA, ANCOVA, Cluster analysis, PCA) will be taught in this course. Graduate students will be introduced to both univariate and multivariate data analyses with the aid of a statistical software package (MINITAB) such that they will be able to analyse their own research data. Statistical techniques useful for laboratory and field scientists will be highlighted, with an emphasis on practical approaches to the design and execution of research.

MLS850 Plant Secondary Metabolites (formerly MLS 810 Secondary Plant-Metabolites)
AUs: 3
There are many different types of secondary metabolites such as plant hormones, phenolic compounds, vitamins, etc. Plants produce secondary metabolites as defences against fungi, bacteria, insects and viruses. This course highlights current developments in secondary plant metabolites research, and emphasises in particular the functions of plant secondary metabolites as defence and signal compounds. The potential uses of plant secondary metabolites in medicine as therapeutic agents, and in agriculture as biorational pesticides will also be included. Techniques for the purification and analyses of these compounds will be included.

MLS811 Separation and Analytical Techniques
AUs: 3
The isolation and purification of organic and bioorganic molecules are important subjects in the study of product performance that carried those components. An understanding of the pure materials either a single component or a class of homologues are highly crucial in the development of new bio-products and understanding their performance. The discovery of new drugs and bio-materials often started from the success in the isolation and purification of the active component as well as an adequate understanding of their structures at the molecular level. Topics are general introduction; classification of physical, chemical & biological methods; physical and physico-chemical methods of separation; chromatographic method and preparative separation; case study on separation of biomolecules; purification and isolation of trace substances; concept and trends in modern chemical analysis; analytical spectroscopy of biomolecules: FTIR, UV, fluorescence and related techniques; magnetic resonance and imaging, capillary electrophoresis; GC-MS and HPLC-MSAnalytical methods in quality control of bio-products; current trends and development.

MLS812 Sustainable Landscapes: Integrating Conservation, Land Use and Food Production
AUs: 3
This course focuses on the search for sustainable relationships between humans and their global environment, an issue that has become a matter of urgency. Economic and social goals, and strategies of resource use and ecosystem management form an integral part of this study. The problems and policies associated with the use of wilderness, forests, eco-tourism, farmland and urban industrial society are examined. Singaporean issues are central, but are set in a global context. Topics include: the concept of sustainable land-use, measuring and monitoring biodiversity, developing land-use policies that take in ecosystem, social, and economic needs, and the development of a "land ethic" in modern societies.

MLS813 Physics in Biology
AUs: 3
This course covers the forces on and in the body; Physics of skeleton; the nervous system and neurons; and electricity within the body. Biomagnetism, pressure in the body, pressure inside the skull, osmotic pressure and transport through membranes will be covered also. The Physics of the lungs and breathing, physics of some common lung diseases, biological effects of radiation, and biological effects involving electricity and magnetism applied to the body are part of this course.

MLS814 Physical Methods for the Analysis of Biological Materials
AUs: 3
The amount of information that can be derived from an examination of any material depends ultimately on how fine a probe is used. The wavelength of X-rays in the region of 0.1 nm would be an excellent probe. X-ray diffraction (XRD) is useful for the studies of molecular structure. The electron microscope is also widely used for high resolution work in studying cellular ultrastructure. Transmission and scanning electron microscopies (TEM and SEM) are normally used to investigate the 3-dimensional pattern of cells and tissues. To identify the various elements especially heavy metals in a biological material, the energy dispersive x-ray fluorescence (EDXRF) spectroscopy is an excellent tool. When light falls on a suspension of biological molecules, a certain fraction of light is absorbed depending on the wavelength of light. When the absorption versus wavelength characteristics are analysed with a spectrophotometer, several absorption bands are evident. These bands give information on the molecular structure of the biological sample. Infrared (IR), visible, and ultraviolet (UV) spectroscopies are common and accurate techniques used in industries and research laboratories. Laser-induced fluorescence (LIF) is another technique for the surface analysis of a sample. All these techniques will be covered in this course.

MLS818 Bioinorganic Chemistry
AUs: 3
The role of metals in biological systems is an area of great interest to chemists and biologists alike. Life in its present form would not be possible without the involvement of the metallic elements. This course deals with the key ways in which metals participate in biochemical processes, focusing on biomolecules that incorporate metal atoms in their molecular structures. The ways in which the chemical properties of selected metals define the biological function of the systems they are found in will be discussed. Important applications of inorganic and coordination chemistry in medicine will also be highlighted. Topics are introduction to the role of inorganic chemistry in life processes, metallobiomolecules and the role of small molecule models in the investigation of the structure and function of metals found in metallobiomolecules; metal management: uptake, transport, storage and detoxification; oxygen-carrier proteins: haem- and non-

haem-proteins; haemoglobin, myoglobin, haemocyanin, and haemerythrin; electron-transfer proteins; further examples of metalloenzymes: superoxide dismutase, vitamin B_{12} coenzyme, nitrogenases; therapeutic uses of coordination chemistry: overview of inorganic drugs, chelating agents, anti-cancer compounds based on platinum and other metals, gold antiarthritic agents, radiopharmaceuticals for diagnostic imaging and radioimmunotherapy.

MLS821 Biosensors: Theory and Applications
AUs: 3
The main objective of this course is to familiarise participants with the development and characterisation of biosensors. Various transducing principles and immobilization techniques of the bioreceptors will be introduced. Important applications of the biosensors in biomedical and biotechnological fields will be highlighted. New trends in the developments of miniaturised and microarray biosensors will be discussed. Topics include introduction to biosensors and classification; fundamentals of transducing techniques, e.g. electrochemical, optical and thermal; immobilization techniques of bioreceptors, e.g. cells, tissues, enzymes, antibodies, microorganisms; important applications in biomedical, biotechnology & environmental areas; trends and issues in the development of biosensors, e.g. miniaturization, microarray, implantable devices, non-aqueous applications.

MLS822 Bioactive Natural Products and Their Derivatives
AUs: 3
The objectives of this course are to familiarise participants with the chemical properties and applications of physiologically active natural products and the roles played by these substances on the development of more effective synthetic analogues for therapy. Topics are classification of natural products; isolation, structure-elucidation and activity screening of biologically active natural products; chemistry of selected bioactive natural products from organisms, micro-organisms, higher plants, insects and marine organisms; natural products and drug development: lead compounds, synthetic analogues, quantitative structure-activity relationships (QSAR) study and molecular recognition.

MLS851 Polymer Chemistry and Biomaterials (formerly MLS 823 Surface and Polymer Chemistry)
AUs: 3
This course highlights the importance of surface and polymer chemistry in life sciences. Colloid and surface science plays a vital role in maintaining and promoting supramolecular structures and processes that sustain life. A specific example is the phospholipid bilayers that form the membranes of biological cells. The applications of some colloidal systems such as liposomes and vesicles for controlled drug delivery will be discussed. The course also deals with the chemistry of biomaterials and the applications of some advanced polymeric systems in life sciences. Topics include introduction to colloid and surface chemistry; surfactants, micelle, micellar catalysis; biological membrane and cells; liposomes and vesicles; controlled delivery systems; general introduction to polymer chemistry; bio-compatible polymers; biomaterials for tissue engineering; intelligent polymers and their applications in biotechnology (protein separation and purification, biocatalysis).

MLS824 Trends in Chemical Science and Technology
AUs: 3
The chemical trade and industry of Singapore, petrochemical and pharmaceutical industry their allied industry will be taught. The other topics include modern chemistry and technologies pertaining to environmental pollution, chemical waste management and good practices, small chemical producers and businesses. This course is intended to give students a comprehensive understanding of the contributions of chemical science and technology to the national economy and policy of Singapore. Course content may vary from year to year.

MLS825 Physical Methods In Structural Elucidation
AUs: 3
Principles of electronic absorption spectroscopy, nature of radiation, ground states and excited states and selection rules will be covered. Other topics include simple symmetry treatment of molecules leading to IR/Raman active modes, mass spectrometry, principles and simple fragmentation patterns, magnetic susceptibility measurements and magnetic behaviour of inorganic compounds. Magnetic resonance spectroscopy, principles and interpretation of nuclear magnetic resonance NMR spectra (proton and other common nuclei), electron magnetic resonance ESR spectra, x-ray spectroscopy, principles and interpretations will also be taught.

MLS826 Bioorganic Chemistry
AUs: 3
This course aims to equip participants with a broad understanding of the organic chemistry of living systems, the tools and techniques for studying biomolecules, and the application of bioorganic chemistry knowledge. The structure, structure determination, synthesis, and functions of DNA, RNA, proteins, and carbohydrates will be discussed. Catalysis by ribozymes and enzymes, the roles of cofactors, and modes of kinetic behaviour and inhibition will be presented. Principles involved in the design of organic molecules to mimic and for recognition in biological systems, tools of bioinformatics, molecular biology and combinatorial synthesis will also be discussed.

MLS827 Earth's Resources and Responses to Stress
AUs: 3
Earth's biodiversity is composed of both abiotic and biotic resources, which sustain life in a balance of constructive and destructive forces. Natural ecosystems depend on these resources, and have efficient means of utilising and cycling them. Destructive forces may be natural or anthropogenic, and they exert various levels of stress on the environment. This course introduces the biodiversity of life on earth at the ecosystem level. Stressors of the environment and the responses of organisms and ecosystems will be examined.

MLS828 Environmental Health and Toxicology
AUs: 3
Pollution is a global problem that affects all of earth's biomes, in the atmospheric, terrestrial and aquatic realms. This course will deal with the various types of physical, chemical and biotic pollutants being introduced into the environment on a daily basis, including modern-day synthetically created products of man. Effects of pollutants on the health of the environment will be investigated, together with various relevant strategies used to mitigate pollution and contamination.

MLS829 Conservation and Management
AUs: 3
In a rapidly changing world where the utilisation of resources is inextricably linked to development, the challenge of ensuring the sustainable use of natural resources has global consequences. This course will deal with issues relating to the sustainable use, protection, conservation and management of the earth's natural resources through relevant case studies. Local, regional and international initiatives, which address the issue of sustainable development and natural resource management, and the role of science in environmental management will be studied.

MLS830 Integrated Management Systems
AUs: 3
The success or failure of management strategies for environmental protection and natural resource utilisation very often depends on the efficient use of tools for managing information, realistic models and simulations. This course examines the use of database management tools, geographic information systems, modelling techniques, as well as economic evaluation and assessment tools for sustainable development, which relate to environmental health.

MLS831 Seminars on Special Topics
AUs: 3
Other relevant and important subjects relating to the study of the environment will be covered in a seminar series. Experts from relevant industries will be invited deliver seminars and workshops on several topics including environmental law, environmental management systems and audits, and the role and relevance of environmental agencies. Students will also be assessed through term papers on related topics.

MLS832 Water Treatment and Process Design
AUs: 3
The supply of adequate water is an issue of much concern to any developing country, more so for an urban city like Singapore. Much effort is being placed in Singapore to ensure adequate water supply for our future. This course provides an important introduction to students on water characteristics, its treatment and process design. Topics on the latest technological advancement in the handling, treatment and recycling of water will be covered.

MLS833 Environmental Biotechnology

AUs: 3
The application of basic concepts of biotechnology is an important field of environmental science and engineering. This course introduces fundamental ideas of biotechnology to the student and discusses the microbial aspects of organisms that are useful to environmental science and engineering.

MLS834 Forest Ecology and Management
AUs: 3
Many countries depend on forests as natural resources that contribute towards economic growth. Large areas of the world's forests, however, are being cleared at a fast pace, which, left unchecked, may result in the loss of biodiversity as well as the degradation of the environment through soil erosion and the building up of greenhouse gases, not to mention a loss of a potentially sustainable source of income. How then do we achieve a balance to attain sustainable growth? This course will examine two overlapping yet very different issues. The first concerns the dynamics of forest ecosystems: their history, distribution, and ecology. The second issue is that of forest usage and management, timber and non-timber extraction methods, and silviculture. Policies pertaining to the international trade in timber, forest conservation, and sustainable forestry will also be examined in an attempt to better understand the forces that will determine the fate of our forest resources.

MLS835 Micro Total Analysis Systems
AUs: 3
Micro total analysis systems (TAS) is still in an early stage of its existence. It is an exciting field in which to work, with simultaneous advances being made on many fronts. With the dynamic nature of this field of research, this course is intended to introduce the students to the current state of the art of TAS, and hopefully, to provide the students with the tools necessary to grow in understanding beyond the scope of this course as the field advances.

MLS840 Biomedical Imaging
AUs: 3
Ultrasound, Doppler effect, and ultrasound pictures of the body. Physiological effects of ultrasound in therapy, and ultrasound to measure motion are also covered. Lasers, laser-tissue interaction, laser-induced autofluorescence of biological tissues, laser diagnosis of diseased tissues, laser imaging of cancer tissues. Confocal and atomic force microscopy: surface topography of native bio-molecules at nanometer resolution, structure and function of living cells, surface topology of objects in fluid for the examination of macromolecular changes of bio-molecular interactions and enzymatic reactions. Magnetic Resonance Imaging (MRI). Equilibrium magnetization, spin precession, pulsed RF & spin rotation, Free Induction Decay (FID), magnetic field gradients, phase & frequency encoding, image contrast. MRI hardware: superconducting magnet, magnetic gradient coils, RF coils. Positron Emission Tomography (PET). Positron annihilation. Interaction of gamma-rays with matter. Scintillation detectors, co-incidence detection. Image resolution.

MLS841 Photonics
AUs: 3
Optics: laser optics, mirrors, polarizers, lenses, electro-optical, nonlinear, fibre optics, aberrations . Lasers: Longitudinal and transverse mode selection, mode locking, Q-switching, laser amplifiers, pulse chopping, pulse lengthening, pulse compression, frequency selection. Techniques to characterise laser energy, pulse shape, wavefront, divergence, coherence, modes, polarisation using calorimetry, photo-diodes, PMT, correlation, interfereometry, spectrometry. Light matter interactions, including light interactions biological tissue and applications of laser in industry and medical field will also be discussed.

MLS842 Nanotechnology
AUs: 3
Nanoparticles; tetrahedrally bonded semiconductor structures. Properties of individual nanoparticles: metal nanocluster; semiconducting nanoparticles. Methods of synthesis: RF plasma; chemical methods; thermolysis and pulsed laser ablation. Carbon nanostrutures: carbon molecule; carbon clusters; carbon nanotubes (fabrication, structure, electrical and mechanical properties); applications of carbon nanotubes. Quantum Wells, Wires and Dots: Introduction and preparation of quantum nanostructures; size and dimensionality effect; and Applications. Biological Nanomaterials: biological building blocks; polypeptide nanowires and protein nanoparticles; DNA double nanowire; biological nanowires. Nanomachine and Nanodevices: MEMSs and NEMSs.

MLS843 Statistical Physics
AUs: 3
Respiration & energy requirements; order of magnitude estimates. Binomial distribution: concepts of probability, variance, mean value; applications to sex distribution of children, random coils. Diffusion and transport: molecular theory of gases, equipartition theorem, random walk in 1 and 3 dimensions, Fick's law; osmotic pressure, hemeodialysis, ultracentrifugation; permeability of red blood cells. Poisson distribution: application to detection of light by the eye; Luria-Delbruck experiment. Thermal equilibrium: equilibrium between phases; dilute solutions. Applications in nanotechnology and biophysics.

MLS844 Applied Quantum Mechanics
AUs: 3
Quantum mechanics is widely recognized as the basic law which 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. The course covers those parts of quantum theory which are necessary for applied physicists. It focuses on the approximations and concepts which allow estimates of the entire range of properties of nuclei, atoms, molecules, and solids, as well as the behavior of lasers and other quantum-optic devices: Foundations; Simple Systems; Hamiltonian Mechanics; Atoms and Nuclei; Molecules; Crystals; Transitions; Tunneling; Transition Rates; Transport; Noise; Energy Bands; Electron Dynamics in Solids; Vibrations in Solids; Creation and Annihilation Operators; Phonons; Coherent States; Coulomb Effects; Cooperative Phenomena; Shake-off Excitations.

MLS845 Spectroscopy
AUs: 3
Interaction of electromagnetic radiation with matter, energy levels. Instrumentation, resolving power. Atomic spectroscopy: emission spectra of hydrogen and sodium, X-ray spectroscopy, electronic structures of atoms and periodicity of elements, applications in analysis of elements and astronomy. Ultraviolet and visible spectroscopy: Instrumentation, colour in transition metal compounds, applications in organic chemistry. Microwave spectroscopy: Theory of rotation of molecules, rotational spectra of diatomic molecules, and of polyatomic molecules, microwave spectrometer, applications in identification of gases and in chemical analysis. Infrared spectroscopy: Theory of the vibrating diatomic molecule, diatomic vibrating rotator, vibration-rotation spectra of diatomic, linear and polyatomic molecules, interaction of rotations and vibrations, applications in the analysis of molecular structure of linear molecules.

MLS846 Thermonuclear Fusion and Radiation
AUs: 3
World Energy Scenario, The energy crisis, Need to develop a relatively clean long-term alternative energy source; Thermonuclear Fusion: The Nuclear fusion as energy source, Possible Fusion Reactions, Fusion Reaction Cross section; The Fundamentals of Fusion Process: The Energy Balance, Bremsstrahlung Power Loss, Cyclotron Power Loss, Effect of Impurity, Ideal Plasma-Confinement Criterion; Plasma Confinement: The Magnetic Confinement, Open-Ended Confinement-Magnetic Mirror, Closed-ended Toroidal Confinement; The Tokamak: General consideration of toroidal devices, Magnetic configuration of Tokamak, Tokamak equilibrium and stability; Laser Fusion: ICF Power gain and Driver requirements, Thermonuclear Burn Fraction, Implosion and compression of matter; Ignition and Propagation burn; The Plasma Focus: General characteristics of Focus Device, Current sheath dynamics in plasma focus, Computational model of Plasma focus device; Plasma Radiation Sources and Application: Development of focus device as multiple radiation source of x-rays, electron beam, ions and neutron, diagnostics and application of focus device to microlithography, thin film processing and thin film deposition.

MLS847 Atomic and Molecular Physics
AUs: 3
One-electron atoms: The Schrodinger equation and its solution for a Coulomb field, spin-orbit interaction energy, relativistic correction of state energy, the Lamb shift, radiative processes and selection rules, applications of the Schrodinger equation. Two-electron atoms: Electrostatic interaction and exchange degeneracy, helium ground state and Pauli exclusive principle, singlet and triplet energy states of helium. Multielectron atoms: The central-field approximation, energy ordering of the outer filled subshells, alkali atoms, the L-S and J-J couplings, allowed terms, multiplet structure and Lande interval rule, Doppler shift and broadening, applications in X-ray line spectra. Molecular Physics: Separation of electronic and nuclear motion, potential energy function for a chemical bond, vibrational energy states of diatomic molecules, rotational energy states for a rigid molecule and a nonrigid rotator, rotational energy-level population,

applications in rotation-vibration spectra of linear molecules and simple polyatomic molecules. Applications in life sciences.

MLS848 Medical Physics
AUs: 3
Ultrasound in medicine: Ultrasound, Doppler effects and ultrasound to measure motion (e.g. Blood flow). Laser in medicine: Laser-tissue interaction, thermal effects, laser angioplasty, laser-induced autofluorescence of biological tissues, laser diagnosis of diseased tissues; Radiation physics and applications in therapeutic medicine: Radioactivity, the interaction of radiation with matter, diagnostic radiology, radionuclides in diagnosis, radiation protection; Medical uses of X rays: Fluoroscopy, mammography, radiation therapy, Nuclear medicine: Activity and cumulated activity, dose calculation.

MLS849 Selected research reports in Biomedical Physics
AUs: 3
Application of LIAF spectra detection system in human colorectal cancer in-vivo Screening; Applications of laser induced autofluorescence diagnosis and confocal imaging techniques to study the diseased plant tissues; Visualization of orchid mycorrhizal structures using light, Epifluorescent and laser scanning confocal microscopy; High sensitivity and specificity of laser-induced autofluorescence spectra for detection of colorectal cancer with an artificial neural network; Red blood cell surface scan via atomic force microscope; Study of the intensity ratio from the characteristics of auto-fluorescence; Spectra of human colorectal tissue; Autofluorescence spectral changes from the colonic mucosa of the rat during colorectal cancer formation; Distance and angular dependence of intensity ratios in laser-induced autofluorescence techniques; Identify human colorectal cancerous tissues via laser induced autofluorescence confocal image; Laser light distribution in tissues; Studies of the steady and time-resolved autofluorescence spectroscopy and autofluorescence photobleaching of in-vitro human colonic tissues.

MLS861 Comparative Functional Anatomy
AUs: 3
The focus of this course is on vertebrate and invertebrate studies at the organismic level, emphasizing comparative, anatomical, developmental morphology, adaptive radiation, and functional characteristics of evolutionary significance. The study of this course in contemporary zoology is vast; consequently, selected themes and taxa, their phylogeny, and systems, will form the topics of study. Laboratory work with preserved and live specimens and demonstrations emphasize comparative functional anatomy and techniques of biological systematics. Evolutionary innovation and the contemporary role of comparative anatomy as a path-breaking, pioneering discipline in solving new problems and generating novel theories crossing traditional interdisciplinary barriers of biological disciplines and engineering science are highlighted.

MLS862 Chemical Zoology
AUs: 3
The main objective of this course is to present a broad coverage of chemical communication in terrestrial and marine animals. The various structural classes of chemicals, pheromones and their biosyntheses and adaptive functions will also be discussed. Emphasis will be on the myriad functions and mechanisms of action of these molecules produced by animals in various phenomena such as bioluminescence and chemosensory mechanisms. The geneses and evolution of chemical communication in animals will also be explored. Topics will include techniques and methodologies employed in the study of chemical communication. This course also highlights the significance of such molecules with regards to biotechnology, especially in the area of drug discovery and development.

MLS863 Economic Zoology
AUs: 3
This course provides a comprehensive survey of the economic importance of animals to Man, their role in human economy, and their economic impact on agriculture, industry and aviation; economic importance of animals as beasts of burden, food supply, biochemical products, pollinators, seed dispersal agents, biological control agents, sport, and outdoor recreational activity. Other topics include: pests of foodstuffs and stored products, pests found in and near buildings, shipping and aircraft facilities; assessment of damage and impact; reproductive biology, life cycles, and foraging habits of major vertebrate pest species; methods, and legal aspects for control strategies using pesticides, poison, traps, gas, hygiene, sound; management options and control of major arthropod and vertebrate pests.

MLS864 Current topics in Animal Behaviour

AUs: 3
The course examines research topics of current importance in animal behaviour and behavioural biology and ethical issues on the use of animals in behavioural studies. Topics include: behavioural and phenotypic plasticity; ontogeny and the role of the brain in behaviour and learning; the evolution of adaptive strategies; techniques for studying animal behaviour in laboratory and field; population and sex differences in behaviour, exemplified by studies examining sexual selection and the evolution of signaling systems and decision-making; optimality, spatial memory, aggression, dispersal and territoriality; life history evolution, female fitness and offspring size-number trade-offs; insights into behaviour gained from new technologies, including DNA fingerprinting, molecular biology, and artificial intelligence; how behavioural studies may contribute to welfare of animals in domestic, zoo, and entertainment environments; the extrapolation from studies of the behaviour of non-human animals to human behaviour.

MLS865 Comparative Environmental Physiology
AUs: 3
The course discusses physiological functioning and comparative adaptation of animals across a range of environments and to parameters such as water, ions, light, nutrient levels, temperature. Topics include: the physical nature of an organism's environment, size, isometric and allometric scaling; mechanisms of adaptation , physiological regulation of gene expression; osmoregulation, excretion, costs and energetics of water and ion balance; energy metabolism; ventilation systems, comparative physiology of respiratory pigments; respiratory and circulatory adaptations to anoxia, hypoxia during diving, burrowing, high-altitude exposure; adaptations to the deep-sea environment; physiological effects of temperature; adaptations to life in the marine, estuarine, freshwater, thermally extreme and terrestrial (including extreme) environments with attention to thermal, respiratory, ionic, osmotic, reproductive and life-cycle adaptation; mammalian thermoregulation, endocrine system and human reproductive physiology.

MLS866 Wildlife Biology and Diseases
AUs: 3
This course is structured both on a discipline basis (epidemiology, virology) and selected taxa by taxa basis, e.g., avian diseases, mammalian diseases. The course areas covered include: (i) foundation topics on wildlife biology- impact of diseases on wildlife populations, vertebrate taxonomy; population cyclicity and growth; techniques for wild life studies; wildlife population monitoring; age structure, demography, population genetics; diversity in anatomy and physiology; principle of management in captivity and in the wild of a range of vertebrate taxa; nutritional and energy requirements; sustainable use of wildlife, (ii) research methodologies relevant to the study of wildlife; principles of epidemiology, (iii) non-infectious diseases of nutritional, toxin-related, and reproductive disorders, and (iv) infectious diseases and disease investigations-immunological techniques for diagnosis and pathogenesis; infectious diseases caused by viruses, bacteria, parasites; emerging wildlife diseases and their investigations and control.

MLS867 Aquaculture and Fisheries Management
AUs: 3
This course is intended for students with an interest in aquaculture and fisheries systems in Singapore and the region. Biology of species exploited in Singapore and the Southeast Asian region and current culture technologies, methods of breeding, genetic selection, and economic models are discussed. The course also explores topics on growth rate and efficiencies, biotic and abiotic factors; reproduction, metabolism and growth models and nutritional requirements, the relationship between stress and disease, including environmental factors and various pathogens important or potentially important during intensive culture; cost-benefit analysis, and new technologies, such as genetic engineering and future prospects for the industry. The fisheries management section discuses fisheries practices, dynamics and research, stock assessment and management, and case studies on fish, shellfish, and crustacean farming; quantitative methods of fisheries stock assessment and quantitative analysis of fisheries.

MLS868 Seminars in Zoology
AUs: 3
The seminar series focuses on current research areas, topics, and reviews of literature in zoological sciences. The sessions are jointly conducted by staff members, adjunct staff, guest lecturers and students. Students are required to read, synthesise, and make a class presentation of the zoological topic that is agreed to early in the course. Seminar topics are selected and approved on a thematic or disciplinary, rather than taxon-specific basis.

MLS869 Economic Entomology

AUs: 3
The course aims to provide a lecture and laboratory survey of the classification, life histories, and ecology of the economically important pest insects in agricultural, forest ecosystems and urban environments, as well as the farming of economically important species. Insect population dynamics is discussed with reference to common insect pests in Southeast Asia and why some insects become pests. Other topics include: pest management theory; principles, practice, application, and issues of biological, cultural, genetic and chemical methods of control to maintain pest populations below economic threshold levels; economic decision levels as applied to agroecosystems; ethics in pest management, and intellectual tools to evaluate beneficial and harmful species.

MLS870 Evolution and Phylogeny: Theory, Practice and Application
AUs: 3
While Physics and Chemistry have many fundamental laws that most science students become acquainted with, Biology is fascinating in that there is a single principle, natural selection, that explains the unity of all life and the incredible diversity of living things and their innumerable adaptations for survival and reproduction. We will explore the process of evolution and the patterns of relationship among living things that follow from it. In addition, we will see how an evolutionary approach can help us better understand the interaction between organisms and their environment, as well as how an understanding of evolution and phylogeny can assist in the conservation and management of habitats and endangered species. Research themes and methods that are currently being actively pursued in the field will be highlighted.

MLS872 Synthetic and Catalytic Organic Chemistry
AUs: 3
Advanced topics in organic synthesis with emphasis on stereoselective synthesis will be covered. Olefin synthesis and metathesis. Applications of organometallics to organic synthesis. Total synthesis of biologically and clinically important compounds. These topics are taught with special emphasis on the current emerging tools in organic synthetic methodology.

MLS873 Analytical Tools and Techniques in Molecular Biology
AUs: 3
This lab-based module exposes students to principal research approaches and methodologies currently adopted in the life sciences. Tools and techniques will be taught in context of their applications to research and industry. Topics include molecular techniques such as DNA and protein isolation and quantification, restriction enzyme digests and RFLPs (restriction fragment length polymorphisms), PCR (polymerase chain reaction), image analysis and documentation, genetic transformation using bacterial plasmids and particle gun bombardment, DNA sequencing, and methods in enzymology such as ELISA (enzyme linked immunoassay). Emphasis is on 'hands-on' laboratory experience and linking this to real situations in which tools and techniques can be used to answer specific scientific questions. Because of the nature and duration of the laboratory sessions, this course will be offered only as an intensive, six consecutive full-day long module. This module will generally be conducted either in June/July or November/December each year.

MLS874 Economic Botany
AUs: 3
Plants are vital sources of food, medicine, fibre and timber. Economically important plants that have changed societies, social habits and made history will be introduced. Uses of local plants and plant produce and their impact on the region's economy will also be highlighted. This module intends to explore the future global impact of plants on healthcare, diets, lifestyles and the environment. Topics include man's dependence on plants, the use of plants as renewable resources, and prospects for research into plants that will yield wonder drugs to combat age-old as well as emerging diseases. Emphasis will also be placed on discussing the bio-prospecting for novel plant products of industrial value and bio-business. This module course can be offered during 3-hour evening sessions over 13 weeks of the semester or, as an intensive, six consecutive full-day long module (conducted either in June/July or November/December each year).

MLS875 Mycology
AUs: 3
This module provides a survey of the biology, activities, and roles of major groups of fungi, with emphasis on classification and evolutionary relationships. Students will be involved in field and lab work as well as presenting seminars based on current topics in mycology.

MLS800 Independent Research Project

AUs: 3
This course exposes students to all phases of the scientific research process through inquiry-based learning strategies. Students will undertake in-depth investigations of suitable research questions relevant to their areas of specialisation (i.e., Applied Plant Sciences, Applied Physics, Chemistry, Environmental Sciences and Zoological Sciences). The processes include the formulation of a research problem, literature survey, hypothesis setting, design of experiments, data collection and analyses, discussion of results, writing of scientific papers and presentation of research findings in the scientific arena. This course provides opportunities for leading-edge research in the life sciences.

MLT801 Foundations of Learning and Knowledge Building
AUs: 3
How do people learn? How do I teach to help learners acquire knowledge and knowledge building process? Various theoretical principles and models of learning will be discussed to how learning takes place and how these could be applied to the design of instruction and teaching. Issues such as neurosciences, social cultural perspective, difference between expert and novice and cognition will be covered.

MLT802 Engaged Learning in Knowledge Building Communities
AUs: 3
The knowledge building community is a pedagogical model that fits well with the notion of engaged learning which the key focus of IT Masterplan 2 (MP2) is. The participants will learn how to craft inquiry-based learning based on curriculum; design thinking prompts to support intentional learning; facilitate social negotiation of ideas among students and structure the online environment to help students in organizing emergent understandings.

MLT803 IT as Cognitive Tools
AUs: 3
The participants will be introduced to concepts and research of cognitive tools with applications in international as well as local primary and secondary schools. IT as cognitive tools exhibit how technologies can be adopted for thinking through epistemic structures such as concept maps. The participants are expected to work in groups of 4-5 to conduct a group project, hold online meetings, gather information, conduct on-going group and individual reflections and maintain the project file in the online environment. At the end of this course, the participants are expected to present their projects orally and submit the project-write up.

MLT804 Design Studio
AUs: 3
How can learners be engaged to construct advanced knowledge and develop their own methods of inquiry? In this course, participants will explore the design and use of interactive resources for engaged learning. Activities include the stages of design from the selection of suitable topic, defining learning outcomes, planning an activity to engage learners, development of interactive resources, scaffolding of learning activity, to the integration of all elements into an e-learning environment.

MLT805 Design Experiments
AUs: 3
Design experiment is an educational research experiment carried out in a complex learning context which explores how a technological innovation affects student learning and educational practice. The aim of design experiments is to engineer innovative learning environments and understand the aspects of human cognition. This course explores the issues of design experiment as a research approach, methodical techniques and scientific understanding of learning and education.

MLT806 Social Foundations for the Learning Sciences
AUs: 3
This course will cover aspects of the relationships students have with one another and with teachers in school and non-school settings. The implications of social learning theory for classroom instruction will be covered as well as topics such as student diversity, classroom environment, cooperative and competitive goal structures, achievement, and motivation.

MLT807 Cognitive Foundations for the Learning Sciences
AUs: 3
In this course, cognitive and social science theories are considered related to how people learn to

understand, to reason, and to solve problems, as well as the implications of these theories for the design of classroom learning environments and learning in real contexts. Centrally important issues in cognitive sciences are considered, such as knowledge representation, expertise, transfer, metacognition, and domain specific learning (eg. mathematics, science, reading/writing), and informal reasoning.

MLT808 Design of Interactive Learning Environments
AUs: 3
This course focuses on issues in designing and studying innovative learning environments and in the use of new models of classroom interaction, particularly those related to using technology to enable new cognitive and social roles for students. Topics include simulation environments, intelligent tutoring and coaching systems, computer-mediated communication, teaching for conceptual change, and problem- and project-based learning approaches. Additional topics include cognitive and social interaction learning theories related to motivation, empirical studies evaluating the effectiveness of interactive learning environments, and prospects for the implementation of such innovations in school settings. General issues in the design of educational software, specific challenges of user-interface design, and learning sciences to theoretical perspectives applied to practical interface design issues will also be considered.

MLT809 Research Methodologies for the Learning Sciences
AUs: 3
This course covers issues in the development and use of applied measures in real learning situations. Topics include reliability, scaling and scale development and construct validity of composite measures. Methodologies such as verbal protocol analysis and design experiments will be surveyed as well as techniques and methods use to analyse data obtained from the observations of teacher-learner interactions in educational settings.

MME802 Fundamental Concepts in Mathematics
AUs: 3
The objectives of the course are (1) to give some historical development of selected fundamental concepts in mathematics, (2) to provide some aspects of mathematics content of these topics, (3) to relate these fundamental concepts with topics in school teaching.

MME803 Using Technology in Mathematics Education
AUs: 3
The course covers various aspects of technology such as Computing Technology (computers and calculators), the Internet and multimedia. Their role in providing practice and developing concepts will be discussed. The focus will be on how these technologies can be used as aids in the teaching and learning of mathematics in schools.

MME804 Research and Issues in Mathematics Education
AUs: 3
This course deals with issues and recent research in mathematics education which relate to curriculum implementation, teaching and learning as well as assessment in mathematics. Students will be able to develop a broad outlook on contemporary issues from both international and local perspectives; examine and evaluate research studies and methodologies on effective mathematics learning and teaching for the primary and secondary levels.

MME805 Assessment in Mathematics
AUs: 3
The course focuses on a holistic approach to classroom assessment in mathematics. Topics such as multiple assessment practices (formative and summative assessment), diagnostic assessment and integrating assessment with instruction will be discussed. Assessment will be examined from both a local and international perspective.

MME806 Curriculum Studies in Mathematics
AUs: 3
This course will discuss current developments in curriculum models, curriculum design, and evaluation as they relate to mathematics education. In particular it will focus on the implications of these ideas for the Singapore curriculum.

MME807 Developments in Problem Solving in Mathematics

AUs: 3
This course will provide opportunities for mathematics teachers to update their knowledge of developments in mathematical problem solving. The course will have an international perspective but will also look at the Singapore context. Students will be encouraged to explore areas which may interest them. The focus will be on the implications for teaching problem solving at the school level. \

**MME812 Teaching and Learning Mathematics **
AUs: 3
Mathematics education is undergoing significant changes in terms of content and pedagogy. Given the importance of mathematics in our society, we need to be aware of these fundamental changes. Further, as the form and substance of school mathematics has evolved from many different disciplines, we need to understand the theory and practice from psychological, sociological, philosophical and mathematical perspectives.

In this course we will discuss developments from psychological points of view. Various theorists such as Skemp, Dienes and Bruner and general theories such as constructivism and information processing will be discussed. The focus will be on the specific implications of theories for the teaching and learning of mathematics.

MME813 Algebra and the Teaching of Algebra
AUs: 3
This course will begin with a consideration of what research tells us about the relationship between arithmetic and algebra and some of the problems associated with the transition between the two. The main differences identified by research will be examined and the theoretical perspectives on algebra that help us to understand the nature of these differences will then be considered. Research related to transition form arithmetic to algebra and then to more specific issues such as solving equations and word problems, symbolization and the use of technology in teaching algebra will be examined.

MME815 Geometry and the Teaching of Geometry
AUs: 3
This course is designed to help mathematics teachers' re-examine school geometry using analysis and algebra. The course will demonstrate that geometry, analysis and algebra can be blended together, resulting an expanded understanding of geometric ideas such as proof. The focus will be on the implications for teaching.

MME816 Statistics and the Teaching of Statistics
AUs: 3
The course is designed to look at the research in statistics education with the focus on the implications of that research for teaching statistics. This has been done through a focus on misconceptions (which, implicitly, implies looking at conceptualisation). Maybe of the misconceptions exist among people at all levels, from primary school through to adults. The major goals of the course are:

- To provide you with an overview of selected components of the statistical education research literature
- To discuss the implications of the literature for the teaching of statistics in the curriculum
- To provide an opportunity for you to operationise one aspect of the statistics curriculum that you will be able to apply to your teaching

Many of the topics span issues from different levels. While some of the topics may appear on the surface to be primary, students in secondary school as well as adults have some of these misconceptions, so the issues are appropriate at different levels.

MME817 Discrete Mathematics
AUs: 3
This course consists of two parts. The topics for Part A Part A (Counting -Its Principles and Techniques) are the addition principle, multiplication principle, divisors of natural numbers, subsets and arrangements, bijection principle, binomial expansion, Pascal's triangle, principle of inclusion and exclusion.

The topics for Part B (Graph Theory and Applications) are Mathematical modeling using graphs, travelling salesman problem, graph colouring, the Konigsberg bridge problem, the Chinese postman problem.

The overall objectives of the course are to extend combinatorial techniques, in particular counting techniques, beyond the high school level; to obtain several heuristics for problem solving and to develop an appreciation of and interest in discrete mathematics, in particular, graph theory, by showing its importance in solving practical problems.

MME819 Number Theory and the Teaching of Arithmetic
AUs: 3
This course consists of exploring number theory and applications. The topics that comprise this courses are Fibonacci, Lucas; Euclidean Algorithm, Greatest Common Divisor, The Fundamental Theorem of Arithmetic, Least Common Multiple, Pythagorean Triples, Linear Diophantine Equations; Infinitude of Primes, Distribution of Primes, Special Primes (Twin, Mersenne, Fermat); Fundamental Properties, Special Divisibility Criteria, Euler's Theorem, Fermat's Little Theorem, Linear Congruences, Chinese Remainder Theorem, Quadratic Congruences; Cryptography -Caesar ciphers, Exponentiation ciphers and Public Key Encryption Systems.

The overall objectives of the course are: to strengthen the understanding of number systems and terminology for effective teaching of arithmetic in the schools; to provide background knowledge and the necessary tools for competent and informed supervision of project work in schools and to develop an appreciation of and interest in number theory by showing its applicability in solving practical problems.

MML810 Research in Language Education
AUs: 3
This course discusses the nature, process, methods and issues in language education research. It provides an overview of the different perspectives on first and second language acquisition and learning. It investigates research on learner variables and the socio-psychological model and questions of aptitude, attitude and motivation among learners including classroom oriented research in specific skills such as listening comprehension, speaking, reading and writing in Malay.

MML811 Issues in Language Education
AUs: 3
Language education in any country is influenced by linguistic, psycholinguistic sociolinguistic and cognitive theories. These are reflected in the language environment, language policies, the language syllabuses, the textbooks and the language teaching methods used in the classroom. This course will discuss the approaches to creative language teaching and assessment, the language curriculum and its implementation issues, as well as the underpinning psychological and sociological factors.

MML812 Education in Malay and Islamic Traditions
AUs: 3
This course focuses on the concept of knowledge in the Malay /Islamic traditions including traditional education, religious and secular education. Educational model and their effect on Malay society are discussed.

MML813 Critical and Creative Thinking to Enhance Learning
AUs: 3
This course focuses on cognitive and social factors affecting learning with a specific focus on types of thinking, the nature of critical thinking and creative thinking. Strategies for teaching specific thinking skills to enhance learning including the use of creativity and imaginative language education are discussed.

MML815 Discourse Analysis
AUs: 3
This course focused on how is discourse used to structure social processes and institutions. It introduces students to discourse analysis with a specific focus on critical discourse analysis (CDA) as a method of data analysis in literacy studies and educational research. Using examples of empirical studies that use CDA, it examines how social and power relations, identities, and knowledge are constructed through written and spoken texts in social settings such as schools, families, and communities. The course provides students with practice in CDA methods using data from Malay homes and Malay language classrooms and addresses the usefulness and limitations of CDA in relation to ethnographic approaches to educational research.

MML816 Contrastive Linguistic and Error Analysis

AUs: 3
This course aims to provide and overview of the theory of both contrastive and error analysis. In addition to the theoretical aspects of the course, there will be a practical component. The general purpose is to increase the students' awareness of areas in another language which might influence the learning of Malay language. Topics covered will include identification, description and explanation of learners' errors, interlanguage and the pedagogical exploitation of Error Analysis.

MML817 Literature Education
AUs: 3
The aims, objectives and development of literature education with special focus on the teaching of literature in Singapore. The principles, approaches, methods and assessment techniques of teaching literature are discussed including creative methods of teaching traditional and modern Malay texts. Issues related to the teaching of Malay literature.

MML818 Literary Criticism and Theories
AUs: 3
The course included a discussion of the major theories of literature and literary criticisms and its influences on creative writings and literary development including the development of Malay literary criticism and local theories. Reading and evaluation of selected texts based on the literary theories discussed. The uses and application of literary theories and criticism in learning and teaching of literature in schools will be explored.

MMM800 Critical Inquiry
AUs: 3
This capstone course requires the participants to identify a problem which forms the focus of inquiry, locate and read the most relevant literature and undertake some data analysis (as appropriate) to generate suggested potential solution(s) to address the problem. The solution(s) should show evidence that they are able to take the available information and restructure it in an appropriate way to deal with the problem. (This course is only available to participants selecting the coursework only option.)

MPM801 Educational Measurement: Theory and Practice
AUs: 3
This course introduces participants to the general process of educational measurement, beginning with the concepts and techniques of classical test theory. In addition, the participants will learn how to use computer programmes to analyse test data. Topics covered include role of assessment and evaluation in teaching and learning; true score model and error analysis; concepts of validity, reliability, objectivity and their roles in the process of measurement; descriptive and inferential statistics; construction of quality assessments and the interpretation of assessment results.

MPM802 Modern Educational Measurement Theory and Its Application
AUs: 3
This course introduces the Item Response Theory (IRT) in reshaping the paradigm of achievement testing. With the assistance of the computer, more sophisticated tests can be adaptively designed, administered and analysed using IRT models. The course focuses on the conceptual basis of IRT and its applications; the 1, 2 and 3 parameter models. Some popular IRT computer programmes will be introduced with hands-on exercises to facilitate the applications of IRT. Topics include basic concepts of IRT; manifest responses versus latent trait; probabilitic model; item and person parameters and their estimation; tests of model fit; issues relating to biases; classroom tests and large scale testing.

MPM803 Computer Assisted Assessment
AUs: 3
The rapid development of IT techniques has led to a great increase in computerization of educational and psychological testing and assessment. Together with the advancement of psychometric theory and techniques, the assistance of computers provides immense power for producing, storing, administering and scoring of large test data sets. This course will cover the general paradigm of computer assisted assessment; the basic stages to conduct CAA in the classroom as well as on a large scale basis; using commercial software to develop CAA and develping in-house tailored programmes.

