COURSE INFORMATION

Department/ Faculty:	Electronic Systems Engineering, Malaysia-Japan International Institute of Technology	**Page:**	1 of 4
		Student learning Times (Hours) :	
		Revision :	C
Course code:	SMJE 1103	**Academic Session/Semester:**	20192020/2
Course name:	Elelctrical Power System	**Pre/co requisite (course name and code, if applicable):**	Null
Credit hours:	3		

Mapping of the Course Learning Outcomes (CLO) to the Programme Learning Outcomes (PLO), Teaching & Learning (T&L) methods and Assessment methods:

Course synopsis	Students will be exposed to the importance of electric power engineering in society. Importance of professional responsibility such as tight safety through engineering is also put on. Topics covered are: Load flow analysis, balanced fault analysis and protection requirements, short circuits, power system stability, DC machines, transformers, power generation. Lecture on safety problem is also given.			
Course coordinator (if applicable)	Dr Rasli Bin Abd Ghani			
Course lecturer(s)	**Name**	**Office**	**Contact no.**	**E-mail**
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	Dr. Mohd Nabil B. Muhtazaruddin	Blok J201K	03-26154772	mohdnabil@utm.my
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No.	CLO	PLO EAC / UTM	Weight (%)	Taxo. & generic skills*	T&L methods	WP	EA	WK	Assessment methods
CLO1	Demonstrate the principles of 3 phase system, AC/DC circuit	1 / SC	30	C3, SC1	Lecture, Problem based				T, F
CLO2	Manipulate a concept of load flow including balanced load fault, power stability, overvoltage and power generation using modern numerical analysis tools (Matlab Codes)	5 TH	20	P4, TH3	Lecture, Matlab Practice, Student Presentation				ASG, Pr
CLO3	Compare various power generation, circuit configuration of DC machine, induction motor performance, synchronous generator performance and equivalent circuit of transformer.	2 SC	30	C4, SC2	Lecture				T, F

Refer *Taxonomies of Learning and **UTM's Graduate Attributes, where applicable for measurement of outcomes achievement
***T – Test; Q – Quiz; ASG –Assignment; PR – Project; Pr – Presentation; F – Final Exam; R-Report; PR-Peer Review , Lg- Logbook etc.

Prepared by: Name: Dr. Rasli ABd Ghani Signature: Date: January 3, 2020	Certified by: Name: Dr. Mohd. Ibrahim bin Shapiai@Abd. Razak Signature: Date:

No.	CLO	PLO EAC / UTM	Weight (%)	Taxo. & generic skills*	T&L methods	WP	EA	WK	Assessment methods
CLO4	Recognize the relationship of safety and ethics in electrical power generation	8 / TW	20	C3, TW2	Literiture Review				ASG

Refer *Taxonomies of Learning and **UTM's Graduate Attributes, where applicable for measurement of outcomes achievement
***T – Test; Q – Quiz; ASG –Assignment; PR – Project; Pr – Presentation; F – Final Exam; R-Report; PR-Peer Review , Lg- Logbook etc.

Details on Innovative T&L practices:

No.	Type	Implementation
1.	Active learning	Conducted through in-class activities
2.	Problem Based Learning	Conducted through given related problem to students for Chapter 1, 2, 3, 4, 5, 6 and 7
3.	Continuous Assessment	Including 2 tests, 2 assignments and final examination

Transferable skills (generic skills learned in course of study which can be useful and utilised in other settings):

Modern tool implementation in completing assignment 1.
Ethic process in preparing assignment 2.

Weekly Schedule:

Week	Topic
Week 1	**Chapter 1. Introduction to Power System** Guidance of this course, Importance of electrical power in the society
Week 2	Fundamentals of Electrical Power (Generation, Transmission and Distribution including Energy, DC circuits, AC circuits, Phasor diagram, Power Factor, AC Power and Power Measurement)
Week 3	**Chapter 2. Three Phase System** Three phase systems (Wye(Y) and Delta(Δ) system, Phasor Voltages and Currents, Phase Diagram of three phase).
Week 4	Load Flow Analysis, Balanced Three-Phase Loads, Power Factor, Power Measurement.
Week 5	**Chapter 3. Electric Power Delivery** Electric power delivery system (AC Transmission Line, Power Cable, Insulator, Circuit Breaker, Gas insulated switchgear(GIS))
Week 6	**Chapter 4. Transformer** Power Apparatus : Transformer, Principle, Equivalent Circuits, Construction and its Materials
Week 7	**Chapter 5. Rotating Machine** Power Apparatus: Rotating Machine - Motor, Generator, Motor-Generator
Week 8	**Mid-Semester Break**
Week 9	**Chapter 6. Induction Motor** Induction-Motor (Principle , Kinds, its characteristics, Operation), Synchronous Generator (principle, its characteristics)
Week 10	**Chapter 7. DC Motor** DC motors (Principle, its characteristics, operation) and its application
Week 11	**Chapter 8. Power Quality** Power default and its recovery (balanced fault), Stability of power and its control, Quality of electric power
Week 12	**Chapter 9. Overvoltage** Overvoltage (Lightning surge ,Switching surge) , Electrical Insulation (Breakdown Phenomena) and Protection Devices(lightning Rod and SPD)
Week 13	**Chapter 10. Power Generations** Generation of electric power: Water-power generation, Thermal Power, Atomic-power generation, Solar power generation, Wind power generation

