

ACADEMIC SUBJECTS

This area of study covers knowledge of the content and fundamental concepts and principles of either one or two subjects depending on the programme enrolled for.

In the case of a BA (Ed) (Primary) student teacher, the choice of the first Academic Subject must be an Arts subject while in the case of a B Sc (Ed) Primary student teacher, the Academic Subject must be a Science Subject.

All BA (Ed) Secondary student teachers must read an Arts subject as Academic Subject 1 but can choose an Arts or Science subject as Academic Subject 2. Similarly, all BSc (Ed) Secondary student teachers must choose a Science subject as Academic Subject 1 but can choose an Arts or Science subject as Academic Subject 2. The lists of subjects for the different programmes are shown below. However, due to the nature of workload for some subjects, the subject combinations allowed will have to be necessarily limited.

BA(Ed) (Primary/Secondary): Academic Subjects

Academic Subject	BA(Ed) Primary	BA(Ed) Secondary	
	AS	AS1	AS2
Art	√	√	√
Biology	X	X	√
Chemistry	X	X	√
Chinese Language*	√	√	X
Chinese Literature*	X	X	√
Drama	√	√	√
English Language	√	√	√
English Literature	X	√	√
Geography	√	√	√
History	√	√	√
Malay Language**	√	√	X
Malay Literature**	X	X	√
Mathematics	X	X	√
Music	√	√	√
Physics	X	X	√

* Chinese Language and Chinese Literature must be offered as AS1 and AS2 together and not with another Academic Subject in both the primary and secondary specialisations.

** Malay Language and Malay Literature must be offered as AS1 and AS2 together and not with another Academic Subject in the primary specialisation. In the secondary specialisation, Malay Language must be offered as AS1 and Malay Literature as AS2. However, student teachers can opt to offer Malay Language as AS1 and any other Arts subject as AS2 but they will then not be considered as specialising in Malay Language.

BSc(Ed) (Primary/Secondary): Academic Subjects

Academic Subject	BSc(Ed) Primary	BSc(Ed) Secondary	
	AS	AS1	AS2
Art	X	X	√
Biology	√	√	√
Chemistry	√	√	√
Drama	X	X	√
English Language	X	X	√
English Literature	X	X	√
Family & Consumer Sciences	X	√	X
Geography	X	X	√
History	X	X	√
Mathematics	√	√	√
Music	X	X	√
PE and Sports Science	√	√	X
Physics	√	√	√

ACADEMIC SUBJECT: ART

**Table 1: AS 1 Art Structure for BA (Ed) (Primary)
AS 1 Art Structure for BA (Ed) (Secondary)**

Year	Module Code	Title	Module Category	No. of AUs	Pre-requisites
1	Semester 1				
	AAA101	The Study of Art: Contexts and Concepts I	Core	3	-
	AAA102	Visual Representation and Expression I: Issues in two-dimensional praxis	Core	3	-
	Semester 2				
	AAA103	Understanding Visual Literacy	Core	3	-
2	AAA104	Visual Representation and Expression II: Issues in three-dimensional praxis	Core	3	-
	Semester 1				
	AAA201	The Study of Art: Contexts and Concepts II	Core	3	-
	AAA202	Visual Representation and Expression III: Issues in new media praxis	Core	3	-
	Semester 2				
3	AAA203	Visual Representation and Expression IV: Issues in new media praxis	Core	3	-
	AAA204	Visual Representation and Expression V: Issues in two-dimensional praxis	Core	3	-
	Semester 1				
	AAA301	Contemporary Southeast Asian Art I	Core	3	-
	AAA302	Visual Representation and Expression VI: Issues in three-dimensional praxis	Core	3	-
4	Semester 2				
	AAA303	Contemporary Southeast Asian Art II	Core	3	-
	AAA304	Visual Representation and Expression VII: Issues in interdisciplinary praxis	Core	3	-
4	Semester 1				
	Choose one of the following:				
	AAA431	Studio Specialisation	Pres	3	-
	AAA432	Curatorial Practices and Exhibition	Pres	3	-
Total AUs for Degree				39	

Table 2: AS 2 Art Structure for BA/BSc (Ed) (Secondary)

Year	Module Code	Title	Module Category	No. of AUs	Pre-requisites
1	Semester 1				
	AAA101	The Study of Art: Contexts and Concepts I	Core	3	-
	AAA102	Visual Representation and Expression I: Issues in two-dimensional praxis	Core	3	-
	Semester 2				
	AAA103	Understanding Visual Literacy	Core	3	-
	AAA104	Visual Representation and Expression II: Issues in three-dimensional praxis	Core	3	-
2	Semester 1				
	AAA201	The Study of Art: Contexts and Concepts II	Core	3	-
	AAA202	Visual Representation and Expression III: Issues in new media praxis	Core	3	-
	Semester 2				
	AAA203	Visual Representation and Expression IV: Issues in new media praxis	Core	3	-
	AAA204	Visual Representation and Expression V: Issues in two-dimensional praxis	Core	3	-
Total AUs for Degree				24	

AAA101 The Study of Art: Contexts and Concepts I

A critical introduction to the materials, techniques, and interpretation of art, with emphasis on twentieth-century modernism and visual arts in its historical context. Discussion will revolve around a variety of media, including the fine arts, architecture, film, video, and installation and performance work. Student teachers will be helped to understand the main characteristics of the art produced, and the relationship of art to the culture in which it was created.

AAA102 Visual Representation and Expression I: Issues in two-dimensional praxis

Introduction to the concept and practice of representation and expression. Student teachers will consider the use of two-dimensional expressive and representational media and its role in the formation of symbolic systems. Using a combination of studio-practice and theory, student teachers will develop their own competence in two-dimensional representation and expressive processes. Additionally, links will be made to the role played by representational and expressive thought in children's intellectual and emotional development. Links with classroom practice will be made. Student teachers will also explore innovative methods of documenting a range of investigative and research-oriented activities undertaken in this module.

AAA103 Understanding Visual Literacy

Visual literacy refers to the capacity to read and interpret visual images. In contemporary culture, the visual image is being increasingly used as a vehicle through which information is relayed. From billboards to DVDs, from computer games to MTV clips, from television to the internet, information is being communicated visually. It is essential that we develop the capacity to understand that visual images do more than merely decorate. Visual images need to be read with the rigor and attention that was once reserved for the printed word. This module will offer an introduction to the study and interpretation of visual culture through a range of theoretical perspectives that seek to explain how visual images generate meaning.

AAA104 Visual Representation & Expression II: Issues in three-dimensional praxis

The concept and practice of representation and expression will continue to be investigated. Student teachers will consider the use of three-dimensional expressive and representational media and its role in the formation of symbolic systems. Using a combination of studio-practice and theory, student teachers will develop their own competence in three-dimensional representational expressive processes. They will be encouraged to undertake projects in which they will develop an understanding of the relationships which link Sculpture and Ceramics. Links will be made to the role played by representational and expressive thought in children's intellectual and emotional development. Links with classroom practice will be made.

AAA201 The Study of Art: Contexts and Concepts II

This module will explore the visual and critical skills for interpreting the varied forms of artistic expression in Asia, both contemporary and traditional times. Student teachers will be helped to examine a variety of themes related to the techniques and functions of art, and study the way art expresses various moral, social, political, and religious ideas. Emphasis will be on the awareness of historical and critical functions of the visual arts.

AAA202 Visual Representation and Expression III: Issues in new media praxis

The concept and practice of representation and expression will continue to be investigated. Student teachers will consider the role of digital and interactive technologies in expressive and representational media and their role in the formation of symbolic systems. Using a combination of studio-practice and theory, student teachers will use new media technologies to develop their own competence in representational and expressive processes. Links with classroom practice will be made.

AAA203 Visual Representation & Expression IV: Issues in new media praxis

Student teachers will have the opportunity to build on their knowledge of concepts of representation and expression. They will further consider the use of digital and interactive technologies in relation to expressive and representational media and their role in the formation of symbolic systems. Using a combination of studio-practice and theory, student teachers will continue to investigate the use of new media and digital technologies in order to formulate, develop and sustain a self-generated inquiry. Student teachers will acquire working methods, research skills and the knowledge necessary for the successful implementation of concepts. They will continue to develop a critical awareness of contemporary and historical art issues relevant to the new technologies and their application to teaching.

AAA204 Visual Representation & Expression V: Issues in two-dimensional praxis

Student teachers will further their investigations into the concept of representation and expression and their roles in the formation of symbolic systems. Student teachers will be encouraged to generate interdisciplinary links between an area of two-dimensional studio practice (drawing, painting or printmaking) and an aspect of either three dimensional studio practice or interactive, digital and new media studio practice. Student teachers will be expected to acquire working methods, research skills and the knowledge necessary to successfully carry out concepts. They will continue to develop a critical awareness of contemporary and historical issues in art and their application to teaching. Student teachers will also explore innovative methods of documenting the range of investigative and research-oriented activities relevant to this module.

AAA301 Contemporary Southeast Asian Art I

This module is the first of two modules that looks at the development of art in Singapore and in Southeast Asia. The interest here is in prospecting the contemporary in historical terms. This module focuses on ways by which the contemporary and the region are diversely seen, read, desired, claimed and discussed. The approach entails studies of art practices, productions and critical texts.

AAA302 Visual Representation & Expression VI : Issues in three-dimensional praxis

Student teachers will have the opportunity to elect to work in either sculpture or ceramics. Through an in-depth investigation they will continue to extend their understanding of concepts of representation and expression and their roles in the formation of symbolic systems. In consultation with lecturers, student teachers will produce a body of work through which they will acquire working methods, research skills and the knowledge necessary to successfully realize the full scope of a self-initiated project. They will also continue to develop a critical awareness of contemporary and historical issues in art and their application to teaching. Links with class room practice will be made.

AAA303 Contemporary Southeast Asian Art II

This module advances the aims and objectives in Contemporary Southeast Asian Art 1. The interest here is in examining the domains of the modern in Singapore and Southeast Asia and their connections and disconnections with the contemporary. The modules focus on ways by which the contemporary and the modern are framed historically and art historically. The approach entails studies of art practices, productions and critical texts.

AAA304 Visual Representation & Expression VII: Issues in interdisciplinary praxis

This module provides student teachers with the opportunity to draw upon and combine their previous investigations into the concepts and practices of representation and expression in two-dimension, three-dimensional and new media studio practices. Student teachers will be encouraged to conduct an interdisciplinary investigation through which they will explore and articulate a personal artistic direction. Student teachers will be expected to acquire working methods, research skills and knowledge necessary for the successful implementation of a self-initiated project. They will also continue to develop a critical awareness of contemporary and historical issues in art and their application to teaching. Links with classroom practice will be made.

AAA431 Studio Specialisation

This module offers the opportunity for student teachers to develop a specific specialization in an area of artistic practice of their choice by drawing upon their previous investigations into the concept and practice of representation and expression. The student teacher will be required to engage in the development of a body of work under the guidance of an appointed supervisor.

AAA432 Curatorial Practices and Exhibition

Application of knowledge in issues of art criticism, art history, aesthetics and studio practice through the organization of an exhibition. The student teachers develop a concept for an exhibition, select the work, write and design the communication, and organize the event.

ACADEMIC SUBJECT: BIOLOGY**Table 1: AS 1 Biology Structure for BSc (Ed) (Primary)
AS 1 Biology Structure for BSc (Ed) (Secondary)**

Year	Module Code	Title	Module Category	No. of AUs	Pre-requisites
1	Semester 1				
	AAB101	Biodiversity in Natural Ecosystems	Core	3	-
	AAB102	Cell Structure and Function	Core	3	-
	Semester 2				
	AAB103	General Microbiology	Core	3	-
	AAB104	Current Genetics	Core	3	-
2	Semester 1				
	AAB201	Diversity and Evolution of Plants	Core	3	-
	AAB202	Animal Diversity and Evolution	Core	3	-
	Semester 2				
	AAB203	Ecology	Core	3	-
	AAB204	Molecular Biology	Core	3	-
3	Semester 1				
	AAB301	Biochemistry	Core	3	-
	AAB302	Animal Physiology	Core	3	-
	Semester 2				
	AAB303	Plant Physiology	Core	3	-
	AAB304	Quantitative Biology	Core	3	-
4	Semester 1				
	Select any 1				
	AAB431	Independent Study Project	Pres	3	-
	AAB432	Modern Biotechnology	Pres	3	-
	AAB433	Animal Behaviour	Pres	3	-
	AAB434	Physiological and Biochemical Adaptation	Pres	3	-
	AAB435	Tropical Marine Biology	Pres	3	-
Total AUs for Degree				39	

Table 2: AS 2 Biology Structure for BA/BSc (Ed) (Secondary)

Year	Module Code	Title	Module Category	No. of AUs	Pre-requisites
1	Semester 1				
	AAB101	Biodiversity in Natural Ecosystems	Core	3	-
	AAB102	Cell Structure and Function	Core	3	-
	Semester 2				
	AAB103	General Microbiology	Core	3	-
	AAB104	Current Genetics	Core	3	-
2	Semester 1				
	AAB205	Evolution and Diversity of Life	Core	3	-
	AAB206	General Physiology	Core	3	-
	Semester 2				
	AAB203	Ecology	Core	3	-
	AAB204	Molecular Biology	Core	3	-
Total AUs for Degree				24	

AAB101 Biodiversity in Natural Ecosystems

Origin, classification and organization of living organisms as they increase in complexity from lower to higher forms; Biological adaptation and phylogenetic relations among the major groups of organisms (micro organisms, plants and animals); Overview of natural ecosystems, with particular emphasis on tropical rainforests, mangrove habitats, intertidal shores and coral reefs; Study of the diversity and interactions of organisms in these tropical ecosystems. These topics are taught with special emphases on linkages to the current school curricula.

AAB102 Cell Structure and Function

The module provides an overview of the chemical constituents of cells, their biological roles and the organization and function of eukaryotic cells. The structure of different cell types and organ systems in both plants and animals and the relation to their physiological functions in an organism will also be discussed. Topics of this module are taught with special emphases on linkages to the current school curricula.

AAB103 General Microbiology

This is a basic course on general microbiology. Microorganisms – bacteria, viruses, fungi - what they are, how they grow and replicate, their interactions with the environment, and the importance of microorganisms to life will be introduced. How microorganisms play a part in disease and health, and how they are controlled will also be discussed. Issues relating to the emergence of new and resurgence of old infectious diseases are included. Topics of this module are taught with special emphases on linkages to the current school curricula.

AAB104 Current Genetics

Cell division, mitosis and meiosis; Principles of genetics and its fundamental laws on genetic segregation and assortment. Mendelian genetics and extensions of Mendelian ratios. Genetic laws of inheritance and the effect of genotype and alleles affecting phenotype and trait. The effect of DNA make-up, RNA and protein activities of the various genes and the mutations and variations that have or are occurring in a dynamic fashion. Developmental, cancer and behavioral genetics will also be covered. Population and evolutionary genetics. These topics are taught with special emphases on linkages to the current school curricula.

AAB201 Diversity and Evolution of Plants

The diversity of plants has long been one of the cornerstones of "traditional" biology. Plant diversity, far from being a static body of knowledge, is a dynamic and progressive field. We will not only learn about the diversity of plants per se, but also about the evolutionary history of plants. Developments in the field of plant diversity studies will be highlighted, as well as the links between plant diversity studies and other areas of the biological sciences. Topics to be covered will include photosynthetic protists, a survey of the Plant Kingdom, plant adaptations and selected life history strategies, and an introduction to plant phylogeny. Topics of this module are taught with special emphases on linkages to the current school curricula.

AAB202 Animal Diversity and Evolution

Concepts of evolution of diversity, speciation and phylogenetic inter-relationships among major invertebrate and vertebrate phyla are discussed based on anatomy, biological design, body size, form and functions. Other aspects covered include allometry, biomechanics; developmental and comparative embryology; major organ systems, e.g., integumentary, cardiovascular system, skeletal system, nervous systems; adaptations; ectothermy and endothermy. A synthesis of evolutionary biology concludes the module. Topics of this module are taught with special emphases on linkages to the current school curricula.

AAB203 Ecology

The module covers concepts in population, community, and applied ecology. Topics included are: population parameters, their measurements and methods of studying populations; population growth; population fluctuations and cycles, regulation and dynamics; life history patterns and strategies; inter-species interactions and co-evolutionary interactions, organizational and functional basis in plant and animal communities; changes in community structure, organization and composition over time; the influences of agents of disturbance or stability as well as diversity indices as measurements of community structure. Topics of this module are taught with special emphases on linkages to the current school curricula.

AAB204 Molecular Biology

Topology of nucleic acids. Regulation of gene expression in prokaryotes and eukaryotes; operons; controls at transcriptional and translational levels. Replicons and DNA replication and recombination. Role of centromere and telomere; process and significance of gene amplification. The transposons and its derivatives through evolution. Dynamics of DNA in genome; introns and exons. Satellite DNAs and immune diversity. Roles of homeotic genes in development of eukaryotes. Protein trafficking and signal transduction. The importance of understanding these concepts and facts in deriving benefits for mankind and the environment will be emphasized. These topics are taught with special emphases on linkages to the current school curricula.

AAB205 Evolution and Diversity of Life

Our planet is home to millions of different kinds of life forms. What is the range of diversity among living things, how do scientists classify this diversity, and what types of research are at the cutting edge of this exciting field? Moreover, we intend not only to study diversity alone, but in addition we will examine the processes by which diversification occurs in Nature. Topics to be covered include an introduction to evolution and phylogeny, classification systems, and survey of the living world. Topics are taught with special emphases on linkages to the current school curricula.

AAB206 General Physiology

The module provides an introduction to the basic physiological processes in an organism. Topics include energy transformation, enzymes, cellular respiration, gaseous exchange in animals, heterotrophic nutrition, autotrophic nutrition including plant mineral nutrition and photosynthesis, physiology of cellular transport in animals, uptake and transport in plants, muscle contraction, homeostasis, excretion and osmoregulation, nervous control and temperature regulation in animals, hormonal communication and reproduction in plants and animals. Topics are taught with special emphases on linkages to the current school curricula.

AAB301 Biochemistry

Cells depend on a continuous inflow and outflow of energy, material and information for its continued existence. The emphasis here will be on the principles of bioenergetics, biosynthesis and catabolism of carbohydrates, fats, amino acids and nucleic acids and the regulation, integration of metabolic pathways in the organism and enzyme kinetics. Basic biochemical techniques like centrifugation, spectrophotometry, column chromatography, thin-layer chromatography, and electrophoresis will be covered in the practical session.

AAB302 Animal Physiology

This module seeks to explain the physiological processes that are needed for the functioning of an organism. The integration of these physiological processes in an organism will also be discussed. Topics covered include digestion, gas exchange, muscle contraction and locomotion, acid base balance, osmoregulation, heart and circulation, temperature regulation and nervous control.

AAB303 Plant Physiology

Metabolism of water and inorganic ions, light use and leaf gas exchange, carbon dioxide assimilation and respiration, distribution of photoassimilate within plants, plant growth and options for reproduction, plant hormones: chemical signalling in plant development, responses of plants to environmental stress and the ability of a plant to withstand stress. The importance of understanding plant physiological processes from the horticultural point of view. The topics are learnt through lecture, cooperative learning, and discussion on selected current research literature of plant physiology, practical class and mini-project.

AAB304 Quantitative Biology

Data description and types of biological data; sampling from populations. The arithmetic mean, median, mode, range, mean deviation, variance, standard deviation, coefficient of variation. Chi-square goodness-of-fit, contingency tables. One sample hypotheses concerning the mean, reporting variability about the mean. Two sample hypotheses: testing for difference between two means and variances. Paired-sample hypotheses: the paired-sample t test. Multisample hypotheses: the analysis of variance (ANOVA), single factor analysis and multiple comparisons. Two factor ANOVA and interaction between variables. Data transformations. Simple linear regression, multiple regressions, regression vs correlation. Fundamentals of experimental design.

Other quantitative aspects of quantitative biology: Hardy-Weinberg equation in population genetics, cladistics and numerical taxonomy in vertebrate zoology, clustering in molecular biology.

AAB431 Independent Study Project

This module exposes student teachers to all phases of the research process through inquiry-based learning strategies. These include the formulation of a research problem, setting of hypotheses, the design of experiments, data collection and analyses, and the discussion of results. This module provides opportunities for investigations in current research in the life sciences.

AAB432 Modern Biotechnology

Developments, methods and applications in microbial, plant, animal and medical biotechnology. Overview of biotechnology: what is biotechnology; the molecular revolution, recombinant DNA technology. Microbial biotechnology: industrial fermentation, products from microbial sources (enzymes, antibiotics, plastics), genetic modification of microorganisms, vaccines, use of immobilised cells, bioconversions. Plant biotechnology: tissue culture (micropropagation, somatic embryogenesis, somaclonal variation), plant genetic engineering. Animal biotechnology: gene transfer methods (microinjection, embryonic stem cell gene transfer), cloning, transgenic animals. Medical biotechnology: human genome project, DNA sequencing, DNA fingerprinting, gene therapy, stem cell research, tissue engineering, xenotransplantation, drug delivery. Regulation of biotechnology. Ethical, legal and social implications of uses of biotechnology in agriculture and medicine.

AAB433 Animal Behaviour

Approaches to the study of the behaviour of diverse animals, the measurement and analysis of animal behaviour for an understanding of the evolutionary and adaptive significance of behaviour as a functional unit are the foci of this module. Topics covered include: mechanisms and evolution of animal behavior, neural, physiological, and genetic analysis of behaviors; spatial orientation, rhythmic behaviour, biological clocks, learning (instinct, imprinting, conditioning, habituation, etc.); communication; foraging and antipredator behaviour; sexual selection, parental care and mating systems; group living, social behaviour and eusociality; altruism; primate behaviour

AAB434 Physiological and Biochemical Adaptation

Why are some fishes capable of surviving on land for long periods of time while others would die within minutes? Why are some animals like the sipunculids, bivalves, sea slugs and mudskippers able to live in the mudflats that are exposed to fluctuating salinities, high ammonia and low oxygen contents? How do plants sense the changing environment? How do plants cope with drought stress? How do plants respond to increases and decreases in photosynthetically active radiation (PAR)? Under what environmental conditions, plants engage different types of photosynthesis based on the modes of carbon fixation (C_3 , C_4 , and CAM plants)? How do plants tackle global warming and is an increased CO_2 levels benefiting plant productivity? This module aims to provide the physiological and biochemical mechanisms found in different types of animals and plants which allow them to survive in their unique habitat.

