

# **RIH SP015**

## **Contents**

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# Lectures

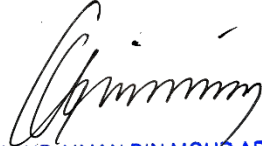
**KOLEJ MATRIKULASI SARAWAK**  
**LESSON PLAN**  
**SEMESTER I SESSION 2022/2023**

<b>LECTURER</b>		SHAFIQ RASULAN															
<b>CODE / COURSE</b>		SP015															
<b>WEEK</b>		1															
<b>CHAPTER</b>		1: PHYSICAL QUANTITIES AND MEASUREMENTS															
<b>MODE</b>		Lecture															
<b>CLO</b>		CLO 1: Describe basic concepts of mechanics, waves, heat and thermodynamics															
<b>SLT</b>		<b>F2F (hour):</b>	1	<b>NF2F (hour):</b>	1												
<b>DAY DATE TIME VENUE</b>	<b>CLASS</b>	<b>LEARNING OUTCOME</b>	<b>T&amp;L STRATEG IES &amp; TOOLS</b>	<b>REFLECTION</b>	<b>REMARKS</b>												
Thursday 8/4/2022 10am- 11am DK2	K1	1.1a Define dimension. 1.2a Define scalar and vector quantities. 1.3a State the significant figures of a given number. 1.3e State the sources of uncertainty in the results of an experiment.	Q&A Discussions	<table><tr><td><b>ITEM *App endix</b></td><td><b>SCOR E</b></td></tr><tr><td><b>i</b></td><td>3</td></tr><tr><td><b>ii</b></td><td>3</td></tr><tr><td><b>iii</b></td><td>4</td></tr><tr><td><b>iv</b></td><td>4</td></tr><tr><td><b>v</b></td><td>4</td></tr></table>	<b>ITEM *App endix</b>	<b>SCOR E</b>	<b>i</b>	3	<b>ii</b>	3	<b>iii</b>	4	<b>iv</b>	4	<b>v</b>	4	<b>All objectives achieved. Students are able to understand the materials of the topic.</b>
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<b>iii</b>	4																
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<b>v</b>	4																

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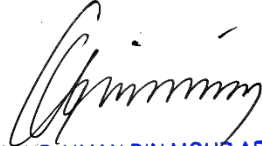
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**SEMESTER II SESSION 2022/2023**