Week 14	Comparison among various power generation in society and environment standpoint (Power Engineering and Environment(EMC, IPCC, Countermeasure)
Week 15	Discussion among students after lecture on safety, ethical and engineering points. Report must be completed by each student for the evaluation.

Student learning time (SLT) details

Distribution of student Learning Time (SLT) Course content outline	Guided Learning (Face to Face) Lecture Practical/Tutorial/Studio Student-Centered learning					Teaching and Learning Activities			TOTAL SLT
						Guided Learning Non-Face to Face Revision	Independent Learning Non-Face to face Self-Directed learning Assessment Preparation Revision		
CLO	**L**	**T**	**P**	**O**					
CO1	13	6		11			5		34
CO2	7	3		0			2		12
CO3	13	6		14.5			5		33.5
CO4	7	3		0			4		14
Total SLT									**93.5**

ASSESSMENT DETAILS

Continuous Assessment		CLO	PLO EAC/UTM					Taxo	Total SLT
Components	Percentage		1/SC	5/GC	8/TW			Gen.	
Test 1	15	1	15					C3	1
Test 2	15	3	15					C4	1
Assignment 1	10	2		10				P4	12
Assignment 2	10	4			10			C3	10
Final Assessment									
Final Examination	50	1	20						1
		3	30						1.5
Total Marks									**26.5**
Total SLT Continuous Assessment									
Grand Total SLT									**120**

Special requirement to deliver the course (e.g: software, nursery, computer lab, simulation room):

Matlab software package

Learning resources:

TEXTBOOK :

REFERENCES :

1. HadiSaadat, Power System Analysis, Mc Graw Hill, ISBN: 007-123955-3, 9780071239554, 2004.
2. Theodore Wildi, Elelctrical Machines, Drives, And Power System, Prentice Hall, ISBN: 0-13-196918-8, 2006
3. J. Duncan Glover, Power System, Analysis and Design, THOMSON, ISBN: 978-0-495-29596-9, 7980495295969, 2008.
4. B.L. Theraja, Work Examples In Electrical Technology, S. Chand & Company Ltd, India, ISBN: 983-061-089-6, 1999.
5. S. J. Chapman, *Electric Machinery Fundamentals*, Mc Graw Hill, ISBN: 978-0-07-352954-7, 2012.
6. McKenzie Smith, Electrical & Electronic Technology, Prentice Hall, ISBN: 0582-405190 X, 2002.
7. D.P. Kothari, Power System Engineering. Tata McGraw Hill, ISBN: 978-0-07-0647916, 2008.
8.

Online

http://elearning.utm.my

Academic honesty and plagiarism:

Cheating is not only dishonest, but also self-destructive. Some of the principles of academic honesty that are especially important in this courses are:

- Plagiarism is a very serious violation. All the writing in your documentation and/or reports must be your own work. You may not copy sentences or paragraphs from books, web pages, other students, or any other source. If you quote or use anything written by anyone else, you must indicate very clearly that it is a quotation ***and*** you must provide a full citation.
- All the programming code that you claim credit for (implicitly or explicitly) must be your own creation. If you use software written by anyone else, you must disclose this very clearly both in your code and in all accompanying documentation and reports.
- Tables and figures of programming results that show how your programs run, must be genuine and not misleading. It may happen that some of your code or algorithms do not work correctly. In this case you must mention and explain this situation in documentation and reports.
- If you work in a team on any assignment or project, and there is a case of academic dishonesty, then all members of the team will be assumed to be equally responsible and will be subject to the same penalties. If you work in a team, it is your responsibility to make sure that your partners are as honest as you are, and that they are well-informed about what is permissible.

Other additional information (Course policy, any specific instruction etc.):

Disclaimer: