COURSE DESCRIPTION

ME610 Building services management (Core, 3 Credits)

Building economics and energy management: Building economics and life cycle analysis of the BSE systems. Building utility and energy management systems.

Facilities Management: Facility management models and systems; strategic facility management; user need evaluation; procurement; building utility and energy management; case studies.
Asset Management and Maintenance: decision making techniques; inventory control; resource management; computerized maintenance; maintenance effectiveness; procurement

ME 611: Building HVAC and refrigeration systems (Core 3, Credits)

Introduction: Psychrometry, thermal comfort, heating and cooling load estimation
Ventilation and indoor air quality: fresh air requirement, air changes, air contamination, fume and dust removal, and applicable local and global standards. Building thermal performance and heat transfer characteristics.
Refrigeration and air conditioning systems design: Air distribution system design, control strategies and equipment selection, utilization of relevant ASHRE, BS, ISO, SLSI standards (health and hygiene, safety, local specifications and equipment design)

ME612 Electrical Services and Lighting Design (Core, 3 Credits)

Electrical Services covers aspects of electrical energy supply, electricity tariffs,
Guidelines for lighting design, artificial light sources and luminaries, day lighting, interior lighting, exterior lighting, colour rendering,
Design of electrical installations to satisfy IEE Wiring Regulations,
Principles of electrical machines and power electronic devices used in building services applications.

ME 613 Acoustics, Fire and Lifts (Core, 3 Credits)

Acoustics: basics of sound power and intensity, propagation of noise, architectural acoustics, sound generation in services systems, introduction to noise isolation design and materials, vibration isolation, legal requirements and noise standards.
Lifts: lift and escalator design, maintenance and operation.
Fire: characteristics and behaviour of fire, fire hazards of materials and buildings, fire protection strategies, smoke management principles, fire detection and alarm systems, fire extinguishing systems, building facilities for fire safety; fire protection and design principles for special hazardous areas; fire codes and approaches, installation and commissioning; maintenance

ME 614 Building utility supply systems (Core, 3 credits)

Characteristics and design of different utility services: cold, hot and flushing water supply systems, sanitary and storm water drainage systems; steam and gas supply system; water treatment; thermal storage systems, system design and economic analysis; preparation of schematics and P&IDs.
Fans, pumps and heat exchangers and line components: types and characteristics, parallel and series operation, system effects;

Fluid network analysis: air and water systems, application of computational fluid dynamics, design and operation, preparation of schematics and P&IDs.

ME 615 Independent Design (Core, 2 Credits)

Formulation and carrying out of an individual research or design project on sustainable built environment under the guidance of a supervisor. At the completion of the project each student submits a technical report and presents the results orally.

ME 710 Building management systems (elective -3 credits)

Introduction to Building Automation System (BAS): configurations; field devices; sensors and actuators; interfacing and protocols.
Principles of building management: components and controls, applications, integration, operation and maintenance.
Signal communication: principles of signal interfacing, protocols, standards and codes of practice, and real time data transfer.
Building control architectures: Centralized control, De-centralized control and Distributed Control Building control implementation.
Energy and security management using SCADA (supervisory control and data acquisition) systems: Human–machine interface (HMI); Programmable logic controller; Power line carriers.
System optimization and control: integrated control; direct digital control; concepts of distributed computer-based monitoring and control.

ME 711 Building energy systems (elective -2 credits)

Introduction: Energy terms and concepts; energy use in buildings;
Energy efficient building design: planning and operation; energy efficient technologies; building energy standards and codes (global and local);
Building energy analysis techniques: energy management and auditing of buildings
Energy Conversion power cycles: combined heat and power, combustion processes, boiler plant, thermal energy storage, waste heat recovery, refrigeration/heat pumps systems and environmental impacts of plant operation.
Renewable energy: Integration of renewable energy technologies in buildings.

ME 712 Seminars and case studies in building services engineering (1credit)

Conducting guest lectures on selected topics in building services engineering, Case studies in sustainable building services engineering, Industry visits and individual presentations.

CE694 Green^{SL} Rating System for Built Environment* (3 credits)

Management of building systems, Sustainable sites of building systems, Water efficiency, Energy and atmosphere, Materials and resources, Indoor environmental quality, Innovation and design process, Society and Cultural awareness, Industrial case studies.

CE695 Sustainable Design of Buildings* (3 credits)

Current and future building regulation requirements, Renewable and recyclable materials, Space efficiency of buildings, Economical design, Code of Practice for Energy-Efficient Buildings in Sri Lanka, Building models and modelling tools, Codes for sustainable buildings and –infrastructure, Water systems design and efficiency, The preparation of a sustainable design brief.

* Offered under post graduate course on Sustainable Built Environment under Dept. of Civil Engineering, University of Peradeniya