AAB435 Tropical Marine Biology

The ocean as a habitat; Classification of the marine environment; Adaptations of marine life; Deep sea, open ocean, Intertidal shore and soft-bottom communities (including estuaries, continental shelf, coral reef ecosystems and life in the abyss); Living in the epipelagic and nature of marine food webs; resources from the sea; Advances in marine technology and exploration; Modern marine biotechnology; Applications of marine biofouling, chemical defences, drug discovery in the biomedical and environmental sciences.

ACADEMIC SUBJECT: CHEMISTRY**Table 1: AS 1 Chemistry Structure for B Sc (Ed) (Primary)
AS 1 Chemistry Structure for B Sc (Ed) (Secondary)**

Year	Module Code	Title	Module Category	No. of AUs	Pre-requisites
1	Semester 1				
	AAY101	General Chemistry	Core	3	-
	AAY102	Fundamentals of Physical Chemistry	Core	3	-
	Semester 2				
	AAY103	Main Group Chemistry – Facts, Patterns and Principles	Core	3	AAY 101
	AAY104	Introductory Organic Chemistry	Core	3	AAY 101
2	Semester 1				
	AAY201	Introduction to Spectroscopy	Core	3	AAY 101
	AAY202	Chemical Kinetics and Electrochemistry	Core	3	AAY 101, 102
	Semester 2				
	AAY203	Further Organic Chemistry	Core	3	AAY 104
	AAY204	Transition Metal Chemistry	Core	3	AAY 101, 103
3	Semester 1				
	AAY301	Introductory Analytical Chemistry	Core	3	AAY 201-204
		Select any 1 from Group A	Pres	3	AAY 201-204
	Semester 2				
	AAY302	Bio-inorganic and Bio-organic Chemistry	Core	3	AAY 203,204
	Select any 1 from Group B	Pres	3	AAY 201-204, 301	
4	Semester 1				
	AAY402	Experimental Techniques in Chemistry	Core	3	-
Total AUs for Degree				39	

Group A	
AA 330	Environmental Chemistry
AA 331	Organometallic Chemistry
AA 332	Phase Equilibria and Colligative Properties
AA 333	Organic Reaction Mechanisms and Synthesis
AA 334	Industrial Chemistry

Group B	
AA 335	Advanced Analytical Chemistry
AA 336	Materials Chemistry
AA 337	Medicinal Chemistry

Table 2: AS 2 Chemistry Structure for BA (Ed) / BSc (Ed) (Secondary)

Year	Module Code	Title	Module Category	No. of Aus	Pre-requisites
1	Semester 1				
	AAY101	General Chemistry	Core	3	-
	AAY102	Fundamentals of Physical Chemistry	Core	3	-
	Semester 2				
	AAY103	Main Group Chemistry – Facts, Patterns and Principles	Core	3	AAY101
	AAY104	Introductory Organic Chemistry	Core	3	AAY101
2	Semester 1				
	AAY201	Introduction to Spectroscopy	Core	3	AAY101
	AAY202	Chemical Kinetics and Electro-chemistry	Core	3	AAY 101, 102
	Semester 2				
	AAY203	Further Organic Chemistry	Core	3	AAY104
	AAY204	Transition Metal Chemistry	Core	3	AAY 101, 103
Total AUs for Degree				24	

AAY101 General Chemistry

Atomic structure and properties, quantum numbers, the exclusion principle, electronic configurations of elements. Periodic properties and group trends. Ionic and atomic sizes; ionic, covalent and metallic bondings; polarising ability and polarisability; properties of ionic and covalent compounds. Polarity of bonds, characteristics of polar and non-polar compounds. Mole concept and stoichiometry. Redox reactions, half reactions, balancing equations, Gibbs equation and general applications of redox reactions in our environment. These topics are taught with special emphases on linkages to the current school curricula.

AAY102 Fundamentals of Physical Chemistry

The gas laws: real gases, the van der Waals equation; kinetic theory of gases; thermodynamics: first, second and third laws and their applications; thermochemistry; chemical equilibria. These topics are taught with special emphases on linkages to the current school curricula.

AAY103 Main Group Chemistry – Facts, Patterns and Principles

Simple molecular orbital treatment of diatomic molecules, both homonuclear and heteronuclear; bond order and bond strength. Molecular shapes and VSEPR theory; hybridization of orbitals, sp , sp^2 , sp^3 , sp^3d^2 . General trends in the chemistry of Main Group elements, with emphasis on hydrides, oxides and halides. Concepts of acids and bases, protonic and aprotic; concept and applications of non-aqueous solvent systems. These topics are taught with special emphases on linkages to the current school curricula.

AAY104 Introductory Organic Chemistry

General principles of organic chemistry – bonding, classification, reaction mechanisms and stereochemistry. Physical and chemical properties of alkanes, alkenes, alkynes, alkyl halides, aromatic compounds, alcohols and thiols, and ethers and epoxides. These topics are taught with special emphases on linkages to the current school curricula.

AAY201 Introduction to Spectroscopy

Basic principles of spectroscopy: electromagnetic radiation, quantum theory of absorption and emission. Vibrational spectroscopy: infrared and Raman spectroscopies. Electronic absorption and emission spectroscopy: chromophores, Beer-Lambert Law, UV-visible and atomic spectroscopy. Nuclear magnetic and electron-spin resonance spectroscopy: nuclear and electron spin energy levels in a magnetic field, shielding/deshielding and chemical shifts, spin-spin coupling. These topics are taught with special emphases on linkages to the current school curricula.

AAY202 Chemical Kinetics and Electrochemistry

Chemical kinetics: rate law, order and mechanism of reactions, steady state approximation, enzyme kinetics, Arrhenius equation. Basic theories of reaction rates: simple collision theory, activated complex theory. Electrochemistry and transport phenomena: conductance, mobility and transport number. Electrodes and electrochemical cells, electrolyte equilibria and activity. These topics are taught with special emphases on linkages to the current school curricula.

AAY203 Further Organic Chemistry

Aldehydes and ketones, carboxylic acids and derivatives, amines and amides, heterocycles. The use of ultraviolet (UV) spectroscopy, infra-red (IR) spectroscopy, mass spectrometry and ^1H nuclear magnetic resonance (NMR) spectroscopy for structural elucidation of organic molecules. These topics are taught with special emphases on linkages to the current school curricula.

AAY204 Transition Metal Chemistry

Nomenclature and structures; geometric, coordination and optical isomerisms. Kinetic and thermodynamic stability, labile and inert complexes. Simple reaction mechanisms; associative and dissociative, inner and outer sphere electron-transfer mechanisms. Crystal field theory, octahedral, tetrahedral and square planar environments, weak and strong fields, Jahn-Teller effects. Simple Ligand Field and Molecular Orbital treatments. Electronic transitions, selection rules, ultraviolet and visible spectral interpretations. Paramagnetic and diamagnetic properties of transition metal complexes; Curie and Curie-Weiss laws. These topics are taught with special emphases on linkages to the current school curricula.

AAY301 Introductory Analytical Chemistry

Concepts in analytical chemistry and data handling. Sample treatment and extraction. Separation techniques: gas, liquid and 2-D chromatography. Spectrometric methods: atomic absorption and emission spectrometry, UV-visible spectrophotometry. Introduction to electroanalysis; conductometry, potentiometry, voltammetry and coulometry. Applications of analytical chemistry.

AAY302 Bio-inorganic and Bio-organic Chemistry

Biomolecules: amino acids, peptides and proteins; fats, oils, steroids and terpenes; carbohydrates; nucleic acids. The role of metal ions in biological systems; oxygen-carrier proteins, electron-transfer proteins and metalloenzymes. Metal management: uptake, transport, and storage.

AAY330 Environmental Chemistry

Concepts and basic problems in environmental issues. Bio-geochemical cycles of elements, with emphasis on carbon, nitrogen and oxygen cycles. Solar energy, fossil fuel and the green-house effect. The atmosphere and atmospheric chemistry. Air pollution; photochemical reactions, kinetics and ozone depletion. Water chemistry and resources. Sewage, solid waste and waste management. Chlorinated organic compounds, polynuclear aromatic hydrocarbons. Toxic metals in the environment. Pollution control and minimization; decontamination and remediation methods; advanced oxidation processes. Environmental chemical analysis.

AAY331 Organometallic Chemistry

Structure, bonding, synthesis and reactions of metal complexes with carbonyl, alkyl, hydride and unsaturated hydrocarbon ligands. Organometallic reaction mechanisms: sigma-pi rearrangement, beta-elimination, migratory insertion, oxidative addition, reductive elimination. Homogeneous catalysis of organic reactions by transition metal complexes, including: hydrogenation, isomerization, polymerisation, hydroformylation, Wacker process.

AAY332 Phase Equilibria and Colligative Properties

One-component systems: phase diagrams; Clapeyron equation and Clausius-Clapeyron equation, phase rule. Two-component systems (simple mixtures): thermodynamic description of mixtures and partial molar properties; vapour-liquid equilibria of binary liquid mixtures: ideal solutions, Raoult's law and Henry's law; colligative properties: elevation of boiling point, freezing point depression, osmotic pressure, molar mass determination by freezing point depression and osmotic pressure.

AAY333 Organic Reaction Mechanisms and Synthesis

Basic principles for writing organic reaction mechanisms. Frontier orbitals. Factors controlling organic reactions: thermodynamic and kinetic factors; stereochemical and electronic factors. Survey of the main types of organic reaction mechanisms. Reactions of carbonyl compounds with alpha hydrogen atoms; enols and enolates. Pericyclic reactions. The disconnection approach to organic synthesis; synthons. These topics are taught with special emphases on linkages to the current school curricula.

AAY334 Industrial Chemistry

History and development of the industry. Sources of chemicals. Main sectors of chemical industries; their social and economical importance towards national and regional development. Operational, pollution and logistic issues. Petrochemical industry and energy sector; petrochemicals and their utilizations. Industrial catalysts, chloro-alkali products and the gas industry. Agricultural chemicals and specialty chemicals. Research and development. These topics are taught with special emphases on linkages to the current school curricula.

AAY335 Advanced Analytical Chemistry

Chromatographic theory: Fick's first and second laws; principles of peak retention and resolution, zone spreading, Einstein diffusion coefficient, theoretical plates. Modern chromatographic systems: column and detector technology; purge-and-trap, head-space analysis, solid-phase microextraction. Mass spectrometry: methods of ionization and mass analysis; hyphenated techniques, GC-MS, LC-MS, MS-MS. Automation, miniaturization, data management and quality assurance in modern analytical science. Case studies.

AAY336 Materials Chemistry

Introduction to the major groups of materials: metals, polymers, ceramics, and composites. Crystal structures, defects and fundamental properties of materials. Polymer synthesis and characterization, polymer properties, hydrogels, polymer degradation and biodegradable polymers, polymer processing for tissue engineering. Biomaterials. Fullerenes and carbon nanotubes.

AAY337 Medicinal Chemistry

This module introduces the basic principles and practice of medicinal chemistry. This is illustrated by how ideas for new drugs are taken through the various stages from initial discovery, generation of lead compounds, optimization of biological activity, and finally into clinical trials. The mechanism of action of clinical drugs (antiviral, antibacterial, anticancer, anti-inflammatory, and anti-parasitic) used for treatment of human ailments will be discussed. Chemical principles of herbal medicine will also be discussed. These topics are taught with special emphases on linkages to the current school curricula.

AAY402 Experimental Techniques in Chemistry

This is a laboratory-based module. The module builds on the experimental skills acquired through the various chemistry modules offered in previous years. In this module, student teachers will learn experimental techniques and instrumental methods in advanced inorganic, organic, physical and analytical chemistry. It aims to bring student teachers to a high level of competence in synthesis, making careful chemical and physical measurements, making logical deductions and in communicating results accurately and precisely.

ACADEMIC SUBJECT: CHINESE LANGUAGE

**Table 1: AS 1 Chinese Language Structure for BA (Ed)
(Chinese) (Primary)
AS 1 Chinese Language Structure for BA (Ed)
(Chinese) (Secondary)**

Year	Module Code	Title	Module Category	No. of AUs	Pre-requisites
1	Semester 1				
	AAC101	Textual Analysis and Writing Practices	Core	3	-
	AAC102	Modern Chinese Phonology and Hanyu Pinyin	Core	3	-
	Semester 2				
	AAC103	Chinese Rhetoric	Core	3	-
2	Semester 1				
	AAC201	Chinese Etymology and the Modern Chinese Script	Core	3	-
	AAC202	Critical Reading and Writing in Chinese	Core	3	-
	Semester 2				
	AAC203	Modern Chinese Lexicology	Core	3	-
	AAC204	Modern Chinese Grammar	Core	3	-
3	Semester 1				
	Select any 2				
	AAC331	Translation and Contrastive English-Chinese Linguistics	Pres	3	-
	AAC332	Features of Singapore Mandarin	Pres	3	-
	AAC333	Language Acquisition and Learning of Chinese	Pres	3	-
	Semester 2				
	Select any 1				
	AAC334	Classical Chinese Grammar	Pres	3	-
AAC335	Selected Readings in Chinese Linguistics	Pres	3	-	
4	Semester 1				
	Select any 1				
	AAC431	Computer Applications in Chinese Language and Literature	Pres	3	-
	AAC432	Chinese Language and Culture	Pres	3	-
Total AUs for Degree				33	

AAC101 Textual Analysis and Writing Practices

This module aims to acquaint student teachers with good Chinese writing through close textual analysis of literary works and commentaries of different kinds of writing. It also aims to enhance student teachers' reading ability and sharpen their writing skills.

AAC102 Modern Chinese Phonology and Hanyu Pinyin

This module will equip student teachers with basic knowledge of Phonetics and Phonology of Modern Standard Chinese. The objective is to enable student teachers to apply such knowledge in teaching.

AAC103 Chinese Rhetoric

This module deals with the functions of rhetoric in literature and everyday life. It aims to enable student teachers to determine the linguistic structure of an expression and relate it to its meaning and rhetorical effects.

AAC201 Chinese Etymology and the Modern Chinese Script

This module aims to equip student teachers with basic knowledge in Chinese etymology and the modern Chinese script. Such knowledge will enhance their ability as a Chinese language teacher, especially when it comes to the teaching of recognition of Chinese characters.

AAC202 Critical Reading and Writing in Chinese

This module aims to familiarize student teachers with the form and conventions of academic writing in Chinese. The objective is to enhance critical reading and writing competencies through a variety of tasks, such as analyzing given texts from various sources; constructing a focused, logical, coherent view-point; selecting and sourcing relevant research material; drafting, revising and editing a short essay; writing a mini research paper.

AAC203 Modern Chinese Lexicology

The module aims to provide student teachers with an understanding of the nature and classification of the Chinese lexicon.

AAC204 Modern Chinese Grammar

This module aims to provide student teachers with a basic knowledge of modern Chinese grammar. It will equip them with the concepts and skill to analyze the various parts of speech and sentence structures of various kinds of modern Chinese writings in daily and academic life as well as in school settings.

AAC331 Translation and Contrastive English-Chinese Linguistics

Introduction to synchronic contrastive linguistics; theoretical and practical aims; models and examples of contrastive study between Chinese and English at orthographical, morphological, semantic and syntactic level. Theories and practice of translation.

AAC332 Features of Singapore Mandarin

This module focuses on the description of the phonology, vocabulary, and syntax of Singapore Mandarin. The historical and present-day influence on Singapore Mandarin from Chinese dialects and other non-Chinese languages in Singapore, the different varieties of Singapore Mandarin and its standardization, and the role of Mandarin in the multilingual context of Singapore will also be examined.

AAC333 Language Acquisition and Learning of Chinese

This module aims to equip student teachers with a basic knowledge in language acquisition models and theories. It aims also to enhance their understanding of normal language development in primary and secondary school and the issues related to learning Chinese as a second language in the special context of Singapore. Student teachers will also be able to have a better understanding of developing bilingualism from infancy through school and the role of language socialization in language acquisition.

AAC334 Classical Chinese Grammar

This module focuses on the grammar of the Chinese language prior to the Tang period. It deals with the development of Classical Chinese grammar and compares classical Chinese grammar with modern Chinese grammar, with special focus on the morphological and syntactic components. It aims to enhance student teachers' ability to read classical Chinese writings as well as consolidating their understanding of the grammar of the Chinese language.

AAC335 Selected Readings in Chinese Linguistics

This module exposes student teachers to various kinds of writings in the area of Chinese General Linguistics, Chinese Etymology, Grammar, Lexicology, Phonology and Sociolinguistics. The objectives are to enrich their knowledge in Chinese language and enhance their ability to do research in the field of Chinese linguistics for academic and teaching purposes.

AAC431 Computer Applications in Chinese Language and Literature

This module provides the fundamental principles and knowledge on the use of IT in the studying and teaching of Chinese Language and Literature. It also aims to equip student teachers with essential digital skills and power tools to achieve the goals in their academic and teaching profession.

AAC432 Chinese Language and Culture

This module aims to introduce different aspects of Chinese language and Chinese culture, with an emphasis on the dynamic relationship between language and culture. Student teachers will better grasp the cultural and social dimensions of Chinese language and thereby have a greater ability of communication.

ACADEMIC SUBJECT: CHINESE LITERATURE

Table 2: AS 2 Chinese Literature Structure for BA (Ed) (Chinese) (Primary)
AS2 Chinese Literature Structure for BA (Ed) (Chinese) (Secondary)

Year	Module Code	Title	Module Category	No. of AUs	Pre-requisites
1	Semester 1				
	AAJ101	Survey of Modern Chinese Literature	Core	3	-
	Semester 2				
	Select 1 (Primary)				
	AAJ131	Readings in Children's Literature	Pres	3	-
	AAJ132	Creative Writing Workshop	Pres	3	-
	Select 1 (Secondary)				
	AAJ132	Creative Writing Workshop	Pres	3	-
AAJ133	Readings in Singapore and Malaysia Chinese Literature	Pres	3	-	
2	Semester 1				
	AAJ201	Selected Readings in Classical Chinese Prose	Core	3	-
	Semester 2				
AAJ202	Selected Readings in Classical Chinese Poetry	Core	3	-	
3	Semester 1				
	Select 2				
	AAJ331	Chinese History	Pres	3	-
	AAJ332	History of Chinese Literature	Pres	3	-
	AAJ333	Introduction to Chinese Thought	Pres	3	-
	Semester 2				
	Select 1				
	AAJ334	Tang Poetry	Pres	3	-
AAJ335	Song Ci	Pres	3	-	
4	Semester 1				
	Select 1				
	AAJ431	Contemporary China	Pres	3	-
	AAJ432	Classical Chinese Fiction	Pres	3	-
AAJ433	Classical Chinese Drama	Pres	3	-	
Total AUs for Degree				24	

AAJ101 Survey of Modern Chinese Literature

The module aims to provide student teachers with a basic knowledge of modern Chinese literature and enhance their understanding of modern Chinese society and the Chinese people in modern times.

AAJ131 Readings in Children's Literature

The module examines the historical development of Children's Literature, various genres of Children's Literature and its relevance to the linguistics, imaginative and psychological development of children. The focus is on the appreciation of Chinese Children's Literature and its relevance and importance in the Teaching of Chinese Language in Primary schools.

AAJ132 Creative Writing Workshop

This module aims to enhance student teachers' ability to appreciate and write creative writings so that eventually they can guide their pupils in creative writings.

AAJ133 Readings in Singapore and Malaysia Chinese Literature

The module aims first to equip student teachers with basic knowledge of the trends and developments of writings by Singapore and Malaysia writers. It also aims to enable student teachers to make good use of Singapore and Malaysia Chinese Literature works in Chinese Language & Literature teaching and curriculum design.

AAJ201 Selected Readings in Classical Chinese Prose

This module aims to enhance student teachers' ability to appreciate classical prose writings and enrich their understanding of Chinese culture.

AAJ202 Selected Readings in Classical Chinese Poetry

The module aims to equip student teachers with a basic knowledge of classical Chinese poetry and enhance their ability to appreciate the genre.

AAJ331 Chinese History

This is a survey of Chinese history from antiquity to the modern era in the perspective of world history.

AAJ332 History of Chinese Literature

This module aims to equip student teachers with a basic knowledge of the history of Chinese literature from Western Zhou dynasty to Qing dynasty, as well as the stylistic features of various genres throughout Chinese history.

AAJ333 Introduction to Chinese Thought

This module aims to provide student teachers with a basic knowledge of the philosophy of major schools in Chinese history. Student teachers will be challenged to reflect on their own life beliefs and modern ethics and norms.

AAJ334 Tang Poetry

This module aims to enhance student teachers' ability to understand and appreciate Tang poetry.

AAJ335 Song Ci

This module aims to enhance student teachers' ability to understand and appreciate Song lyric poetry.

AAJ431 Contemporary China

This module aims to provide student teachers with a basic understanding of contemporary China through a multi-disciplinary approach. It will cover the historical, political, economic, sociological, geographical, and international aspects of the latest development in contemporary China

AAJ432 Classical Chinese Fiction

This module aims to provide student teachers with a basic knowledge of the development and characteristics of the Classical Chinese Fiction. They will read selected tales of the Six Dynasties, *chuanqi* and *huaben* stories of the Tang and Song periods as well as excerpts from the four major novels, namely, The Romance of the Three Kingdoms, The Water Margin, The Journey to the West and The Dream of the Red Chamber.

