

MKAE 1013 Advanced Structural Analysis (3 credits)

Energy method: Linear and non-linear theory, Theory of Plates and shells: Introduction to shell structures, types of shells and membrane, theory of shells, bending of thin cylindrical shells, application.

MKAE 1083 Advanced Design of Concrete Structures (3 credits)

Design of support and connections of RC beams, precast, bearing and nibs. Introduction to torsion, membrane and sand analogy. Water retaining structures for cylindrical, rectangular and cone shapes. Analysis and design of continuous slab, waffle slab, flat slab, shear wall.

MKAM 1013 Construction Project Management (3 credits)

This course provides insight about contemporary practice in managing construction project. It analyse issues faced by construction industry and strategy to reengineer its current practice with regard to work process flow, procurement system and reporting system.

MKAG 1113 Advanced Hydraulics (3 credits)

This course will expose students to the advanced concepts of fluid mechanics in relation to viscous flows. It covers laminar flows, transition to turbulence and turbulent flows and will be taught with civil engineering applications in mind. . In this course, unsteady flow in open channels and pipes such as water hammer problems - topics of specific interest to civil engineers – will also be covered.

MKAJ 1013 Advanced Soil Mechanics (3 credits)

This subject is one of the core subjects offered which provide the knowledge on the application and principles of soil mechanics. It considers the following topics: soil and clay mineralogy, strength behaviour of cohesionless and cohesive soils. Mohr-Coulomb failure criterion, peak stresses, effective stress ratio, residual stress and critical state soil mechanics. Principles of the laboratory measurement. Consolidation theory and pore pressure parameters. Difference between 1-D and 3-D Consolidation theory. Field Settlement. Soil-water characteristic curve for unsaturated soils and its applications.

MKAK 1003 Environmental Management and Sustainability (3 credits)

This course introduces students to issues of environmental management. The course includes discussion on the fundamentals of environmental conservation and control, concept of sustainability, environmental consequences of coastal and inland developments and environmental law and regulations. At the end of the course, students should be able to apply the knowledge by associating environmental problem that arise with poor management of environmental sensitive areas.

MKAE 1023 Analysis and Design of Structural system (3 credits)

Schematic building forms as total structural system, integrity and subsystem interaction, schematic analysis, structural loads and responses, design of horizontal subsystems, design of vertical subsystems, linear components, vertical components, applications to high rise buildings, bridges, suspension and shell systems load bearing structures and foundation subsystems.

MKAE 1043 Advanced Construction Materials (3 credits)

Industrial by-product for construction, fibre reinforced composite and polymer modified concrete, advanced masonry, structural brickwork. Properties, manufacturing and applications of construction materials. Advanced highway materials: flexible and rigid pavement – bitumen, modified bitumen, asphalt, specialised asphalt, chip seal, concrete and interlocking concrete blocks. Advanced geotechnical engineering materials: type and purpose, design and analysis, performance and quality control.

MKAE 1073 Advanced Design of Steel Structures (3 credits)

Analysis and design of connections, braced multi-storey frames, semi-continuous and continuous construction. Analysis and design of unbraced multi-storey frames, plate girders and portal frames.

MKAE 1143 Finite Element Method (3 credits)

Methods of formulation and development of finite element equation. One-dimensional element, truss and beam element, plane stress element, plane strain, triangular, rectangular and plate bending elements, axis-symmetry and brick elements. Software application, modelling and convergence study and result interpretation.

MKAE 1183 Design of Prestressed Concrete (3 credits)

This is an elective course, which will provide students an understanding and ability to analyse and design of prestressed concrete structural elements. Topics discussed include the concept and principles of prestressing, methods of prestressing concrete, stress limits, losses of prestress, selection of section, and serviceability and strength requirements. Students will also be exposed to the complete analysis and design procedure of simply supported prestressed concrete non-composite and composite beams, and design principles of continuous beams.

MKAM 1023 Construction Site Management and Safety Control (3 credits)

This course introduce main concept of project safety planning which include occupational and safety and health concept, safety risk and hazard at construction site. Legislation and safety code of practices such as OSHA 1994, BOWEC will be reviewed.

MKAM 1033 Construction Technology(3 credits)

Site inspection, investigation, clearance and preparation. Pile driving and construction methods. Construction production and control, IBS, bridge and high rise construction, other methods of construction.