MPM804 Attitude Measurement and Personality Assessment
AUs: 3
The measurement of attitude and personality traits generally adopts psychological processes different from

those used in achievement tests. This course aims to clarify principles of those processes and introduce various scaling methods according to Guttman, Thurston,and Likert. The participants will be able to understand different scaling procedures and use them in the various stages of instrument design, data analyses and result interpretation. Some well-established scales and related computer programmes will be introduced with hands-on exercises.

MPM805 Evaluation Methodology and Applications to Programmes
AUs: 3
This course will discuss the different types of methodology used in carrying out evaluation studies. Topics include evaluation questions and investigative approaches for answering them; proper procedures for evaluation studies using measurement and non-measurement data; qualitative and quantitative and qualitative measures focussing on the wider perspective of evaluations. The course will examine processes, implementation, outcome, impact and cost-effectiveness of programme evaluation.

MPS801 The Curriculum in Primary Education: Concepts, Applications, Issues
AUs: 3
This course will look at the concepts, principles and frameworks that underpin curriculum as a field of study. It will consider current views of primary education and the impact of the national education agenda on the curriculum in Singapore's primary schools. At the micro level, it will examine how some the aims of the curriculum are represented in school subjects e.g. English, Mathematics, Social Studies and Science, and describe and assess pedagogic practices in the primary classroom in relation to curriculum aims and values.

MPS802 Child Development and Learning in Primary School
AUs: 3
A major objective of teaching is to plan learning activities that successfully promote children's development. This course will provide teachers with an overview of theory and research in developmental psychology relating to the developmental changes that occur in children's social relationships, self-concept, cognitive development and learning during the primary school years. The focus will be on individual development and learning within the social context of the primary school. The course will place strong emphasis on exploring the practical implications for education of the theories and research reviewed.

MSC882 Research Methods in Science Education
AUs: 3
This course aims to introduce participants to the principles and techniques of research to enable them to read, interpret and carry out research studies in science education. It also aims to introduce participants to some statistical techniques commonly used in science educational research and also perspectives offered by qualitative methodologies.

MSC883 Issues and Trends in Science and Science Education
AUs: 3
This course aims to provide participants with perspectives on the nature, history and philosophy of science. Participants will gain insights into the interactions of scientists as a social group, the varying styles of scientific thinking and problem solving, and the changes in scientific knowledge over time. Issues and trends related to the teaching and learning of science will also be included.

MSC884 Science Curriculum, Instruction and Evaluation
AUs: 3
This course aims to provide participants with opportunities to examine key issues in planning, implementing and evaluation of the science curriculum, and their implications for research and development. It covers learning theories, curriculum models, assessment principles in the context of the entire process of science curriculum development, implementation and evaluation. Participants will be expected to examine and critique related research, to design and evaluate instructional packages based on theories and principles covered.

MSC885 Science Education Research Problem Identification, Definition and Exploration
AUs: 3
This is a pre-dissertation course, which allows the individual participant to identify, define and explore an area of research within science education that he/she is interested in, or which meets his/her academic and professional goals. Among other things, the participant will carry out the relevant literature review of the problem area and produce a research proposal for participant's dissertation. The course will also include

seminars to be conducted by participants on various topics such as key papers (one to three) representative of the research area that they are interested in, and the theoretical framework, concepts, issues and methodology of their intended research problem.

MSE801 Investigations in Special Education
AUs: 3
This course is designed to build upon the material covered in Educational Inquiry I and II. It will also introduce students to the research and research methods particular to Special Education. Students will have the opportunity to locate and review the literature in their field, work towards identifying a topic, and develop a method to investigate it.

MSE802 Issues and Trends in Special Education
AUs: 3
This introductory course provides an overview of issues, trends and research in Special Education, both internationally and locally.

MSE803 Investigations in Early Childhood
AUs: 3
This course is designed to introduce students to the research and research methods particular to Early Childhood. Students will have the opportunity to locate and review literature in their field, work towards identifying a topic, and develop a method to investigate it.

MSE804 Issues and Trends in Early Childhood
AUs: 3
This introductory course provides an overview of issues, trends and research in Early Childhood, both internationally and locally.

MSE806 Curriculum Design and Development
AUs: 3
This course introduces curriculum design and development models and practices pertinent to the field of special education. Students will learn about the 'why', 'what' and 'how' of curriculum design and development. Issues related to the process of curriculum implementation will also be covered.

MSE808 Learning Disabilities
AUs: 3
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.

MSE809 Human Development
AUs: 3
This course offers a general introduction to the study of human development and learning from infancy through until adulthood. Students will consider issues such as the roles of nature and nurture, the extent to which people develop because of what they are taught and what they experience. Students will also become familiar with the methods, concepts, and issues of interest in the study of human development.

MSE813 Professional Studies in Early Childhood
AUs: 3
Students will make an in-depth study in an area of relevance to professionals working in Early Childhood. The focus of the course is on professional behaviour in issues such as social contexts of childhood, curriculum, leadership, and relationships with parents and other professionals. Many of these issues are addressed through examples from arts disciplines (Visual Art, Music, Dance and Drama).

MSE814 Early Intervention
AUs: 3
This course provides a review of the research of early intervention targeted at students with disabilities and those at risk of developmental delay. The emphasis in this course is to gain an understanding of the wide range of research in this area, its methodology and quality, and to reflect on its relevance for Singaporean education.

MSE820 Differentiated Pedagogies for Learners with High Ability
AUs: 3
The learner is at the core of the teaching and learning process, and effective teaching and learning requires a renewed focus on the unique needs of the learner and an understanding of differentiated pedagogies to meet these needs. This course aims to help teachers understand models for curriculum design, development and differentiation. It offers systematic knowledge and skills to develop appropriate curricula and instructional approaches to accommodate learners with high ability.

MSE821 Understanding Learners with High Ability
AUs: 3
This course is an introduction to the intellectual, social and emotional needs of learners with high ability. The course provides an overview of the historical and philosophical background and current thinking in the education of learners with high ability. Teachers will be introduced to key conceptions of giftedness and intelligence, identification issues, and will develop an understanding of human potential and the nature and needs of learners with high ability.

MSE822 Character Transformation
AUs: 3
In the light of new MOE initiatives to inculcate values and develop character including social emotional learning (SEL) competencies, this course aims to prepare teachers at the Masters level with knowledge, insights and skills to develop character strengths in pupils. Character development is about individual transformation. Transformation is a deep and vital shift in something or someone, a change from one state to the next. It may happen at different speeds but a great deal of effort is needed. When people like teachers, pupils and parents choose to practise character qualities consistently and effectively in their lives, they will become happier, more purposeful, goal-directed, mature and wiser. This course highlights the essentials in character development, including the understanding of moral theories, the development of moral reasoning and volitional capacities. It discusses the composition of human character, volition to effect changes in oneself, goal-setting phenomenon and finally virtues development during teachable moments in adults and children. Growth theories and self-knowledge are also explicitly expounded.

MSE823 Teachers as Arts Researchers: Giving 'Voice' To Children
AUs: 3
This course is designed to ground early childhood and visual and performing arts students in the practical application of qualitative research methodologies, particularly ethnography and narrative enquiry. Students will apply principles and practices in their workplace by collecting, transcribing and analysing data with the support of experienced researchers in the field. The content focus will be on models of arts education practices in the classroom, and will foreground approaches to surfacing the voices of children through art, music, dance and drama. This course will be useful for laying the foundations for students wishing to undertake further independent research.

MSE830 Affective Needs & Moral Development of the Gifted
AUs: 3
A central concern in gifted education involves the understanding and resolution of the tension between talent development and personal growth, including social, emotional, moral dimensions and interpersonal relationships. This course discusses the typical personality characteristics of highly intelligent and creative persons. Other issues related to spiritual intelligence, emotional giftedness, intensities in energy levels and positive maladjustment will be explored. Discussions of Motivational and volitional strengths as sources of productive behaviours; underachievement and learning disabilities will be featured as well. In addition, instruments for measuring the personal attributes of the gifted and research methods to study the affective and moral capacities of the gifted youths will be examined to enhance the ability of significant professionals in this area to make a difference in their development.

MSE831 Identification of Potential & Interventions for Talent Development
AUs: 3
Human potential is indeed hidden and latent. This course presents concepts of gifts and talents, abilities and disabilities, in the intellectual, emotional, physical and moral realms. Extreme precocity and savant syndrome will be featured as interesting phenomena for the understanding of human capabilities. Identification methods, criteria and procedures, tests used to identify the gifted and assessment issues will be discussed in view of programming provisions and intervention possibilities. Alternative identification tools and forms of intervention will be introduced with regard to culturally deprived gifted population and invisible

underachievers. Developmental approaches to nurturing talent in an integrated context of special services, other educational options like pull-out programmes and talent search models will be examined for their impact.

MSE832 Critical and Creative Thinking for High Ability Learners
AUs: 3
The course will focus on achieving an understanding of creative and critical thinking processes in highly creative and intellectually gifted learners. It promotes pedagogy that is informed by whole brain research and functioning. Other than examining the 4Ps in creativity—the person, process, product and press, it will discuss the intricacies of the creative-problem solving process and what constitutes a creative product. The development of higher-order analytical thinking, logical thinking, perception, imagination and discovery will be included in discussions. Models of instruction will be explored for possible applications. The course aims to prepare teachers for the challenges of developing thinking dispositions in students and developing classes into thinking communities.

MSE833 Issues, Policies and Trends in Gifted Education
AUs: 3
Contemporary issues with regard to formal programming for the gifted; equity issues and the needs of gifted children, including the gifted from disadvantaged home background will be explored. Significant longitudinal studies, current research and future possibilities in the study of highly intellectual and creative students will be examined in view of application of research to practice. Policies on programming that includes Individual Education Plans, acceleration for the extremely precocious in the form of grade-skipping, curriculum compacting, early admission to college will be analysed. The 'rights and responsibilities' of gifted children and adults in the context of local and global communities will be discussed as well.

MSE834 Administration and Evaluation of Programmes for High Ability Learners and Talent Development
AUs: 3
This course presents guiding principles for the administration and evaluation of programmes designed for High Ability Learners and Talent Development. Standards for systematically developing, implementing and managing appropriate programmes to meet the needs of High Ability Learners at primary and secondary school levels will be examined. Issues relating to the integration of such programmes into general education programming; professional development and resources to support such programmes will be discussed. Programme evaluation will be stressed as an integral part of the programme improvement cycle to support decision making towards optimal impact of services (what works and what doesn't). Models and methods of programme evaluation will be explored with implications and recommended applications for practitioners in mind.

MSM800 Mathematical Inquiry
AUs: 3
This capstone subject requires the candidates to identify a mathematics problem to focus on and to read relevant mathematics research papers. The candidate would be required to simplify, construct or reconstruct some mathematics proofs or results under the supervision of a mathematician. A short written report is to be submitted at the end of the module.

MSM810 Advanced Calculus and Applications for Educators
AUs: 3
This module consists of two parts: advanced concepts in differential and integral calculus, and their applications in ordinary differential equations. The module will provide school educators with opportunities to link skills and knowledge in higher mathematics to related topics in mathematics at secondary and Pre-University levels. Material to be covered will be selected from topics such as functions and limits, derivatives and integrals, partial derivatives and multiple integrals, vector calculus, and solutions and applications of ordinary differential equations.

MSM811 Abstract Algebra for Educators
AUs: 3
This module is intended for educators who have never had a course in modern abstract algebra. It covers basic definitions and elementary properties of abstract algebraic systems such as groups, rings and fields. The sets of integers, rational numbers, real numbers, polynomials and matrices, which are studied in school mathematics, are concrete examples of rings with respect to the operations of addition and multiplication.

This module will help 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.

MSM812 Elements of Mathematical Analysis with Applications in the Teaching of Calculus
AUs: 3
This module aims to provide educators with the theoretic backgrounds for teaching topics in Mathematics such as Sequence and Series, Differentiation and Integration. Topics covered include: Sequence. Limit of a sequence. Finding limit of a sequence. Type of sequences. Recurrence relations. Series. Method of summation. Convergence of series. Sequence and series of variables (functions). Maclaurin's series. Approximation of functions by polynomials. Limits and continuity of functions. Differentiation. Rolle's Theorem, Mean Value Theorem. Definite integral as a limit of sum. Fundamental Theorem of Calculus. indefinite Integrals.

MSM813 Number Theory and the Teaching of Arithmetic (MME 819)
AUs: 3
This subject consists of exploring number theory and applications. The topics that comprise this subjects are Fibonacci, Lucas; Euclidean Algorithm, Greatest Common Divisor, The Fundamental Theorem of Arithmetic, Least Common Multiple, Pythagorean Triples, Linear Diophantine Equations; Infinitude of Primes, Distribution of Primes, Special Primes (Twin, Mersenne, Fermat); Fundamental Properties, Special Divisibility Criteria, Euler's Theorem, Fermat's Little Theorem, Linear Congruences, Chinese Remainder Theorem, Quadratic Congruences; Cryptography - Caesar ciphers, Exponentiation ciphers and Public Key Encryption Systems.

MSM814 Statistical Reasoning for Educators
AUs: 3
This module aims to develop an understanding of the statistical reasoning 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, statistical inference and modeling.

MSM815 Discrete Mathematics and Problem Solving (MME 817)
AUs: 3
This subject consists of two parts. The topics for Part A (Counting - Its Principles and Techniques) are the addition principle, multiplication principle, divisors of natural numbers, subsets and arrangements, bijection principle, binomial expansion, Pascal's triangle, principle of inclusion and exclusion. The topics for Part B (Graph Theory and Applications) are mathematical modeling using graphs, travelling salesman problem, graph colouring, the Konigsberg bridge problem, the Chinese postman problem.

MSM816 Geometry and the Teaching of Geometry (MME 815)
AUs: 3
This subject is designed to help educators re-examine school geometry using analysis and algebra. The subject will demonstrate that geometry, analysis and algebra can be blended together, resulting an expanded understanding of geometric ideas such as proof. The focus will be on the implications for teaching.

MSM817 Computing and Programming Techniques
AUs: 3
The aim of this module is to provide an introduction to programming using a common programming language such as C, FORTRAN or advanced CAS like Maple or Mathematica. The focus will be on writing computer programs for mathematical computations. Topics include computer basics, data, statements, control flow and structures, arrays, functions and subroutines, recursive techniques, testing and debugging. Examples of numerical methods will be discussed.

MSM821 Real Analysis
AUs: 3
Continuous functions, basic topology on the real line. Riemann integration. Measurable functions and absolutely integrable functions. Monotone, dominated and other convergence theorems. Fourier series.

MSM822 Functional Analysis
AUs: 3

Banach spaces, examples, fixed point theorem. Linear operators, representation of functionals. Selected topics in function spaces, norm topology and geometry of Banach spaces.

