



UNIVERSITI TEKNOLOGI MARA

ARK754: INTEGRATED BUILDING SERVICES

<b>Course Name (English)</b>	INTEGRATED BUILDING SERVICES <b>APPROVED</b>
<b>Course Code</b>	ARK754
<b>MQF Credit</b>	2
<b>Course Description</b>	This course focuses on integration of building services systems as they relate to high-rise and other complex building types. Lecture topics and class discussions will cover on current and innovative technologies for building services that meet human comfort and high performance building criteria.
<b>Transferable Skills</b>	Systematically inquisitive Independent and critical thinker
<b>Teaching Methodologies</b>	Lectures, Field Trip, Case Study, Presentation
<b>CLO</b>	CLO1 Elaborate the understanding of an integrated building services system for fairly complex building nature. CLO2 Develop the application of integrated building services system in building. CLO3 Compose integrated building services systems using appropriate architectural representations.
<b>Pre-Requisite Courses</b>	No course recommendations
<b>Topics</b>	
<b>1. Introduction to Integrated Services in Complex Buildings</b> 1.1) Space Planning in Complex Buildings 1.2) Services Provision in Multistorey and complex buildings	
<b>2. Understanding of the total integrated control systems</b> 2.1) N/A	
<b>3. Services Core in multi storey buildings</b> 3.1) Principles of design, safety and precautions needed 3.2) Appraisals on existing buildings in relationship to building services 3.3) Vertical transportation requirements	
<b>4. Fire Safety and Protection</b> 4.1) Bomba Requirements and protections by design solutions 4.2) Provisions of fire fighting for complex buildings: High rise building, lecture theatre, stadium, auditorium, etc.	
<b>5. Mechanical Ventilation and Air Conditioning</b> 5.1) Design criteria and installation of mechanical ventilation, air conditioning, ducting, equipment and space requirements. 5.2) Impact of innovative technologies on mechanical services for building design	
<b>6. Facade System</b> 6.1) Building facade design 6.2) MS1525 and OTTV 6.3) Design trends of Commercial Buildings	
<b>7. Zero and Low Energy Office (ZEO + LEO)</b> 7.1) Case Study: ZEO Building in Bangi 7.2) Architecture of the Building 7.3) Mechanical and Electrical Design Provision 7.4) Energy Efficient Design Features 7.5) Energy Recovery Ventilation Systems 7.6) Building Integrated Photo Voltaic (BIPV)	

**8. Electrical, Communication and PV**

- 8.1) High voltage supply
- 8.2) Low voltage
- 8.3) Photo Voltaic energy

**9. Water and Sewerage**

- 9.1) Water supply principles and provisions for Buildings
- 9.2) Sewerage and Healthy Environment for Cities

**10. Building Energy Management (BEM)**

- 10.1) Advanced Control Systems and automated buildings

Assessment Breakdown	%
Continuous Assessment	40.00%
Final Assessment	60.00%

Details of Continuous Assessment	Assessment Type	Assessment Description	% of Total Mark	CLO
	Assignment	Assessment on the application of integrated building services system in building.	20%	CLO2
	Assignment	Presentation on integrated building services systems by using appropriate architectural representations.	20%	CLO3

Reading List	Reference Book Resources
	<ul style="list-style-type: none"> <li>• Levermore, G. 1992, <i>Building Energy Management Systems: An Application to Heating, Natural Ventilation, Lighting and Occupant Satisfaction</i>, (3rd Ed.) Ed., Taylor &amp; Francis. London</li> <li>• Talbot, R. 1991, <i>Educated Energy Management: Energy Management in Educational Establishments</i>, E. &amp; F.N. Spon. London</li> <li>• Twiddle, J. 2005, <i>Renewable Energy Resources</i>, 3rd Ed Ed., Taylor &amp; Francis. London</li> <li>• Warne, D.F. 1983, <i>Wind Power Equipment</i>, E. &amp; F.N. Spon London</li> <li>• Johnson. T.E. 1981, <i>Solar Architecture</i>, McGraw-Hill New York</li> <li>• Wright, D. 1984, <i>Natural Solar Architecture</i>, 3rd Ed. Ed., Van Nostrand Reinhold. New York</li> <li>• Kut, D. 1994, <i>Illustrated Encyclopedia of Building Services</i>, Taylor &amp; Francis New York</li> <li>• Dadras, A.S. 1995, <i>Mechanical Systems for Architects</i>, McGraw Hill New York</li> <li>• Dadras, A.S. 1995, <i>Electrical Systems for Architects</i>, McGraw Hill New York</li> <li>• Papanek, V. 1995, <i>The Green Imperative: Ecology and Ethics in Design and Architecture</i>, Thames &amp; Hudson Thames &amp; Hudson</li> <li>• Vale, B &amp; R. 1991, <i>Green Architecture: Design for a Sustainable Future</i>, Thames &amp; Hudson London</li> <li>• Sorensen, B. 2004, <i>Renewable Energy: Its Physics, Engineering, Use, Environmental Impacts, Economy and Planning Aspects</i>, 3rd Ed Ed., Academic Press. San Diego</li> </ul>
<b>Article/Paper List</b>	This Course does not have any article/paper resources
<b>Other References</b>	This Course does not have any other resources