AAJ433 Classical Chinese Drama

The modules aims to equip student teachers with the basic knowledge of the Form and development of Chinese Classical Drama. It will include a comparative study of systems and traits of Classical Drama, the classification and Appreciation of Classical Drama. An understanding of the influence of the Classical Drama on Chinese ethics and moral concepts.

ACADEMIC SUBJECT: DRAMA

**Table 1: AS 1 Drama Structure for BA (Ed) (Primary)
AS 1 Drama Structure for BA (Ed) (Secondary)**

Year	Module Code	Title	Module Category	No. of AUs	Pre-requisites
1	Semester 1				
	AAU101	Acting	Core	3	-
	AAU102	Foundations of Drama	Core	3	-
	Semester 2				
	AAU103	Educational Drama	Core	3	-
	AAU104	Contemporary Theatre in Singapore and Southeast Asia	Core	3	-
2	Semester 1				
	AAU201	Twentieth-Century Theatre and Drama	Core	3	-
	AAU202	Applied Theatre	Core	3	-
	Semester 2				
	AAU203	Physical Theatre	Core	3	-
	Choose from one of the following options:				
	AAU231	Traditional Asian Theatre Forms	Pres	3	-
AAU232	Technology, Media and Theatre	Pres	3	-	
3	Semester 1				
	AAU301	Cultural Theory and the Theatre	Core	3	-
	Choose from one of the following options:				
	AAU331	Technical Theatre	Pres	3	-
	AAU332	Early Modern Theatre and drama	Pres	3	-
	AAU333	Theatre for Development	Pres	3	-
	Semester 2				
	AAU302	The Director in the Theatre	Core	3	-
	Choose from one of the following options:				
	AAU334	Semiotics and Aesthetics of Theatre	Pres	3	-
AAU335	Modern Drama	Pres	3	-	
AAU336	Dramaturgy and Writing for the Theatre	Pres	3	-	

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Year	Module Code	Title	Module Category	No. of AUs	Pre-requisites
4	Semester 1				
	AAU402	Performance and Production	Core	3	-
Total AUs for Degree				39	

Table 2: AS 2 Drama Structure for BA/ BSc (Ed) (Secondary)

Year	Module Code	Title	Module Category	No. of AUs	Pre-requi-sites
1	Semester 1				
	AAU101	Acting	Core	3	-
	AAU102	Foundations of Drama	Core	3	-
	Semester 2				
	AAU103	Educational Drama	Core	3	-
	AAU104	Contemporary Theatre in Singapore and Southeast Asia	Core	3	-
2	Semester 1				
	AAU201	Twentieth-Century Theatre and Drama	Core	3	-
	AAU202	Applied Theatre	Core	3	-
	Semester 2				
	AAU203	Physical Theatre	Core	3	-
	Choose one of the following:				
	AAU231	Traditional Asian Theatre Forms	Pres	3	-
AAU232	Technology, Media and Theatre	Pres	3	-	
Total AUs for Degree				24	

AAU101 Acting

Explores the processes of personal preparation for a range of acting roles and performance modes. Gives initial experience of Asian and presentational modes as well as the traditional core work in realistic acting. Emphasises personal commitment to and ownership of the process. Both group and individual performances will be presented and assessed, supported by journals and written theoretical accounts.

AAU102 Foundations of Drama

This will constitute a general introduction to the field of drama, in its literary, theatrical, performative and educational aspects. Set texts will include a Shakespeare play and a Singapore play, and there will be a theatre visit. The plays will be approached dramaturgically – through the means of analysis for theme, structure, character and patterns of language; through the possible theatrical modes for their realisation; and through practical work on the text as a script for performance, focussing on the work of the actor/performer. Elementary theory will be incorporated to give the student teachers critical purchase on the knowledge base. An overarching concern will be the historical and present-day social purposes of theatre, and in this context the important area of educational drama will be introduced. The module thus establishes a foundation for the other six core modules at Levels 1 and 2.

AAU103 Educational Drama

This module introduces student teachers to the history, philosophies and theories of educational drama. The focus will be on learning in, through and about drama with a practical orientation. Links will be drawn between developments in our understanding of how children learn and the ways that educational drama practices have contributed to discourse in the field.

AAU104 Contemporary Theatre in Singapore and Southeast Asia

The course will explore issues that are relevant in contemporary Southeast Asian theatre, with particular emphasis on Singapore and Malaysia and a brief introduction to Indonesia and the Philippines. It will include an introduction to the elements of traditional theatre as well as theatre forums with theatre practitioners on current practices, and will consider questions of identity, history, social and cultural changes and the trends. Student teachers will be required to prepare a 20-30 minute workshop performance in groups which may be an excerpt or adaptation of a play from the region.

AAU201 Twentieth-Century Theatre and Drama

The course will explore some of the practices and ideas that have had a significant impact on theatre in the 20th Century. It will often revolve around the writings or practices of theatre practitioners. Sometimes it will include other cultural influences such as political thought and social ideology, and their integration into theatre practice. The course will be taught through workshop and lecture and student teachers will be required to engage in practical and theoretical discussion, as well as prepare a workshop performance for assessment.

AAU202 Applied Theatre

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 module introduces the practical, theoretical and philosophical underpinnings of these approaches.

AAU203 Physical Theatre

This module explores the fundamental ideas of physical theatre and provides practical training in the relevant skills. It will focus on the articulation of ideas through the articulation of the body by emphasizing movement and gesture. It will use experimental techniques of improvisation, movement analysis, contact improvisation and basic choreography in extending the vocabulary of the body. It will discuss how physical theatre has influenced much contemporary theatre and trace its origins to traditions from the East and West. The course will also employ selected literary texts of poetry and prose to be used for performance.

AAU231 Traditional Asian Theatre Forms

This course will examine aspects of form, style and technique in major traditional theatre forms across Asia, such as Kabuki in Japan, Beijing Opera in China and Kathakali in India. It will employ an integrated approach to learning these forms by using practical workshops that are informed by history and theory. It will also examine some relevant literary texts that have become part of the tradition. The course will discuss and analyse the theoretical frameworks within which these forms have developed and how they continue to influence ideas about tradition in Asia.

AAU232 Technology, Media and Theatre

This module will examine theatre as a live performance and its implications in a mediatized culture. It will discuss the idea of 'liveness' in a world increasingly dominated by media technology and consider how this implies a reduced space for 'live' performances. It will study technologised performance as an emergent space and analyse how the element of 'liveness' impacts on theatre's value. It will also explore how theatre contends with mass media and popular forms of technologised culture. The course will provide opportunity for creating live performance that uses technology and engages media culture to enhance as well as question the quality of 'liveness' in theatre.

AAU301 Cultural Theory and the Theatre

This module explores contemporary theatre within the frame of cultural theory. It will highlight significant aspects of theories such as post-colonialism, gender and post-modernism, and trace how they have had a marked impact on theatre performances in a range of contexts. The approach taken will include the close examination of theatre practice that is informed by cultural theory. It will study how practice can be constructed to embody and develop forms of contemporary theatre making. It will involve watching contemporary performances and analyzing the construction of work according to the ideas being examined. The course will also provide opportunity to create original performances that are critically informed by theory and analysed within the respective framework.

AAU331 Technical Theatre

A detailed practical investigation of lighting design and operation, sound design and operation, costume and set design and stage management practices (including safety). The context for this work is the essential artistic contribution made by these practical aspects of theatre-making and the historical changes that are represented through changing techniques, just as much as through changing playscripts.

AAU332 Early Modern Theatre and Drama

Covers the major theatre developments in Western Europe between 1580 and 1700, together with study of representative dramatic texts. The large context is the change from pre-modern to enlightenment mentalities, and the historical disruptions which were part of this change. The theatre is seen as a cultural site which, in the detail of its modes of presentation, embodies and reflects upon these changes.

AAU333 Theatre for Development

This module takes a critical stance with regard to contemporary Applied Theatre and Community Theatre models. Student teachers will consider the ethics and implications of social and cultural constraints and impacts of TFD in a global society. The practical workshops aim to empower student teachers to devise and co-create impactful and culturally sensitive works.

AAU302 The Director in the Theatre

Practical work in the process of directing – from conceptualization through design and rehearsal to performance – with the working context of managing relationships and the theoretical context of the major directors in the last hundred years and the implications of their work for the cultural operation of theatre. The significance of changing relationships with the actor and with audience are two central motifs.

AAU334 Semiotics and Aesthetics of Theatre

This module will examine key topics in analyzing performance such as decoding the sign, the politics of performance, the performing body, audience and spectatorship. It will draw on critical theory in semiotics and aesthetics to inform the understanding of theatre as a sign-system and aesthetic space. The approach will involve examining what is involved in the practical construction of performance texts and mise en scene whilst giving opportunity for original performance texts created in the course to be deconstructed and analysed.

AAU335 Modern Drama

An investigation of modern approaches to drama and theatre from Chekhov and Ibsen through to more contemporary playwrights. These texts may be addressed in seminars and performance workshops.

AAU336 Dramaturgy and Writing for the Theatre

This module offers an investigation of the role of the dramaturg in contemporary theatre practice. It focuses on playwriting processes, dramaturgical methods, criteria used for script assessment and the role of the script editor. Student teachers will have the opportunity to create original texts and act as dramaturgs for their peers.

AAU402 Performance and Production

This module represents the final collaborative theatre work of the cohort. The character of the production will depend upon the further developmental needs of the group at that time – for instance, it could take the form of a devised Theatre-in-Education piece to be toured through schools, if co-operative creation and the educational nexus were considered the most important areas to develop further. Or it could be a classic production, or an interdisciplinary performance piece.

The production work will grow out of continuing drama training, that is out of processes that will be valuable beyond the context of the immediate performance. It will also be theorized and subject to critique and review to place it firmly in the arena of work-in-progress, however much it is, at the same time, aiming to be a polished topping-out ceremony.

ACADEMIC SUBJECT: ENGLISH LANGUAGE

Table 1: AS 1 English Language Structure for BA (Ed) (Primary)
AS 1 English Language Structure for BA (Ed) (Secondary)

Year	Module Code	Title	Module Category	No. of AUs	Pre-requisites
1	Semester 1				
	AAE101	Introduction to the Study of Language	Core	3	-
	AAE104	Exploring the Grammar of English	Core	3	-
	Semester 2				
	AAE102	Language in Context	Core	3	-
	AAE103	Understanding the Sounds & Words of English	Core	3	-
2	Semester 1				
	AAE201	The Social Variation of Language	Core	3	-
	AAE202	Language Meaning and Use	Core	3	-
	Semester 2				
	AAE203	Language Acquisition & Development	Core	3	-
	Select any 1 elective				
	AAE231	The Role of Language in Education	Pres	3	-
	AAE232	Analysing Text	Pres	3	-
	AAE233	Language and Literacy	Pres	3	-
AAE234	The Structure of Singapore English	Pres	3	-	

cont'd

Year	Module Code	Title	Module Category	No. of AUs	Pre-requisites
3/4	Select any 5 electives				
	AAE 331/431	An Introduction to Systemic Functional Grammar	Pres	3	-
	AAE 332/432	Topics in Phonetics / Phonology	Pres	3	-
	AAE 333/433	Topics in Pragmatics	Pres	3	-
	AAE 334/434	Lexicology and Lexicography	Pres	3	-
	AAE 335/435	Critical Discourse Analysis	Pres	3	-
	AAE 336/436	English in New Cultural Contexts	Pres	3	-
	AAE 337/437	Understanding Reading	Pres	3	-
	AAE 338/438	Understanding Writing	Pres	3	-
	AAE 339/439	Multiliteracy and the Language Classroom	Pres	3	-
	AAE 340/440	Bilingual Education	Pres	3	-
	AAE 341/441	Using IT in the Language Classroom	Pres	3	-
	AAE 342/442	Language Testing	Pres	3	-
	AAE 343/443	History of Modern Linguistics	Pres	3	-
	AAE 344/444	Comparative Linguistics and the Theory of Translation	Pres	3	-
	AAE 345/445	Language Across the Curriculum	Pres	3	-
	AAE 346/446	Special Topics in Language & Education	Pres	3	-
	AAE 347	Research Methods	Pres	3	-
	AAE 447	Independent Reading and Research	Pres	3	AAE347
Total AUs for Degree				39	

Table 2: AS 2 English Language Structure for BA/ BSc (Ed) (Secondary)

Year	Module Code	Title	Module Category	No. of AUs	Pre-requisites
1	Semester 1				
	AAE101	Introduction to the Study of Language	Core	3	-
	AAE104	Exploring the Grammar of English	Core	3	-
	Semester 2				
	AAE102	Language in Context	Core	3	-
	AAE103	Understanding the Sounds & Words of English	Core	3	-
2	Semester 1				
	AAE201	The Social Variation of Language	Core	3	-
	AAE202	Language Meaning and Use	Core	3	-
	Semester 2				
	AAE203	Language Acquisition & Development	Core	3	-
	Select any 1 elective				
	AAE231	The Role of Language in Education	Pres	3	-
	AAE232	Analysing Text	Pres	3	-
	AAE233	Language and Literacy	Pres	3	-
	AAE234	The Structure of Singapore English	Pres	3	-
Total AUs for Degree				24	

AAE101 Introduction to the Study of Language

This module comprises a basic introduction to the study of language, of English, and of applied linguistics. It provides an overview, with basic terminology, of the major branches of language, investigating the nature, history and structure of English, and how language relates to the mind, society, and education. It provides the basis of investigation in subsequent modules. Throughout the module, the connections between the various branches are emphasized.

AAE102 Language in Context

The major aim of this course is to make student teachers systematic and critical observers of language as they use and encounter it in different contexts. It will examine spoken and written texts across a variety of settings and for a wide range of purposes. By providing student teachers with a beginner's framework and metalanguage for talking about texts, interactions and social context, the course will enable them to appreciate how language works to enable purposeful communication in context, but also to understand how it often works to cover underlying purposes and values. The course is organized around specific weekly small-scale tasks, where student teachers apply and finetune the framework and concepts provided to texts which feature in their everyday and professional/academic life, and which, for future teachers, are likely to be relevant to their pupils.

AAE103 Understanding the Sounds and Words of English

This module will introduce the basic concepts of English morphology and then consider the pronunciation of English words. Student teachers will become thoroughly familiar with the IPA, to enable them to read the phonetic transcription in dictionaries and also describe features of their own speech. In addition, they will be introduced to sound-letter correspondences, to provide a foundation for the teaching of reading. The course will discuss the rules for the pronunciation of suffixes, and the influence of derivational suffixes on word stress. Finally, the basic patterns of intonation will be introduced, including the location of sentence stress and the contribution of intonation to discourse structure.

AAE104 Exploring the Grammar of English

This module introduces grammar as the study of the different parts of the English sentence and how these parts relate to each other. It covers the full range of units – the individual *words*, which combine with other words to form *phrases*, which, in turn, combine with other phrases to form *clauses*. The module draws attention to the key features of the major constituents of the English sentence, and the various functions they perform. Student teachers are also given a brief introduction to the two main approaches to the study of grammar – the formal and the functional.

AAE201 The Social Variation of Language

This course introduces student teachers to basic concepts in sociolinguistics, including socially determined variation in style and register; language varieties reflecting social class, gender and ethnicity. Topics also include investigations of factors influencing language choice in bilingual societies, as well as related phenomena such as code-mixing and code-switching. Issues such as language maintenance and language shift, the emergence of new language varieties such as pidgins and creoles, and the impact of globalization and new communicative orders on the status of languages will also be covered.

AAE202 Language Meaning and Use

This course looks at the meanings of English and how we use meaning to represent and interact with reality and other people, from word to discourse level, and in contexts of real interaction and use. It will consider the nature of meaning, different types of meaning, relationships between meaning and form, the nature and characteristics of words, different types of word, how words are linked by different meaning relationships, how meanings and words change over time, how we use metaphor to create new meanings, the role of dictionaries, how computer corpora can provide information about meaning, words, idioms, grammar and use, how meanings function in spoken and written discourse, how we use meanings and meaning patterns to construct different kinds of text, and how we can use meanings and words conventionally and creatively, as rule and imaginative resource.

AAE203 Language Acquisition and Development

This course examines theories and issues of language learning from both psycholinguistic and sociolinguistic perspectives. It introduces important concepts about how languages are learnt and used in society. Making links between psychological and social factors, the course considers the normal path of development for English monolinguals and bilinguals at home and in school. It highlights features of English language development in primary and secondary schools in multilingual societies such as Singapore. Such knowledge can help teachers understand key factors that influence language learning and make informed decisions about instruction.

AAE231 The Role of Language in Education

This course explores the centrality of language in education, where it is both the medium and the message. Through language the process of teaching and learning takes place, and one of the principal aims of education is to foster student teachers' ability to use language. Among the key questions raised are the following: What is the relationship between language and learning, and how can teachers use language effectively to promote learning? Which language, or types of language, should be taught in school and why? Why do some students learn the language, or types of language, of schooling more readily than others?

AAE232 Analysing Text

This course builds on earlier courses concerned with language, meaning, discourse and text, and emphasises *semiosis* – meaning-making – and the semiotic resources available to users. The course will explore the relationships between texts and contexts, people and contexts, and people and texts, and involve analysis of spoken, written and visual discourse, in order to understand and appreciate their characteristics, similarities and differences, the roles they play in our everyday lives, and their importance in educational contexts.

AAE233 Language and Literacy

This course introduces student teachers to the ways in which definitions of and research on literacy have changed in recent years from static, unidimensional understandings to views of literacy as diverse in nature and as sets of situated social practices inextricably linked to culture and societal structures. Readings and discussion focus on the diverse nature of literacies across time and space and different communities, and the social, cognitive and linguistic aspects of becoming literate. In each area, the concepts and findings of the readings will be linked to literacy development and teaching in the multiracial and multilingual Singapore context.

AAE234 The Structure of Singapore English

This module examines the structure of Singapore English: its grammar, morphology, phonology, lexis and discourse. This is achieved by examining Singapore English as a new variety of English in its own right, and also by comparison with standard international English. Throughout the module, student teachers will carry out investigations of their own variety of (Singapore) English, and relate these to issues and practices of the use of the informal variety of Singapore English in Singapore schools.

**AAE331/ An Introduction to Systemic Functional Grammar
431**

This module explores the structure of English in context. It introduces key concepts from Michael Halliday's systemic functional grammar, and examines in detail the interpersonal, experiential, textual, and logical organization of texts. This module focuses on the broad functions of language, and equips student teachers with the knowledge to account for how language is used in a particular way.

**AAE332/ Topics in Phonetics/ Phonology
432**

This module provides an in-depth description of the vowel, consonant, stress, rhythm and intonation systems of English. It will include an overview of phonological theory, including a detailed study of phoneme theory as well as an introduction to generative phonology. Student teachers will also learn how to measure features of their own speech, and they will be required to compare their findings against existing research on Singapore English. Finally, student teachers will investigate and report on their own intonation and other patterns of their discourse.

**AAE333/ Topics in Pragmatics
433**

A study of the ways in which meanings are generated in context. It explores the philosophical aspects of meaning in Speech Acts, Gricean Maxims, Relevance Theory, Conversational Structure and the coherence of talk, the relations between pragmatics and society, and the application of pragmatics to discourse.

**AAE334/ Lexicology and Lexicography
434**

This module focuses on the history, design and use of dictionaries, and innovations in the design of lexical resources for language learners. It explores the processes by which lexicographers compile dictionary entries and also the factors which affect the type, extent and focus of the information presented in language learning resources for language learners. A feature of the course is a hands-on review of corpus-based methods in language description for compiling dictionaries and other reference resources.

**AAE335/ Critical Discourse Analysis
435**

Critical Discourse Analysis or CDA, for short, is an approach to discourse analysis which looks at issues of power and ideology and the ways by which they are reproduced through language. This critical approach to discourse analysis will explore areas like media discourse, gender discourse and political discourse to uncover the linguistic processes that underlie the ideological construction of contemporary society. CDA's analytic method relies heavily, though not exclusively, on Halliday's functional grammar, and so student teachers with a background knowledge of functional grammar may have an advantage.

**AAE336/ English in New Cultural Contexts
436**

This course surveys the socio-cultural and linguistic characteristics, the roles and functions of new varieties of English in societies around the world. The main objective is to increase student teachers' understanding of the characteristics of New Englishes and the development of new meanings and structures in new cultural contexts. A range of issues related to the spread of English, such as linguistic human rights, language death, decolonisation and the search for cultural roots in new literatures in English will also be examined.

**AAE337/ Understanding Reading
437**

This module will incorporate theoretical and research foundations of past years as well as new conceptualizations of reading and literacy. This requires an understanding of various models of reading and literacy processes. The concept of reading and comprehension has undergone massive change in several ways. The text is viewed as a multiple, intertextual construct. The reader is seen to play a central role in the process of constructing meaning. Context as realized by the constraints of task, purpose and situation is given an important role emphasizing the social dimension of the learning situation. Student teachers will develop an understanding of comprehension and the processes of reading embedded within a learning framework that stresses cognitive development and the social context of learners. Aspects of language processes connected with initial encounters with print, social context and culture, the comprehension process and the role of metacognition in the development of reading will form the focus of this module.

**AAE338/ Understanding Writing
438**

Student teachers will be introduced to significant research and theoretical perspectives on the nature of writing (composing) and the development of writing competence in school and non-school contexts. They will use the research and theoretical models to explore the nature of writing and writing tasks in local school and non-school situations. Implications for the teaching/learning of writing will be discussed.

AAE339/ Multiliteracy and the Language Classroom
439

This course examines the 'what' and 'how' of language and literacy teaching in the context of new and emerging communication channels, forms of message arrangement and technologies and a rapidly changing English language. Specific issues discussed are: Does knowledge remain the same when it is represented in language, image, gesture or other modes? Can image do what writing does, or writing what image does? How do new forms of message arrangement in texts and genres affect the processes of reading and writing? Does learning happen differently when we engage with knowledge through image or language, and are taught in traditional or computer-mediated classrooms? The course also looks at examples of language classrooms which show how the increasingly complex demands of language and literacy pedagogy in contemporary times can be effectively addressed.

