

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.

MKAG 1123 Hydraulics Structures (3 credits)

The course in hydraulic structures cover topics such as dam, spillways, weirs, intake structures, energy dissipators, river diversion works, barrages, reservoir sedimentation, pumping stations, and hydraulic modelling.

MKAG 1133 Coastal Engineering(3 credits)

The course provides a basic understanding of the nearshore hydrodynamic and morphological processes in coastal areas. It gives background knowledge of the various hydrodynamic parameters acting in the coastal region due to waves, tides and currents.

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.

MKAG 1233 Urban Stormwater Management (3 credits)

The course covers the theoretical aspects and design of urban stormwater drainage system. This topics includes drainage planning process, non-structural planning, control option for flow reduction and pollution minimization. At the end of the course, the students are being exposed to design elements in urban drainage and flood control systems that comply with Malaysian design criteria.

MKAG 1143 River and Estuarine Hydrodynamics and Transport(3 credits)

This course is designed to expose the students to surface water modeling including an overview of the present state-of-the-art of modeling and analysis of hydrodynamics, eutrophication, and toxic materials (organic chemicals and metals) and review of recent trends in river and estuarine.

MKAG 1153 Fluvial Hydraulics (3 credits)

This course is formulated largely to give an overall view of the mechanics of sediment transport in open channel, river and coastal areas. Students will be introduced to compute sediment discharge in river flows and in coastal region. Local erosion is also discussed.

MKAG 1163 Computational Environmental Hydraulics (3 credits)

This course covers the environmental aspects in the field of hydraulics. Environmental Hydraulics is the hydrodynamic aspects of water quality management in natural body of water. This course will consist of the examination of the physical, chemical and biological attributes of flowing water, with the objective of protecting and enhancing the quality of the environment.

MKAG 1173 Water Supply Engineering (3 credits)

The course discusses broad range of topics that include water uses and demand, water demand forecasting, sources of water supply, water distribution and transmission systems, water treatment processes, water quality criteria and safe drinking water act, water tariff and non-revenue water (NRW).

MKAG 1183 Coastal Structures (3 credits)

The course is designed to provide a detailed understanding of the design process of coastal engineering structures such as breakwaters, revetments, groynes, etc as well as an introduction to “soft engineering approaches including beach drainage systems and biotechnical methods. Statistical distribution and analysis of wave data will also be highlighted in order to derive the design wave parameters.

MKAG 1193 Port and Harbour Engineering (3 credits)

This course introduces students to the fundamentals and functional requirements of port planning and design: tides, waves, currents, and methods of design. The course will focus on both hydrodynamic concerns and construction aspects such as breakwater design, berthing layout, land reclamation and dredging. Special considerations of sedimentation in navigation channels and in turning basins are also discussed.

MKAG 1243 Groundwater Hydrology (3 credits)

The course has been prepared for hydrologists and engineers interested in learning groundwater exploration, exploitation, quality control and management. The course gives emphasis on basic hydrogeology and nature of groundwater, groundwater occurrence, groundwater movement, groundwater investigation and development, well hydraulics, evaluation of groundwater resources, contamination of groundwater resources, mass transport and subsurface contaminants.

MKAG 1253 Groundwater Modelling (3 credits)

The course introduces the methods commonly used to model groundwater flow and solute transport in the subsurface of the Earth. The course is designed to focus on the applications of finite difference and finite element methods for hydrogeological modeling.

MKAG 1263 Irrigation Engineering (3 credits)

Presents the relevant topics on irrigation engineering that covers the soil-water relationship, factors influencing crop production, economic analysis, crop water requirements, irrigation scheduling, planning and design procedure for surface and pressurized irrigation system, canal design and water control structures.

MKAG 1273 Statistical Hydrology (3 credits)

This course has been prepared for hydrologists and engineers interested in learning how statistical models and methods can be valuable tools in the analysis and solution of many hydrologic and engineering problems. The course introduces statistics, probability, and time series, and their application to problems in hydrology.

MKAG 1313 Computational Fluid Mechanics (3 credits)

The course provides relevant topics in fundamental of matrix algebra, numerical solution of ordinary and partial differential equation, elliptic and parabolic partial differential equation, finite difference

method, finite element method and application in fluid mechanics. The students will write some simple program to appreciate the method of solution.