

SBS5498 Final Year Project 2 (Applied Research Project)

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Suggested Topics from Supervisors (2018-2019)

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Title:	Study of adaptive thermal comfort in a student dormitory in Hong Kong
Description:	Unlike conventional, heat-balance-based thermal comfort theory, adaptive thermal comfort considers people as active rather than passive recipients in response to ambient physical thermal stimuli. This project aims to study the characteristics of adaptive thermal comfort when applied to a student dormitory in Hong Kong. The basic principles and fundamental theory will be examined. Field study and measurements will be conducted to assess the practical situation and human response. [Skills required: theory study, field study and measurements]

Title:	Critical review of thermal comfort in sleep environment
Description:	Current thermal comfort theories and standards are mainly concerned with people in waking state although people spend a third of their lives sleeping. This project will review the existing knowledge on thermal comfort of sleeping people and evaluate critically the key factors and parameters affecting thermal comfort in sleep environment. Literature research will be carried out to assess the basic principles; pilot field study will be conducted to investigate the effects on sleep quality and human well-being. [Skills required: theory study, critical review, field study and questionnaire]

Title:	Energy modelling and analysis of variable refrigerant flow (VRF) system
Description:	Variable refrigerant flow (VRF) system is a direct-expansion (DX) heating, ventilating and air conditioning (HVAC) technology that varies the refrigerant flow rate to match the system capacity to the space cooling loads. This project will develop building energy simulation models and practical information for the analysis of VRF system. The fundamental principles and characteristics of the system will be studied. Models for building energy simulation of the system will be developed and compared with experimental results. [Skills required: literature study, theoretical study, building energy simulation]

Title:	Experimental study and field test of variable refrigerant flow (VRF) system
Description:	Variable refrigerant flow (VRF) system is a direct-expansion (DX) heating, ventilating and air conditioning (HVAC) technology that varies the refrigerant flow rate to match the system capacity to the space cooling loads. This project will perform experimental study and field test of a VRF system in order to evaluate its system performance and operational characteristics. The experimental results will be compared with the energy modelling study in order to assess the system operation parameters and energy saving potential. [Skills required: literature review, experimental study, field testing]

Title:	Flow dynamics and design of kitchen hoods in residential buildings in Hong Kong
Description:	<p>Kitchens in residential buildings require adequate ventilation to remove smoke, grease particles and other pollutants. For densely populated cities like Hong Kong, the performance of kitchen hoods and associated ventilation systems will affect the indoor environment and occupant's health. This project will investigate the flow dynamics and design of kitchen hoods in residential buildings in Hong Kong, with the aim to identify critical design factors and evaluate important issues for planning and designing the kitchen space. Theoretical models will be developed for air flow analysis. Field study will be conducted to examine practical kitchen designs and verify the models.</p> <p>[Skills required: literature review, theory study, field study]</p>

Title:	Assessment of indoor environment in small residential flats with open kitchen design
Description:	<p>With limited living space in urban cities like Hong Kong, one common method to better utilize the residential space is to adopt open kitchen design. However, the cooking fumes and heat may spread to other areas (including living room, bedroom, etc.) and will affect the indoor environmental quality and fire risk. This project will examine the open kitchen design in small residential flats and assess its effects on the indoor environment. Literature research and field study will be carried out to evaluate the pros and cons of the open kitchen design.</p> <p>[Skills required: literature research, theory study, field study]</p>

Title:	Lighting requirements and design considerations for the elderly
Description:	<p>An increasing proportion of the elderly population can be observed in many societies. However, the lighting design and needs of elderly people are often overlooked. This project will investigate the lighting requirements and design considerations for the elderly with the aim to identify key concerns and develop practical guidelines for building designers. The lighting needs of elderly people and the theory will be studied critically. Field study and measurements will be carried out to examine the practical issues and human factors.</p> <p>[Skills required: theory study, critical review, field study and measurements]</p>

Title:	Study of lighting system design and performance in lecture theatres
Description:	<p>Lighting system is an important element of lecture theatre design and will affect the visual comfort and learning performance of the users (including students and lecturers). It is important to enhance the lighting system design in order to satisfy the needs of modern learning environment and teaching methods. This project aims to examine the lighting system design in typical lecture theatres and evaluate the critical factors affecting system performance. Literature research and field study will be carried out to investigate the design criteria and issues. Lighting simulation and economic analysis will be conducted to compare different design options.</p> <p>[Skills required: literature research, field study, lighting simulation and economic analysis]</p>

Title:	Study of an integrated green roof and solar photovoltaic system in Hong Kong
Description:	<p>Green roof and solar photovoltaic systems are two technologies that could contribute to sustainable building and reduction of greenhouse gas emissions. When they are combined and integrated together on the building roof, their functions and effectiveness can be enhanced by mutual cooling and shading effects. This project will study an integrated green roof and solar photovoltaic system in Hong Kong to evaluate its performance and effectiveness. Field study will be carried out and measurement data will be assessed.</p> <p>[Skills required: literature review, field study, analysis of measurement data]</p>