AAE340/ Bilingual Education
440

The course includes an exploration of issues in societal bilingualism. It will include discussion on models of bilingual education, the roles and functions of languages, eg official, mother tongue languages in multilingual communities. Issues related to linguistic minorities, socio-psychological aspects of bilingualism: attitudes to language, culture, identity & ethnicity, factors influencing language maintenance and shift, and the politics of language policy planning will be examined.

**AAE341/ Using IT in the Language Classroom
441**

This course focuses on the use of Information Technology (IT) in the study, as well as the teaching, of English language. We explore how various themes of language and learning can meet the challenges of the Digital Age.

**AAE342/ Language Testing
442**

This module provides an introduction to fundamental concepts in language test development, including validity, reliability, washback and ethical testing. Through the creation and trialing of a language test, student teachers will discover the practical implications of the theoretical aspects covered in the course.

**AAE343/ History of Modern Linguistics
443**

This course surveys the developments and broad directions in linguistics from the 19th century to the present day. It describes the tenets of the major schools of linguistics and their analytical approaches. The intellectual atmosphere within which various ideas were evolved, and the prime architects of each school – Saussure, Bloomfield, Chomsky, among others – are also discussed.

**AAE344/ Comparative Linguistics and the Theory of
444 Translation**

This course provides an overview of the theories and techniques of translation, focusing on issues that influence the translation of texts from the student's home language into English and comparisons of the structure of English with one of the other languages of Singapore.

**AAE345/ Language Across the Curriculum
445**

This course emphasises the crucial role of language in learning, the important role that teachers play in the thinking and learning processes, and progress, of their students at primary and secondary levels, developing awareness of, and knowledge about, the language of subjects across the curriculum. The course will explore the use of language in primary and secondary subject classrooms, the nature of the texts and textbooks used in schools, and the ways in which theories of language and learning can be put into practice so that teachers can address the learning needs of their student teachers more effectively and confidently.

**AAE346/ Special Topics in Language and Education
446**

This course will focus on subjects, key texts or persons that have played an important role in the study of language and education. Because of its specialised nature, the module will give student teachers a chance to explore a topic or the work of an educational linguist in greater depth. Topics vary with the instructor and the interests of student teachers.

AAE347 Research Methods

This module examines the various research methods employed in the study of English Language. It aims to provide basic knowledge and skills needed for student teachers to identify and define a significant issue in an area of English Language or Applied Linguistics and to decide on the appropriate theoretical framework and methodology to investigate it. Student teachers will be familiarised with different types of research design, quantitative and qualitative, and their strengths and limitations. As they are drafting their research plan, student teachers will also discuss what constitutes effective academic argumentation and style in their area of study.

AAE447 Independent Reading and Research

This module provides an opportunity for undergraduate student teachers to do independent reading and research in a topic of their choice in English Language under the guidance of an ELL staff member. Student teachers use this opportunity to explore an area of study or issue that relates to their academic and/or professional interests. Often, new tools, concepts or strategies learned during the first three years of study spark an interest in exploring further applications of ideas. This independent study module is an excellent opportunity for focused, personalised reading and research. Subject to the approval of the Academic Group, student teachers will select a topic and will be matched with a research mentor.

ACADEMIC SUBJECT: ENGLISH LITERATURE**Table 1: AS 1 English Literature Structure for BA(Ed) (Secondary)**

Year	Module Code	Title	Module Category	No. of AUs	Pre-requisites
1	Semester 1				
	AAR101	Speaking of Narrative	Core	3	-
	AAR102	Survey of British Literature I: Chaucer, Shakespeare & the Renaissance	Core	3	-
	Semester 2				
	AAR103	Survey of British Literature II: 17 th Century to Modernism	Core	3	-
	AAR104	Reading Strategies	Core	3	-
2	Semester 1				
	AAR201	American Literary Tradition	Core	3	-
	AAR202	Literature, Education and Culture	Core	3	-
	Semester 2				
	AAR203	Singapore and the Region in Literature	Core	3	-
	Select any 1 module from Group A				
	Group A	AAR231	Shakespeare and Early Modern Drama	Pres	3
AAR232		The Restoration to Blake	Pres	3	-
AAR233		17 th Century Poetry and Prose	Pres	3	-

cont'd

Year	Module Code	Title	Module Category	No. of AUs	Pre-requisites	
3/4	Select 5, with at least 1 each from Group B, Group C and Group D					
	Group B	AAR 331/431	Romanticism	Pres	3	-
		AAR 332/432	Victorian Poetry and Prose	Pres	3	-
		AAR 333/433	The English Novel: Jane Austen to the 19 th Century	Pres	3	-
	Group C	AAR 334/434	20 th Century Drama	Pres	3	-
		AAR 335/435	20 th Century Poetry	Pres	3	-
		AAR 336/436	Contemporary British Literature	Pres	3	-
		AAR 337/437	Contemporary American Literature	Pres	3	-
		AAR 338/438	Film Studies	Pres	3	-
		AAR 339/439	Adolescent Literature	Pres	3	-
	Group D	AAR 340/440	Understanding Critical Theory	Pres	3	-
		AAR 341/441	Post-colonial Theory and Literature	Pres	3	-
		AAR 342/442	Literature and Feminism	Pres	3	-
		AAR 343/443	Approaches to Cultural Studies	Pres	3	-
		AAR 344/444	Developments in Anglophone Literatures	Pres	3	-
	AAR345	Research Methods in the Study of Literature in English	Pres	3	-	
	AAR446	Independent Reading and Research	Pres	3	AAR345	
	Total AUs for Degree				39	

Table 2: AS 2 English Literature Structure for BA(Ed)/BSc(Ed) (Secondary)

Year	Module Code	Title	Module Category	No. of AUs	Pre-requisites
1	Semester 1				
	AAR101	Speaking of Narrative	Core	3	-
	AAR102	Survey of British Literature I: Chaucer, Shakespeare & the Renaissance	Core	3	-
	Semester 2				
	AAR103	Survey of British Literature II: 17 th Century to Modernism	Core	3	-
	AAR104	Reading Strategies	Core	3	-
2	Semester 1				
	AAR201	American Literary Tradition	Core	3	-
	AAR202	Literature, Education & Culture	Core	3	-
	Semester 2				
	AAR203	Singapore and the Region in Literature	Core	3	-
Total AUs for Degree				24*	

Note: *For the AS2, student teachers will in addition choose any module from Groups B, C or D in the AS1 listings for a total of 24 AUs.

AAR101 Speaking of Narrative

As the first step in the education of a teacher of Literature, this module will introduce the student teacher to some of the modes of storytelling which have arisen through the ages from narrative poetry fiction and drama to more recent developments such as film, television anime, and computer realizations of current events. This is in anticipation of the various types of narrative structures a student teacher will have to deal with in the classroom.

AAR102 Survey of British Literature I: Chaucer, Shakespeare & the Renaissance

This module surveys the first 'half' of the English literary tradition, a necessary step in the preparation of a teacher of Literature. The selection of authors and texts will introduce student teachers to literary periods, movements and aesthetics, and the particular emphasis will be Chaucer, Shakespeare and readings from the Renaissance. The three major literary genres of prose fiction, poetry and drama will be highlighted.

AAR103 Survey of British Literature II: 17th Century to Modernism

This module surveys the second 'half' of the English literary tradition, continuing from where *Survey I* leaves off in the preparation of a teacher of Literature. The selection of authors and texts will continue to introduce student teachers to important literary periods, movements and aesthetics. Once again the three major genres of prose fiction, poetry and drama will be well-highlighted even as this module is mindful of its emphasis on historical survey.

AAR104 Reading Strategies

Student teachers will be given a selected number of texts and taught how to subject them to multiple readings, using a variety of approaches. They will start by mapping the semiotics of a text and understanding how it works as a system of signs before learning how to read gender biases and assumptions in its use of figurative language and narrative perspective. They may also learn how to disentangle the text's ideologies, its class and other affiliations, and read critically into its gaps and absences. Student teachers will also be introduced to some basic psychoanalytical strategies of reading and learn how to relate a text's discourse to the wider world of intellectual and cultural practices outside it. By the end of the course, student teachers will be able to relate to literature as social text and view reading as social practice, and be well prepared to proceed to the second year of their education as teachers of Literature.

AAR201 American Literary Tradition

This module examines the definition of the term "American", what ideas and ideals are associated with its appropriation as a descriptive for the country, the United States, and how those ideas and ideals have been enunciated in American literature through the end of the nineteenth century. The readings will include selections from some of the following writers: Winthrop, Mather, Wheatley, Franklin, Cooper, Poe, Hawthorne, Melville, Emerson, Fuller, Thoreau, Dickinson, Whitman and Twain.

AAR202 Literature, Education and Culture

This module explores what the relationship might be between contemporary culture and literature education in the secondary school. Central to the challenge of literature education is the ongoing rapid growth of the mass media, youth-targeted consumption culture and the change in gender expectations of men and women, along with the more 'traditional' problems of youth gangs and how literature in English should be taught in a multi-ethnic/multi-lingual context. The social category 'youth' itself is affected by such cultural changes. Given these challenges, the roles of cultural literacy and complex written texts remain important as they are linked with the educational potential of developing creativity, strong identity and expanded formal and informal learning capacities. However, for literature education to be effective, teachers cannot ignore *both* the challenges *and* opportunities offered by contemporary culture. This module investigates the implications of contemporary culture for education, and the potential uses of youth culture as foci for the teaching of literature and the development of a more general cultural literacy.

AAR203 Singapore and the Region in Literature

This module will explore cultural and historical connections and shared ethnic traditions in the literatures of post-independence South-east Asian nations and Singapore. Using translated works as well as writing in English, student teachers will look, for example, at the modern rewriting of Hindu and Malay myths in the region, and examine the literary treatment of immigrant identities. It could also look at the modern woman's struggle against Asian patriarchal cultures and consider similarities and differences in these nations' literary constructs of modernity and their engagement with globalisation.

AAR231 Shakespeare and Early Modern Drama

The module focuses on the breadth of Shakespeare's writing, covering his major plays as well as his poetry. Shakespeare and his work will be studied in the context of Elizabethan history and culture. Topics might include performance, identity, personal and political power, the effects of economic expansion and/or the roots of empire.

AAR232 The Restoration to Blake

This module provides an introduction to the literature of the Restoration and Eighteenth Century, excluding novels. Primary attention will be given to major poets (including John Dryden, Alexander Pope, Samuel Johnson, and William Blake) as well as essayists and prose satirists (especially Johnson and Jonathan Swift). Particular attention will be given to the role of the author as social actor and commentator.

AAR233 17th Century Poetry and Prose

This module studies major non-dramatic literature of the period with primary attention given to the works of John Donne and John Milton. Topics include metaphysical poetry (Donne, George Herbert, Andrew Marvell et al.), cavalier poetry (Ben Jonson, Thomas Carew, Richard Lovelace et al.), and the interaction of those traditions on Milton. The module may also include a study of the emergence of popular literature in John Bunyan's *Pilgrim's Progress*.

AAR331/ Romanticism 431

This module considers Romanticism as an intellectual and aesthetic movement and looks at the work of the major writers such as Blake, Byron, Shelley, Southey, Keats, Coleridge, and Wordsworth. Issues of style and elements of Poetry including form and imagery will be considered. Issues explored will include the nature of revolution, the sublime, Nature, the representation of the past, romantic love, travel, and exoticism.

**AAR332/ Victorian Poetry and Prose
432**

This module looks at a selection of poetry and prose and considers it in relation to such major concerns and cultural pre-occupations of the Victorian period as the woman question, colonialism, class struggle, industrialisation, social ills, the changing landscape, and the division between private and public spheres. Questions of poetic prose form will be integral to the module. Poetic works to be studied may include those of Robert Browning, Elizabeth Barrett Browning, Christina Rossetti, Alfred Tennyson, Matthew Arnold, and Thomas Hardy. Prose writing by Thomas Carlyle, Thomas Macaulay, John Stuart Mill, John Ruskin and William Morris will also be considered.

**AAR333/ The English Novel: Jane Austen to the
433 19th Century**

This module looks at the nineteenth-century English novel and the contribution to the form's development by major writers like Jane Austen, the Brontes, Charles Dickens, Wilkie Collins, George Eliot, Elizabeth Gaskell, William Thackeray, and Thomas Hardy. Questions of form, point of view and the conventions of realism will be considered. Other issues to be examined include the trope of the fallen woman, sensation fiction, the place of the writer in Victorian society, serial publication and the material conditions of production.

AAR334/ 20th Century Drama
434

This module focuses on the seminal figures of the modern dramatic movement in Europe and the USA: Henrik Ibsen, Anton Chekov, August Strindberg, George Bernard Shaw, Eugene Ionesco, Eugene O'Neill and Samuel Beckett, among others. It will examine the ways in which these playwrights rejected conventional theatrical forms as well as look at concerns of subjectivity, gender, and social and cultural identities in response to major shifts in the intellectual life and socio-political climate leading to and during the twentieth century.

AAR335/ 20th Century Poetry
435

This module begins with an examination of poetry in English as a distinctively international phenomenon. It also considers the impact of the central issues and techniques of the 'classic' modernist poetry of T.S. Eliot, W.B. Yeats and Ezra Pound, among others, on the poetry that follows by writers such as W.H. Auden, Wallace Stevens, Sylvia Plath, as well as late twentieth-century figures such as Derek Walcott. Other issues may include the ways in which feminist and postcolonial concerns, for example, have influenced the development of modern poetry. There will be consideration of how the experimentation with poetic form is related to the poet's thematic and other concerns.

**AAR336/ Contemporary British Literature
436**

Working from the conviction that the study of literature is without equal in providing an understanding of other cultures, this module will offer a grounding in some of the fundamental attitudes, mores, and areas of dispute of contemporary British society.

The module will survey a range of contemporary fiction poetry and drama of the British Isles. Attention will be given to such issues as regional diversity – for example, the differences between the literatures of England, Northern Ireland, Scotland, and Wales – and the impact of the literatures produced by immigrants and their descendants after World War II.

**AAR337/ Contemporary American Literature
437**

This module examines twentieth-century American literature through the often-cited argument that all American literature can be traced back to Mark Twain's *The Adventures of Huckleberry Finn*. Readings will include fiction, poetry and drama and non-fiction prose. Writers may include some of the following: Cummings, Hemingway, Baldwin, Stevens, Steinbeck, O'Neill, Faulkner, O'Connor, McCullers, Miller, Williams, Frost, Kingston, Vonnegut, Coover, Pynchon, Morrison.

AAR338/ Film Studies
438

This is basically a methods and materials module in film criticism. It aims to teach student teachers how to *read* a film by introducing them to the tactics of practical film criticism, the basic language of the discipline, and the major critical theories. Some film history will be included but that is not the main focus of the module. The selection of films to be studied is at the discretion of the instructor and is liable to change from year to year.

AAR339/ Adolescent Literature
439

Much of what society intends in terms of identities and values can be inferred from writing for the child and what he/she is made out to be in such writing. This module examines representative texts for an in-depth understanding of the didactic and cultural aspects of socialisation. Texts include the folk tale, books used for language arts teaching, and canonical and contemporary writing for adolescents.

AAR340/ Understanding Critical Theory

440

This module is a survey of some of the currents of theoretical thinking which have proven to be influential in the study of literature. The range of 'schools' covered may include: Leavisite or humanistic approaches to criticism; Marxist and post-Marxist criticism and theories; psychoanalytical criticism; cultural criticism and theories of mass culture; structural and poststructural theories; postmodernist theories of the arts, writing and culture. Major figures which this module will focus on may include Claude Lévi-Strauss, Jacques Derrida, Jean-François Lyotard, Michel Foucault and Fredric Jameson. Understanding the contemporary debates on literature and reading will affect the way we read and teach literature in the classroom.

**AAR341/ Post-colonial Theory and Literature
441**

Selected readings of theory and literature will introduce student teachers to salient topics concerning post-colonial culture, such as the paradoxes of imagining post-colonial identity in the former master's language as well as the identity problems that stem from contemporary global movements of peoples. Student teachers will also study the ways in which selected literary texts from the Indian subcontinent, Africa, and the Caribbean, as well as the Asian diaspora, among others, dismantle colonial fictions of the racial 'Other' and imagine new national, transnational and ethnic identities for their communities. The course will prepare student teachers to tackle in the classroom, important cultural and social concerns raised today within the new context of globalisation and transnational identities.

**AAR342/ Literature and Feminism
442**

The course brings women's issues to bear on the study of literature. Student teachers will begin by learning how to read literature from a female subject-position before being introduced to women's writing as a genre. They will scrutinise the gender biases in writing by the literary 'masters' and ask whether both literature and literary criticism are patriarchal in character. Course readings will range from canonical male texts, to women's novels and poetry and include salient writings from the Women's Movement.

**AAR343/ Approaches to Cultural Studies
443**

This module introduces the study of culture beyond the literary text. It considers the development of British cultural studies and the development of the idea that 'culture is common'. The range of issues covered may include: the 'usefulness' of high culture in an industrial society, resistance against hegemonic notions of culture and society, the development of the concerns of gender, race and class in literary study, the concerns of mass culture in consumption-oriented societies, the emergence of youth culture, counter cultures and other sub-cultures. This module will also consider the question of the relevance of cultural studies in contemporary Asian contexts. Major figures focused on may include Raymond Williams, Stuart Hall, Paul Gilroy, Walter Benjamin and Theodor Adorno.

**AAR344/ Developments in Anglophone Literatures
444**

This course will consider developments in Anglophone literary traditions as they developed outside the United Kingdom, with a focus on texts from a particular region. These could include Australasia, South Asia, the Caribbean, North America and Africa. The influence of native oral literary traditions, Magic Realism, and challenges to Western conceptions of history could be among developments considered. The course will introduce student teachers to the cultural imaginary of a region.

AAR345 Research Methods in the Study of Literature in English

This module examines the various research methods employed in the study of Literature in English. It aims to provide the basic knowledge and skills needed for student teachers to identify and define a significant issue in an area of literary-cultural study and to decide on the appropriate theoretical framework and methodology to investigate it. Student teachers will be familiarised with different types of research design, and bibliographic research, along with their strengths and limitations. As they are drafting their research plan, student teachers will also discuss what constitutes effective academic argumentation and style in their area of study.

AAR446 Independent Reading and Research

This module provides an opportunity for undergraduate student teachers to do independent reading and research in a topic of their choice in Literature in English under the guidance of an ELL staff member. Student teachers use this opportunity to explore an area of study or issue that relates to their academic and/or professional interests. Often, new tools, concepts or strategies learned during the first three years of study spark an interest in exploring further applications of ideas. This independent study module is an excellent opportunity for focussed, personalised reading and research. Subject to the approval of the Academic Group, student teachers will select a topic and will be matched with a research mentor.

ACADEMIC SUBJECT: FAMILY AND CONSUMER SCIENCES

Table 1: AS1 Family and Consumer Sciences Structure for BSc(Ed) (Secondary)

Year	Module Code	Title	Module Category	No. of AUs	Pre-requisites
1	Semester 1				
	AAQ101	Principles of Nutrition	Core	3	-
	AAQ102	Resource Management for Individuals and Families	Core	3	-
	Semester 2				
	AAQ103	Textiles Study	Core	3	-
2	AAQ104	Food and Society	Core	3	-
	Semester 1				
	AAQ201	Food Management and Preparation	Core	3	-
	AAQ202	Creative Textiles	Core	3	AAQ103
	Semester 2				
AAQ203	Consumer Issues	Core	3	AAQ102	
AAQ204	Enterpreneurialship in Family and Consumer Sciences	Core	3	AAQ101, 103, 201, 202	
3	Semester 1				
	AAQ301	Food Science and Principles	Core	3	-
	AAQ302	Consumer Research Methods	Core	3	AAQ102, 203
	Semester 2				
	AAQ303	Clothing and the Consumer	Core	3	AAQ103
4	AAQ304	Applied Nutrition	Core	3	AAQ101
	Semester 1				
AAQ401	Individual Project with Industrial Attachment	Core	3	-	
Total AUs for Degree				39	

AAQ101 Principles of Nutrition

An overview of how macro- and micro-nutrients affect health, disease, energy balance and weight control. Various aspects of food composition and its relationship to food choices and subsequent impact on health issues. The principles of digestion, absorption and metabolism. The application of nutrition principles to the needs of individuals and groups at different stages in the life cycle. Global issues such as food safety, food technology and world hunger.

AAQ102 Resource Management for Individuals and Families

This module focuses on the application of management principles to individuals, household and families, management as a process of using resources to achieve goals. The basic concepts of what is management, why manage, who manages, values, attitudes, goals, resources, decision making and problem solving, managing human resources, work and family, stress, environmental resources time and finances.

AAQ103 Textiles Study

The study of textile fibres according to their origin, structure, physical and chemical properties. Identification of fibres (burning tests, microscopic appearance and reactivity with reagents used in the home). Characteristics of yarns and fabrics in relation to production processes that affect the finishing, dimensional stability and serviceability.

AAQ104 Food and Society

This module focuses on the patterns, customs and management of foods in the context of diverse cultural populations. The influences of history and origins, culture and religions on foods, the impact of geographical and economic factors on food patterns, eating habits, preparation of traditional foods from around the world, and the impact of these on the Singapore food scene and marketplace.

AAQ201 Food Management and Preparation

The study of nutrient values of specific foods and changes of nutrient content of foods during food preparation. Ways of minimizing food loss, preventing food spoilage and food-borne poisoning will be discussed. Integration of knowledge and skills in food science and nutrition to food choice, selection, preparation, storage, presentation and evaluation of a variety of meals and food products that are nutritious, appealing and balanced. Emphasis on food preparation and food investigation skills from the perspective of the Singapore Healthy Diet Pyramid.

AAQ202 Creative Textiles

The study of aesthetic principles involved in the selection of colour, texture, line and shape and their application in the design and production of clothing and other textile products. Developing creativity and production of objects through the use of different materials and surface decorative techniques, including hand and machine embroidery.

AAQ203 Consumer Issues

This module focuses on the basic economic principles as they apply to the consumer marketplace. Consumer purchase decisions with a specific focus on consumer issues in the areas of food, product safety, housing and family finance. A study of consumer problems such as consumer rights, responsibilities and remedies in the context of purchase decisions.

AAQ204 Entrepreneurialship in Family and Consumer Sciences

The focus of this module is on the development of business ventures related to food and textiles. An introduction to business applications and how they apply to an entrepreneurial venture. Topics include how a concept is taken from a business plan to a start up in the first phases of the entrepreneurial process, idea conception, entrepreneurship, business planning, market research, entrepreneurial opportunities and strategies.

AAQ301 Food Science and Principles

This module illustrates the principles of food science, emphasizing the functional, physical and chemical properties of food constituents and their behaviour in production, processing, preparation, selection, evaluation, storage and usage of food. This investigative approach to the underlying principles provides content knowledge and develop process skills and experiments that can be applied to teaching at secondary school levels.

AAQ302 Consumer Research Methods

This module focuses on the analysis of consumption patterns and behaviour of consumers in the marketplace. Data collection methods are explored in the context of family and individual purchase decisions. A range of quantitative methods with emphasis on the use of simple regression analysis and correlation to explain consumer behaviour.

AAQ303 Clothing and the Consumer

The focus of this module is on introducing clothing issues as they relate to the consumer. The function of clothing will be explored by investigating the fibre content and fabric structure in relation to construction techniques. Clothing issues will be explored through surveying market trends.

AAQ304 Applied Nutrition

This module covers the study of nutrition relating to physiological adaptations and nutritional needs through the lifespan, included are the translation of nutrients in food terms, menu adaptations for specific groups and effects of various food preparation on the nutritive value of foods. Factors relating to food choice / selection to meet nutritional requirements and decision making about current nutrition-related issues will be discussed.

AAQ401 Individual Project with Industrial Attachment

The focus of this module is on reviewing the family and consumer science philosophy and how it has been anchored in businesses. Practice will be followed by a consideration of the ways in which the individual consumer and the family as a consuming unit are the driving forces behind a variety of businesses/industries relevant to the content areas of family and consumer sciences.

ACADEMIC SUBJECT: GEOGRAPHY**Table 1: AS 1 Geography Structure for BA(Ed) (Primary)
AS 1 Geography Structure for BA (Ed) (Secondary)**

Year	Module Code	Title	Module Category	No. of AUs	Pre-requisites
1	Semester 1				
	AAG101	Elements of Physical Geography	Core	3	-
	AAG102	Elements of Human Geography	Core	3	-
	Semester 2				
	AAG103	Techniques in Geography	Core	3	-
	AAG104	Singapore in Asia	Core	3	-
2	Select 4 (at least 1 from each of the 3 strands)				
Physical	Semester 1				
	AAG231	Humid Tropical Environments	Pres	3	-
	AAG234	Coastal and Ocean Systems	Pres	3	-
	Semester 2				
	AAG232	Biogeography	Pres	3	-
	AAG233	Climate and Climate Change	Pres	3	-
Human	Semester 1				
	AAG242	Urban Development and Change	Pres	3	-
	AAG243	Space, Place and Culture	Pres	3	-
	Semester 2				
	AAG241	The New Global Economy	Pres	3	-
	AAG244	Population and Sustainability	Pres	3	-
	AAG245	Political Geography	Pres	3	-
Techniques	Semester 1				
	AAG251	Introduction to Geographical Information Systems	Pres	3	-
	Semester 2				
	AAG252	Introduction to Remote Sensing	Pres	3	-
3	Select any 4				
	Semester 1				
	AAG331	Catchment Management and Conservation	Pres	3	AAG231
	AAG332	Ecosystem Dynamics	Pres	3	-
	AAG333	Resource and Environmental Management	Pres	3	-
	AAG341	Dynamics of Industrial Location	Pres	3	AAG241
	AAG342	Feeding the World	Pres	3	-
	AAG343	Ethnic Geography	Pres	3	-
	AAG344	Transportation Systems and Planning	Pres	3	-
	AAG345	City and Regional Planning	Pres	3	-
	AAG351	Applied Geographical Information Systems	Pres	3	AAG251

Year	Module Code	Title	Module Category	No. of AUs	Pre-requisites
4	Semester 1 & 2				
	AAG401	Geographical Methods and Fieldwork	Core	3	-
Total AUs for Degree				39	

Table 2: AS 2 Geography Structure for BA(Ed)/BSc(Ed) (Secondary)

Year	Module Code	Title	Module Category	No. of AUs	Pre-requisites
1	Semester 1				
	AAG101	Elements of Physical Geography	Core	3	-
	AAG102	Elements of Human Geography	Core	3	-
	Semester 2				
	AAG103	Techniques in Geography	Core	3	-
	AAG104	Singapore in Asia	Core	3	-
2	Select 4 (at least 1 from each of the 3 strands)				
Physical	Semester 1				
	AAG231	Humid Tropical Environments	Pres	3	-
	AAG234	Coastal and Ocean Systems	Pres	3	-
	Semester 2				
	AAG232	Biogeography	Pres	3	-
	AAG233	Climate and Climate Change	Pres	3	-
Human	Semester 1				
	AAG242	Urban Development and Change	Pres	3	-
	AAG243	Space, Place and Culture	Pres	3	-
	Semester 2				
	AAG241	The New Global Economy	Pres	3	-
	AAG244	Population and Sustainability	Pres	3	-
Techniques	Semester 1				
	AAG251	Introduction to Geographical Information Systems	Pres	3	-
	Semester 2				
	AAG252	Introduction to Remote Sensing	Pres	3	-
Total AUs for Degree				24	

AAG101 Elements of Physical Geography

Global occurrences of natural phenomena and the physical environment associated with such events. Studying Earth as a multi-dimensional and dynamic system. Understanding of the various processes operating within the physical environment and their inter-relationships.

AAG102 Elements of Human Geography

Introduces some fundamental concepts of human geography concerning human characteristics of place, factors leading to shaping of the world's cultural, spatial, political and development patterns. Culture components, cultural change, bases of spatial interaction, migration and behaviour, population change, ethnic geography, systems and evolution of rural and urban settlements. Also political ordering of space, and impacts of globalisation on development.

AAG103 Techniques in Geography

This course introduces the basic techniques in geography for the collection, analysis, interpretation and presentation of geographical information. It covers quantitative, qualitative and cartographic methods of investigation through lectures, tutorials/workshops and fieldwork. Hands-on experience with basic Geographical Information Systems will also be introduced. Student teachers will be expected to participate in fieldwork activities.

AAG104 Singapore in Asia

This module integrates geographical skills and different study strands – human, environmental and technical – in the study of Singapore in the Asian region. The global positioning of Singapore and the contemporary challenges to development that it faces in a highly competitive and fast changing global environment will be the framework for the study of issues and problems that have emerged - SARS, bird flu, haze, terrorism, implications of cross-straits relations between China and Taiwan, economic liberalization in China and India among others.

AAG231 Humid Tropical Environments

Study of the physical environment of the humid tropics. The geomorphological and hydrological processes operating within the region form the main platform. Local and regional physical attributes and examples are analysed around the key concepts and the interrelationships between the operating processes and the resulting landforms are discussed. Elements of fluvial sedimentation and applications of urban geomorphology under humid tropical environments are included. Techniques applied to geomorphological research and analysis of field data are integral parts of the coursework. Field trips are an essential component of the module.

AAG232 Biogeography

Deals with biological processes and concepts that are basic to the understanding of the complex interrelationships between the inorganic and the organic world. After the initial groundwork on soils and their properties the module will deal with plants, as these are the primary food producers which form the essential link between humans and the physical environment. The module also deals with the reciprocal relationships between biogeographic processes and humans. Field trips and laboratory work are essential to this module.

AAG233 Climate and Climate Change

This module will examine atmospheric processes that are involved in anomalous and adverse weather conditions, climate zones of the tropics and trans-boundary atmospheric issues and global climate change. The focus of the module will include discussion on impacts and management responses to climate changes

AAG234 Coastal and Ocean Systems

Describes the landforms and processes operating along the land-sea interface as well as in the oceans. Challenges facing coastal and ocean environments. Topics covered include the evolution of coastal landforms, history of sea level changes and shoreline response, current state of the coastal and ocean environment and coastal management initiatives. Particular attention will be given to the coastal environments of the Straits of Malacca and the Singapore Straits and in field techniques.

AAG241 The New Global Economy

Global patterns of resource production, consumption and distribution. Regional disparities in sectoral performance (primary, secondary, tertiary). Problems of inequality and poverty. Impacts of globalization and the phenomena of spatial convergence and divergence of global economic development. Inter-regional and intra-regional disparities in growth and development. The roles of the states, supra-states, transnational corporations, local authorities and non-governmental organizations. Technology change and economic development, the North-South problems and digital divide. The limits to growth and development. The knowledge-based economy in the ICT age.

AAG242 Urban Development and Change

Urban concepts are introduced and defined on the basis of three selected elements of contemporary urban geography: spatial, social and economic. These fundamental characters are translated into three respective key areas and explored in greater details: city as environment (physical and land use change, settlement, transport); city as people (urbanization, suburbanization, poverty and segregation); and city as economy (industrial, post-industrial, world city developments). Worldwide relevant urban issues including those from Singapore are used as teaching and class reflection materials.

AAG243 Space, Place and Culture

Examines the cultural turn in geography that has led to a renewed interest in senses of place, identity and meaning, rather than deterministic views of the world that do not map neatly onto the experience of everyday life. The new cultural geography has been enriched by a variety of approaches and interdisciplinary connections, particularly from debates in feminist, postcolonial and cultural studies. The evolving meanings and significance of gender, ethnicity and race will be discussed in a Southeast Asian context.

AAG244 Population and Sustainability

Population trends in the world today provide a confusing and contradictory mix of policy issues that are at the centre of the discussion in this module. While affluent countries in Asia and the West face declining fertility rate and ageing populations with resulting policy packages that are pro-natalist, there are societies which have been focused on addressing rapid population growth rates. In an age of global or international migration flows, it is not surprising to believe demographers' views that if the challenge to sustainability concerns in the last millennium has been population growth, then the issue today is the spatial distribution of such population. This module considers global sustainability concerns and changing population trends like the demographic transition in advanced industrialized societies.

AAG245 Political Geography

This is a course that engages with the politics of space and place-making. The course will consider how politics has resulted in contestation for space and spatially defined life in societies in terms of social integration as well as other outcomes such as, fragmentation and divides. Globalisation increasingly challenges the territorial meanings of nation-states and the process of nation-building. While seeking to raise consciousness of the importance of geography in the understanding of politics at the global and everyday levels, the module will also highlight the meanings of citizenship and the contestation for both space and territory in today's world.

AAG251 Introduction to Geographical Information Systems

This module provides conceptual and technical foundations of geographical information systems (GIS). It equips student teachers with basic skills for collecting, storing, manipulating, analysing and presenting geographical data and information using GIS, and for the use of GIS in support of school teaching. It is laboratory-based, giving hands-on experience of GIS software.

AAG252 Introduction to Remote Sensing

An introduction to the fundamentals of remote sensing in terms of image acquisition procedures and interpretation skills which will provide a basis for selecting and analysing image data sets to address specific geographical or environmental issues. Both lectures and tutorials emphasise the applied and practical aspects of remote sensing principles and image interpretation.

AAG331 Catchment Management and Conservation

Primary concepts of catchment management and conservation. Problems of environmental degradation in the face of increasing urban development. Catchment management as an integrated systems approach. Concepts relating to conservation and management of natural systems with a distinct emphasis on their application. Environmental Impact Assessment and monitoring.

AAG332 Ecosystem Dynamics

Understanding of ecosystem essentials. Ecosystem concept and inter- relationships between inorganic and organic worlds. Concepts of vegetation ecology such as plant communities, migration, vegetation dynamics, competition are covered. Local ecosystems, such as the tropical rainforest, and the mangroves. Urban vegetation. Field trips to areas of biogeographical interest as an essential component of the module.

AAG333 Resource and Environmental Management

Introduces current environmental issues and concerns, principles underlying the various major global environmental initiatives starting from the Stockholm Earth Summit, builds on some topics covered in environmentally related modules in earlier years. Topics covered include Agenda 21, sustainable earth, environmental impact assessment and specific resource (such as water) and environmental management from the global to local scale.

AAG341 Dynamics of Industrial Location

Conventional and contemporary theories in explaining the location of industrial activities and the changing patterns from global to local scales. Changes in manufacturing production, processes, management and organization – from the era of Industrial Revolution to the ICT-KBE age. Geographic variations in distribution of manufacturing industries. The roles of small and medium-sized and transnational firms. Locational conditions and changing production factors – the new supply chain. The impact of technological changes, government policies, foreign direct investment, mobility of production factors. Industrial transformations and new industrial spaces and their implications.

AAG342 Feeding the World

The food chains and the natural environments. Food production and consumption and regional disparities – from Green Revolution to Gene Revolution. Food distribution and problems of hunger, famines and malnutrition. Food manufacturing - producer and consumer services in developing and developed countries, impact of biosciences and life sciences. Food culture – tradition, religion, society, ethnicity and innovations. The culinary delights and etiquette of the oriental, the occidental and the universal. The roles of the states, supra-states and transnational corporations and the impacts.

AAG343 Ethnic Geography

A relatively neglected field within geographical studies of the impact of society on cultural landscapes apart from the introductory sessions incorporated into first year human geography modules, contemporary issues that have arisen since 9'11 highlight the continuing importance of ethnicity and ethnic identities in human as well as global development. This module considers the meanings and interpretations of ethnicity and ethnic identities as well as diversity in the global stage drawing on case-studies of policies that states have introduced to manage multi-ethnicity as well as the ethnic conflicts that have de-stabilised societies and economies in the region and around the world.

AAG344 Transportation Systems and Planning

Historical evolution of transportation, transportation networks and their spatial structure, globalization and international transportation, land use and urban transportation, socio-economic and environment impacts of transportation, methods in transportation analysis and planning, including accessibility measures, transportation modeling, network analysis and resource allocation.

AAG345 City and Regional Planning

The module traces traditions of town planning in industrial Europe, with reference to garden city and new town developments. From basic planning principles, modern urban planning concepts, regulations, policies are examined as an evolutionary process and in different perspectives in both developed and developing worlds. Roles of city and regional planning agencies in managing local and regional problems and in pursuing economic growth, equitable distribution of resources, environmental quality control and sustainable land use. Renewal and modernization of Paris, London, and post-colonial Singapore provides learning examples of planning theories and practice.

AAG351 Applied Geographical Information Systems

This course equips student teachers with essential GIS skills for geographical problem solving and spatial decision-making. It introduces GIS data collection techniques, such as digitizing and GPS, and spatial analysis techniques, including cartographical modeling, terrain modelling, network analysis and 3-D visualisation. Case studies and hands-on practices allow student teachers to gain experience in the use of GIS in both human and physical geographical studies. By the end of the course, student teachers are expected to be able to appreciate the character and quality of geographical data and the ways in which they can be used in geographical studies.

AAG401 Geographical Methods and Fieldwork

Geographical issues, techniques and applications in research – both physical and human – are rigorously debated and discussed in the module. Research design, acquisition of data through field surveys, methods of data analysis and report writing are core areas of work done. Field investigations spanning 10 to 14 days are conducted as part of the module and fieldwork sites are located outside of Singapore. Individual academic reports of the field investigations and field data collected are assessed.

ACADEMIC SUBJECT: HISTORY

**Table 1: AS 1 History Structure for BA(Ed) (Primary)
AS 1 History Structure for BA(Ed) (Secondary)**

Year	Module Code	Title	Module Category	No. of AUs	Pre-requisites
1	Semester 1				
	AAH101	Film as History	Core	3	-
	AAH102	Biography and History	Core	3	-
	Semester 2				
	AAH103	Singapore History: The Making of a Global City-State	Core	3	-
2	AAH104	Dawn of Asian Civilisations	Core	3	-
	Semester 1				
	AAH201	Modern Southeast Asia	Core	3	-
	Select any 1				
	AAH231	Early Modern Asia	Pres	3	-
	AAH232	From Reform to Revolt: Europe 1450-1789	Pres	3	-
	AAH233	United States to 1900: From Settlement to World Power	Pres	3	-
	Semester 2				
	Select any 2				
	AAH234	Modern East Asia	Pres	3	-
	AAH235	Modern Europe	Pres	3	-
AAH236	Australia and Asia	Pres	3	-	
AAH237	United States: The Emergence of a Superpower	Pres	3	-	
3	Semester 1				
	Select any 2				
	AAH331	International History: From World War One to the Present	Pres	3	-
	AAH332	Themes in Southeast Asian History	Pres	3	-
	AAH333	China and Japan: A Comparative History	Pres	3	-
	Semester 2				
	Select any 2				
	AAH334	Heritage and Culture	Pres	3	-
AAH335	Historical Interpretations	Pres	3	-	
AAH336	A Glimpse of the Past: Reading Sources	Pres	3	-	

cont'd

Year	Module Code	Title	Module Category	No. of AUs	Pre-requisites
4	Semester 1				
	Select any 1				
	AAH431	Peace and War in Twentieth-century Asia	Pres	3	-
	AAH432	Asian Strategic Thought	Pres	3	-
	AAH433	The Roots of Technological Creativity: The Case of Japan and Singapore	Pres	3	
	AAH434	The History of Racial Thought	Pres	3	
	AAH435	Tradition and Revolt in Southeast Asia	Pres	3	
AAH436	Political Ideas from Aristotle to Osama bin Laden	Pres	3		
Total AUs for Degree				39	

**Table 2: AS 2 History Structure for BA(Ed)/BSc(Ed)
(Secondary)**

Year	Module Code	Title	Module Category	No. of AUs	Pre-requisites
1	Semester 1				
	AAH101	Film as History	Core	3	-
	AAH102	Biography and History	Core	3	-
	Semester 2				
	AAH103	Singapore History: The Making of a Global City-State	Core	3	-
	AAH104	Dawn of Asian Civilisations	Core	3	-
2	Semester 1				
	AAH201	Modern Southeast Asia	Core	3	-
	Select any 1				
	AAH231	Early Modern Asia	Pres	3	-
	AAH232	From Reform to Revolt: Europe 1450-1789	Pres	3	-
	AAH233	United States to 1900: From Settlement to World Power	Pres	3	-
	Semester 2				
	Select any 2				
	AAH234	Modern East Asia	Pres	3	-
	AAH235	Modern Europe	Pres	3	-
	AAH236	Australia and Asia	Pres	3	-
AAH237	United States: The Emergence of a Superpower	Pres	3	-	
Total AUs for Degree				24	

AAH101 Film as History

History does not only include examining the written word. Other mediums, such as film, can be used in looking at the past. This course covers the use of film as a source for exploring the past, and how history has been represented in film. The history of cinema and television is also studied. The emphasis is on empowering student teachers to interpret films in critical and analytical ways, as well as teaching student teachers how films are created. The skills of historical interpretation and writing history are taught. This module is offered to all NTU students.

AAH102 Biography and History

Biography is one of the most popular and enjoyable ways of reading history. Biographers employ a range of interesting methods in researching their subject, such as psychoanalysis and interviews. Biographies covered range from those of Hitler to Mao. The module studies the life stories of not only the “great” figures of history but also of the “unknown” men and women who also “made history. The skills of writing biography and doing oral history are taught. This module is offered to all NTU students.

AAH103 Singapore History: The Making of a Global City State

This module looks at critical stages in the birth, decline and rise again of Singapore as a Global City. Singapore first briefly bloomed in the thirteenth to fourteenth centuries, declined into relative obscurity as a minor Malay port, and then from 1819 entered a new, free-trade and multicultural phase of development. This module takes the story from the early years, through the nineteenth century, to the tumultuous birth of a new nation after the war. It covers the major markers of Singapore history, and the variety of that history, with its experience of development and disaster, conflict and peace, multiculturalism and modernity, and wealth and poverty. It is a History that allows for the perspectives of a variety of people who helped to build Singapore, from the politician and the colonialist, to the prostitute and the opium addict. This module is suitable for NTU students who want a good overview of key points in the historical formation and shaping of Singapore up to 1965, as a multicultural city-state, located in the Malay maritime world, but also becoming first an Imperial and then a Global City.

AAH104 Dawn of Asian Civilizations

This module provides an introductory survey of the beginning and the growth of civilizations across Asia from the prehistoric times to 1400 AD. The module begins with a brief study of the early phase of human society before studying the rise of first states and their socio-economic underpinnings. Using innovative technological means and drawing examples from India, Southeast Asia and China in the light of archaeological evidence and other historical records, this module will discuss major cultural developments such as the rise and the expansion of religions and the ways in which they influenced the life of people, and how their material life changed over time. This module is open to all students in NTU who are interested in learning about the early phase of Asian civilization.

AAH201 Modern Southeast Asia

This module deals mainly with the tumultuous period from the mid-nineteenth century to the 1970s, when Southeast Asia went from independence to colonial subjugation, through the nightmare of the Pacific War, towards independence. It deals with the international forces brought to bear on Southeast Asia, and local responses to those forces, as lives were transformed, and modern nationalism and nation-states were born.

This module is suitable for NTU students who want an overview of main points in the historical formation and shaping of Southeast Asia up to 1975.

AAH231 Early Modern Asia

This module explores main themes in political, socio-economic and cultural developments across Asia from 1400 to the 1820s. The rise and fall of states and development of political institutions in India, Southeast Asia and China are discussed in the context of economic changes that affected both the rulers and the ruled as Asia came into close contact with Europe, ushering in the age of globalization. The module concludes with a brief analysis of the ways in which indigenous states tried to modernize themselves and the extent to which they were successful. This module is open to all students in NTU who are interested in learning about the beginnings of modern socio-economic and political developments of Asia before the rise of colonial state.