<b>LECTURER</b>		SHAFIQ RASULAN															
<b>CODE / COURSE</b>		SP015															
<b>WEEK</b>		2															
<b>CHAPTER</b>		2: KINEMATICS OF MOTIONS															
<b>MODE</b>		Lecture															
<b>CLO</b>		CLO 1: Describe basic concepts of mechanics, waves, heat and thermodynamics															
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<b>DAY DATE TIME VENUE</b>	<b>CLASS</b>	<b>LEARNING OUTCOME</b>	<b>T&amp;L STRATEG IES &amp; TOOLS</b>	<b>REFLECTION</b>	<b>REMARKS</b>												
Thursday 8/11/2022 10am- 11am DK2	K1	1.1a Define dimension. 2.1b Interpret the physical meaning of displacement-time, velocity-time and acceleration-time graphs. 2.3a Describe projectile motion launched at an angle, $\theta$ as well as special cases when $\theta=0$ degrees	Q&A Discussions	<table><tr><td><b>ITEM *Appendix</b></td><td><b>SCORE</b></td></tr><tr><td><b>i</b></td><td>3</td></tr><tr><td><b>ii</b></td><td>3</td></tr><tr><td><b>iii</b></td><td>4</td></tr><tr><td><b>iv</b></td><td>4</td></tr><tr><td><b>v</b></td><td>4</td></tr></table>	<b>ITEM *Appendix</b>	<b>SCORE</b>	<b>i</b>	3	<b>ii</b>	3	<b>iii</b>	4	<b>iv</b>	4	<b>v</b>	4	All objectives achieved. Students are able to understand the materials of the topic.
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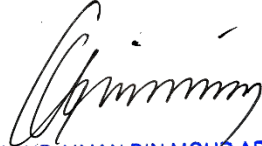
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<b>WEEK</b>		3															
<b>CHAPTER</b>		2: KINEMATICS OF MOTIONS 3: DYNAMICS OF LINEAR MOTION															
<b>MODE</b>		Lecture															
<b>CLO</b>		CLO 1: Describe basic concepts of mechanics, waves, heat and thermodynamics															
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Thursday 8/18/2022 10am- 11am DK2	K1	2.3a Describe projectile motion launched at an angle, $\theta$ as well as special cases when $\theta=0$ degrees 3.1a Define momentum and impulse, $J = F\Delta t$ 3.2a State the principle of conservation of linear momentum. 3.2c Differentiate elastic and inelastic collisions. (remarks: similarities & differences)	Q&A Discussions	<table><tr><td><b>ITEM *App endix</b></td><td><b>SCOR E</b></td></tr><tr><td><b>i</b></td><td>3</td></tr><tr><td><b>ii</b></td><td>4</td></tr><tr><td><b>iii</b></td><td>4</td></tr><tr><td><b>iv</b></td><td>4</td></tr><tr><td><b>v</b></td><td>3</td></tr></table>	<b>ITEM *App endix</b>	<b>SCOR E</b>	<b>i</b>	3	<b>ii</b>	4	<b>iii</b>	4	<b>iv</b>	4	<b>v</b>	3	All objectives achieved. Students are able to understand the materials of the topic.
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<b>WEEK</b>		4															
<b>CHAPTER</b>		3: DYNAMICS OF LINEAR MOTION															
<b>MODE</b>		Lecture															
<b>CLO</b>		CLO 1: Describe basic concepts of mechanics, waves, heat and thermodynamics															
<b>SLT</b>		<b>F2F (hour):</b>	1	<b>NF2F (hour):</b>	1												
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Thursday 8/25/2022 10am- 11am DK2	K1	3.3a Identify the forces acting on a body in different situations: i. Weight, W; ii. Tension, T; iii. Normal force, N; iv. Friction, f; and v. External force (pull or push), F. 3.4a State Newton's laws of motion.	Q&A Discussions	<table><tr><td><b>ITEM *App endix</b></td><td><b>SCOR E</b></td></tr><tr><td><b>i</b></td><td>3</td></tr><tr><td><b>ii</b></td><td>3</td></tr><tr><td><b>iii</b></td><td>4</td></tr><tr><td><b>iv</b></td><td>3</td></tr><tr><td><b>v</b></td><td>4</td></tr></table>	<b>ITEM *App endix</b>	<b>SCOR E</b>	<b>i</b>	3	<b>ii</b>	3	<b>iii</b>	4	<b>iv</b>	3	<b>v</b>	4	<b>All objectives achieved. Students are able to understand the materials of the topic.</b>
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<b>WEEK</b>		5															
<b>CHAPTER</b>		4: WORK, ENERGY AND POWER															
<b>MODE</b>		Lecture															
<b>CLO</b>		CLO 1: Describe basic concepts of mechanics, waves, heat and thermodynamics															
<b>SLT</b>		<b>F2F (hour):</b>	1	<b>NF2F (hour):</b>	1												
<b>DAY DATE TIME VENUE</b>	<b>CLASS</b>	<b>LEARNING OUTCOME</b>	<b>T&amp;L STRATEG IES &amp; TOOLS</b>	<b>REFLECTION</b>	<b>REMARKS</b>												
Thursday 9/1/2022 10am- 11am DK2	K1	4.1a State the physical meaning of dot (scalar) product for work : $W = F \cdot s = F_s \cos \theta$ 4.1b Define and apply work done by a constant force. 4.2a Define and use: i. Gravitational potential energy, $U = mgh$ ii. Elastic potential energy for spring, $U = kx^2$ iii. Kinetic energy, $K = 0.5mv^2$ 4.2b State the principle of conservation of energy.	Q&A Discussions	<table><tr><td><b>ITEM *Appendix</b></td><td><b>SCORE</b></td></tr><tr><td>i</td><td>3</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>4</td></tr><tr><td>iv</td><td>4</td></tr><tr><td>v</td><td>4</td></tr></table>	<b>ITEM *Appendix</b>	<b>SCORE</b>	i	3	ii	3	iii	4	iv	4	v	4	All objectives achieved. Students are able to understand the materials of the topic.
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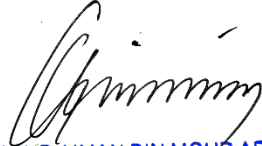
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<b>CODE / COURSE</b>		SP015															
<b>WEEK</b>		6															
<b>CHAPTER</b>		4: WORK, ENERGY AND POWER 5: CIRCULAR MOTION															