MSM823 Commutative and Noncommutative Algebra
AUs: 3
Commutative rings. Homomorphisms and ideals. Modules over commutative rings. Noncommutative rings and modules. Lie algebras and nonassociative algebras. Categories and functors.

MSM824 Topics in Applied Algebra
AUs: 3
This subject gives a survey of some applications of abstract and linear algebra. The aim is to give a flavour of the range of interesting applications of modern algebra, and is not meant to be an exhaustive treatment of each topic. Topics covered may include applications to coding theory, Markov chains, computer graphics, game theory. Concepts and results in algebra needed for the applications will be revised during the course.

MSM825 Theory and Applications of Differential Equations
AUs: 3
This module will consist of both theoretical treatment as well as practical applications of various classes and types of differential equations. Topics will include analytic solutions and numerical methods for ordinary and partial differential equations, as well as systems of differential equations. Applications in mathematical modeling will be discussed.

MSM826 Advanced Techniques in Applied Mathematics
AUs: 3
This module consists of two parts: a course work component on techniques in mathematical modelling and a practical component involving a mini-project. The course work component will equip students with advanced techniques in a specific area of mathematics (such as computational methods in partial differential equations), while the practical component will provide students with an opportunity to apply these techniques in a real-life problem. Topics for the mini-project may be prescribed or open.

MSM827 Statistical Methods
AUs: 3
Selected topics from statistical methods. e.g., regression models, design of experiment, time series, multivariate methods.

MSM828 Topics in Mathematical Statistics
AUs: 3
Selected topics from mathematical statistics e.g., theory of linear models, large-sample theory, estimation theory, hypothesis testing theory.

MSM829 Directed Graphs: Theory, Algorithms and Applications
AUs: 3
Digraphs, Connectivity, Tournaments, Orientations, Algorithmic Aspects; Distances in digraphs: Structure of shortest paths, Algorithms for finding distances, Minimum diameter orientations, Kings in digraphs, applications; Flows in networks: Flow decompositions, the residual network, the maximum flow problem, applications of flows.

MSM830 Vertex Colouring and Chromatic Polynomials
AUs: 3
Vertex colouring, Brook's Theorem, Critical graphs and Cliques. Vertex colouring of plane graphs, Four colour problem. Chromatic polynomials, the deletion-contraction formula, basic properties of chromatic polynomials, zeros of chromatic polynomials. Chromatic polynomials of chordal graphs. Chromatic equivalence classes. Chromatic unique graphs and open problems on chromatic polynomials.

MSM831 Differential Geometry
AUs: 3
Selected topics from differentiable manifolds, tangent spaces and vector fields, differential forms, Stokes theorem, Frenet formulae, quadratic forms on surfaces, and the Gauss-Bonet theorems.

MSM832 Topology

AUs: 3
Topological spaces, continuous functions. Separation axioms and countability axioms. Compactness.

MSS801 Current Issues in Adolescent Psychological Development
AUs: 3
This course provides a deeper understanding of adolescent psychosocial and moral development. Current issues on peer influence, juvenile delinquency, adolescent sexuality, depression and suicide, and the impact of the Internet will be discussed. Participants will also examine research on the efficacy of various strategies and interventions of working with youth.

MTL810 Tamil Literature in Education
AUs: 3
The aim is to develop various theoretical approaches in the study of modern poetry, short story, novel, drama using integrated language in – education approaches and techniques. In-depth study of selected topics in Tamil history and culture in sangam poems, medival literature, short story, modern poetry and novels. Selected topics include Tamil society, culture and values. Educational, historical and social changes in Tamil culture in Singapore, for example, critical enquiry in the reading of Primary Literary texts.

MTL811 Tamil Curriculum, Materials including IT: Selection and Evaluation
AUs: 3
The participants will be trained in the importance of curriculum development with the evidence of educational and psychological theories of learning and literacy development. The course will include current methods of selection, evaluation of IT related materials and assessment, as well as learning strategies for effective learning in language skills(will be taught in Tamil & English).

MTL812 Tamil Language Education
AUs: 3
The aims, objectives and development of language education with special focus on integrated approaches in the teaching of reading and writing of Tamil. Developing listening, speaking, reading and writing skills through integrated IT approaches, language acquisition and co-operative learning approaches(will be taught in Tamil & English).

MTL813 Special Topics in Sociolinguistics and Bilingualism for Tamil
AUs: 3
An introduction to the sociolinguistic situation in Singapore. Emphasis on special topics include Tamil as a first and second language in a multilingual and multicultural society, varieties of Singapore Tamil, modernisation and standardisation of Standard Spoken Tamil(will be taught in Tamil & English).

MUE801 Foundations of Music Education
AUs: 3
This course focuses on the historical, philosophical, psychological and sociological foundations of teaching and learning music. Included in the topics are attitude formation, creativity, cognitive processing and behavioral techniques.

MUE802 Music and Technology
AUs: 3
The mass availability of music has greatly affected how people experienced music, and, in turn, how music is taught. The course explores the various technologies available to music. It also looks at how technology changes have affected music making as well as music learning.

MUE803 Research in Music Education
AUs: 3
The course is concerned primarily with the various unique stages of music education research. It examines the major forms of music educational research methodology and relates them to the theoretical or ideological commitments of different researchers. It will also explore various available resources towards research in music education.

MUE804 Issues in Music Ed
AUs: 3
This course explores in depth current curricular thinking in music education in schools. Issues explored will

include the integration of IT in music into the classroom, multi-cultural and interdisciplinary approaches to music teaching, composing for children, and the value of music for developing creative and imaginative thought.

MUE805 Musical Practices
AUs: 3
This course allows the student to develop a range of practical musical skills relevant to the school music teacher. Students will select options to further their study from a list including solo and ensemble performance, composing, arranging, singing, choral conducting, band conducting, recorder playing and keyboard skills for the classroom applicable to their own situation.

SA801 Chinese Writing System (Chinese Paleography)
AUs: 3
Research resources and methodology; micro- and macro- studies; origins of the Chinese writing script; formal and structural evolution of the Chinese writing script; relationships between form, structure and meaning; analyses of selected texts in oracle bone and bronze inscriptions.

SA802 Chinese Syntax
AUs: 3
Field of Chinese syntax; methodologies of Chinese syntactic analyses; formation and classes of words; phrase structures and types; sentence structures and types; relationships between word, phrase and sentence.

SA803 Applied Linguistics
AUs: 3
Teaching approaches and methods in language teaching; syllabus design and curriculum development; curriculum evaluation model; comparing and contrasting two languages, interlanguage and error analyses; sociocultural variables in language learning, teacher education in language teaching; research methods in applied linguistics.

SA804 Chinese Literary Criticism
AUs: 3
Literary theories and practices in the Chinese tradition of literary criticism, including literary theories, critical studies of writers and works from the perspective of traditional Chinese literary criticism, in-depth studies of selected works of literary criticism; critical analyses and reevaluation of traditional Chinese literary criticism in the light of modern western literary theories.

SA805 Classical Chinese Poetry and Poetics
AUs: 3
In-depth study of selected topics in traditional Chinese poetry (including ci) and poetics, including the study of authors and works, poetic theories, and prosody.

SA806 Chinese History and Culture
AUs: 3
Study of selected topics in Chinese history and culture, such as Chinese historiography, traditional government of China, shi and Chinese culture, women in traditional China, Song culture, and cultural changes in modern China.

SA807 Special Topics in Chinese Lexicology
AUs: 3
In-depth study of significant aspects of Chinese lexicology. Selected topics include core vocabulary; lexical semantics; receptive vs. productive aspects of vocabulary; lexical variation; wordlist and frequency counts; collocation; corpus and concordance; wordlist and frequency counts; and the craft of lexicography.

SA808 Special Topics in Sociolinguistics
AUs: 3
Detailed study of sociolingusitics with special reference to the sociolingustic situation in Singapore. Selected topics include societal mutilingualism; qualitative formulas; quantitative approaches; ethnicity and social networks; language attrition; varieties of language; and language planning and standardization.

SA809 Special Topics in Chinese Rhetoric
AUs: 3
Detailed study of selected topics in Chinese rhetorical studies, such as peculiar rhetorical devices, norm and deviance, rhetoric and culture, the language of literary works, revitalization of traditional rhetorical techniques, use of dialectal expressions and essential writings in the history of Chinese rhetoric.

SA810 Special Topics in the History of Chinese Literature
AUs: 3
Studies of one or two topics essential to an in-depth understanding of traditional Chinese literature: society, civil service examination, education system and literature; influence of Confucianism, Taoism or Buddhism on Chinese literature; major themes in Chinese literature; pre-Qin, Tang or Song literature, and their significance in the history of Chinese literature; major literary schools and movements.

SA811 Studies in Chinese Classics
AUs: 3
In-depth study of selected Chinese classics which have far and wide influence in Chinese culture, such as The Analects, Mencius, Daodejing, Zhuangzi, Hanfeizi, Shiji, Jinsi lu, Chuanxi lu, and The Platform Sutra.

SA812 Special Topics in Chinese Philosophy and Religion
AUs: 3
Study of selected topics in Chinese philosophy and religion, such as pre-Qin Confucianism and Taoism, Wei-Jin Neo-Taoism, Song-Ming Neo-Confucianism, religiosity in Confucianism, the Taoist theory of inner alchemy.

SA813 Research In Malay Language Studies
AUs: 3
The aim of the module is to examine the theories and methodologies used in Malay Language studies. Candidates will be required to be engaged in critical analysis of current works pertaining to research in Malay phonology, morphology, syntax and semantics. Other relevant area of language studies such as comparative and contrastive studies including discourse analysis will also be dealt in depth.

SA814 Theory and Practice in the Study of Malay / Indonesian Literature
AUs: 3
This module examines the general literary theories, criticisms, approaches, methods and system of classification used in the writing of history and development of the Malay and Indonesian literature; main problems and issues related to it; new and latest research findings and view, and important and potential research topics and areas. The module aims to build a strong foundation and to explore new ground, in both theory and practice in the study of Malay and Indonesian literature.

SA815 Issues in Malay Studies
AUs: 3
This module examines the key and existing issues of Malay Studies through a critical review of existing works. Such a critical evaluation aims towards greater knowledge and understanding as well as the building up of research materials wherever possible and necessary. The module aims to identify new areas of research and to encourage the exploration of original and creative methods that could be developed from the current knowledge in Malay Studies.

SA 816 Special Topics in Sociolinguistics
Aus: 3
The detailed analytical study of the sociolinguistics with special reference to the sociolinguistic situation in Tamil Nadu and Singapore. Special topics include Tamil as a native, first and second language; multilingual nature; varieties of language, language acquisition and learning; language planning, modernization and standardization.

SA817 Special Topics in Tamil History & Culture
AUs: 3
In-depth study of selected topics in Tamil history and culture such as Ancient Sangam literature. Selected topics include the traditional governments and changes in Tamil culture; introduction of various religions; the primary and secondary roles of women in Tamil Nadu now and then; educational equality and the influence of historical and social changes in Tamil culture.

SA818 Special Topics in Tamil Syntax
AUs: 3
Research methodologies and theories used in Tamil language studies in relation with Tamil Syntax. In-depth study on Tamil phonology, morphology, syntax, methodologies of Tamil syntactic analyses, formation and divisions of words, phrase structure and types, sentence structures and types; relationships between word, phrase and sentence.

SA819 Graduate Seminar (Chinese Language & Culture)
AUs: 3
This course is compulsory for all postgraduate students (by research). It is designed to introduce participants to the theoretical foundation of educational research on Chinese language & culture. Every participant will be scheduled to present at least one research paper orally during this course. He/she has to discuss the scope of the presentation with his supervisor and submit an abstract of his/her presentation at least one week before the presentation. After the presentation, the lecturer will facilitate a discussion of the research topic amongst all participants. A copy of the paper is to be submitted to the lecturer within the next two weeks.

SA821 Current Research In Linguistic Pragmatics
AUs: 3
This subject will provide an overview of core theories in pragmatics as well as a review of the latest research in pragmatics. Among the topics covered are the nature of reference, information structure, Speech Act Theory, Gricean pragmatics, Conversation Analysis, and common ground.

SA822 Lexical Approaches To Language Description and Vocabulary Learning
AUs: 3
The course will explore lexical approaches to language description such as pattern grammars and collocational patterns, Sinclair's 'idiom principle' and Hoey's concept of lexical priming. The impact of such lexically-oriented frameworks for language description on lexicography and language teaching will then be examined through reviews of innovations in dictionary production, syllabus design and vocabulary learning tasks.

SA823 Academic Discourse
AUs: 3
The course introduces participants to the conventions of academic discourse in preparation for the writing of their postgraduate thesis/ dissertation. Course participants will analyse texts from their own discipline to observe the discourse practices in their discourse community and learn cognitive and metacognitive strategies for producing these types of writing.

SA824 Written Discourse Analysis
AUs: 3
The course will examine a variety of theoretical and analytical models, approaches and concepts concerned with text. It will include consideration of the similarities and differences among different types of discourse and ways in which knowledge about text and text analysis is relevant and applicable to pedagogical contexts.

SA825 English As A Global Language
AUs: 3
This course explores varieties of English around the world from a sociolinguistic perspective. Students will analyse the social and historical contexts in which these varieties evolved, the status of new varieties of English in relation to that of more established varieties, their role in forging national and community identities, and problems in standardizing these varieties.

SA826 Advanced Phonetics and Phonology
AUs: 3
This course focuses primarily on the history as well as current developments in the field of phonetics and phonology. It aims to provide a very broad and thorough theoretical background for students who may be interested in attempting a post-graduate research topic in this field. A basic methodology for doing experimental work in phonetics and/or phonology will also be introduced.

SA841 Resource Use: Cooperation and Conflict Resolution

AUs: 3
This subject will introduce students to various concepts on resources, resource stewardship and sustainable resource use. It will then document the different types of resource use conflicts from local to global scale, examines the origin of these conflicts and discusses how such conflicts could be alleviated or resolved. Emphasis will be placed on selected conflicts relevant to the Southeast Asian region and the manner in which attempts are being made to resolve them. The course will consist of lectures, seminars and role-playing by course participants to resolve hypothetical conflicts. Students are trained to view conflicts in a holistic manner and to use negotiation in resolving conflicts, which are often complex and multi-faceted. Students are expected to read widely and make extensive use of the web. Assessment will be based solely on seminars and project work on an area of conflict.

SA845 Globalisation and Urban Land Use Change
AUs: 3
The subject investigates a series of intriguing questions of land use development in cities: in what ways are the impacts received by world cities in core developed countries different from mega-cities in the developing world? How would the city form be anticipated to develop in these two types of cities? Is the coexistence of concentration and decentralisation of city forms a generally acceptable pattern? In-depth analysis of the dynamics of selected world cities and mega-cities in the developing world is included.