AAH232 Rise of Modern India

This module provides a broad survey of political, economic and socio-cultural aspects of India's development as a modern nation. The module begins with a brief introduction to the social and cultural milieu of India. Its economic and social transformation under colonial rule and the struggle against colonial rule leading to the foundation of a nation-state are discussed at some length. India's efforts to forge national unity against regional, ethnic and religious diversity and to achieve economic growth and modernization after independence are examined in the context of regional and global political and economic affairs.

AAH233 Historical Interpretations

Can history be objective? Who owns history? History is what we make of it or what we want it to be? Historical interpretations essentially beg many other such infuriating questions from the definition, components and 'selection' bias of the discipline. The module will be asking myriad questions of the theoretical and the practical but crucially will attempt to explore the subject of history from how it affects the individual, society and nation in the past and into the future. Through selective case studies such as the Holocaust, the 'discovery' of the New World and the post-war World War Two accounts, this module is suitable for NTU students who have already done at least one other History module, and want to look at the many ways in which historians go about creating history.

AAH234 Modern East Asia

This module deals with the broad current of historical changes in China and Japan in the 19th and 20th centuries. Discussions on China include such topics as the decay of the imperial order, the Nationalist revolution, the rise of Communism, the founding of the People's Republic, the Cultural Revolution, and Deng Xiaoping's reforms in the 1970's and the 1980s. In the case of Japan, emphasis will be put on Japan's transformation from an isolated, "feudalistic" society to a modern democracy and a leading industrialized nation today. In analysing Japan's economic, social and political changes, comparisons and contrasts with China will also be frequently made. This module is also offered to students of NTU with an interest in the modern history of China and Japan.

AAH235 Modern Europe

This module deals with Europe from the French Revolution to present-day, with an emphasis on the later period. Europe is here defined to include Russia at one extreme, and the United Kingdom at the other. Each semester there will be a different set of themes and countries covered, so as to introduce student teachers to aspects of European politics and society, and European interactions with each other and the world. Typically, these might include issues as varied as Nazism, democracy, and the growth of European unity. This module is suitable for NTU students who want a general introduction to European History. They are advised to check the Humanities and Social Studies webpages for each semester's particular themes.

AAH236 Australia and Asia

Examines how Australia came to occupy the unique position of being a predominantly European culture in an Asian region. A focus is on one of the consequences of that position - the infamous "White Australia" policy which existed until the 1970s. It also examines Australian-Asian relations concentrating on Australian interventions into the Asian region, such as Australia helping the birth of the new nation of East Timor in 1999. The course deals with Australia's images of its Asian neighbours and these countries' views of Australia. It covers transformations in foreign policy, cultural and economic relations between Australia and Asia. This module is offered to all NTU students.

AAH237 United States: The Emergence of a Superpower

This module presents a political, social, cultural and economic history of the United States in the 20th Century and up to the present. It starts with the Progressive period and continues to the current administration. The first half of the century will be examined in such areas as the legacies of the Great War, the boom of the 1920s and the Great Depression. This will be followed by an analysis of the Second World War, the Cold War and the current 'War on Terror'. Essentially, this module will explore the motivations, impulses and manifestations of a growing superpower becoming fully engaged in global affairs and the impact on the rest of the world. This focus on global engagement will be framed together with domestic political and social changes marked by such events as the turbulent 60s, the Civil Rights movement, Watergate and the so-called 'Culture War' between liberals and conservatives. This module is also offered to all NTU students.

AAH331 International History: From World War One to the Present

This module examines the major developments in international history beginning with the First World War with a view to understanding the dynamics of underlying political, economic and social forces which have shaped the world in the course of the twentieth century. We shall discuss the ways in which hopes of progress and stability were kindled and shattered as the world came to be divided into power blocks. The module concludes with a discussion on the beginning of a new era in international politics starting with the collapse of bipolarity and the emergence of one superpower towards the end of the twentieth century. This module is also offered to all NTU students interested in international history.

AAH332 Themes in Southeast Asian History

This module provides an opportunity to study in depth chosen facets of political, strategic, socio-economic and cultural developments in Southeast Asia from the mid-19th century onwards. The forces that have shaped society are examined through a multi-disciplinary focus so as to stimulate critical understanding of the ways in which modern Southeast Asia has emerged and what challenges it faces in the 21st century as a result of its historical legacy. This module is ideal for the student teachers who like to exercise a degree of freedom to explore in depth various aspects of political and socio-economic changes in modern Southeast Asia. The students in NTU pursuing business management, communication and disciplines other than history may also find that this module provides them with a new set of tools to broaden their understanding of the region.

AAH333 China and Japan: A Comparative History

Adopting a comparative approach to the study of pre-modern history of China and Japan, this module focuses on the similarities and differences in terms of political, economic and cultural developments in the two countries. The module will treat such topics as bilateral relations, political institutions, mode of economic development, religion as well as culture. This module is also offered to NTU students who are interested in East Asian history.

AAH334 Heritage and Culture

Student teachers are engaged in making practical assessments of historic landscapes and examining the heritage value of historical sites and landmarks. They do a major case study of a place that they consider to be of heritage value. The significance and meaning of what constitutes heritage is covered. Student teachers consider why some historical sites and monuments and not others are regarded as essential for school field trips and tourism. The question of how the public perceives the past as it is presented in the media, textbooks, museums and in historic buildings is also analysed. This module is offered to all NTU students.

AAH336 A Glimpse of the Past: Reading Sources

This module provides a critical understanding of the ways in which historians read and interpret primary sources and reconstruct historical reality. Drawing examples from a wide range of primary sources such as chronicles, inscriptions, state papers, private papers including diaries and letters and newspapers from both Asia and Europe, the module will explore how the historians penetrate into the minds and milieu of people represented in the sources and opens a window to the world we have lost through a multi-disciplinary focus. This module is open to all students in NTU who are curious about learning how our ancestors lived and how their minds worked. Students who are keen to undertake historical research will find this module very useful as it provides a sound training in using sources.

AAH431 Peace and War in Twentieth-century Asia

This module focuses on the history of relations between Asian countries, and the broad ideological, economic, and cultural forces that have influenced the evolution of international politics in the twentieth century. Topics covered by this module will include the rise of newly independent states in Asia, the course and consequences of the three major global conflicts in Asia: the First World War, the Second World War and the Cold War, the major regional conflicts: the Korean war, the Vietnam war, and the armed conflicts between China and the Soviet Union. This module is also offered to students of NTU with an interest in world history, particularly in international politics of modern Asia.

AAH432 Asian Strategic Thought

This module re-visits the strategic writings of selected Asian thinkers, such as Sunzi, Sunbin, Wuzi, Weiliaozi, Takuan Soho, Miyamoto Musashi, Yukio Mishima, Kautilya, the Bhagavad-Gita, Mao Zedong, Vo Nguyen Giap, Lee Kuan Yew, Kenichi Ohmae. We will seek to explore the following questions in the course: How the writings reflect the spirit of the particular period and its problems; and to what extent they are still relevant. This module is offered to all NTU students with an interest in the evolution of Asian Strategic Thinking.

AAH433 The Roots of Technological Creativity: The Case of Japan and Singapore

Why are some nations innovative and others not? This module examines the impact of history on the development of technological creativity through the case study of Japan and Singapore. Rising from the ashes of the atomic war, Japan's phenomenal economic transformation since the 1950s to a world economic power has been well documented. In this module we look specifically into the scientific and technological dimension of its transformation. As one of its former imperial colonies during the war period, Singapore was often cited as a success story of the "flying-geese" model – learning, adopting and adapting the ways of Japan's success. What was the historical role of science and technology in Singapore's development?

AAH434 The History of Racial Thought

An examination of the history of racial thought in Western societies. The course starts with classical and Biblical views of human types. There is a focus on racial ideologies rationalising European settlement of the New World, America, Australia, and the Pacific. Racial justifications for slavery and colonialism are covered. Then the course deals with the impact of the enlightenment and the rise of scientific racism, Social Darwinism, passing onto anti-Semitism and Nazi racial ideology. It ends with a study of contemporary racism in western societies. This module is offered to all NTU students.

AAH435 Tradition and Revolt in Southeast Asia

This module examines the dynamics of popular uprisings, protest movements and peasant wars in Southeast Asia from the 1870s to the end of the twentieth century. We shall begin our discourse with a brief survey of how popular movements of social and political agitation emerged under colonial rule, reached a climax just before the organized modern political movements came into existence in the early 1900s and changed its character as new nation-states emerged in the second half of the twentieth century. We shall try to understand how the painful process of modernization through which people adjusted themselves to numerous forces of socio-economic and political changes in Southeast Asia from the 1870s is reflected in rural protest movements.

AAH436 Political Ideas from Aristotle to Osama bin Laden

What was, or is Conservatism, Liberalism, Marxism, 'Political Islam', or for that matter Environmentalism? History involves more than a series of dry chronological events, it also involves ideas, ideologies, and utopian visions which people have been willing to suffer for, die for, and even kill for. This module introduces a selection of concepts, ideas and ideologies, and especially key thinkers, from ancient times to modern. As such, it will give student teachers not just a better understanding of the past, but also tools for analysing the present. This module is suitable for NTU students who would like a historians' perspective' on political and social thinkers and on the ideas that have shaped action, and history, and which in many cases are still important in shaping our world today. It is particularly suitable for student teachers who enjoy thinking conceptually.

ACADEMIC SUBJECT: MALAY LANGUAGE

Table 1: AS 1 Malay Language Structure for BA (Ed) (Malay) (Primary)
AS 1 Malay Language Structure for BA (Ed) (Malay) (Secondary)

Year	Module Code	Title	Module Category	No. of AUs	Pre-requisites
1	Semester 1				
	AAD101	Introduction to Malay Linguistics	Core	3	-
	AAD102	Jawi and Malay Literacy	Core	3	-
	Semester 2				
	AAD103	Phonetics and Phonology in Malay	Core	3	-
2	Semester 1				
	AAD201	Education of the Malays	Core	3	-
	AAD202	Malay Morphology and Syntax	Core	3	-
	Semester 2				
	AAD203	Introduction to Sociolinguistics	Core	3	-
	AAD204	Origin and Development of Malay Language	Core	3	-
3	Semester 1				
	AAD301	Semantics and Pragmatics in Malay	Core	3	-
	AAD302	Islam and Malay Society	Core	3	-
	Semester 2				
	Select any 2				
	AAD331	Standardization and Issues in Malay Language	Pres	3	
	AAD332	Malay Arts & Civilization	Pres	3	
AAD333	The Cultural Life and Practices of the Malays	Pres	3	-	
4	Select any 1				
	AAD431	Readings in Malay Language Education	Pres	3	
	AAD432	Approaches in Malay Language Studies	Pres	3	
Total AUs for Degree				36	

AAD101 Introduction to Malay Linguistics

An introduction to the scientific study of human languages. The study of sounds and their patterns in Malay (phonetics and phonology). Morphology; word formation and Malay affixes. Word classes, sentential constituents (syntax) and meanings (semantics).

AAD102 Jawi and Malay Literacy

This module highlights the special place of Jawi and Islamic writings in Malay literacy. It traces the origin of the Arabic script, the Persian influences and adaptations into Malay classical script. The old and modern development of Jawi writings and manuscript will be examined. Practice in reading and writing of Jawi materials, old and new will be provided

AAD103 Phonetics and Phonology in Malay

This module consists of training in the discrimination and production of Malay sounds (vowels, consonants, diphthongs, and intonation). As a means of recording phonetics material, student teachers will be trained in the use of international Phonetic Alphabet (IPA). It also includes practical reading from phonetic texts of Malay for the purpose of improving diction and pronunciation.

The second part of the module will deal with the sound systems of Malay in structural and generative terms. The segmental and supra-segmental sounds of language will be covered. Emphasis will be placed on the practical application of phonological description to the teaching of Malay language.

AAD201 Education of the Malays

This module looks at traditional education and the historical development of education among the Malays of South East Asia. It covers education during the Srivijaya period, the process of Islamization, through the beginnings of modernization during colonial period up to the development of education in the independent states of Indonesia, Malaysia and Brunei. An understanding of the role of language and culture in influencing education systems will be examined.

AAD202 Malay Morphology and Syntax

Analysis of the morphological structure of the Malay language: word structure, word formation, affixes and reduplication, morphological processes, and interface between morphology and syntax. Study of the syntax of Malay: structure of sentences, structural relations among phrases, and formal and functional grammars. Linguistic problem-solving skills, and the foundations for syntactic analysis and grammatical description.

AAD203 Introduction to Sociolinguistics

Concepts in Sociolinguistics studies. Language Varieties and patterns of language use in multilingual communities. Explorations of roles and functions of languages in multilingual communities; problems of linguistic minorities; factors influencing language maintenance and language shift. Cross-cultural differences in language behaviour. Social factors in the variation in language. Modern Malay in relation to social factors: social class, education level, type of education, age, sex, ethnic origin etc.

AAD204 Origin and Development of Malay Language

An overview of the historical development of Malay from its origin to the modern period. Malay language in the family of Austronesian languages. Old Malay inscriptions; the Sanskrit, Arabic and Persian elements and influences in Malay language. Characteristics of Malay language in pre and post war era. Development of Malay as a modern language.

AAD301 Semantics and Pragmatics in Malay

Introduction to a scientific description of linguistic meaning in Malay: semantic properties and relations, entailment, ambiguity, theories of word and sentence meaning, and logical form. Topics in pragmatics such as presupposition, conversational implicature, speech acts, language-culture relationships. The meaning of metaphors. The types of evidence and arguments vis-à-vis key concepts and claims in semantics and pragmatics.

AAD302 Islam and Malay Society

A historical and sociological understanding of the role of Islam in Malay society will be the focus of this module. Amongst the themes that will be explored are: the Islamization of the Malays in the past and contemporary period, the conditioning of the Malay value system, religious institutions in Malay society and the influence of Islam on Malay ideas in education, aesthetics, community life and economic ethos. Also the phenomenon of the *dakwah* movement since the 1970s will be discussed. Overall the significance and contribution of Islam in the cultural life of the Malays will be examined.

AAD331 Standardization and Issues in Malay Language

The socio-political history in the standardization of Malay language. Important events in the development of vocabulary, grammar and genres within the Malay and Indonesian language. Investigation of issues such as the status of Malay, *Sebutan baku*, Malay as medium of instruction, identity and maintenance and shift in use of Malay with special emphasis on the role of Malay in Singapore.

AAD332 Malay Arts and Civilization

An overview of the historical and cultural development of arts and civilization of the Malays. This will include the location of cultural hearths, the extent of cultural regions and the spatial diffusion of cultural groups. Multiple manifestations of Malay arts and civilization such as Jawi scripts, traditional Malay architecture, music and dance, performance and fine arts, crafts, language, literature, economies, government etc will be examined as well as processes of cultural acculturation and assimilation.

AAD333 The Cultural Life and Practices of the Malays

Introduction to an analysis of the various components of Malay beliefs, customs and practices. The important festivals and their values, places of worships, customs and traditions. Interaction of the Malays with the various components of cross-cultural practices existing in our multi-racial culture.

AAD431 Readings in Malay Language Education

Readings and discussions of selected areas in language education. Some of the topics covered will include the social construction of the language curriculum, teaching mother tongues, bilingual and multilingual education, the inculcation of values through language education, language and culture, language and ethnicity, language and cognition as well as globalization and issues surrounding the role of Malay language.

AAD432 Approaches in Malay Language Studies

Exploration to research in Malay language, including principles and procedures in language research, approaches to research design, data collection and analysis and the methodologies of writing a report.

ACADEMIC SUBJECT: MALAY LITERATURE**Table 1: AS 2 Malay Literature Structure for BA (Ed) (Malay) (Primary)**

Year	Module Code	Title	Module Category	No. of AUs	Pre-requisites
1	Semester 1				
	AAF101	Traditional Malay Literature 1	Core	3	-
	Semester 2				
	AAF102	Traditional Malay Literature 2	Core	3	-
2	AAF103	Modern Malay/ Indonesian Literature 1	Core	3	-
	Semester 1				
	AAF201	Critical Theory	Core	3	-
	AAF202	Modern Malay/ Indonesian Literature 2	Core	3	-
	Semester 2				
	AAF231	Reading of Literary Canon	Pres	3	-
	Select any 1				
	AAF232	Singapore Malay Literature	Pres	3	-
AAF233	Children's and Adolescent's Literature	Pres	3	-	
AAF234	Modern Malay Drama	Pres	3	-	
Total AUs for Degree				21	

Table 2: AS 2 Malay Literature Structure for BA (Ed) (Malay) (Secondary)

Year	Module Code	Title	Module Category	No. of AUs	Pre-requisites
1	Semester 1				
	AAF 101	Traditional Malay Literature 1	Core	3	-
	Semester 2				
	AAF102	Traditional Malay Literature 2	Core	3	-
	AAF103	Modern Malay / Indonesian Literature 1	Core	3	-
2	Semester 1				
	AAF201	Critical Theory	Core	3	-
	AAF202	Modern Malay / Indonesian Literature 2	Core	3	-
	Semester 2				
	AAF231	Reading of Literary Canon	Pres	3	-
	Select any 2				
	AAF232	Singapore Malay Literature	Pres	3	-
AAF233	Children's and Adolescent's Literature	Pres	3	-	
AAF234	Modern Malay Drama	Pres	3	-	
Total AUs for Degree				24	

AAF101 Traditional Malay Literature 1

An overview of the development of traditional Malay literature. The concepts, genres, classification and functions of literature in the traditional Malay society. The religious, cultural and historical factors influenced the content, production, distribution and contribution of the literature. Special focus on the oral/folk literature (*Sastera Rakyat*) and major works produced during the Hindu period such *Hikayat Seri Rama*, and *Sastera Panji*.

AAF102 Traditional Malay Literature 2

Further discussion on the development of traditional Malay literature. The influence of Islam on the development of Malay literature, especially on written works or classical manuscripts. *Sastera Sejarah* (Malay historiography) such as *Sejarah Melayu*, *Sastera Hikayat*, *Sastera Epik* (epics), *Sastera Kitab*, *Sastera Undang-Undang* (adat laws), *Sastera Ketatanegaraan*, classical poetry such as *syair*, *nazam* and *gurindam* etc.

AAF103 Modern Malay/Indonesian Literature 1

Introduction to the socio-historical development of modern Malay literature, beginning from Munsyi Abdullah in the 19th century to the early decades of the twentieth century. The significance of literary movements and orientations will be examined such as in the institutions of Pejabat Karang Mengarang, Balai Pustaka, the literary movement of Pujangga Baru and Angkatan 45 in pre-War Indonesia and Malaya. The vision and idea of literature amongst the various literary circles, major authors and the growth of literary genres will be examined in the context of pre-war nationalism and cultural revivalism.

AAF201 Critical Theory

Focuses on modern and post-modern literature theories to enable the student teacher to master the subject and enable them to carry out practical criticism on literary texts. The effects and influences of the theories towards the development of creative writing and Malay literature will also be discussed. This proposed course will prepare student teachers to be knowledgeable and competent literature teachers.

AAF202 Modern Malay/Indonesian Literature 2

This module is a detailed thematic survey of Malay/Indonesian literature in the postwar period. Special attention will be given to examine the works of major authors like Masuri S.N., Keris Mas, Usman Awang, A Samad Said, Shahnnon Ahmad in Singapore-Malaysian literary scene, while focusing on Pramoedya Ananta Toer, Achdiat Mihardja, Mochtar Lubis, WS Rendra, Sutarjdi Calzoum etc. in the Indonesian case. Various issues in the development of contemporary literary culture will be evaluated, such as the issues on nation building and literature, the functions of literature and the religious orientations in literature, as encapsulated in the discourse of *sastera Islam*.

AAF231 Reading of Literary Canon

A study on canon literature by analyzing texts which had already reached highest and supreme ranking in order to explore their characteristics in terms of textual and contextual aspects. The main objective is to appreciate those evergreen texts so that their characteristics will be followed upon and to simultaneously enhance the development of creative writing and literature critics. Among the texts for study will include *Sejarah Melayu*, *Hikayat Hang Tuah*, *Syair Hamzah Fansuri*, *Hikayat Abdullah*, *Poetry by Chairil Anwar* and Usman Awang, and selected novels such as *Ranjau Sepanjang Jalan*, *Kering*, *Sukma Angin* etc.

AAF232 Singapore Malay Literature

The development of Malay literature in Singapore from the earliest time to date. The role of Singapore as the regional publication, cultural and literary centre in the 19th century, major stages of literary movements before and after the World Wars, and the emergence of new literature after Independence (1965) and its recent developments.

AAF233 Children's and Adolescent's Literature

The role and function of literature to children's and adolescent psychological development. Discussion on various styles, techniques and thematic conventions in children's literature. Focus on the development of children and adolescent literature in Malay language. Examination of selected and popular stories and poetry for children and its application in school contexts.

AAF234 Modern Malay Drama

An in-depth account of the history of modern drama development which started with *sandiwara*, realism, absurdism until the latest trend. Emphasis will be given to text analysis, writing technique and stream. Staging aspects will also be discussed and will include topics such as text transformation, directing, acting and technical aspects such as setting, lighting, costumes, music, tempo and drama management.