<b>MODE</b>		Lecture															
<b>CLO</b>		CLO 1: Describe basic concepts of mechanics, waves, heat and thermodynamics															
<b>SLT</b>		<b>F2F (hour):</b>	1	<b>NF2F (hour):</b>	1												
<b>DAY DATE TIME VENUE</b>	<b>CLASS</b>	<b>LEARNING OUTCOME</b>	<b>T&amp;L STRATEG IES &amp; TOOLS</b>	<b>REFLECTION</b>	<b>REMARKS</b>												
Thursday 9/15/2022 10am- 11am DK2	K1	4.2d State and apply work-energy theorem, $W = \Delta K$ 4.3a Define and use average power, $P_{av} = \Delta W/\Delta t$ and instantaneous power, $P = F \cdot v$ 5.1a Define and use: i. angular displacement, $\theta$ ii. period, $T$ iii. frequency, $f$ iv. angular velocity, $\omega$ 5.2a Describe uniform circular motion.	Q&A Discussions	<table><tr><td><b>ITEM *App endix</b></td><td><b>SCOR E</b></td></tr><tr><td><b>i</b></td><td>4</td></tr><tr><td><b>ii</b></td><td>3</td></tr><tr><td><b>iii</b></td><td>3</td></tr><tr><td><b>iv</b></td><td>4</td></tr><tr><td><b>v</b></td><td>3</td></tr></table>	<b>ITEM *App endix</b>	<b>SCOR E</b>	<b>i</b>	4	<b>ii</b>	3	<b>iii</b>	3	<b>iv</b>	4	<b>v</b>	3	<b>All objectives achieved. Students are able to understand the materials of the topic.</b>
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<b>CODE / COURSE</b>		SP015															
<b>WEEK</b>		7															
<b>CHAPTER</b>		5: CIRCULAR MOTION 6: ROTATION OF RIGID BODY															
<b>MODE</b>		Lecture															
<b>CLO</b>		CLO 1: Describe basic concepts of mechanics, waves, heat and thermodynamics															
<b>SLT</b>		<b>F2F (hour):</b>	1	<b>NF2F (hour):</b>	1												
<b>DAY DATE TIME VENUE</b>	<b>CLASS</b>	<b>LEARNING OUTCOME</b>	<b>T&amp;L STRATEG IES &amp; TOOLS</b>	<b>REFLECTION</b>	<b>REMARKS</b>												
Thursday 9/22/2022 10am- 11am DK2	K1	5.3a Explain centripetal acceleration and centripetal force, $a_c = v^2/r = r\omega^2 = v\omega$ and $FC = mv^2/r = mr\omega^2 = mv\omega$ 6.1a Define and use: i. angular displacement, $\theta$ ; ii. average angular velocity, $\omega_{av}$ ; iii. instantaneous angular velocity, $\omega$ ; iv. average angular acceleration, $\alpha_{av}$ ; and v. instantaneous angular acceleration, $\alpha$ . 6.2a State the physical meaning of cross (vector) product for torque, $= rF\sin\theta$ 6.2b Define and apply torque. 6.2c State conditions for equilibrium of rigid body. $\Sigma F = 0$ . $\Sigma \tau = 0$	Q&A Discussions	<table><tr><th>ITEM *App endix</th><th>SCOR E</th></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>4</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>4</td></tr><tr><td>v</td><td>3</td></tr></table>	ITEM *App endix	SCOR E	i	4	ii	4	iii	3	iv	4	v	3	All objectives achieved. Students are able to understand the materials of the topic.
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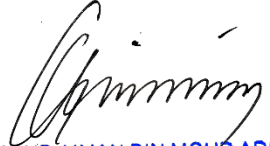
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<b>CODE / COURSE</b>		SP015															
<b>WEEK</b>		8															
<b>CHAPTER</b>		6: ROTATION OF RIGID BODY															
<b>MODE</b>		Lecture															
<b>CLO</b>		CLO 1: Describe basic concepts of mechanics, waves, heat and thermodynamics															
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Thursday 9/29/2022 10am- 11am DK2	K1	6.3a Define and use moment of inertia, $I = mr^2$ 6.3d State and use net torque, $\Sigma\tau = I\alpha$ 6.4a Explain and use angular momentum, $L = I\omega$ 6.4b State and use principle of conservation of angular momentum.	Q&A Discussions	<table><tr><td><b>ITEM *Appendix</b></td><td><b>SCORE</b></td></tr><tr><td><b>i</b></td><td>3</td></tr><tr><td><b>ii</b></td><td>4</td></tr><tr><td><b>iii</b></td><td>3</td></tr><tr><td><b>iv</b></td><td>4</td></tr><tr><td><b>v</b></td><td>4</td></tr></table>	<b>ITEM *Appendix</b>	<b>SCORE</b>	<b>i</b>	3	<b>ii</b>	4	<b>iii</b>	3	<b>iv</b>	4	<b>v</b>	4	All objectives achieved. Students are able to understand the materials of the topic.
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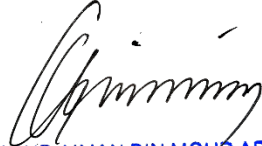
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<b>WEEK</b>		9															
<b>CHAPTER</b>		7: OSCILLATIONS AND WAVES															
<b>MODE</b>		Lecture															
<b>CLO</b>		CLO 1: Describe basic concepts of mechanics, waves, heat and thermodynamics															
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Thursday 10/6/2022 10am- 11am DK2	K1	7.1a Explain SHM. 7.1d Emphasise the relationship between total SHM energy and amplitude.	Q&A Discussions	<table><tr><td><b>ITEM *App endix</b></td><td><b>SCOR E</b></td></tr><tr><td><b>i</b></td><td>3</td></tr><tr><td><b>ii</b></td><td>4</td></tr><tr><td><b>iii</b></td><td>3</td></tr><tr><td><b>iv</b></td><td>4</td></tr><tr><td><b>v</b></td><td>4</td></tr></table>	<b>ITEM *App endix</b>	<b>SCOR E</b>	<b>i</b>	3	<b>ii</b>	4	<b>iii</b>	3	<b>iv</b>	4	<b>v</b>	4	<b>All objectives achieved. Students are able to understand the materials of the topic.</b>
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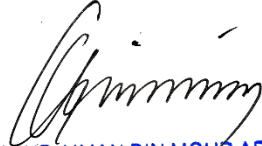
**KOLEJ MATRIKULASI SARAWAK**  
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**SEMESTER II SESSION 2022/2023**

<b>LECTURER</b>		SHAFIQ RASULAN															
<b>CODE / COURSE</b>		SP015															
<b>WEEK</b>		10															
<b>CHAPTER</b>		7: OSCILLATIONS AND WAVES															
<b>MODE</b>		Lecture															
<b>CLO</b>		CLO 1: Describe basic concepts of mechanics, waves, heat and thermodynamics															
<b>SLT</b>		<b>F2F (hour):</b>	1	<b>NF2F (hour):</b>	1												
<b>DAY DATE TIME VENUE</b>	<b>CLASS</b>	<b>LEARNING OUTCOME</b>	<b>T&amp;L STRATEG IES &amp; TOOLS</b>	<b>REFLECTION</b>	<b>REMARKS</b>												
Thursday 10/13/2022 2 10am-11am DK2	K1	7.4a Define wavelength. 7.4b Define and use wave number, $k = 2\pi/\lambda$	Q&A Discussions	<table><tr><td><b>ITEM *Appendix</b></td><td><b>SCORE</b></td></tr><tr><td><b>i</b></td><td>4</td></tr><tr><td><b>ii</b></td><td>4</td></tr><tr><td><b>iii</b></td><td>4</td></tr><tr><td><b>iv</b></td><td>4</td></tr><tr><td><b>v</b></td><td>4</td></tr></table>	<b>ITEM *Appendix</b>	<b>SCORE</b>	<b>i</b>	4	<b>ii</b>	4	<b>iii</b>	4	<b>iv</b>	4	<b>v</b>	4	<b>All objectives achieved. Students are able to understand the materials of the topic.</b>
<b>ITEM *Appendix</b>	<b>SCORE</b>																
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<b>ii</b>	4																
<b>iii</b>	4																
<b>iv</b>	4																
<b>v</b>	4																

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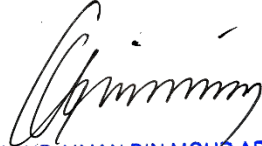
**KOLEJ MATRIKULASI SARAWAK**  
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**SEMESTER II SESSION 2022/2023**

LECTURER		SHAFIQ RASULAN															
CODE / COURSE		SP015															
WEEK		11															
CHAPTER		7: OSCILLATIONS AND WAVES															
MODE		Lecture															
CLO		CLO 1: Describe basic concepts of mechanics, waves, heat and thermodynamics															
SLT		F2F (hour):	1	NF2F (hour):	1												
DAY DATE TIME VENUE	CLASS	LEARNING OUTCOME	T&L STRATEG IES & TOOLS	REFLECTION	REMARKS												
Thursday 10/20/2022 10am-11am DK2	K1	7.4d Distinguish between particle vibrational velocity and wave propagation velocity. 7.5a State the principle of superposition of waves for the constructive and destructive interferences.	Q&A Discussions	<table><tr><td>ITEM *Appendix</td><td>SCORE</td></tr><tr><td>i</td><td>3</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>4</td></tr><tr><td>iv</td><td>4</td></tr><tr><td>v</td><td>3</td></tr></table>	ITEM *Appendix	SCORE	i	3	ii	3	iii	4	iv	4	v	3	All objectives achieved. Students are able to understand the materials of the topic.
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ii	3																
iii	4																
iv	4																
v	3																

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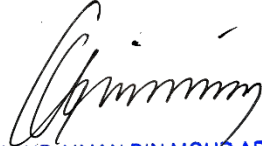
**KOLEJ MATRIKULASI SARAWAK**  
**LESSON PLAN**  
**SEMESTER II SESSION 2022/2023**

<b>LECTURER</b>		SHAFIQ RASULAN															
<b>CODE / COURSE</b>		SP015															
<b>WEEK</b>		12															
<b>CHAPTER</b>		7: OSCILLATIONS AND WAVES 8: PHYSICS OF MATTER															
<b>MODE</b>		Lecture															
<b>CLO</b>		CLO 1: Describe basic concepts of mechanics, waves, heat and thermodynamics															
<b>SLT</b>		<b>F2F (hour):</b>	1	<b>NF2F (hour):</b>	1												
<b>DAY DATE TIME VENUE</b>	<b>CLASS</b>	<b>LEARNING OUTCOME</b>	<b>T&amp;L STRATEG IES &amp; TOOLS</b>	<b>REFLECTION</b>	<b>REMARKS</b>												
Thursday 10/27/2022 10am-11am DK2	K1	7.5c Compare between progressive waves and standing waves. 7.7a State Doppler Effect for sound waves. 8.1c Explain elastic and plastic deformations.	Q&A Discussions	<table><tr><td><b>ITEM *App endix</b></td><td><b>SCORE</b></td></tr><tr><td><b>i</b></td><td>4</td></tr><tr><td><b>ii</b></td><td>4</td></tr><tr><td><b>iii</b></td><td>4</td></tr><tr><td><b>iv</b></td><td>3</td></tr><tr><td><b>v</b></td><td>4</td></tr></table>	<b>ITEM *App endix</b>	<b>SCORE</b>	<b>i</b>	4	<b>ii</b>	4	<b>iii</b>	4	<b>iv</b>	3	<b>v</b>	4	All objectives achieved. Students are able to understand the materials of the topic.
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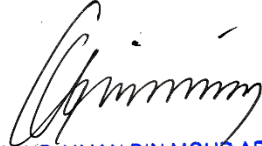
**KOLEJ MATRIKULASI SARAWAK**  
**LESSON PLAN**  
**SEMESTER II SESSION 2022/2023**

LECTURER		SHAFIQ RASULAN															
CODE / COURSE		SP015															
WEEK		13															
CHAPTER		8: PHYSICS OF MATTER															
MODE		Lecture															
CLO		CLO 1: Describe basic concepts of mechanics, waves, heat and thermodynamics															
SLT		F2F (hour):	1	NF2F (hour):	1												
DAY DATE TIME VENUE	CLASS	LEARNING OUTCOME	T&L STRATEG IES & TOOLS	REFLECTION	REMARKS												
Thursday 11/3/2022 10am- 11am DK2	K1	8.2a Define and use Young's Modulus, $Y= \sigma/\epsilon$	Q&A Discussions	<table><tr><td>ITEM *App endix</td><td>SCOR E</td></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>3</td></tr><tr><td>v</td><td>4</td></tr></table>	ITEM *App endix	SCOR E	i	4	ii	3	iii	3	iv	3	v	4	All objectives achieved. Students are able to understand the materials of the topic.
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**LESSON PLAN**  
**SEMESTER II SESSION 2022/2023**

<b>LECTURER</b>		SHAFIQ RASULAN															
<b>CODE / COURSE</b>		SP015															
<b>WEEK</b>		14															
<b>CHAPTER</b>		8: PHYSICS OF MATTER															
<b>MODE</b>		Lecture															
<b>CLO</b>		CLO 1: Describe basic concepts of mechanics, waves, heat and thermodynamics															
<b>SLT</b>		<b>F2F (hour):</b>	1	<b>NF2F (hour):</b>	1												
<b>DAY DATE TIME VENUE</b>	<b>CLASS</b>	<b>LEARNING OUTCOME</b>	<b>T&amp;L STRATEG IES &amp; TOOLS</b>	<b>REFLECTION</b>	<b>REMARKS</b>												
Thursday 11/10/2022 10am-11am DK2	K1	8.3a Define heat conduction.	Q&A Discussions	<table><tr><td><b>ITEM *Appendix</b></td><td><b>SCORE</b></td></tr><tr><td><b>i</b></td><td>3</td></tr><tr><td><b>ii</b></td><td>3</td></tr><tr><td><b>iii</b></td><td>3</td></tr><tr><td><b>iv</b></td><td>4</td></tr><tr><td><b>v</b></td><td>4</td></tr></table>	<b>ITEM *Appendix</b>	<b>SCORE</b>	<b>i</b>	3	<b>ii</b>	3	<b>iii</b>	3	<b>iv</b>	4	<b>v</b>	4	All objectives achieved. Students are able to understand the materials of the topic.
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**SEMESTER II SESSION 2022/2023**

<b>LECTURER</b>		SHAFIQ RASULAN															
<b>CODE / COURSE</b>		SP015															
<b>WEEK</b>		15															
<b>CHAPTER</b>		8: PHYSICS OF MATTER															
<b>MODE</b>		Lecture															
<b>CLO</b>		CLO 1: Describe basic concepts of mechanics, waves, heat and thermodynamics															
<b>SLT</b>		<b>F2F (hour):</b>	1	<b>NF2F (hour):</b>	1												
<b>DAY DATE TIME VENUE</b>	<b>CLASS</b>	<b>LEARNING OUTCOME</b>	<b>T&amp;L STRATEG IES &amp; TOOLS</b>	<b>REFLECTION</b>	<b>REMARKS</b>												
Thursday 11/17/2022 2 10am- 11am DK2	K1	8.4a Define coefficient of linear expansion, $\alpha$ , area expansion, $\beta$ and volume expansion, $\gamma$	Q&A Discussions	<table><tr><td><b>ITEM *App endix</b></td><td><b>SCOR E</b></td></tr><tr><td><b>i</b></td><td>3</td></tr><tr><td><b>ii</b></td><td>3</td></tr><tr><td><b>iii</b></td><td>3</td></tr><tr><td><b>iv</b></td><td>4</td></tr><tr><td><b>v</b></td><td>3</td></tr></table>	<b>ITEM *App endix</b>	<b>SCOR E</b>	<b>i</b>	3	<b>ii</b>	3	<b>iii</b>	3	<b>iv</b>	4	<b>v</b>	3	All objectives achieved. Students are able to understand the materials of the topic.
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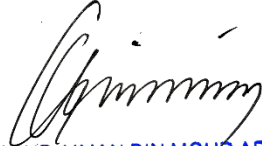
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<b>LECTURER</b>		SHAFIQ RASULAN															
<b>CODE / COURSE</b>		SP015															
<b>WEEK</b>		16															
<b>CHAPTER</b>		9: KINETIC THEORY OF GASES AND THERMODYNAMICS															
<b>MODE</b>		Lecture															
<b>CLO</b>		CLO 1: Describe basic concepts of mechanics, waves, heat and thermodynamics															
<b>SLT</b>		<b>F2F (hour):</b>	1	<b>NF2F (hour):</b>	1												
<b>DAY DATE TIME VENUE</b>	<b>CLASS</b>	<b>LEARNING OUTCOME</b>	<b>T&amp;L STRATEG IES &amp; TOOLS</b>	<b>REFLECTION</b>	<b>REMARKS</b>												
Thursday 11/24/2022 2 10am-11am DK2	K1	9.1a State the assumptions of kinetic theory of gases. 9.1b Describe root mean square (rms) speed of gas molecules $v_{rms}=(\langle v^2 \rangle)^{0.5}$ 9.2a Explain and use translational kinetic energy of a molecule, $K_{tr} = (3/2)(R/NA)(T)=(3/2)kT$	Q&A Discussions	<table><tr><td><b>ITEM *Appendix</b></td><td><b>SCORE</b></td></tr><tr><td><b>i</b></td><td>4</td></tr><tr><td><b>ii</b></td><td>4</td></tr><tr><td><b>iii</b></td><td>4</td></tr><tr><td><b>iv</b></td><td>3</td></tr><tr><td><b>v</b></td><td>3</td></tr></table>	<b>ITEM *Appendix</b>	<b>SCORE</b>	<b>i</b>	4	<b>ii</b>	4	<b>iii</b>	4	<b>iv</b>	3	<b>v</b>	3	<b>All objectives achieved. Students are able to understand the materials of the topic.</b>
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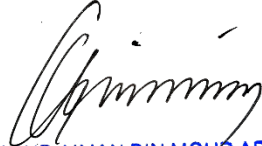
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**SEMESTER II SESSION 2022/2023**

<b>LECTURER</b>		SHAFIQ RASULAN															
<b>CODE / COURSE</b>		SP015															
<b>WEEK</b>		17															
<b>CHAPTER</b>		9: KINETIC THEORY OF GASES AND THERMODYNAMICS															
<b>MODE</b>		Lecture															
<b>CLO</b>		CLO 1: Describe basic concepts of mechanics, waves, heat and thermodynamics															
<b>SLT</b>		<b>F2F (hour):</b>	1	<b>NF2F (hour):</b>	1												
<b>DAY DATE TIME VENUE</b>	<b>CLASS</b>	<b>LEARNING OUTCOME</b>	<b>T&amp;L STRATEG IES &amp; TOOLS</b>	<b>REFLECTION</b>	<b>REMARKS</b>												
Thursday 12/1/2022 10am- 11am DK2	K1	9.2b Define degree of freedom. 9.2c Identify number of degrees of freedom, for monoatomic, diatomic and polyatomic gas molecules. 9.2d State the principle of equipartition of energy. 9.2e Discuss internal energy of gas.	Q&A Discussions	<table><tr><td><b>ITEM *App endix</b></td><td><b>SCOR E</b></td></tr><tr><td><b>i</b></td><td>3</td></tr><tr><td><b>ii</b></td><td>4</td></tr><tr><td><b>iii</b></td><td>4</td></tr><tr><td><b>iv</b></td><td>4</td></tr><tr><td><b>v</b></td><td>3</td></tr></table>	<b>ITEM *App endix</b>	<b>SCOR E</b>	<b>i</b>	3	<b>ii</b>	4	<b>iii</b>	4	<b>iv</b>	4	<b>v</b>	3	<b>All objectives achieved. Students are able to understand the materials of the topic.</b>
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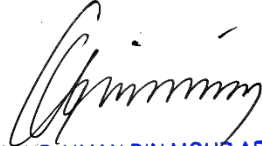
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**SEMESTER II SESSION 2022/2023**

LECTURER		SHAFIQ RASULAN															
CODE / COURSE		SP015															
WEEK		18															
CHAPTER		9: KINETIC THEORY OF GASES AND THERMODYNAMICS															
MODE		Lecture															
CLO		CLO 1: Describe basic concepts of mechanics, waves, heat and thermodynamics															
SLT		F2F (hour):	1	NF2F (hour):	1												
DAY DATE TIME VENUE	CLASS	LEARNING OUTCOME	T&L STRATEG IES & TOOLS	REFLECTION	REMARKS												
Thursday 12/8/2022 10am- 11am DK2	K1	9.3a State the First Law of Thermodynamics, $\Delta U=Q - W$ 9.4a Define the following thermodynamic processes: i. Isothermal; ii. Isochoric; iii. Isobaric and iv. Adiabatic. 9.4b Analyse P-V graph for all the thermodynamic processes.	Q&A Discussions	<table><tr><td>ITEM *Appendix</td><td>SCORE</td></tr><tr><td>i</td><td>3</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>4</td></tr><tr><td>v</td><td>3</td></tr></table>	ITEM *Appendix	SCORE	i	3	ii	3	iii	3	iv	4	v	3	All objectives achieved. Students are able to understand the materials of the topic.
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# Tutorials

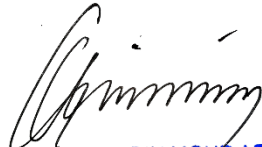
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**SEMESTER I SESSION 2022/2023**

LECTURER		SHAFIQ RASULAN																			
CODE / COURSE		SP015																			
WEEK		1																			
CHAPTER		1: PHYSICAL QUANTITIES AND MEASUREMENTS																			
MODE		Tutorial																			
CLO		CLO2: Solve problems related to mechanics, waves, matter, heat and thermodynamics.																			
SLT		F2F (hour):	1	NF2F (hour):	1																
DAY DATE TIME VENUE	CLASS	LEARNING OUTCOME	T&L STRATEG IES & TOOLS	REFLECTION	REMARKS																
<table><tr><td>K2 (Mon)</td></tr><tr><td>K2 (01/08/2022)</td></tr><tr><td>T3 (11am - 12pm),T4B (12pm -1pm), T4A (2pm-3pm)</td></tr><tr><td>T3 (MF),T4B (MF), T4A (BT3)</td></tr></table>	K2 (Mon)	K2 (01/08/2022)	T3 (11am - 12pm),T4B (12pm -1pm), T4A (2pm-3pm)	T3 (MF),T4B (MF), T4A (BT3)	K2	1.1b: Determine the dimensions of derived quantities. 1.1c: Verify the homogeneity of equations using dimensional analysis.	Discussion and Sample Problem Practice	<table><tr><td>ITEM *Appendix</td><td>SCORE</td></tr><tr><td>i</td><td>3</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>3</td></tr><tr><td>v</td><td>4</td></tr></table>	ITEM *Appendix	SCORE	i	3	ii	3	iii	3	iv	3	v	4	All objectives achieved. Students are able to understand the materials of the topic.
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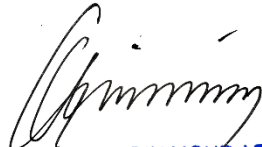
**KOLEJ MATRIKULASI SARAWAK**  
**LESSON PLAN**  
**SEMESTER I SESSION 2022/2023**

LECTURER		SHAFIQ RASULAN															
CODE / COURSE		SP015															
WEEK		1															
CHAPTER		1: PHYSICAL QUANTITIES AND MEASUREMENTS															
MODE		Tutorial															
CLO		CLO2: Solve problems related to mechanics, waves, matter, heat and thermodynamics.															
SLT		F2F (hour):	1	NF2F (hour):	1												
DAY DATE TIME VENUE	CLASS	LEARNING OUTCOME	T&L STRATEG IES & TOOLS	REFLECTION	REMARKS												
<div><div>T3 &amp; T4B (Tues), T4A (Wed)</div><div>T3 &amp; T4B (02/08/2022), T4A (03/08/2022)</div><div>T3 (12pm - 1pm),T4B (2pm - 3pm), T4A (2pm- 3pm)</div><div>T3 (DK1),T4B (MF), T4A (BT3)</div></div>	K2	1.2b: Resolve vector into two perpendicular components (x and y axes). 1.2c: Determine resultant of vectors. (remarks: limit to three vectors only).	Discussion and Sample Problem Practice	<table><tr><th>ITEM *Appendix</th><th>SCORE</th></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>3</td></tr><tr><td>v</td><td>4</td></tr></table>	ITEM *Appendix	SCORE	i	4	ii	3	iii	3	iv	3	v	4	All objectives achieved. Students are able to understand the materials of the topic.
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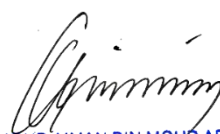
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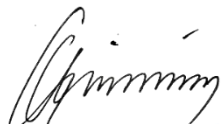
**KOLEJ MATRIKULASI SARAWAK**  
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**SEMESTER I SESSION 2022/2023**

LECTURER		SHAFIQ RASULAN																			
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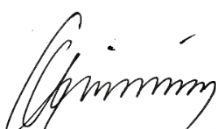
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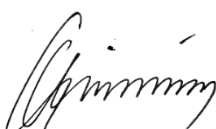
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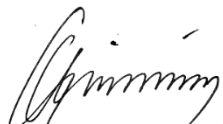
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DAY DATE TIME VENUE	CLASS	LEARNING OUTCOME	T&L STRATEG IES & TOOLS	REFLECTION	REMARKS												
<div><div>K2 (Mon)</div><div>K2 (15/08/2022)</div><div>T3 (11am - 12pm),T4B (12pm -1pm), T4A (2pm-3pm)</div><div>T3 (MF),T4B (MF), T4A (BT3)</div></div>	K2	2.2a: Derive and apply equations of motion with uniform acceleration $v = u + at$ ; $v^2 = u^2 + 2as$ ; $s = ut + -at^2$ ; $s = 1/2(u + v)t$	Discussion and Sample Problem Practice	<table><tr><td>ITEM *Appendix</td><td>SCORE</td></tr><tr><td>i</td><td>3</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>4</td></tr><tr><td>v</td><td>3</td></tr></table>	ITEM *Appendix	SCORE	i	3	ii	3	iii	3	iv	4	v	3	All objectives achieved. Students are able to understand the materials of the topic.
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DAY DATE TIME VENUE	CLASS	LEARNING OUTCOME	T&L STRATEG IES & TOOLS	REFLECTION	REMARKS																
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LECTURER		SHAFIQ RASULAN																			
CODE / COURSE		SP015																			
WEEK		5																			
CHAPTER		3: DYNAMICS OF LINEAR MOTION																			
MODE		Tutorial																			
CLO		CLO2: Solve problems related to mechanics, waves, matter, heat and thermodynamics.																			
SLT		F2F (hour):	1	NF2F (hour):	1																
DAY DATE TIME VENUE	CLASS	LEARNING OUTCOME	T&L STRATEG IES & TOOLS	REFLECTION	REMARKS																
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<div>T3 &amp; T4B (Tues), T4A (Wed)</div> <div>T3 &amp; T4B (30/08/2022), T4A (31/08/2022)</div> <div>T3 (12pm - 1pm),T4B (2pm - 3pm), T4A (2pm- 3pm)</div> <div>T3 (DK1),T4B (MF), T4A (BT3)</div>	K2	3.4b: Apply Newton's laws of motion. *include static and dynamic equilibrium for Newton 's first law motion	Discussion and Sample Problem Practice	<table><tr><td>ITEM *Appendix</td><td>SCORE</td></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>4</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>4</td></tr><tr><td>v</td><td>4</td></tr></table>	ITEM *Appendix	SCORE	i	4	ii	4	iii	3	iv	4	v	4	All objectives achieved. Students are able to understand the materials of the topic.
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<b>CLO</b>		CLO2: Solve problems related to mechanics, waves, matter, heat and thermodynamics.															
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LECTURER		SHAFIQ RASULAN															
CODE / COURSE		SP015															
WEEK		6															
CHAPTER		4: WORK, ENERGY AND POWER															
MODE		Tutorial															
CLO		CLO2: Solve problems related to mechanics, waves, matter, heat and thermodynamics.															
SLT		F2F (hour):	1	NF2F (hour):	1												
DAY DATE TIME VENUE	CLASS	LEARNING OUTCOME	T&L STRATEG IES & TOOLS	REFLECTION	REMARKS												
<div><div>K2 (Mon)</div><div>K2 (12/09/2022)</div><div>T3 (11am - 12pm),T4B (12pm -1pm), T4A (2pm-3pm)</div><div>T3 (MF),T4B (MF), T4A (BT3)</div></div>	K2	4.1c: Determine work done from a force-displacement graph.	Discussion and Sample Problem Practice	<table><tr><td>ITEM *Appendix</td><td>SCORE</td></tr><tr><td>i</td><td>3</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>4</td></tr><tr><td>iv</td><td>4</td></tr><tr><td>v</td><td>3</td></tr></table>	ITEM *Appendix	SCORE	i	3	ii	3	iii	4	iv	4	v	3	All objectives achieved. Students are able to understand the materials of the topic.
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LECTURER		SHAFIQ RASULAN																			
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WEEK		7																			
CHAPTER		4: WORK, ENERGY AND POWER																			
MODE		Tutorial																			
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CODE / COURSE		SP015																			
WEEK		8																			
CHAPTER		5: CIRCULAR MOTION																			
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CHAPTER		5: CIRCULAR MOTION															
MODE		Tutorial															
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SLT		F2F (hour):	1	NF2F (hour):	1												
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<div>T3 &amp; T4B (Tues), T4A (Wed)</div> <div>T3 &amp; T4B (27/09/2022), T4A (28/09/2022)</div> <div>T3 (12pm - 1pm),T4B (2pm - 3pm), T4A (2pm- 3pm)</div> <div>T3 (DK1),T4B (MF), T4A (BT3)</div>	K2	5.2b: Convert units between degrees, radian, and revolution or rotation.	Discussion and Sample Problem Practice	<table><tr><th>ITEM *Appendix</th><th>SCORE</th></tr><tr><td>i</td><td>3</td></tr><tr><td>ii</td><td>4</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>3</td></tr><tr><td>v</td><td>4</td></tr></table>	ITEM *Appendix	SCORE	i	3	ii	4	iii	3	iv	3	v	4	All objectives achieved. Students are able to understand the materials of the topic.
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**SEMESTER I SESSION 2022/2023**

LECTURER		SHAFIQ RASULAN															
CODE / COURSE		SP015															
WEEK		8															
CHAPTER		5: CIRCULAR MOTION															
MODE		Tutorial															
CLO		CLO2: Solve problems related to mechanics, waves, matter, heat and thermodynamics.															
SLT		F2F (hour):	1	NF2F (hour):	1												
DAY DATE TIME VENUE	CLASS	LEARNING OUTCOME	T&L STRATEG IES & TOOLS	REFLECTION	REMARKS												
<div><div>T3 (Thurs) &amp; T4 (Fri)</div><div>T3 (29/09/2022) &amp; T4 (30/09/2022)</div><div>T3 (2pm - 3pm),T4B (10am - 11am), T4A (9am-10am)</div><div>T3 (DK1),T4B (MF), T4A (MF)</div></div>	K2	5.3b: Solve problems related to centripetal force for uniform circular motion cases: horizontal circular motion, vertical circular motion and conical pendulum. *exclude banked curve	Discussion and Sample Problem Practice	<table><tr><th>ITEM *Appendix</th><th>SCORE</th></tr><tr><td>i</td><td>3</td></tr><tr><td>ii</td><td>4</td></tr><tr><td>iii</td><td>4</td></tr><tr><td>iv</td><td>4</td></tr><tr><td>v</td><td>3</td></tr></table>	ITEM *Appendix	SCORE	i	3	ii	4	iii	4	iv	4	v	3	All objectives achieved. Students are able to understand the materials of the topic.
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LECTURER		SHAFIQ RASULAN																			
CODE / COURSE		SP015																			
WEEK		9																			
CHAPTER		6: ROTATION OF RIGID BODY																			
MODE		Tutorial																			
CLO		CLO2: Solve problems related to mechanics, waves, matter, heat and thermodynamics.																			
SLT		F2F (hour):	1	NF2F (hour):	1																
DAY DATE TIME VENUE	CLASS	LEARNING OUTCOME	T&L STRATEG IES & TOOLS	REFLECTION	REMARKS																
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MODE		Tutorial															
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<div>T3 (Thurs) &amp; T4 (Fri)</div> <div>T3 (06/10/2022) &amp; T4 (07/10/2022)</div> <div>T3 (2pm - 3pm),T4B (10am - 11am), T4A (9am-10am)</div> <div>T3 (DK1),T4B (MF), T4A (MF)</div>	K2	6.2d: Solve problems related to equilibrium of a uniform rigid body.*limit to 5 forces	Discussion and Sample Problem Practice	<table><tr><th>ITEM *Appendix</th><th>SCORE</th></tr><tr><td>i</td><td>3</td></tr><tr><td>ii</td><td>4</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>3</td></tr><tr><td>v</td><td>3</td></tr></table>	ITEM *Appendix	SCORE	i	3	ii	4	iii	3	iv	3	v	3	All objectives achieved. Students are able to understand the materials of the topic.
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WEEK		11															
CHAPTER		7: OSCILLATIONS AND WAVES															
MODE		Tutorial															
CLO		CLO2: Solve problems related to mechanics, waves, matter, heat and thermodynamics.															
SLT		F2F (hour):	1	NF2F (hour):	1												
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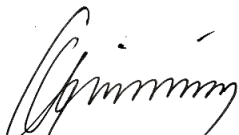
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Endorsed by,