SA847 Module: Catchment Dynamics and River Management
AUs: 3
This module covers conceptual, and practical aspects of channel, floodplain and drainage basin response to environmental change resulting from natural processes and anthropogenic activities. Special emphasis will be given to regulated rivers and their responses to natural phenomena such as the climate change and human interference such as channel alteration and land use change. The place of river harnessing in managing the water resources will be discussed. In-depth local and regional case study will form an integral part of the course. On completion of this module, students should be able to undertake some basic environmental reconstruction and field interpretation of fluvial sediments and landforms; assess the relative importance of natural and anthropogenic factors responsible for catchment disturbance and river instability; evaluate and forecast the impact of changes in climate, land-use, and engineering in rivers and catchment systems.

SA848 Transnationalisation of Capital, Networks and Contested Economic Space
AUs: 3
This course discusses the changing economic space arising from capital flows. It examines the strengths and weaknesses of local firms in responding to the process of transnationalisation of capital and the options that are open to them in contesting for an economic space in an increasingly competitive global economy. The complexities of corporate networks, cultural links, institutional frameworks and others will also be discussed. The experiences of firms in developing countries will be used as examples.

SA849 Quantitative and Computing Methods in Geography
AUs: 3
This course introduces students to a range of quantitative and computing methods and techniques most frequently used for geographical research and problem-solving. A sequence of lectures, practical exercises and course projects will guide students through a range of techniques covering
(1) statistical techniques for geographical data analysis;
(2) simulation modelling for geographical systems analysis;
(3) spatial allocation models; and
(4) multi-criteria analysis and linear programming for land use optimisation. Students will gain hands-on experience in using an advanced statistical software package for statistical analysis, a microcomputer-based spreadsheet for simulation modelling, and integration of GIS with multi-criteria analysis for land use allocation.

SA851 Geographical Perspectives of Globalisation and the Nation-State
AUs: 3
Globalisation has fascinated researchers because of the compression of space and time that has been allowed by advances in telecommunications. In highly globalised economies, the competitive edge means to have international communications networks link up global trading centres and stock as well as financial centres. Such global trends as well as flows of investment, goods, services information and even people have led to the proliferation of literature that has as its focus the relevance of the nation-state and national

identity in a rapidly globalizing world. This module focuses on 'unpacking' the meanings of the outcomes of globalisation for the nation-building project and in the process, national identity and the sense of nationhood.

SA852 Capitalism, Development and Urban Change
AUs: 3
Focus is on the relationships between modern capitalist development and the associated spatial evolution involving urban change. The module explores theories and ideologies of development in the context of industrial capitalism of the colonial powers and post-colonial capitalism as applied in post-war independent nations. The dynamics of modernization and urbanization taking place in post-war independent Asian nations are examined in general. Case studies of Asian cities which have grown from small colonial settlements to present-day metropolitan centres will be selected for further illustration and analysis with reference to their specific features

SA861 History and Popular Culture
AUs: 3
This course deals with how history is represented or misrepresented in popular culture. Included are issues such as how accurate are historical films, how history is presented in museum exhibitions and school history textbook ideologies.

SA862 Theoretical Frameworks in International Relations
AUs: 3
This course seeks to provide a basic understanding of the three core theoretical approaches governing world politics. These are Realism, Pluralism (or Liberalism) and Marxism (or Structuralism). Each approach will be analysed in terms of their strength, relevance limitations and implications to past and current world events. This analysis will be extended further to include an examination how each approach can help explain global issues such as conflicts, change, cooperation and the interplay between economics and politics. Additionally, the development and role of theory in the social sciences will also be discussed with particular reference to international relations.

SA863 Imperialism, Nationalism and Decolonisation
AUs: 3
This subject covers theories, historiography and case-studies in Imperialism, Nationalism and Decolonization. Content will be tailored for research in chosen areas and will be set from: Theories of Imperial Expansion; Theories of Decolonization; Theories of Nationalism; Approaches to Colonial Contacts and Cultures; Approaches to Post-Colonial Relationships and States; Case-studies of a Nationalist Subject; Case-studies of an Imperialist; Case-studies of a country or region of specialisation; Case-studies of an event.

SA864 Technology and Change in Southeast Asia, 19th Century to 1945
AUs: 3
This subject begins with a discussion of the forces behind the rapid expansion of European "New Imperialism" in Southeast Asia, emphasizing Daniel Headrick's interpretation of the impact of technological change in this process. The rest of the course deals with the role of the colonial governments (mainly the British and Dutch), European firms and individuals and the indigenous population in the overall development of science and technology in countries like Singapore, Malaya and Indonesia. It ends with a discussion of the impacts of the Japanese occupation on the progress of science and technology in this region.

SA865 Science, Technology and the Economics Development of Asian IESs, 1945 to the Present
AUs: 3
Interpretations of the economic transformation of East Asia, Hong Kong and Singapore; the "flying-geese" model and the concept of "technologyless" industrialization. Outstanding characteristics of this East Asia development model; the impact of Confucianism; role of governments in the evolution of science and technological policies.

SA866 Issues in Contemporary Chinese History
AUs: 3
This subject focuses on the key issues in Contemporary Chinese politics: military Communism to Deng's reforms, the Chinese Communist ideology (Marxism-Leninism, Mao's thought and De-Maoisation), political institutions of the party-state, the cadre system (leadership style, factionalism and succession), Centralism versus Regionalism, the military's role in Chinese politics of modernization.

SA867 Readings in Diplomatic and Military History
AUs: 3
Students will be expected to master the major historiographic trends within their primary or secondary fields of study. The selection of readings will be tailored to the specific research objectives of the students and the specialisation of the tutor.

SA868 Modern Economic Transformation in Southeast Asia
AUs: 3
This course seeks to provide a broad understanding of the process and dynamic of modern economic transformation in Southeast Asia from ca. 1400 to 1990s. The first part of the course examines the economic of growth and the change in the region in the context of global economic development. The second part of the course is thematically organized and devoted to examine various aspects of modern economic transformation with reference to specific countries in a comparative perspective.

SA870 Multicultural Studies
AUs: 3
Our globalising world implies that dealing with multicultural contexts has become an inevitable part of modern life and particularly life in a post-industrial and urbanised world. In Singapore the terms 'multicultural' and 'multiculturalism' have been used increasingly in recent years. 'Multiculturalism' has often also been assumed to speak only of race or ethnicity, but it is much more than that. 'Multiculturalism' also addresses class, gender and other social structures. It also speaks of a frame of mind, of whether a society is pluralistic, that is, really open to and truly embraces diversity, of the multiplicity of voices that help to find a consensus that best guarantees equality and justice.

SA871 Oral History and Memory
AUs: 3
This subject covers the practice of oral history and theoretical issues that it raises. These include the nature of memory and how it is reconstructed in the present through reinterpretation. Also covered is the reliability of oral testimony generations after the historical events being discussed have passed. The relationship between oral history as a historical source and other sources, such as the written word is also assessed. Students will be introduced to the ways oral history has been represented, such as in museum exhibitions, community history, film and the media.

SA881 Music Composition
AUs: 3
The main project involves a composition by each participant. Genres chosen are subject to practical performance considerations. Seminar sessions are based on the presentation and discussion of works-in-progress by the participants as well as their completed compositions, focusing on compositional approach and technique as well as analysis. Selected works representing a range of recent "movements" in composition will also be studied. The course will also involve studying procedures used during the rehearsal of the composition projects and will culminate in a performance recital of the participants' works.

SA882 Music Analysis
AUs: 3
A study of various analytical concepts and methods applicable to music from the common-practice period and the twentieth century. Major analytical theories will be introduced and their merits evaluated so that appropriate analytical approaches can be adopted according to the analytical demands at hand. Meta-theoretical issues will be considered.

SA883 Performance Studies in Music
AUs: 3
A written submission of about 5000 words on one of the following areas:
i. Studies in theoretical accounts of instrumental technique and performance practice;
ii. Studies of repertoire of a particular period in relation to performance practice and instrumental technique;
iii. A study of a single substantial work with implications for performance practice and instrumental technique.
A lecture and public recital of the works discussed in the written submission.

SA884 Performance Studies in Ethnomusicology
AUs: 3
The candidate will undertake studies in one instrument of a specific musical culture. This will culminate in a public solo or ensemble recital of about 30 minutes accompanied by a presentation about the ethnic instrument. (A recording may be admissible under certain circumstances)

SA885 Asthetics and Philosophy in Music
AUs: 3
This module is concerned with the way in which music is viewed from perspectives in aesthetics and philosophy. This module makes a selection from the notated and non-notated repertoire of western art music as well as the art and folk music traditions around the world. A discussion of the practice of music is the starting point for this module, although greater emphasis in placed, from an interdisciplinary perspective, on the critical implications of viewpoints expressed by practitioners, philosophers, theorists and aestheticians.

SA886 Research in Musicology
AUs: 3
An introduction to musical historiography, giving the student a good foundation for research in musicology. The course will help the student acquire basic music research skills. At the same time, the history of the discipline and more recent trends in the field will be discussed to help the student contextualise his/her own research.

SA887 Advanced Music Research Topic
AUs: 3
This module offers the student a chance to explore in some detail a second topic besides the dissertational one. This can be a more advanced study on a specific topic in the area of Music Education, Musicology, Ethnomusicology, Music Theory, or any music-related subjects including interdisciplinary ones.

SA901 Art and Technology
AUs: 3
The different technologies of image-making, past and present, have offered various possibilities (and constraints) for the manipulation of imagery, the expression of ideas and the representation of the world. This topic will involve students considering a range of technologies available in past and present times for the making of art, including some traditional art materials, the technologies of print, and also electronic media. In both theoretical and practical work, students will consider the variety of ways technologies have shaped the expression of ideas and emotions.

SA902 Reviewing and Interpreting Exhibitions of Artworks
AUs: 3
This involves the critical appraisal and review of artworks in an exhibition. The project will entail study of a range of approaches to the interpretation and analysis of artworks. To this end, students will be expected to acquaint themselves with key writings on the study of meaning in art works and theories of interpretation and analysis. The project will culminate in students preparing a written review of an exhibition of artworks.

SA903 Performance and time-based art
AUs: 3
This topic will entail the study of performance, movement, dance and other time-based art forms and their potential for the expression of ideas and feelings. The topic will involve studies of some aspects the history of performance art and dance, and will culminate in the students presenting a time-based, performance work or dance.

SA904 Artmaking and Aesthetics Inquiry
AUs: 3
This module explores contemporary aesthetics studies in the visual arts. Implications about current visual theories and their application to art processes will be considered. The final project constitutes a commitment in working with a body of original work taken through to exhibition status.

SA905 Visual Arts Research Methods
AUs: 3
This module examines the history of the discipline and explores various methodologies, critical theory, and resource material for visual arts research. This involves techniques of scholarly and critical writing and

evaluation of bibliographic sources. At the same time the conceptual and theoretical issues attending the integration of technology into visual arts research are explored.

SA971 Advanced Topics in Applied Cognitive Developmental Psychology
AUs: 3
The latest empirical findings and theories in cognitive developmental psychology will be examined in this course. A specific focus is the development of working memory and executive functioning. Other topics that may be covered are the development of attentional processes, knowledge representation, and the neural substrates of behaviour. Relating cognitive development to children's academic performance will be a particular focus of this course.

SA972 Advanced Research Methodologies in Psychology
AUs: 3
Recent advances in research methodologies are studied using a series of readings and exercises. Topics may include longitudinal designs, functional magnetic resonance imaging, and the use of multivariate techniques in applied research settings.

SA973 Advanced Topics in Creativity and Talent Development
AUs: 3
This module aims to present the state of art and new understanding of creativity and talent development. The topics include identification, diagnosis and counselling of potential talented students and talented students with learning disabilities. The new approaches highlight the total talent or strength development for all students, positive growth, individualised counselling, improved academic achievement, and engaged learning paths. The module also examines successful creativity and talent development projects, school-based programs, services, interventions, mentoring, curriculum and creative pedagogies.

SA1000 Experiential Inquiry
AUs: 3
This subject provides the opportunity for students to select an area of interest (eg. inclusive preschool) or a particular group of individuals (eg. adults with autism in vocational settings), which will become the focus of an in-depth experiential inquiry. After identifying the focus for their experiential learning and contacting an appropriate site for attachment, students will engage in activities such as teaching and learning opportunities and working directly with relevant stakeholders to gain a deeper understanding of the quality of service provision. Students are expected to complete an assignment that consists of learning how the particular site(s) cater to its clientele, assessing the quality of services, and proposing a constructive action plan. This subject is particularly applicable for individuals from the PDCM route who may desire to have more direct experiences in SE or EC.

SA1001 Researching with Young Children: Connecting Qualitative Methods with Contexts, Issues, and Dilemmas
AUs: 3
This course will allow participants to become more aware of the dilemmas and issues involved in ethical qualitative research with young children (preschool & primary).

Participants will explore issues of power, subjectivity, and voice in researching with children and adult "gatekeepers" (e.g. research ethics, ways to enter the field, building relationships with participants, representation of data).

These issues will be addressed through fieldwork including observations and interviews of children in natural settings, the creation of field notes and transcripts, collection of artifacts; and the analysis of data.

SA1002 Assessment of Children and Youth
AUs: 3
This course offers an introduction to assessment and testing in early intervention, special needs, and gifted education. Topics to be covered include: foundational concepts in assessment, technical aspects, purposes, assessment processes, approaches, testing procedures, ethical issues, and collaboration with other professionals.

SA1003 History and Reform in Curriculum

AUs: 3
This subject will re-examine the historical changes of curriculum to problematise and reconstruct the nature of curriculum reform. The historicising of curriculum will allow us to rethink curriculum change as a non-linear and uneven transformation contingently formed by the complexity of power relations which draw from different historical trajectories. The amalgamation of multifarious discourses makes impossible the logical and causal history of curriculum that has been taken for granted before.

SA1030 Citizenship Education: Trends and Issues
AUs: 3
This subject introduces participants to the major concepts, perspectives and models of citizenship education. Key issues such as the contested nature of citizenship education, the democratic ideal, impact of globalisation, citizenship education in the school curriculum will be examined. The major cross-cultural and national studies in citizenship education will be critically analysed for their findings, methodologies and implications. Case studies of citizenship education in the different types of democracies, such as western democracies, 'Asian' democracies, and newly emerging democracies, will be discussed. Special attention will also be given to the development of citizenship education in Singapore. The role of the teacher as a citizenship educator will be addressed.