ACADEMIC SUBJECT: MATHEMATICS**Table 1: AS 1 Math Structure for B Sc (Ed) (Primary)
AS 1 Math Structure for B Sc (Ed) (Secondary)**

Year	Module Code	Title	Module Category	No. of AUs	Pre-requisites	
1	Semester 1					
	AAM101	Calculus I	Core	3	-	
	AAM102	Algebra I	Core	3	-	
	Semester 2					
	AAM103	Finite Mathematics	Core	3	-	
	AAM104	Number Theory	Core	3	-	
2	Semester 1					
	AAM201	Calculus II	Core	3	-	
	AAM202	Algebra II	Core	3	-	
	Semester 2					
	AAM203	Statistics I	Core	3	-	
	AAM204	Computational Mathematics	Core	3	-	
3	Select any 4 modules, at least one from Group A and one from Group B					
	Semester 1					
	Group A	AAM331	Differential Equations	Pres	3	-
		AAM332	Statistics II	Pres	3	-
	Group B	AAM341	Real Analysis	Pres	3	-
		AAM342	Modern Algebra	Pres	3	-
	Semester 2					
	Group A	AAM333	Modelling with Differential Equations	Pres	3	AAM331
		AAM334	Statistics III	Pres	3	AAM332
	Group B	AAM343	Combinatorial Analysis	Pres	3	-
AAM344		Complex Analysis	Pres	3	-	

Year	Module Code	Title	Module Category	No. of AUs	Pre-requisites
4	Semester 1				
	Select any 1				
	AAM431	Advanced Mathematical Modelling	Pres	3	AAM331
	AAM432	Statistical Theory	Pres	3	AAM332
	AAM433	Applied Statistics	Pres	3	AAM332
	AAM434	Techniques in Operations Research	Pres	3	-
	AAM435	Mathematical Programming and Stochastic Processes	Pres	3	-
	AAM436	Metric Spaces	Pres	3	AAM341
	AAM437	Galois Theory	Pres	3	AAM342
	AAM438	Graph Theory	Pres	3	-
AAM439	Geometry	Pres	3	-	
Total AUs for Degree				39	-

Table 2: AS 2 Math Structure for BA/BSc(Ed) (Secondary)

Year	Module Code	Title	Module Category	No. of AUs	Pre-requisites
1	Semester 1				
	AAM101	Calculus I	Core	3	-
	AAM102	Algebra I	Core	3	-
	Semester 2				
	AAM103	Finite Mathematics	Core	3	-
	AAM104	Number Theory	Core	3	-
2	Semester 1				
	AAM201	Calculus II	Core	3	-
	AAM202	Algebra II	Core	3	-
	Semester 2				
	AAM203	Statistics I	Core	3	-
	AAM204	Computational Mathematics	Core	3	-
Total AUs for Degree				24	

AAM101 Calculus I

Functions: domain, codomain, range, composition of functions, graphs. Limits and continuity. Differentiation and applications of differentiation. Integration and applications of integration.

AAM102 Algebra I

Introduction to set theory. Linear systems and methods of solving linear systems. Matrix algebra, determinant function. Vectors in \mathbb{R}^2 and \mathbb{R}^3 , dot product, cross product and geometric applications. Euclidean n-space, linear transformations.

AAM103 Finite Mathematics

Basic principles of counting. Permutations and combinations. Generalized permutations and combinations. Binomial theorem and combinatorial identities. The Pigeonhole principle. Sample space and probability distributions. Conditional probability. Independent events.

AAM104 Number Theory

Divisibility. Greatest common divisor. The Euclidean algorithm. Prime numbers. The Fundamental Theorem of Arithmetic. Linear Diophantine equations. Congruences. The Chinese Remainder Theorem. The Euler's Phi function. The sum and number of divisors. Euler's Theorem. Quadratic residues. The Law of Quadratic Reciprocity. Primitive roots and indices. Real-life applications such as check digits, cryptography.

AAM201 Calculus II

Sequence and series. Power series. Partial derivatives for functions of two or more variables, differentiability and chain rules for functions of two variables, directional derivatives and gradients for functions of two variables, tangent planes and normal lines, maxima and minima of functions of two variables, generalization of the concepts to functions of more than two variables. Double integrals and triple integrals.

AAM202 Algebra II

Introduction to propositional logic. Methods of proof. General vector spaces, bases and dimensions. Linear transformations between general vector spaces, matrices of linear transformations. Eigenvalues and eigenvectors, diagonalization. Orthogonality in n -space, diagonalization of quadratic forms, conic sections. Applications.

AAM203 Statistics I

Descriptive statistics. Random variables. Probability distributions and probability density functions. Cumulative distribution functions. Mathematical expectations. Sampling distributions and central limit theorem. Estimation and confidence intervals: one and two samples.

AAM204 Computational Mathematics

Introduction to computational methods and computing tools. Use of computing techniques to solve problems in mathematics, science and other disciplines. Examples may be drawn from problems involving numerical solutions of equations in one variable, approximation of functions, solving systems of linear equations, and numerical simulations.

AAM331 Differential Equations

Separable, linear and exact first order ordinary differential equations (ODEs). Existence and uniqueness of solutions. Modelling with first order ODEs. Second order ODEs: fundamental solutions, Wronskian, linear dependence. Applications and approaches in modelling, solving and interpreting physical problems with second order ODEs. Laplace transform method for initial value problems.

AAM332 Statistics II

Hypothesis testing: large and small samples. Tests concerning variances. Bivariate distributions: marginal and conditional distributions, covariance, independence. Simple linear regression.

AAM341 Real Analysis

The Completeness Axiom. The Archimedean Property. Density of rational and irrationals. The limit of a sequence, limit theorems. The limit of a function, the continuity of a function. The Intermediate Value Theorem. The Bolzano-Weierstrass Theorem. Extreme Value Theorem. Differentiation. Mean Value Theorem. Riemann Integration. The Fundamental Theorem of Calculus.

AAM342 Modern Algebra

Permutations and permutation groups. Groups, Lagrange's Theorem. Symmetry groups of plane figures. Quotient groups, Cauchy's theorem. Group homomorphisms and the Fundamental homomorphism theorems. Rings and fields, ring homomorphism. Ideals, quotient rings. Rings of polynomials.

AAM333 Modelling with Differential Equations

The solution of ordinary differential equations (ODEs), including system of ODEs. Phase-plane, trajectories and fixed points. Stability and classification of fixed points. Sketching solutions in the phase-plane. Examples will include mass/spring systems, pendulum motions and predator/prey models. Numerical solution of ordinary differential equations: initial value problems, Euler's method. Runge-Kutta method. Applications of numerical techniques.

AAM334 Statistics III

Analysis of variance: completely randomised design, randomised block design, factorial designs. Chi-square tests and contingency tables. Non-parametric tests.

AAM343 Combinatorial Analysis

Combinatorial techniques in proving. The principle of Inclusion and Exclusion and the general principle of

Inclusion and Exclusion. The generating function of a sequence of numbers.

AAM344 Complex Analysis

Complex numbers, complex functions. Complex differentiation, analytic functions, the Cauchy-Riemann equations. Complex integration over paths, Cauchy integral theorem, Cauchy integral formula. Fundamental theorem of algebra. Taylor series. Residues and poles. Laurent series, the residue theorem, evaluation of real definite integrals.

AAM431 Advanced Mathematical Modelling

Introduction to partial differential equations (PDEs) and classification into elliptic, parabolic and hyperbolic PDEs. Analytical and numerical solutions of PDEs. Explicit and implicit finite difference techniques for time-dependent PDEs, such as the unsteady diffusion equation. Direct and iterative methods for solving systems of algebraic equations. Application of numerical techniques for solving PDEs to industrial problems.

AAM432 Statistical Theory

Distribution theory, moment generating functions, central limit theorem. Sampling distributions: t-, F-, and chi-square distributions. Estimation theory and hypothesis testing theory.

AAM433 Applied Statistics

Selected topics from multiple regression models, design of experiments.

AAM434 Techniques in Operations Research

Topics from the theory of networks: minimal spanning trees, shortest paths, maximal flows, critical path analysis. Topics from the advanced theory of networks: least cost flows, transportation problem, travelling salesman problem, dynamic programming.

AAM435 Mathematical Programming and Stochastic Processes

Selected topics from the theory of linear programming: the simplex algorithm, introduction to duality, sensitivity analysis, dual simplex algorithm, integer programming, non-linear programming. Selected topics from the theory of stochastic processes: queueing theory, probabilistic inventory models, project scheduling under uncertainty.

AAM436 Metric Spaces

Topology in \mathbb{R} . Metric spaces. Open sets and closed sets. Convergence and completeness. Continuity and compactness. Equicontinuity, Arzela-Ascoli Theorem. Topological spaces.

AAM437 Galois Theory

Field extensions, simple, finite and algebraic extensions, constructions with straight-edge and compass, splitting fields, normal and separable extensions, primitive elements, finite fields, Galois groups, Galois extensions, The Fundamental Theorem of Galois Theory, solvability by radicals.

AAM438 Graph Theory

Graphs. Euler tours, Hamiltonian cycles, representations of graphs, isomorphisms of graphs, planar graphs. Trees and applications.

Selected topics from:

Connectivity and matching: Hall's theorem, transversals, Konig's theorem, vertex and edge cuts, Menger's theorem.

Colouring: vertex colouring, Brook's theorem, chromatic polynomials, map colouring and the four colour problem, edge colouring, Vizing's theorem.

Planarity: planar graphs, Kuratowski's theorem, Euler's formula, dual graphs.

Ramsey theory, extremal graphs.

AAM439 Geometry

The axiomatic approaches to various geometries, including finite geometries, Euclidean geometry, hyperbolic geometry and spherical geometry. Geometric transformations of the Euclidean plane, symmetries and isometries. Brief excursions to the classical projective geometry and the modern geometry of fractal.

ACADEMIC SUBJECT: MUSIC**Table 1: AS 1 Music Structure for BA (Ed) (Primary)
AS 1 Music Structure for BSc (Ed) (Secondary)**

Year	Module Code	Title	Module Category	No. of AUs	Pre-requisites
1	Semester 1				
	AAI101	Musical Practices I (including Instrumental Studies)	Core	3	-
	AAI102	Foundations in Musical Studies I (including Ensemble Studies)	Core	3	-
	Semester 2				
	AAI103	Musical Practices II (including Instrumental Studies)	Core	3	-
	AAI104	Foundations in Musical Studies II (including Ensemble Studies)	Core	3	-
2	Semester 1				
	AAI201	Musical Practices III (including Instrumental Studies)	Core	3	-
	AAI202	Orchestration and Arranging (including Ensemble Studies)	Core	3	-
	Semester 2				
	AAI203	Musical Practices IV (including Instrumental Studies)	Core	3	-
	AAI204	Foundations in Music Education (including Ensemble Studies)	Core	3	-
3	Semester 1				
	Select any 1				
	AAI330	Music and Technology (including Ensemble Studies)	Pres	3	-
	AAI331	Ethnomusicology (including Ensemble Studies)	Pres	3	-
	Select any 1				
	AAI332	Musical Behaviours (including Ensemble Studies)	Pres	3	-
	AAI333	Analysis of Twentieth-century Music (including Ensemble Studies)	Pres	3	-
	Semester 2				
	AAI301	Studies in Music Education (including Instrumental Studies)	Core	3	-
	Select any 1				
AAI334	Conducting (including Ensemble Studies)	Pres	3	-	
AAI335	Composing (including Ensemble Studies)	Pres	3	-	

Year	Module Code	Title	Module Category	No. of AUs	Pre-requisites
4	Semester 1				
	Select any 1				
	AAI430	Performance Studies Project (including Ensemble Studies)	Pres	3	-
	AAI431	Music Education Project (including Ensemble Studies)	Pres	3	-
	AAI432	Ethnomusicology Project (including Ensemble Studies)	Pres	3	-
	AAI433	Musicological Research Project (including Ensemble Studies)	Pres	3	-
	AAI434	Composition Project (including Ensemble Studies)	Pres	3	-
Total AUs for Degree				39	

* Special Note: All students must obtain a pass in both written and practical components to pass the entire module.

**Table 2: AS 2 Music Structure for BA (Ed) / BSc (Ed)
(Secondary)**

Year	Module Code	Title	Module Category	No. of AUs	Pre-requisites
1	Semester 1				
	AAI101	Musical Practices I (Including Instrumental Studies)	Core	3	-
	AAI102	Foundations in Musical Studies I (including Ensemble Studies)	Core	3	-
	Semester 2				
	AAI103	Musical Practices II (Including Instrumental Studies)	Core	3	-
	AAI104	Foundations in Musical Studies II (including Ensemble Studies)	Core	3	-
2	Semester 1				
	AAI201	Musical Practices III (Including Instrumental Studies)	Core	3	-
	AAI202	Orchestration and Arranging (including Ensemble Studies)	Core	3	-
	Semester 2				
	AAI203	Musical Practices IV (Including Instrumental Studies)	Core	3	-
	AAI204	Foundations in Music Education (including Ensemble Studies)	Core	3	-
Total AUs for Degree				24	

* Special Note: All students must obtain a pass in both written and practical components to pass the entire module.

AAI101 Musical Practices I (including Instrumental Studies)

This module, as the first of a series of similarly constructed modules, seeks to introduce musical practices by situating them in a social and historical context. Musical practices, via creating performing and responding, form the basis of learning about any specific musical practice and the activity of experiencing and reflecting on the musical practice. Each musical practice would have to be viewed from its own culturally situated and practice specific context. This module acknowledges a constructivist paradigm in the teaching and learning of and about music asserting knowledge as being uniquely constructed by individuals. Learning is facilitated in an environment, which is created and/or constructed by both student teachers and facilitators as stakeholders. This module also requires student teachers to take up instrumental studies in the form of their main instrument and prescribed ensembles.

AAI102 Foundations in Musical Studies I (including Ensemble Studies)

This module introduces analysis as a mode of systematic inquiry which will serve, via listening, as a foundation for understanding a wide variety of musics. It introduces theoretical and analytical approaches to formal knowledge, either as verbal/oral or written, about musics through musical experiences of performing and listening. In this module, analyses of musics describe and distinguishing musical exemplars by employing a coherent and comprehensible terminology through contemplation of fundamental compositional materials in the activity of concentrated listening. This module also requires prescribed ensemble participation.

AAI103 Musical Practices II (including Instrumental Studies)

This module, the second in the series, continues to introduce musical practices by situating them in a social and historical context. Musical practices, via creating performing and responding, form the basis of learning about any specific musical practice and the activity of experiencing and reflecting on the musical practice. Each musical practice is viewed from its own culturally situated and practice specific context. This module acknowledges a constructivist paradigm in the teaching and learning of and about music asserting knowledge as being uniquely constructed by individuals. Learning is facilitated in an environment, which is created and/or constructed by both student teachers and facilitators as stakeholders. This module also requires student teachers to take up instrumental studies in the form of their main instrument and prescribed ensembles.

AAI104 Foundations in Musical Studies II (including Ensemble Studies)

This module builds on the processes of musical theory and practice as a mode of systematic inquiry and serves, via listening, to contemplate the musical examples by analysing relationships beyond it; composer, compositional realisation, compositional systems; compositional antecedents and precedents, perceptual properties, issues and challenges in apprehension, musical anthropology, among a variety of concerns. In engendering a mode of systematic enquiry, this module seeks to affirm the role of analysis as a way to enhance enjoyment, appreciation and understanding of musical works, procedures and practices.

This module also requires prescribed instrumental/vocal ensemble participation.

AAI201 Musical Practices III (including Instrumental Studies)

This module, the third in the series, represents a further development in learning musical practices, via creating performing and responding, from a culturally situated and practice specific context. This module introduces concepts about construction of greater/lesser in musical traditions and ramifications of such a construction. Learning is facilitated in an environment, which is created and/or constructed by both student teachers and facilitators as stakeholders. This module also requires student teachers to take up instrumental studies in the form of their main instrument and prescribed ensembles.

AAI202 Orchestration and Arranging (including Ensemble Studies)

This module involves a study of varied repertoire ranging from orchestral music, rock, pop, techno to big band, and explores the capabilities of the various instruments, with a view to developing skills in applying and sequencing instrumental combinations effectively in creating an effective piece of music.

AAI203 Musical Practices IV (including Instrumental Studies)

This fourth and final module in the series of musical practices, prepares student teachers for a more advanced approach to learning musical practices from a culturally situated and practice specific context, while still engaging them via creating, performing and responding. This module critically examines the ramifications of constructing labels in musical traditions such as greater/lesser, written/oral (aural), mainstream/marginal, specifically music of popular culture and jazz. This module introduces concepts in cultural theory, ethnomusicology and anthropology through musical learning which is facilitated in an environment, which is created and/or constructed by both student teachers and facilitators as stakeholders. This module also requires student teachers to take up instrumental studies in the form of their main instrument and prescribed ensembles.

AAI204 Foundations in Music Education (including Ensemble Studies)

This module introduces a study of historical, psychological and philosophical foundations of music education including established music educators and their contributions. This introduction to fundamental philosophies, principles and educational practices in the field of music education forms a knowledge base for developing ways of thinking and knowing of and about music education for the music classroom. This module also requires student teachers to take up instrumental studies in the form of their main instrument as well as prescribed ensembles.

AAI330 Music and Technology (including Ensemble Studies)

This module introduces ways in which technology supports musical practice in the areas of creating, performing and responding. The terms and tools of technology are critically examined in their nature, role and function in musical practice. This module requires student teachers to take up instrumental studies in the form of their main instrument and prescribed ensembles.

AAI331 Ethnomusicology (including Ensemble Studies)

A study of the theory and methods of ethnomusicology. This study will also emphasise the importance of techniques and technology in ethnomusicological fieldwork studies and methodology as well as a study of musical transcriptions from various cultures and their significance for ethnomusicological study. There will also be a study of the traditional music from a wide range of cultures. This module requires student teachers to take up instrumental studies in the form of their main instrument and prescribed ensembles.

AAI332 Musical Behaviours (including Instrumental Studies)

A study of musical practices around the world with special emphasis on interdisciplinary perspectives such as philosophy, music education, analysis, sociology and the teaching and learning of the various musical traditions. This module also requires student teachers to take up instrumental studies in the form of prescribed ensembles.

AAI333 Analysis of Twentieth-Century Music (including Ensemble Studies)

This module involves a more in-depth study of twentieth-century music (including local composers' works) and their attendant musical aesthetics and techniques like serial analysis, set-theory based approaches to art music as well as approaches to understanding jazz, music of popular culture, including pop, rock and rap. This module also requires prescribed instrumental/vocal ensemble participation.

AAI301 Studies in Music Education (including Ensemble Studies)

This module seeks to develop the foundations of music education by introducing aspects of programme development, teaching methods, administration, supervision and evaluation alongside comparative studies of major music educators with music curriculum design. This module also requires prescribed instrumental/vocal ensemble participation.

AAI334 Conducting (including Ensemble Studies)

This module seeks to introduce fundamental principles and practices of conducting ensembles like band or choir with emphasis on consolidation of techniques and practical skills. These skills involve the study of rehearsal procedures and performance practice; seen as a knowledge base for developing other skills in performing and ensemble directing. This module also requires prescribed instrumental/vocal ensemble participation.

AAI335 Composing (including Ensemble Studies)

Further exploration of compositional procedures study of composition, in which the student teacher produces either an extended work or a portfolio of compositions. A portfolio of examples via practical-based composition is also taken into account and includes musics of popular cultures from around the world. This module also requires prescribed instrumental/vocal ensemble participation.

AAI430 Performance Studies Project (including Ensemble Studies)

This module offers the opportunities for student teachers to pursue in-depth performance/instrumental studies in the form of their main instrument or ensemble related performances, like conducting an ensemble.

AAI431 Music Education Project (including Ensemble Studies)

This module requires the student teacher to carry out research projects by tapping into knowledge and skills introduced and developed in previous modules in the areas of historical, psychological and philosophical foundations of music education, programme development, methods of teaching, administration, supervision and evaluation and the comparative study of the philosophies of major music educators, along with music curriculum design. This module also requires prescribed instrumental/vocal ensemble participation.

AAI432 Ethnomusicology Project (including Ensemble Studies)

The project involves the application of approaches and methods of ethnomusicology to a chosen musical culture as well as a study of the theory and methods of ethnomusicology, with emphasis on techniques in ethnomusicological field work methods and the study of musical transcriptions from various cultures. There will also be a study of traditional musics from a wide range of cultures. This module also requires prescribed instrumental/vocal ensemble participation.

AAI433 Musicological Research Project (including Ensemble Studies)

An exploration of some aspects of the history of music in some depth, based on contemporary historical theories. Student teachers will have the opportunity to explore chosen topics. The project explores problems and issues surrounding the study of musical compositions and involves the use of analytical techniques applied to them. This module also requires prescribed instrumental/vocal ensemble participation.

AAI434 Composition Project (including Ensemble Studies)

This module is an advanced study of composition, in which the student teacher must produce either an extended work or a portfolio of compositions which can include practical-based composition like musics of popular cultures from around the world. Student teachers here are now expected to have their compositions performed by ensembles and performances recorded. This module is used for developing other skills like composing using music technology. This module also requires prescribed instrumental/vocal ensemble participation.

ACADEMIC SUBJECT: PHYSICAL EDUCATION & SPORTS SCIENCE

Table 1: AS 1 PE & Sports Science Structure for BSc (Ed) (PESS) (Primary)
AS 1 PE & Sports Science Structure for BSc (Ed) (PESS) (Secondary)

Year	Module Code	Title	Module Category	No. of AUs	Pre-requisites
1	Semester 1				
	APA101	Introduction to Physical Education & Sport	Core	3	-
	APA102	Growth and Motor Development	Core	2	-
	Semester 2				
	APA103	Anatomical and Biomechanical Foundations of Physical Activity	Core	3	-
	APA104	Physiology of Exercise	Core	2	-
2	Semester 1				
	APA201	Foundations of Psychology & Motor Learning in Physical Activity	Core	3	APA102
	APA202	Measurement and Evaluation	Core	2	-
	Semester 2				
	Select any 2				
	APA231	Physiological Bases of Exercise	Pres	3	APA104
	APA232	Quantitative Methods in Biomechanics	Pres	3	APA103
	APA233	Psychology of Physical Education & Sport	Pres	3	APA201
	APA234	Neuromuscular Control of Human Movement	Pres	3	APA201
	APA235	Sociology of Sport	Pres	3	APA101
APA236	Management of Sport Organisations	Pres	3	APA101	
3	Semester 1				
	Select any 2				
	APA331	Applied Physiology of Exercise	Pres	3	APA231
	APA332	Biomechanics in Sport	Pres	3	APA232
	APA333	Applied Psychology of Physical Education & Sport	Pres	3	APA233
	APA334	Neural and Behavioural Perspectives of Human Movement	Pres	3	APA234
	APA335	Social History of Sport	Pres	3	APA235
APA336	Event and Facilities Management in Sport	Pres	3	APA236	

Year	Module Code	Title	Module Category	No. of AUs	Pre-requisites
3	Semester 2				
	Select any 1				
	APA337	Theory of Coaching	Pres	3	-
	APA338	Adapted Physical Education & Sport	Pres	3	-
4	Semester 1				
	APA402	Teaching Effectiveness in Physical Education	Core	3	-
	Semester 2				
	APA403	Curriculum Design in Physical Education	Core	2	-
Total AUs for Degree				35	

APA101 Introduction to Physical Education & Sport

This course emphasises concepts related to the broad field of physical education and sport. It provides an overview of the disciplines that study the field's philosophical, historical, cultural, and sociological foundations and their applications to professional practice. The module examines the structure of the Singapore Sports Council, National Sport Associations, Singapore Schools Sports Council and the Co-Curricular Activities Branch and their relationships in promoting participation in sports from recreational to high performance levels. The daily work in physical education and sport, looking at the traditional field of teaching and coaching, is also highlighted. Current issues and future directions in the field are also explored.

