

UNIVERSITI TEKNOLOGI MARA

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Course Name (English)	BUILDING SERVICES APPROVED					
Course Code	ECM346					
MOE Credit						
Course Description	This course prepares the knowledge and understanding of the principle in electrical and mechanical to civil engineering student. The syllabus emphasis on studying electrical system and mechanical equipment installed in the various building. Student will be given an exposure on system operation and maintenance.					
Transferable Skills	Knowledge and understanding of the basic principle in electrical and mechanical engineering and exposure on system operation and maintenance					
Teaching Methodologies	Lectures, Lab Work, Demonstrations					
CLO	 CLO1 Apply the basic knowledge, concepts and principles of operations, safety and control of using electrical and mechanical system in the building. CLO2 Adapt skills through experiments based on the knowledge, concepts and principles of operations, safety and control of using electrical and mechanical system in the building. CLO3 Act effectively as an individual and as a member in multidiscipline construction team. 					
Pre-Requisite Courses	No course recommendations					
Topics						
 1. Electrical Engineering Practices 1.1) 1.1 Power Generation, Transmission, Distribution and Supply. 1.2) 1.1.1 Generation Power Plant – Hydro, Thermal, Solar, Wind etc. 1.3) 1.1.2 Transmission and Distribution of three phase and single phase supply. 1.4) 1.5) 1.2. Electrical Installation 1.6) 1.2.1 Conductor, insulator cable and wire. 1.7) 1.2.2 Type and installation method. 1.8) 1.2.3 IEE Regulation - Safety, Protection and Control 1.9) 1.2.4 Protection devices 1.10) 1.2.5 Cut out, Meter, Main Switch, ELCB, MCCB, Fuse, Earthing and Lightning Arrestor. 1.11) 1.2.6 Simple design by using diversity factor, power factor and estimation - Schematics wiring diagram 1.12) 1.13) 1.3. Electrical Machines. 1.14) 1.3.1 Introduction to electrical machines 1.15) 1.16) 1.4. Illumination. 1.17) 1.4.1 Basic Illumination theory 						
 2. Mechanical Engineering Practice 2.1) 2.1 Air Conditioning System 2.2) 2.1.1 Basic principle of an air conditioning 2.3) 2.1.2 Psychometric chart 2.4) 2.1.3 Types of air conditioning system - package, split unit, plant, AHU, chiller, cooling tower. 2.5) 2.1.4 Air cooled and water cooled. 2.6) 2.1.5 Ventilation System 2.7) 2.1.6 Important of ventilation system 2.8) 2.1.7 Natural and Mechanical Ventilation 2.9) 2.10) 2.2 Fire Fighting System. 2.11) 2.2.1 Purpose, fire triangle, classification and agent 2.12) 2.2.2 Types — Active and Passive 						

Faculty Name : COLLEGE OF ENGINEERING © Copyright Universiti Teknologi MARA 2.13) 2.2.3 Fire fighting equipment
2.14) 2.2.4 Detection device
2.15) 2.2.5 Fire Safety Regulation — Ventilation, Fire Escape Route
2.16)
2.17) 2.3 Building Transportation
2.18) 2.3.1 Lift, escalator and travelator. Function and application.
2.19)
2.20) 2.4 Utility
2.21) 2.4.1 Plumbing System — Hot and cold water supply.
2.22) 2.4.2 Sanitary System.
2.33) 2.4.3 Solid waste Collection.
2.26) 2.5 Building Automation and Control.
2.26) 2.5 Intelligent Building
3. Current Issues
3.1.1 Energy Saving Building
4. Laboratory
4.1 1.0 Plumbing ransportation
3.3 0. Air conditioning - package and spit unit system
4.2 0.4.0 Kir conditioning - package and spit unit system
4.4.4.0 Air conditioning - package and spit unit system
4.4.5.0 Ventilation System
4.6.0 Electrical Supply - Three Phase and Single Phase wiring system and accessories, Electrical Machine
4.7 7.0 Illumination
4.8.0 Fire Fighting Equipment - demonstration of portable fire extinguisher
4.9.9.0 Fire Fighting Equipment - demonstration of portable fire extinguisher
4.9.9.0 Fire Fighting System - sprinkler, fire hose reel, smoke detector and heat detector
5. Practical

5.1) Practical test

Assessment Breakdown	%
Continuous Assessment	100.00%

Details of								
Continuous	Assessment Type		Assessment Description	% of Total Mark	CLO			
Assessment	Lab Exercise		Laboratory Report	10%	CLO3			
	Practical		Practical test	30%	CLO2			
	Quiz		Quiz	30%	CLO1			
	Test		Test	30%	CLO1			
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Reading List	Recommended Text	Hall, F & Greeno, R. 2015, <i>Building Services Handbook</i> , 8th Ed., Butterworth – Heinemann.						
	rvices Engineering,	ices Engineering, Sixth						
		Greeno, R 2013, <i>Building Services, Technology and Design,</i> , Routledge Taylor & Francis Group.						
	Reference Book Resources	Tymkow, Savvas Tassou, Mar ara 2013, <i>Building services de</i> <i>ings.</i>	, Maria Kolotronit and Husam es design for energy efficient					
		ng Services Handbo nn.	y Services Handbook. 7th n.					
		Grondzik, W, T., et.al 2010, <i>Mechanical and Electrical Equipment for Buildings. 7th Edition.</i> , John Wiley & Sons Inc.						
		Chow, T. T 2009, <i>Development Trends in Building Services</i> <i>Engineering.</i> , City University of Hong Kong.						
		ph, B. W and Frank, R. D 2009 om in Architecture, Engineerin on, Pearson.	ank, R. D 2009, <i>Mechanical and Electrical</i> ire, Engineering and Construction. 5th					
		Stoke Pract	okes, G 2003, <i>Handbook of Electrical Installation Practice</i> , actice, Blackwell Sciences Ltd.					
Article/Paper List	This Course does not have any article/paper resources							
Other References	This Course does not have any other resources							