SA1031 Sociology of Curriculum
AUs: 3
This course will focus on curriculum issues that have a strong combination with contemporary sociological theories. These issues include, but not limited to, the dual notion of power which shapes curriculum knowledge and school subjects, equity problematic vs problematic of knowledge in the production of school curriculum, globalisation and national imaginaries that bring in the topics of cultural hybridity, cultural anxiety, cultural dislocation and historical amnesia in curriculum decision-making, and cosmopolitanism which normalises the school subjects through demarcating the civilised and non-civilised in educational practices.

SA1032 Trends and Issues in Contemporary Curriculum Discourses
AUs: 3
This course explores main currents in curriculum theory. It involves a variety of curriculum discourses that form multifaceted curriculum understandings. Among others, we will draw attention to curriculum discourses that link political theory, feminism, aesthetics, racial and ethnic theories, institutionalism, phenomenology, and all 'posts.' The reviewing of advanced conversations and debates over various problematics in curriculum would help open new possibilities in the invention of our own curriculum theory(ies).

SC801 Trends in Chemical Science and Technology
AUs: 3
The chemical trade and industry of Singapore, petrochemical and pharmaceutical industry their allied industry. Modern chemistry and technologies pertaining to environmental pollution, chemical waste management and good practices. Small chemical producers and businesses. This module is intended to give students a comprehensive understanding of the contributions of chemical science and technology to the national economy and policy of Singapore. Course content may vary from year to year.

SC804 Biotechnology and Microbiology
AUs: 3
Growth mechanisms. In vitro Biology. Explant culture and micropropagation techniques. Organogenesis, somatic embryogenesis and protoplast culture. Genetic stability and variation: somaclonal. Genetic manipulation via transformation, cellular hybridization and mutagenesis. Control and alteration of metabolic pathways and hormonal metabolisms. Biotechnology of crop improvement and commercial application. Recombinant technology in medical sciences. Cellular defence mechanisms and immunology. Diagnosis using DNA probes, production of monoclonal antibodies. Transgenic animals. Microbial growth and manipulations. Fermentors and bioreactor systems. Microbes in health, disease, industrial, food and environmental applications. Fermentation technologies. Recent advances in rapid automation and detection methods for microbes.

SC805 Molecular Biology
AUs: 3

Topology of nucleic acids. Genetic regulation of prokaryotes: control at transcriptional and translational levels. Recombinant DNA technology: principles of gene isolation, cloning. Types of cloning vectors. DNA, RNA and protein analysis methods. DNA sequencing and polymerase chain reaction. Dynamics of DNA in genomes. Satellite DNAs and molecular markers for differentiation. Transformation and transgenics in eukaryotes. Genes in the development of prokaryotes and eukaryotes. Scientific discussion and seminars are included.

SC806 Population Ecology
AUs: 3
Analyses of density and estimation of growth rates and parameters for species with age structure, and for open and closed populations; population dynamics and regulation; one species, and two-species (pairwise interactions) models; equilibrium density; deterministic dynamics; population dynamics with stable equilibrium point, with an unstable equilibrium point; metapopulation dynamics of rare species; stability, resilience, and resistance in stochastic systems; role of evolution, models in population ecology; application of population ecology in commercial harvesting of natural populations and environmental problems.

SC807 Genetics
AUs: 3
Transmission genetics. Mendel's laws of inheritance. Genes, phenotype, alleles and recombination. Structure and function of DNA, genes and chromosomes. The central dogma: DNA-> RNA -> Protein. DNA replication and recombination. Cloning and manipulation. Regulation of genes and its expression. Genetic codes and protein synthesis. Genes and development. Genetic analyses of viruses and bacteria. Extrachromosomal inheritance. Population and evolutionary genetics.

SC808 Current Issues in Life Sciences
AUs: 3
Recent developments in life sciences, and the implications of these developments and their impacts on society will be covered. Readings and discussions on the latest issues in the life sciences will be the focus of this course.

SC809 Herpetology
AUs: 3
Biodiversity, taxonomy, phylogeny, and biogeography of selected taxa, such as, amphibians, turtles and crocodilians, lizards and snakes. Thermal ecology and physiological ecology in squamate reptiles; energetics; foraging and trophic ecology; evolution of parasite-host relationship, and anti-predator adaptations; life history strategies; parental investments; reptilian assemblages and spatial organisation; homeostasis; population dynamics and modelling of endangered taxa.

SC810 Advanced Molecular Genetics
AUs: 3
Molecular cloning, different cloning and expression vectors, advanced molecular cloning and sequencing techniques. Application of modifying enzymes and different types of Taq polymerases, trouble shooting and cloning using PCR. Protein expression and purification technology. Current topics in molecular biology will be discussed and seminars will be conducted.

SC811 Plant Pathology
AUs: 3
Molecular research in plant microbe interactions: pathogenicity, symbiosis and biocontrol. Current problems in epidemiological and disease control studies. Recent advances for early detection and diagnosis of plant diseases: automation, immunoassays, DNA probes. Trends in development of fungicides, integrated pest management strategies, induced plant defences (immunisation, systemic acquired resistance or SAR), genetic engineering of disease resistant plants.

SC812 Biochemical and Physiological Adaptations
AUs: 3
This module deals with the physiological and biochemical adaptations of various organisms eg. Onchidium tumidium (intertidal gastropods), Phascolosoma arcuatum, (Sipunculid), mudskippers (amphibious fish), snake-head, catfish and eel (freshwater fishes) to their specific habitats. Nitrogen metabolism, acid-base balance, osmoregulation, anaerobic metabolism, metabolic arrest and tolerance to high toxicants in the

environment will be included. The topics taught will vary from time to time and will be based on the most current information in this area of research.

SC814 Intertidal Ecology
AUs: 3
Physical, chemical and biological features of the intertidal zone. Fauna of special habitats. Tolerance of environmental stress. Establishment and maintenance of zonation patterns. Energy acquisition in the intertidal zone: food resources and energy partitioning, mechanisms of feeding and factors affecting rate of feeding. Food webs and keystone species.

SC815 Advanced Plant Physiology
AUs: 3
The processes of plant adaptation to both abiotic and biotic environmental factors. The biochemical, physiological and morphological attributes of plants and the molecular mechanisms underlying the expression of these attributes. The topics will be leant through lectures, cooperative learning, and discussion on selected current research literatures of plant physiology.

SC818 Evolution and Phylogeny
AUs: 3
The shared history and ancestry of living things can account for the unity as well as the diversity of living things. It can also explain the myriad modes of life and adaptations of living things to their environment. This course will explore the history, concepts, and applications of evolutionary biology, and look at the related field of systematics and phylogeny. In addition, there will be emphasis placed on the discussion of current topics in evolutionary biology and a hands-on familiarization of methods in phylogenetic.

SC821 Physical Methods In Structural Elucidations
AUs: 3
Principles of electronic absorption spectroscopy, nature of radiation, ground states and excited states and selection rules. Simple symmetry treatment of molecules leading to IR/Raman active modes. Mass spectrometry, principles and simple fragmentation patterns. Magnetic susceptibility measurements and magnetic behaviour of inorganic compounds. Magnetic resonance spectroscopy, principles and interpretation of nuclear magnetic resonance NMR spectra (proton and other common nuclei), electron magnetic resonance ESR spectra.

SC823 Advanced Research Techniques In Chemical Synthesis
AUs: 3
Design of synthetic pathways, thermodynamic and kinetic factors, feasibility from logistic and economic considerations; limitations and precautions. Purification techniques and methods for growing of single crystals for X-ray crystallography and preparation of samples for spectroscopic analysis. Handling of air- and moisture-sensitive compounds.

SC825 Environmental Analytical Chemistry
AUs: 3
Introduction and overview of advanced analytical methods and instrumentation in environmental science and related services. The chromatographic theory. Trace metal and organic pollutant analyses. Capillary electrophoresis. Detection methods /devices and quality control. Modern trends in the ultra-trace analysis for potable water and on-line analysis. Case study.

SC826 Separation and Purification of Materials
AUs: 3
This subject seeks to promote students' awareness and understanding of the science and technology of separation and purification of raw materials or intermediates needed by commercial and industrial sectors. A strong growth in the value-added products for raw materials as well as intermediates is expected for the regional and global growth.

SC827 Polymer Chemistry
AUs: 3
Introduction and classification of polymers, biopolymers and synthetic polymers, solubility and miscibility of polymers, molecular mass and molecular mass distribution, polymerization processes; kinetic and mechanism of step-reaction (condensation) polymerization and radical-chain reaction (addition)

polymerization, common plastics and their applications, thermosets and thermoplastics, biopolymeric materials and their applications, specialty polymers.

SC828 Surfactant Chemistry
AUs: 3
Introduction to surface and colloid chemistry: thermodynamics of surfaces, surface tension, capillarity, surfactants, micelles, thermodynamic of micellization, solubilization, Gibbs adsorption equation and Langmuir adsorption isotherm.

SC861 Topics in Analysis
AUs: 3
Selected topics from functional analysis (Banach spaces and geometry of Banach spaces), real analysis (theory of integration), and topology.

SC862 Topics in Algebra
AUs: 3
Selected topics from commutative Algebra, category theory, ordered structures.

SC863 Topics in Probability and Statistics
AUs: 3
Selected topics in probability theory, stochastic processes, mathematical statistics (theory of estimation and hypothesis testing), applied statistics (regression analysis, time-series analysis, design of experiments, etc).

SC864 Topics in Mathematics
AUs: 3
Selected topics from real analysis, functional analysis, algebra and topology.

SC865 Topics is Applied Mathematics
AUs: 3
Selected topics from differential equations, mathematical modeling, optimization, computational science, probability and statistics.

SC866 Topics in Mathematics II
AUs: 3
Selected topics from real analysis, functional analysis, algebra and topology.

SC867 Topics in Applied Mathematics II
AUs: 3
Selected topics from differential equations, mathematical modeling, computational science, probability and statistics.

SC841 Dimensions of World Energy Problem- Role of Plasma Fusion
AUs: 3
This subject surveys the various sources and resources of energy available to the world. It looks at historical consumption pattern and projects world requirements into the future, using various scenarios. It is apparent that within a century from now, new sources of energy will be needed. The strongest candidate as a long-term solution is fusion energy from plasmas. The historical route of science towards the present status of world fusion programmes will be traced. Large programmes will be briefly described, as will small programmes which has led to international scientist-to-scientist collaboration, resulting in networks which have strengthened research capacity in developing countries leading to many applications as spin-offs to the research on fusion plasmas. Thus a scenario is sketched in which the long-term energy problem of the world is solved, ensuring continuity in the progress of human civilization. At the same time many important applications related to advanced materials, microelectronics, radiation and the environment are also brought to fruition.

SC842 Laser and Optical Technology
AUs: 3
At the end of the course, students will be familiar with technology associated with solid state lasers, gas lasers, dye lasers, diode lasers.

Laser Control: Longitudinal and transverse mode selection, mode locking, Q-switching, laser amplifiers, pulse chopping, pulse lengthening, pulse compression, frequency selection.
Laser Optics: laser optics (mirrors, polarizers, lenses, electro-optical, nonlinear, fibre optics), Aberrations (spherical, chromatic), Materials Characterization of a laser:Energy, pulse shape, wavefront, divergence, coherence, modes, polarisation Techniques to characterise lasers: calorimetry, photo-diodes, PMT, correlation, interfereometry, spectrometry.
Students will have to complete assignments related to the course and their project.

SC844 Plasma Diagnostics
AUs: 3
Measurements of amplitudes and phases of rf current and voltage. Wire-wound and Hall magnetic probe diagnostics. Langmuir probe measurements for plasma density, electron temperature, plasma potential and electron energy/probability distribution functions. In-situ optical emission spectroscopy of plasma species. Mass spectroscopy of radicals and nonradical neutrals in chemically active plasmas.

SC845 Wave Propagation
AUs: 3
Wave equations. Wave propagation in dissipative medium. Maxwell equations.
Telegrapher equation and specialisation to transmission line equation.
Path integral methods and application to solving telegrapher equation.
Waveform distortion, prediction and restoration.

SC847 Industrial Applications of Infrared Spectroscopy
AUs: 3
The infrared vibrational spectroscopy is a technique that is widely used in industry. It provides information on the chemical structures and physical characteristics of materials; they are used for identification of substances by 'fingerprinting'; and they are used to provide quantitative information on products and processes. The technique is now used to characterise by-products, end and formulated products, feedstock, fabricated materials, semiconductor materials, gas pollution, and in de-formulation (reverse engineering) studies of competitors' products. It has multi-disciplinary applications across all sciences.
The content of this subject consists of the theory and principle of infrared spectroscopy, instrumentation, sampling techniques and accessories, and quantitative analysis. The course will be conducted in the form of lectures, tutorials, and laboratory work on some industrial products using an infrared spectrometer.

SC848 Applications of Physics in Medicine and Biology
AUs: 3
Waves vs Photon; Atomic Spectra; Biological Examples of Emission, Absorption, and Fluorescence. Production of X-rays; Absorbed Dose and Exposure; Biological Effects of Radiation; Medical Uses of X rays. Nuclear Decay Rate and Half- Life; Cumulated Activity and Sample Dose Calculation; Nuclear Medicine. Laser; Autofluorescence; Laser Induced Autofluorescence Techniques and Cancer research. Ultrasound and Doppler Effect; Ultrasound to Measure Motion; Ultrasound pictures. The Source of Magnetic Moment and Magnetic Moment in an External Magnetic Field; Relaxation Times; Introduction to Magnetic Resonance Imaging.

SC849 Quantum Computation
AUs: 3
Quantum Computation is an emerging interdisciplinary field that with great potential as the next generations of computer technology. It is not merely able to miniaturise the storage capacity of conventional computers; it is also able to perform certain task deemed computational hard in classical computer. This course aims to provide an overview of this emerging field with sufficient rigor for a working in this area.

SC850 Introduction to Quantum Field Theory
AUs: 3
The course will being with path integral in quantum mechanics, followed by quantization of classical fields. The lambda-phi-4 model will be treated in detail, ending with ideas of renormalization.

SC851 Quantum Mechanics 1
AUs: 3

Introduction to quantum mechanics, wave packets, wave equation, Schrodinger equation, operator algebra, principles of wave mechanics, solution of Schrodinger equation with different potentials, WKB approximation, variational methods, vector spaces, eigenvalues and eigenvectors of operators and angular momentum. \

SC852 Quantum Mechanics 2
AUs: 3
Scattering, quantum dynamics – principles of Feynman's path integral formulation, spin, polarization and scattering, density matrix, measurement and information, rotation and other symmetry operations, perturbation theory.

SC853 A Primer To Quantum Cryptography
AUs: 3
Secure and robust communication systems based on quantum devices have experimentally been demonstrated and shown to be viable commercially. The module covers some rudiments regarding quantum mechanics; an introduction to classical and quantum cryptographic scheme and a brief discussion of experimental work in this field.