APA102 Growth and Motor Development

This module is designed to understand the relation between physical growth and motor development in children and adolescent. Various topics including stages, age related changes, individual differences, and gender differences in relation to growth and motor development will be covered during the module. In addition, interventional strategies to facilitate growth and motor development will be discussed. Implications for the teaching of physical education will be emphasized throughout the module.

APA103 Anatomical and Biomechanical Foundations of Physical Activity

Structural anatomy deals with the knowledge and an understanding of the skeleton, joints and muscle structure that produces movement. Biomechanics is the study of a biological system by means of mechanics. This module introduces the basic mechanical and anatomical concepts and principles that govern human movement. The aim of this module is to enable student teachers to perform qualitative analyses of human movement using basic concepts of mechanics and anatomy in the context of PE and sports.

APA104 Physiology of Exercise

The principal areas covered include energy metabolism for exercise, aerobic performance and anaerobic performance, sex and age-associated differences in exercise performances and thermoregulation in the heat. The associated teaching implications will be brought to the fore. In addition, aspects of functional anatomy dealing with the associated exercise parameters and the part each plays in physical performance, health and fitness will be discussed in this module.

APA201 Foundations of Psychology & Motor Learning in Physical Activity

This module examines the foundations of sport and exercise psychology and the concepts and principles associated with skill acquisition. Specifically, the module will focus on topics and issues related to the social psychological variables that influence participation in physical activity and sport, the sport and exercise environments within which participants operate, as well as selected outcomes of such participation.

APA202 Measurement and Evaluation

This module is designed to provide student teachers with basic concepts of measurement and evaluation in physical education. The course will focus on basic concepts of statistics and the use of computers for data analysis. In addition, techniques to analyse the effectiveness of physical education programme will be introduced and discussed. This course is designed to prepare future teachers to become knowledgeable in administering and evaluating tests within the discipline of physical education.

APA231 Physiological Bases of Exercise

This academic module on exercise physiology embraces important concepts in the physiology of exercise in the school-going age population (8-18 years), contrasting with those of adults. The principal areas covered include the trainability of aerobic & anaerobic performance in young people compared to adults, and nutritional aspects of performance including fluid supplementation.

APA232 Quantitative Methods in Biomechanics

This module introduces participants to quantitative methods for determining mechanical parameters of movement, namely linear and angular kinematic and kinetic quantities through laboratory work. Participants should have completed the mechanical and anatomical bases of human motion before enrolling for this module. A quantitative analysis of sports using basic biomechanical concepts will be introduced to explain movements required in various activities. The use of such quantitative procedures will allow the teacher or coach to effectively analyse movement, explain causes of observed effects and to remediate errors using a safe and scientific approach.

APA233 Psychology of Physical Education & Sport

This module is designed to provide student teachers with an understanding of how psychological variables influence participation in sport and physical education, focusing on the key motivational perspectives of exercise and sport.

APA234 Neuromuscular Control of Human Movement

The purpose of this module is to examine the concepts associated with motor control and the neuromuscular basis of human movement. Student teachers will look at the structures involved in motor control from anatomical, neurophysiological, and biomechanical perspectives, and then, their motion will be interpreted from motor control perspective. Student teachers are encouraged to actively participate in the class by making questions or raising problems.

APA235 Sociology of Sport

The module focuses on the role of sport in society. Sociological theories and methodologies are examined and applied to the study of sport. The module will examine issues such as globalization, race, and women in sport.

APA236 Management of Sport Organisations

This module introduces student teachers to the types of sport organizations and the important issues relating to the management of such organizations. The study of sport organizations will be based on organizational theory's concepts and principals. The important topics of the module include: type of sport organizations, legal identity of sport organizations, goals and objectives of sport organizations, leadership, conflict management and decision making in sport organizations, and strategic planning in sports. The module also introduces to the student the key managerial roles and functions important to managing sport and physical education. The physical education department will be used as a constant management unit to illustrate the key concepts covered.

APA331 Applied Physiology of Exercise

This module examines the sports training adaptations for aerobic endurance, short term power output, and strength in young people (ages 8-18 yrs), nutrition for sports & training (ergogenic aids), power recovery from intermittent exercise & effects of attitude training on swimming performance.

APA332 Biomechanics in Sport

Biomechanics is the study of a biological system by means of mechanics. This module will focus on the quantitative analysis of human movement in sports. Student teachers will learn how to design a quantitative analysis, collect, analyze and interpret data obtained from the equipment associated with the measurement technique. From the analysis work of this module, student teachers will be expected to examine the relationship between performance measure and human motor system. Student teachers will have the opportunity to explore the underlying processes that is involved in the production of this human movement in sports. The module will consist of theory and applied field work.

APA333 Applied Psychology of Physical Education & Sport

This is an applied sport psychology module targeted at student PE teachers who want to consider mental training as a useful tool for enhancing sport performance. The participants will be introduced to the role of applied sport psychologist, the development and evaluation of basic mental skill training, and theories underpinning each mental skill. This course will be both theoretically and practically based.

APA334 Neural and Behavioural Perspectives of Human Movement

The objective of this module is to describe, compare, and contrast current theoretical perspectives of motor learning and control. The range of topics covered in this module will be from the basic principles of human movements to complex human behavior, mainly from the behavioral perspectives. In addition, the basic concept of neural interpretation of human motor control will be addressed.

APA335 Social History of Sport

This module will examine the historical development of sport across cultures, tracing the significant milestones in the changing role of sport in society. Issues such as Olympism, from its elitist neo-classical origins to its present commercialized form, will be examined.

APA336 Event and Facilities Management in Sport

The module will focus on the important considerations required to successfully conduct a sport event. Design and maintenance considerations of a sport facility will also be studied to determine what is preferable. Module topics include: important public of a sport event, organizing sport competitions, executing a sport event, sport facilities design, concept of tort and negligence, and risk management in sport.

APA337 Theory of Coaching

This module will focus on issues related to the effective coaching of young athletes. Discussions will be centered on theoretical concepts, yet placed in the context of practical applications for the local competitive environment.

The content from NCAP Level 1, 2 and 3 will be covered. If participants so wish, they may register for the NCAP Level 3 certification. This certification will be conferred on participant's meeting the assessment requirements and paying the appropriate fee to the Singapore Sports Council.

APA338 Adapted Physical Education & Sport

Student teachers with special needs, like all other student teachers, need to develop movement control and efficiency of movement in fine and gross motor skills. They can, and should, be equipped with the necessary skills and knowledge to participate in modified and regular games and sporting events. The effective physical education teacher can encourage and plan for successful integration of student teachers with special needs in mainstream physical education lessons or inclusive physical activity settings. This introductory module introduces pre-service PE teachers to the area of adapted physical education and to the different disability conditions. This module aims to equip pre-service teachers with the foundation knowledge and skills to integrate students with special needs into the regular PE/physical activity program.

APA402 Teaching Effectiveness in Physical Education

This module covers a range of topics relevant to the teaching of physical education in schools. It examines student teachers' concerns arising from their teaching experiences and addresses these in relation to the research on teaching effectiveness in physical education. Teacher socialization issues that occur in schools are discussed. Observer systems that can be used to analyse the effectiveness of the teacher and the management of student behaviours in teaching settings are introduced.

APA403 Curriculum Design in Physical Education

This module will build on the knowledge and theory gained in the Instructional Methods and Strategies Units. The content will focus on issues related to the development and assessment of physical education curricular and attention will be given to the PE curriculum in Singapore.

ACADEMIC SUBJECT: PHYSICS**Table 1: AS 1 Physics Structure for BSc (Ed) (Primary)
AS 1 Physics Structure for BSc (Ed) (Secondary)**

Year	Module Code	Title	Module Category	No. of AUs	Pre-requisites
1	Semester 1				
	AAP101	Understanding Essential Mechanics	Core	3	-
	AAP102	Optics and Waves	Core	3	-
	Semester 2				
	AAP103	Electricity and Magnetism	Core	3	-
	AAP104	Physics Laboratory I	Core	3	AAP101
2	Semester 1				
	AAP201	Modern Physics and Special Relativity	Core	3	-
	AAP202	Exploring Thermal Physics	Core	3	-
	Semester 2				
	AAP203	Electromagnetism	Core	3	AAP103
	AAP204	Physics Laboratory II	Core	3	AAP103
3	Semester 1				
	AAP301	Solid State Physics	Core	3	AAP201
	AAP302	Quantum Mechanics	Core	3	AAP101 AAP201
	Semester 2				
	AAP303	Material Science	Core	3	AAP201
	AAP304	Physics Laboratory III	Core	3	AAP201
4	Semester 1				
	Select any 1				
	AAP431	Plasma Science and Technology	Pres	3	AAP203
	AAP432	Atomic and Molecular Physics	Pres	3	AAP302
	AAP433	Relativity	Pres	3	AAP302
	AAP434	Spectroscopy	Pres	3	AAP302
	AAP435	Astrophysics	Pres	3	AAP203
	AAP436	Condensed Matter Physics	Pres	3	AAP302
AAP437	Thermonuclear Fusion and Radiation	Pres	3	AAP203	
Total AUs for Degree				39	

Table 2: AS 2 Physics Structure for BA (Ed)/BSc (Ed) (Secondary)

Year	Module Code	Title	Module Category	No. of AUs	Pre-requisites
1	Semester 1				
	AAP101	Understanding Essential Mechanics	Core	3	-
	AAP102	Optics and Waves	Core	3	-
	Semester 2				
	AAP103	Electricity and Magnetism	Core	3	-
	AAP104	Physics Laboratory I	Core	3	AAP101
2	Semester 1				
	AAP201	Modern Physics and Special Relativity	Core	3	-
	AAP202	Exploring Thermal Physics	Core	3	-
	Semester 2				
	AAP203	Electromagnetism	Core	3	AAP103
	AAP204	Physics Laboratory II	Core	3	AAP101
Total AUs for Degree				24	

AAP101 Understanding Essential Mechanics

Vector algebra and kinematics; Newton's laws and simple applications; Friction; Circular motion & universal gravitation; Conservation laws: Rigid body kinematics and dynamics; oscillations; introduction to continuous media. Supplementary material: Solution of linear differential equations and use of Mathematica or Maple. These topics are taught with special emphases on linkages to the current school curricula.

AAP102 Optics and Waves

Geometrical Optics: Basic concepts in geometrical optics: Fermat's Principle; Reflection and refraction; Thin Lens. **Physical Optics:** Wave Motion and equation, Harmonic Waves; Phase and Phase Velocity; The Superposition of Waves; Standing Waves; Beats; Group Velocity; Interference; Diffraction; Polarization. These topics are taught with special emphases on linkages to the current school curricula.

AAP103 Electricity and Magnetism

Electrostatics; Electric field; Gauss's law; Electric potential energy and potential; Electric dipoles; Capacitance. Energy stored in electric field. Electric current, Ohm's law, resistivity; Kirchhoff's law; DC circuit. Magnetism; Magnetic field; Bio-Savart law; Ampere's Law. Force between currents carrying wires. Torque on a current loop and applications such as galvanometers, motors and loudspeakers. Charge particles in E and B fields -- Hall effect and mass spectrometer. Electromagnetic Induction; Faraday's law and Lenz's law. Electric generator. Eddy currents. Transformer and other applications of induction such as microphone, tape recording and seismograph. Inductance: self and mutual. Energy stored in magnetic field. Analysis of AC circuit, including LRC. Resonance. Impedance matching. These topics are taught with special emphases on linkages to the current school curricula.

AAP104 Physics Laboratory I

Experimental techniques, errors and statistics. Introduction to computer aided experimentation and data loggers, with special emphasis on the use of dataloggers in school context. Measurement of length, time and temperature. Free fall and projectile motion. Accelerated motion. Conservation of energy, impulse and momentum, airtrack, damped and driven oscillators, resonance and vibrating strings. Heat transfer experiment. Electrical awareness, multimeter and oscilloscope. Electric and magnetic fields. Linear and nonlinear devices. Resistors, capacitors, and inductors. Modern circuits. Geometrical and physical optics.

AAP201 Modern Physics and Special Relativity

Galilean Relativity and transformation. Michelson-Morley Experiment; Postulates of relativity and implications: simultaneity and clock synchronization, time dilation and length contraction. Lorentz Transformation including Fizeau's experiment. Paradoxes of relativity: Pole and barn paradox, and twin paradox. Relativistic mechanics: energy and momentum and relativity in nuclear & particle physics. Blackbody radiation; Photoelectric effect; Compton scattering; Atomic structure: plum-pudding model, Rutherford's Model of Atom and Bohr's theory. Wave-particle dualism; Davisson and Germer experiment, Heisenberg Uncertainty principle, Wave-function, Schrödinger's theory of quantum mechanics. Nuclear Physics: Nuclear shape and size, Nuclear stability, Binding energy, Radioactivity, concept of half-life and mean life, conservation laws; Nuclear fission and fusion. These topics are taught with special emphases on linkages to the current secondary school curricula.

AAP202 Exploring Thermal Physics

Temperature. Zeroth Law of Thermodynamics. Thermal expansion. Specific and latent heat. Ideal gas law. Heat transfer. Stefan-Boltzmann law. Kinetic theory. Mean free path. Diffusion. Internal energy & First Law of Thermodynamics. Enthalpy. Equipartition theorem. Heat capacities of gases. Adiabatic processes. Heat engines and efficiency. Carnot cycle. Reversibility. Second Law of Thermodynamics. Entropy: order & disorder. Free Energy and chemical thermodynamics. Boltzmann statistics. Maxwell distribution. Quantum statistics. Fermi-Dirac distribution. Bose-Einstein distribution. Plank's radiation law. Debye theory of solids. These topics are taught with special emphases on linkages to the current secondary school curricula.

AAP203 Electromagnetism

Polarization; Dielectrics and their applications. Macroscopic and microscopic fields in dielectrics. Electric displacement vectors. Electrostatic energy. AC Circuits. Electromagnetic waves in free space and isotropic insulating materials. In addition, a vast variety of interesting topics are covered in this course: Lightning, Pacemakers, Electric Shock Treatment, Electrocardiograms, Metal Detectors, Musical Instruments, Magnetic Levitation, Bullet Trains, Electric Motors, Radios, TV, Car Coils, Superconductivity, Aurora Borealis, Rainbows, Radio Telescopes, Interferometers, Particle Accelerators (a.k.a. Atom Smashers or Colliders), Mass Spectrometers, Red Sunsets, Blue Skies, Haloes around Sun and Moon, Color Perception, Doppler Effect, Big-Bang Cosmology. These topics are taught with special emphases on linkages to the current school curricula.

AAP204 Physics Laboratory II

Analogue electronics: Impedance of resistors, capacitors and inductors, characteristics of diodes, transistors and operational amplifiers. Digital Electronics: Introduction to types of logic gates e.g. CMOS, TTL. Use of logic gates flip flops for counters, displays and binary arithmetic. Using electronics for physics experiments. Exposure to real life applications of electronics. The experiments are selected with special emphases on linkages to the current school curricula.

AAP301 Solid State Physics

Introduction to basic concepts of solid-state physics and materials sciences. Crystalline states and symmetry; reciprocal lattice; phonons and their interactions; free electron theory of metals and Fermi surface; Density of States and energy bands. Semiconductors. Electrons, holes, donors and acceptors. Carrier concentrations in intrinsic and extrinsic materials. Transport Properties. Carrier mobility and ways to measure it. Hall Effect. Physics of P-N Junction and MOSFETs. Semiconductor processing. Physics of low dimensional solids. Nanostructures and nanotechnology. Teaching of solid state physics at secondary level. These topics are taught with special emphases on linkages to the current school curricula and school-based projects.

AAP302 Quantum Mechanics

De Broglie's hypothesis and wave-particle duality; principle of superposition; The Schrodinger theory of quantum mechanics; wave function and its interpretation; probability density; concepts of quantum states; state vectors and its properties; bra and ket vectors and the vector space; the basic postulate of quantum mechanics; the operators and expectation values; eigenfunction and eigenvalues; one-dimensional potential problem; the orbital angular momentum and the spin angular momentum; three dimensional potential problem; the central potential problem; the hydrogen atom; symmetry and degeneracy. Teaching of quantum theory at secondary level. These topics are taught with special emphases on linkages to the current school curricula and school-based projects.

AAP303 Material Science

Introduction to advanced materials. Atomic Structure and Bonding in solids, Atomic arrangement and crystal structure. Imperfections in solids, diffusion; liquid crystals, anisotropy; Phonons, phonon transport; Electronic Properties of Materials; Free electrons, Band formation, energy gaps and Fermi energy; Semiconducting materials; Magnetic Properties of Materials; Optical Properties of Materials; Biomaterials, Nanomaterials and nanotechnology. Physics and applications of analytical techniques for materials characterization. These topics are taught with special emphases on linkages to the current school curricula and school based projects.

AAP304 Physics Laboratory III

Experiments covering a broad range of modern physics such as Franck-Hertz, Faraday, and Compton experiments. X-ray diffraction, Hall effect, charge carrier measurement, nuclear magnetic resonance, superconductivity, alpha, beta particles and gamma radiation, measurement of speed of light, fine structure constant, Boltzmann constant, and Planck constant. Wave propagation and transmission lines. Breakdown of gases. Interference spectroscopy and holography. Optical communication. The module also stresses the basic experimental techniques and data acquisition and analysis, and written and oral presentation of experiment results. These topics are taught with special emphases on linkages to the current school curricula and school-based projects.

AAP431 Plasma Science and Technology

Introduction to plasma physics and applications. Vacuum systems and handling. Kinetic theory of gasses. Electrodynamics of ionized gases. Motion of charges in electric and magnetic fields. Plasma generation, discharge characteristics and devices. Plasma properties. Plasma-surface interaction. Chemically active plasmas and applications for plasma assisted deposition, etching, implantation and surface modifications. Plasma TV. Plasma assembly of nanomaterials. High temperature plasmas and controlled thermal nuclear fusion. Plasma diagnostics and simulation. These topics are taught with special emphases on linkages to the current school curricula and school-based projects.

AAP432 Atomic and Molecular Physics

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 selective 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. These topics are taught with special emphases on linkages to the current school curricula and school-based projects.

AAP433 Relativity

Basic postulates of the Special Theory of Relativity; the relativistic dynamics; the geometry of space-time; the Minkowski diagram; Relativistic dynamics including elastic and inelastic collision; particle decays and production; relativity and electromagnetism; space-time curvature; elementary tensor analysis including tensor algebra and tensor calculus; the principle of general relativity; Einstein's theory; the field equation; the experimental tests of the general theory of relativity. These topics are taught with special emphases on linkages to the current school curricula and school-based projects.

AAP434 Spectroscopy

Interaction of electromagnetic radiation with matter, energy levels, basic instrumentations, 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. These topics are taught with special emphases on linkages to the current school curricula and school-based projects.

AAP435 Astrophysics

General Introduction. Qualitative overview of stellar evolution: nucleosynthesis, white dwarf stars, neutron stars, black holes. Qualitative overview of cosmology. Measurement techniques: radiation, optics, telescopes & interaction of matter with radiation. Stellar parameters. Mass determination. Spectra classifications, Hertzsprung-Russell Diagram. Stellar atmospheres. Interiors of stars: Hydrostatic equilibrium. Pressure equation of state. Stellar Energy Sources. Transportation of energy. Main sequence. Star Formation: Formation of protostars. Evolution of stars (pre, main & late stages). Fate of massive stars. White Dwarfs. Neutron Stars. Black holes. Chandrasekhar Limit. The Solar System. The Galaxies. Large scale structure. General cosmology (the Early Universe). These topics are taught with special emphases on linkages to the current school curricula and school-based projects.

AAP436 Condensed Matter Physics

The focus of this course is the liquid state. Forces, energies, and timescales in condensed matter, with emphasis on the liquid state: bonding in liquids and structure of liquids – radial density function, Clausius virial theorem, internal energy and liquid crystals. The dynamics of a liquid: the cell model, diffusion, viscous flow, and ionic conduction. Properties of liquid: Mechanical, thermal, electrical, optical, magnetic, as well as surface tension and viscosity -- experimental data and theory. Understanding of the speed of sound in gas, liquid and solid. Change of phase and the Gibbs free energy. Initiation of a phase transition: Nucleation and growth -- experimental data and

theory. Introduction to the colloidal state of matter (liquid-in-liquid, solid-in-liquid and liquid-in-gas) and polymers (glass, rubber, and polymer crystals). These topics are taught with special emphases on linkages to the current school curricula and school-based projects.

AAP437 Thermonuclear Fusion and Radiation

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. These topics are taught with special emphases on linkages to the current school curricula and school-based projects.