MKAM 1043 Construction Law and Contract(3 credits)

This course introduces Malaysia laws, which will focus on the sources, and branches of law in Malaysia. The course will emphasize on private laws related to construction practice, torts, law of contract and construction contract administration.

MKAG 1213 Advanced Hydrology (3 credits)

The course offer study in hydrological processes, include the rainfall, evapo-transpiration, infiltration, soil water processes and overland flow. Aspect of rainfall-runoff processes and hydrologic routing are discussed and how these are modelled for use in flood estimation.

MKAG 1223 Water Resources Management (3 credits)

The course provides relevant topics in planning and management of water resources that include: surface water & groundwater, water resources issues & development, water law, policy and institutions, water resources planning, economic and financing, water resources analysis, reservoir and yield operation, river basin management, multi-objectives analysis, risk and reliability analysis.

MKAJ 1023 Advanced Geotechnical Analysis and Design (3 credits)

Design and construction of earthworks, such as embankment, cutting, dam, tunnel and earth retaining structures. Ground improvement techniques and practical solution to problems often confronted during construction in difficult ground area. Evaluation of construction and post-construction data for purposes of performance, safety and design compatibility. Design and stability analysis of slope and embankment.

MKAJ 1033 Advanced Foundation Engineering (3 credits)

Site Investigation Interpretation for design of foundation. Principles of foundation design, selection of foundation, bearing capacity and settlement problems. Various types of foundation and their criteria for selection will be presented which is interpreted from site investigation related for shallow foundation, pile, raft foundation, drilled shaft, cofferdam, underpinning, Group piles, laterally loaded and uplift piles. Settlement and bearing capacity considerations will be employed to select and design the appropriate foundation scheme for structures. The student will be able to understand and apply the principles of foundation design in terms of technical feasibility, economic viability, articulate and justify technical analyses through oral, written and graphical means.

MKAJ 1053 Software Application in Geotechnical Engineering (3 credits)

This course is designed to expose the students in analyzing geotechnical engineering problem using Plaxis 7.2 and Geo-Studio 2004 Products: SEEP/W, SIGMA/W and SLOPE/W. This course will illustrate what students can do with the modern software tools now available and highlight the important/benefits of numerical modeling. The series of example which taken from the existing literature are employed in this courses, intended to provide the students some example problems that they can use to develop their modeling skills. This course also exposes the knowledge on the usage some of the notation and basic input procedures that are used in the software effectively. At the end of the course, students should be able to utilize this software, improve modeling skills and give some new ideas on how to apply numerical models related to geotechnical engineering problems.

MKAQ 1013 Highway and Infrastructure Design (3 credits)

Road location, network pattern, and geometric design: horizontal and vertical alignments, cross-section curves, crawling lane and weaving area, design of at-grade and grade-separated junctions, roadway in residential areas, cyclist and pedestrian facilities, bus facilities, servicing facilities and parking design.

MKAQ 1053 Advanced Road Material (3 credits)

Factors influencing thickness design, methods of pavement design: AASHTO, Asphalt Institute, Rigid pavement design, Interlocking block design, surface dressing design, construction of various pavement types, earthworks, cut slopes, embankments, surface drainage, subsurface drainage, erosion control, slope protection, culverts.

MKAQ 1063 Public Transport System (3 credits)

Public transport vehicle characteristics, the planning process of public transport, facilities location analysis and layout design, transit system planning and mode selection, highway design and traffic management for buses. Use of intelligent systems in urban mass transport modes and passengers. Economics of fares structure and economic evaluation of public transport plans.

MKAK 1043 Environmental Quality and Analysis (3 credits)

Legislation and standards for environmental quality analysis and examination. Principles of biological, chemical and physical methods for environmental quality analysis. Advanced techniques in analytical methods appropriate to environmental quality control. The subject includes laboratory and field works.

MKAK 1063 Water Quality Assessment and Management(3 credits)

This course is designed to expose students to the current trends and various aspects in water quality assessment and management for river catchments, lakes, reservoirs and wetlands. It tackles problems involving water pollution and its impacts on the environment and legislation. Water quality monitoring projects carried out by students will enable application of proper sampling and monitoring methods.

At the end of the course students will then be able to assess water quality problems and plan mitigation and control measures for water pollution.