SC881 Advanced Studies In Science Education
AUs: 3
This subject involves an in-depth study and review of research in science education, particularly in the area of research of the doctoral student.

SC882 Advanced Issues In Science Education
AUs: 3
This subject involves an in-depth study and review of the issues which are relevant to science education and how they influence the research area of the doctoral student.

SC883 Interaction and Discourse in Education Research
AUs: 3
This course is designed to introduce alternative means of examining educational practices in schools. Educational activities are complex and hence difficult to make sense of them. We argue here that there is more than one way to examine educational practices. Examination and assessment grades of students are a common way to 'prove' the success of an educational activity. However, merely focusing on grades as a measure of educational success is limiting as it disregards the processes which students and teachers journey through. The social dimension of the educational experience, if ignored, presents education as a purely cognitive and individualistic activity. In this course, students will be exposed to alternative ways of understanding educational activities by examining the talk and interaction between learners and teachers.

SE801 Topics in Learning and Technologies
AUs: 3
The content for these topics change as new understandings arise. Topics may include the theoretical approaches to teaching/learning with technologies; recent development in technologies that support effective learning practice; design and study of leaning environments; cognitions and learning; relations between the growth of conceptual understanding and cognitive skills; collaborative learning with technologies; and engaged learning.

SE802 Design of Asynchronous Online Discussion
AUs: 3
This course will discuss how the asynchronous online discussion can be used as an effective instructional strategy. The topics covered will include the integration of the asynchronous collaborative online discussion environment with the face-to-face approach, the role of the teachers in designing and evaluating the environment, and the use of scaffolds in the online discussion environment to facilitate critical thinking skills.

SE803 An Introduction to Analyzing and Designing Systems
AUs: 3
This course aims to equip learners with the capability to examine, analyse and design systems from a systemic perspective. Learners will discuss the characteristics of non-living and living systems based on general systems theory, cybernetics, control systems, and chaos theory. Through the designing and building of natural and learning systems using various computational systems modeling tools such as

STELLA and VisSim, learners will be able to analyse the requirements and the dynamic behaviours of systems.

This course is relevant to professionals from various fields who wish to gain a broader aspect of systems and learn to identify system problems and opportunities in order to efficiently and effectively manage system changes.

SE804 Basic Structural Equation Modeling for Educational Research
AUs: 3
Structural equation modeling (SEM) is an advanced statistical method that allows the measurement of causal relationships among variables based on *a priori* assumptions. Using covariance matrix algebra as the foundation for computation, the use of this technique has grown exponentially since its initial appearance in the 1930s. Today, the use of SEM is so pervasive that it is rare NOT to see its use in articles published in journals on education, psychology, sociology, and other social sciences disciplines.

Specific topics to be covered in this course include exploratory factor analysis, path analysis, and confirmatory factor analysis. This course will be useful to students who are using a quantitative approach to analyse their data.

SE805 Instructional Methods for Student-centered Learning in School Contexts
AUs: 3
Teacher-centered instructional methods such as direct instruction and lecture are typically employed in Singapore schools. This new special course examines some other instructional methods including problem-based learning, case-based reasoning, and anchored instruction. We will specifically explore how these instructional methods can be used to support student-centered learning in school contexts.

SE806 Technologies for Educational Research
AUs: 3
Educational research can be tedious and some times messy. How to take advantage of cutting-edge technologies to make the research process to be more standardised and efficient to ensure the quality?

This course is intended to introduce a suite of technology tools that can help educational researchers in research processes such as organizing bibliography, sharing and facilitating writing, preparing digital footages, field note taking, and data management.

Some tools will be introduced for recording computer screen activities and student conversation. Some tools can help transcription and analysis. Some tools can help digital publication. There are also tools for detecting plagiarism.

This course emphasises how to use the tools to design and produce sound research and improve education practices based on theories and research on using the tools. This course uses a student-centered approach so that students will be involved in hands-on project work and collaboration. Real cases from local Singapore schools will be used as examples. Participation in class activities, leading discussions, mini papers and presentations will be used for both learning and assessment purposes.

SE807 Technology and Assessment
AUs: 3
What are the implications of computer-based technologies for the assessment of student learning? What are the potentials? What are the challenges?

In this course we will work collectively to investigate critical issues concerning technology and assessment. These include:

(1) Technology-based innovations have the potential to change both what and how students learn. For example, computer-based learning environments in physics, genetics, and other content area focus on knowledge and skills that extend beyond traditional curricula. We will investigate the

issues involved in assessing such products and processes. This will include the appropriateness of pencil-and-paper assessments of learning in computer-based environments.

(2) The new technologies themselves can be used as a means of student assessment. We will examine a variety of ways technology can be used in assessing student learning. This will include how models of student learning can be derived from student interactions with a given educational application, and the ways in which computer-based learning environments can provide opportunities for immediate and individualised feedback to students.

The course will be taught using a case-based approach, drawing from work on classroom-based learning technologies. Students will work individually and in teams to define and investigate questions related to the topics of the course and to build an online knowledge base of learnings. The final project will involve group poster presentations, synthesising the areas of inquiry that students have pursued throughout the semester.

SE808 Advanced Literature Review and Analysis
AUs: 3
This course is designed to help students analyse and synthesise the literature for their respective research, thereby establishing the significance of their research proposal. The outcome of this course will therefore be a literature synthesis paper with clear articulation of gaps in the field of research of students' interests and strong justifications for the significance of the study. It will lay down a working structure for the literature review chapter for their respective proposals. Some advanced library skills will also be introduced.

SE809 Advanced Special Topics in the Learning Sciences
AUs: 3
How learning is distributed, mediated, contextualised, changed and supported in today's technologically dynamic society is a key area of concern for all educators. The Learning Sciences is a cross disciplinary field of study that investigate the phenomenon of learning. Based on the interests and backgrounds of the participants, this course will guide them to explore emerging areas of interests in the field. Some possible areas include collaborative learning and knowledge building in face-to-face and mediated environments, situated learning within immersive virtual learning environments and the development of multi-literacy.

SE810 Advanced Qualitative Research Methodologies
AUs: 3
While the Master's courses equip graduate students with basic qualitative research methods, PhD students usually need advanced methodologies to address their research questions. This course will focus on advanced qualitative research methodologies. Possible areas include phenomenology, grounded theory, ethnography, discourse analyses, hermeneutics and design research. It will also cover issues related to the establishment of trustworthiness in qualitative studies. The outcome of this course can form the foundation for the candidate's methodology chapter if s/he uses qualitative research methods in the research study.

SE811 Advanced Quantitative Research Methodologies
AUs: 3
Continuing from the Master's courses on basic statistical methods, this seminar exposes students to advanced quantitative methodologies for in-depth and meaningful data analysis and interpretation, required skills for PhD candidates. This course will focus on advanced statistical skills such as multivariate statistics, structural equation modelling, social network analysis and the principles of survey design. It will also cover issues related to validity and reliability of quantitative studies. The outcome of this course can form the foundation for the candidate's methodology chapter if s/he uses quantitative research methods in the study.

SG801 Nurturing Creative and Socially-Responsible Learners Psychological Issues and Educational Implications
AUs: 3
This course is suitable for those participants who wish to gain a deep understanding of creativity, as well as to develop the creative potential of students in Singapore. Participants will be kept abreast of the latest findings in the educational and psychological literature on creativity. Participants will examine the implication of these findings for teaching and learning in the creative classroom. Specifically, participants will learn how to evaluate the creative products of students and motivate them to engage in creative problem-solving by the use of creative puzzles, techniques and lesson plans. Participants will also understand how the cultural milieu influences the development of creativity in the Singapore classroom, and gain a deep awareness of

the challenges facing the creative teacher in a post-modern world. Finally, participants will grasp the importance of nurturing creative and independent students who exercise their creative talents in a socially-responsible way.

SR801 Educational Research for Improved Pedagogical Practice
AUs: 3
This module introduces students to several contemporary educational research methods and how research proposals are written from the point of view of different research paradigms. The assignment components of the module will discuss the mechanics of research such as framing the research question within educational enquiry, reviewing literature to support the study and creating an appropriate methodology which addresses the research questions and provides a well structured, robust, ethical, and critical study. In particular, it will discuss contemporary approaches, action research and how this might be considered a specific implementation of ethnographic and case study methods. It will also introduce the concept of design experiments and how they provide a well conceptualised yet ecologically relevant approach to social science field based investigations. The module will explore these methods by:

- providing students with the necessary technical instruction to explore the conceptual scope of research question and proposal development.
- guiding students through the investigation of a research question and development of research proposals so that they complete basic planning and have documented their approach to the research task

SR802 School-Based Applied Educational Research
AUs: 3
This course introduces teachers to the nature of educational change and reform, and then focuses on the conduct of dissertation research. Participants will engage in critical discussion of research approaches, and identify their strengths, weaknesses and best contexts in which to apply them. Instructors will then help to de-mystify the dissertation process. Drawing on insights from previous units, students will work individually and collaboratively to develop and present research proposals. Peer and instructor feedback will be provided.

Participants will learn how to conduct high quality educational research to solve school-based problems and undertake the development of a draft dissertation. The course will also provide them with skills and experiences to identify their research needs and support their colleagues in research roles.

SR803 Approaches to the Analysis of Classroom Discourse
AUs: 3
This course introduces students to the study of situated language use in the social setting of the classroom. Not only is language the basic medium through which teaching and learning take place, but it also has a powerful influence on older children's language development. The key questions raised are the following:
- How do interaction patterns and overall lesson structure affect the learning that happens and the quality of knowledge?
- How can teachers structure interaction effectively to involve students actively in the construction of knowledge?
- How do teachers achieve the kind of connected learning and coherence across larger units than the lesson that allows their students' knowledge and understanding to be accumulated, modified and deepened?
- Do the patterns of classroom discourse vary across the key learning areas and if so how?
- How do the patterns of classroom discourse position students differently with respect to educational opportunities?

SR804 History and Philosophy of Pedagogy and Practice
AUs: 3
This course is an introduction to the history and philosophy of pedagogy and practice. Topics might include historical and philosophical foundations of pedagogy and practice, and subjects covered include core philosophers such as Dewey, Vygotsky, Bakhtin, Bourdieu etc as well as Bernstein and Bruner.

SR805 Current Issues and Reform Issues in Pedagogy
AUs: 3

The course is an introduction to the current issues in pedagogy and educational reform. Topics might include globalisation, comparative research, school effectiveness and critical pedagogy, social equity, etc.

SR806 Videography and Research in Pedagogy and Practice
AUs: 3
The course in an introduction to videography as a theory and as a methodology in educational research. The topics will include theoretical and epistemological foundation for the use of videography in educational research, videography as it is used within and across different research traditions, and the methods for conducting video data collection and analysis.

SR807 Analysis and Publication of Professional Research Literature in Educational Linguistics
AUs: 3
A graduate course in understanding and using discourse analysis for reading, as well as analysing, research publications with the explicit aim of publishing substantive articles or book chapters in strategically chosen publications or publishers in the field of educational linguistics. After initially exploring possible forums for publication, and investigating and analysing samples of successful writing in these, students will re-work substantially, both in content and form, high-quality term papers or rough drafts of research projects in order to meet the topical and rhetorical requirements of the forum of their choice.

SR808 Teacher Knowledge and Teacher Development – Foundations, Methods and Findings of Research
AUs: 3
This course is designed to give interested graduate students an overview of research in the area of teacher knowledge and teacher development. It aims to introduce the students what we know and how we know about teacher knowledge and teacher development from past and current research. We explore the major philosophical and epistemological foundations guiding the research in posing and framing questions, selecting methods to answer them as well as the major research findings that fuel the policy debate and inform policy making for teacher education and professional development.

Pre-requisite: Students who are involved in research projects related to classroom observations, teacher practice, and professional development.

SR809 Structural Equation Modeling For Educational Research
AUs: 3
This course covers the theory of structural equation modeling and its application in educational research. Illustrations and applications using software packages will be a feature of the course. Application on educational research projects is the emphasis of the course.

SR810 Understanding by Design: Building Teacher Capacity in Curriculum and Pedagogical Design in NT Classrooms
AUs: 3
This module uses Understanding by Design as an approach for improving teachers' capacity as designers for student learning. Working within the NT curriculum, this module will help teacher-researchers clarify learning goals, devise assessments that reveal student understanding, and craft effective engaging learning activities.

SR811 Social Class and Education
AUs: 3
This seminar introduces advanced degree students to a major area of research in the sociology of education: the relationship between social class and education. The seminar will begin with an examination of how social class has been conceptualized and measured. The class will examine research in the area of social stratification and how that relates to educational achievement and educational attainment. Other themes in the seminar include the role of capital, the ethnicity gap in achievement, and school effectiveness research.

SR812 Independent Study: Contemporary Social Organisation
AUs: 3
This course is designed as an independent study where the student will explore and critically examine an area of interest relevant to postmodern social organisation and the discourse between structure and agency. Special reference will be made along the works of key contemporary social theorists, e.g. Bauman, Beck, Castells, Giddens, Lash.

SR813 Alternative Assessment in Education
AUs: 3
This module aims to provide students with alternative assessment knowledge and skills. It will address ways to assess higher order thinking skills and real-world problem solving in the day-to-day classroom teaching and assessment contexts. Theoretical discussions and hands-on activities that enhance understanding of various types of authentic assessments, assessment task development, and alignment between assessment, curriculum, and pedagogy will be included. Toward the end of the module, students will be able to develop one type of the alternative assessments in a complete unit lesson plan, to communicate the assessment results with parents and students, and to defend their views of alternative assessment in school improvement.

SR814 Hierarchical Linear and Non-linear Modeling
AUs: 3
Hierarchical linear and non-linear modeling was widely used in educational and social science research because of the nested nature of the data (eg. student nested in class, class nested in school). This course introduces and covers hierarchical linear and non-linear modeling. The objectives are to give students and researchers the knowledge as to when these techniques might be useful, an understanding of the theory and statistics involved in these techniques and their limitations, an ability to read and criticize, publish research using these techniques, and an overview of current issues and developments. Illustrations and applications using software packages will be the main feature of the course.

SR815 Independent Study: Contemporary Social Organisation II
AUs: 3
This course is designed as an independent study where the student will explore and critically examine an area of interest relevant to postmodern social organisation and the discourse between structure and agency. Special reference will be made along the works of key contemporary social theorists, e.g. Beck, Castells, Giddens, Hall.

SR816 Categorical Data Analysis
AUs: 3
Categorical data modeling is commonly used in educational and social science research. This course introduces and covers the modeling techniques for data in categorical nature and aims to give students and researchers an overall coverage on the various statistical techniques involving categorical data analysis. Illustrations and applications using software packages will be the main feature of the course. Topics include contingency table analysis, generalised linear models, loglinear models, and non-parametric methods in categorical analysis.