  
**MOHD AIMAN BIN MOHD ADLI**  
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**KOLEJ MATRIKULASI SARAWAK**  
**LESSON PLAN**  
**SEMESTER I SESSION 2022/2023**

LECTURER		SHAFIQ RASULAN															
CODE / COURSE		SP015															
WEEK		15															
CHAPTER		8: PHYSICS OF MATTER															
MODE		Tutorial															
CLO		CLO2: Solve problems related to mechanics, waves, matter, heat and thermodynamics.															
SLT		F2F (hour):	1	NF2F (hour):	1												
DAY DATE TIME VENUE	CLASS	LEARNING OUTCOME	T&L STRATEG IES & TOOLS	REFLECTION	REMARKS												
<div>T3 (Thurs) &amp; T4 (Fri)</div> <div>T3 (17/11/2022) &amp; T4 (18/11/2022)</div> <div>T3 (2pm - 3pm),T4B (10am - 11am), T4A (9am-10am)</div> <div>T3 (DK1),T4B (MF), T4A (MF)</div>	K2	8.2c: Apply strain energy per unit volume, $U/V=(1/2)\sigma\epsilon$ from stress-strain graph.	Discussion and Sample Problem Practice	<table><tr><th>ITEM *Appendix</th><th>SCORE</th></tr><tr><td>i</td><td>3</td></tr><tr><td>ii</td><td>4</td></tr><tr><td>iii</td><td>4</td></tr><tr><td>iv</td><td>3</td></tr><tr><td>v</td><td>3</td></tr></table>	ITEM *Appendix	SCORE	i	3	ii	4	iii	4	iv	3	v	3	All objectives achieved. Students are able to understand the materials of the topic.
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LECTURER		SHAFIQ RASULAN																			
CODE / COURSE		SP015																			
WEEK		16																			
CHAPTER		8: PHYSICS OF MATTER																			
MODE		Tutorial																			
CLO		CLO2: Solve problems related to mechanics, waves, matter, heat and thermodynamics.																			
SLT		F2F (hour):	1	NF2F (hour):	1																
DAY DATE TIME VENUE	CLASS	LEARNING OUTCOME	T&L STRATEG IES & TOOLS	REFLECTION	REMARKS																
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DAY DATE TIME VENUE	CLASS	LEARNING OUTCOME	T&L STRATEG IES & TOOLS	REFLECTION	REMARKS												
<div>T3 &amp; T4B (Tues), T4A (Wed)</div> <div>T3 &amp; T4B (22/11/2022), T4A (23/11/2022)</div> <div>T3 (12pm - 1pm),T4B (2pm - 3pm), T4A (2pm- 3pm)</div> <div>T3 (DK1),T4B (MF), T4A (BT3)</div>	K2	8.3c: Analyse graphs of temperature-distance (T-L) for heat conduction through insulated and non-insulated rods. *maximum two rods in series	Discussion and Sample Problem Practice	<table><tr><th>ITEM *Appendix</th><th>SCORE</th></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>3</td></tr><tr><td>v</td><td>3</td></tr></table>	ITEM *Appendix	SCORE	i	4	ii	3	iii	3	iv	3	v	3	All objectives achieved. Students are able to understand the materials of the topic.
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DAY DATE TIME VENUE	CLASS	LEARNING OUTCOME	T&L STRATEG IES & TOOLS	REFLECTION	REMARKS												
<div>T3 (Thurs) &amp; T4 (Fri)</div> <div>T3 (24/11/2022) &amp; T4 (25/11/2022)</div> <div>T3 (2pm - 3pm),T4B (10am - 11am), T4A (9am-10am)</div> <div>T3 (DK1),T4B (MF), T4A (MF)</div>	K2	8.4b: Solve problems related to thermal expansion of linear, area and volume (include expansion of liquid in a container), $\Delta L= \alpha L_o \Delta T$ , $\Delta A= \beta A_o \Delta T$ , $\Delta V= \gamma V_o \Delta T$ , $\beta=2\alpha$ , $\gamma=3\alpha$	Discussion and Sample Problem Practice	<table><tr><th>ITEM *App endix</th><th>SCOR E</th></tr><tr><td>i</td><td>3</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>4</td></tr><tr><td>v</td><td>3</td></tr></table>	ITEM *App endix	SCOR E	i	3	ii	3	iii	3	iv	4	v	3	All objectives achieved. Students are able to understand the materials of the topic.
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LECTURER		SHAFIQ RASULAN																			
CODE / COURSE		SP015																			
WEEK		17																			
CHAPTER		9: KINETIC THEORY OF GASES AND THERMODYNAMICS																			
MODE		Tutorial																			
CLO		CLO2: Solve problems related to mechanics, waves, matter, heat and thermodynamics.																			
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DAY DATE TIME VENUE	CLASS	LEARNING OUTCOME	T&L STRATEG IES & TOOLS	REFLECTION	REMARKS																
<table><tr><td>K2 (Mon)</td></tr><tr><td>K2 (28/11/2022)</td></tr><tr><td>T3 (11am - 12pm),T4B (12pm -1pm), T4A (2pm-3pm)</td></tr><tr><td>T3 (MF),T4B (MF), T4A (BT3)</td></tr></table>	K2 (Mon)	K2 (28/11/2022)	T3 (11am - 12pm),T4B (12pm -1pm), T4A (2pm-3pm)	T3 (MF),T4B (MF), T4A (BT3)	K2	9.1c: Solve problems related to root mean square (rms) speed of gas molecules, $v_{rms}=(3kT/m)0.5=(3RT/M)0.5$	Discussion and Sample Problem Practice	<table><tr><td>ITEM *Appendix</td><td>SCORE</td></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>4</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>3</td></tr><tr><td>v</td><td>3</td></tr></table>	ITEM *Appendix	SCORE	i	4	ii	4	iii	3	iv	3	v	3	All objectives achieved. Students are able to understand the materials of the topic.
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<div><div>T3 &amp; T4B (Tues), T4A (Wed)</div><div>T3 &amp; T4B (29/11/2022), T4A (30/11/2022)</div><div>T3 (12pm - 1pm),T4B (2pm - 3pm), T4A (2pm- 3pm)</div><div>T3 (DK1),T4B (MF), T4A (BT3)</div></div>	K2	9.1d: Solve problems related to the equations, $PV = (1/3)Nm v_{rms}^2$ and pressure , $P=(1/3) \rho v_{rms}^2$	Discussion and Sample Problem Practice	<table><tr><th>ITEM *Appendix</th><th>SCORE</th></tr><tr><td>i</td><td>3</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>4</td></tr><tr><td>iv</td><td>4</td></tr><tr><td>v</td><td>4</td></tr></table>	ITEM *Appendix	SCORE	i	3	ii	3	iii	4	iv	4	v	4	All objectives achieved. Students are able to understand the materials of the topic.
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WEEK		17															
CHAPTER		9: KINETIC THEORY OF GASES AND THERMODYNAMICS															
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DAY DATE TIME VENUE	CLASS	LEARNING OUTCOME	T&L STRATEG IES & TOOLS	REFLECTION	REMARKS												
<div>T3 (Thurs) &amp; T4 (Fri)</div> <div>T3 (01/12/2022) &amp; T4 (02/12/2022)</div> <div>T3 (2pm - 3pm),T4B (10am - 11am), T4A (9am-10am)</div> <div>T3 (DK1),T4B (MF), T4A (MF)</div>	K2	9.2f: Solve problems related to internal energy, $U = (1/2)fNkT$	Discussion and Sample Problem Practice	<table><tr><th>ITEM *Appendix</th><th>SCORE</th></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>3</td></tr><tr><td>v</td><td>4</td></tr></table>	ITEM *Appendix	SCORE	i	4	ii	3	iii	3	iv	3	v	4	All objectives achieved. Students are able to understand the materials of the topic.
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LECTURER		SHAFIQ RASULAN															
CODE / COURSE		SP015															
WEEK		18															
CHAPTER		9: KINETIC THEORY OF GASES AND THERMODYNAMICS															
MODE		Tutorial															
CLO		CLO2: Solve problems related to mechanics, waves, matter, heat and thermodynamics.															
SLT		F2F (hour):	1	NF2F (hour):	1												
DAY DATE TIME VENUE	CLASS	LEARNING OUTCOME	T&L STRATEG IES & TOOLS	REFLECTION	REMARKS												
<div><div>K2 (Mon)</div><div>K2 (05/12/2022)</div><div>T3 (11am - 12pm),T4B (12pm - 1pm), T4A (2pm- 3pm)</div><div>T3 (MF),T4B (MF), T4A (BT3)</div></div>	K2	9.3b: Solve problem related to First Law of Thermodynamics.	Discussion and Sample Problem Practice	<table><tr><td>ITEM *Appendix</td><td>SCORE</td></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>4</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>4</td></tr><tr><td>v</td><td>4</td></tr></table>	ITEM *Appendix	SCORE	i	4	ii	4	iii	3	iv	4	v	4	All objectives achieved. Students are able to understand the materials of the topic.
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DAY DATE TIME VENUE	CLASS	LEARNING OUTCOME	T&L STRATEG IES & TOOLS	REFLECTION	REMARKS												
<div>T3 &amp; T4B (Tues), T4A (Wed)</div> <div>T3 &amp; T4B (06/12/2022), T4A (07/12/2022)</div> <div>T3 (12pm - 1pm),T4B (2pm - 3pm), T4A (2pm- 3pm)</div> <div>T3 (DK1),T4B (MF), T4A (BT3)</div>	K2	9.4b Analyse P-V graph for all the thermodynamic processes.	Discussion and Sample Problem Practice	<table><tr><th>ITEM *Appendix</th><th>SCORE</th></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>4</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>3</td></tr><tr><td>v</td><td>4</td></tr></table>	ITEM *Appendix	SCORE	i	4	ii	4	iii	3	iv	3	v	4	All objectives achieved. Students are able to understand the materials of the topic.
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<div><div>T3 (Thurs) &amp; T4 (Fri)</div><div>T3 (08/12/2022) &amp; T4 (09/12/2022)</div><div>T3 (2pm - 3pm),T4B (10am - 11am), T4A (9am-10am)</div><div>T3 (DK1),T4B (MF), T4A (MF)</div></div>	K2	9.5a: Derive equation of work done in isothermal, isochoric and isobaric processes from P-V graph. 9.5b: Solve problem related to work done in: i. isothermal process, $W = nRT \ln (V_f / V_i)$ ii. isobaric process, $W = P(V_f - V_i)$ iii. isochoric process, $W = 0$	Discussion and Sample Problem Practice	<table><tr><th>ITEM *Appendix</th><th>SCORE</th></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>4</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>3</td></tr><tr><td>v</td><td>4</td></tr></table>	ITEM *Appendix	SCORE	i	4	ii	4	iii	3	iv	3	v	4	All objectives achieved. Students are able to understand the materials of the topic.
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# Labs

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**SEMESTER I SESSION 2022/2023**

LECTURER		SHAFIQ RASULAN															
CODE / COURSE		SP015															
WEEK		3															
CHAPTER		1: PHYSICAL QUANTITIES AND MEASUREMENTS															
MODE		Practical															
CLO		CLO3: Apply the appropriate scientific laboratory skills in physics experiments															
SLT		F2F (hour):	2	NF2F (hour):	-												
DAY DATE TIME VENUE	CLASS	LEARNING OUTCOME	T&L STRAT EGIES & TOOLS	REFLECTION	REMARKS												
<div><div>K2T4 (Wed); K2T3 (Thurs)</div><div>K2T4 (17/08/2022); K2T3 (18/08/2022)</div><div>K2T4 (11am - 1pm); K2T3 (11am - 1pm)</div><div>K2T4 (Makmal Fizik); K2T3 (Makmal Fizik)</div></div>	K2	1: Measurement and Safety 1.3g: Measure and determine the uncertainty of physical quantities.(Experiment I : Measurement and uncertainty)	Experim ental Work	<table><tr><th>ITEM *App endix</th><th>SCOR E</th></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>3</td></tr><tr><td>v</td><td>4</td></tr></table>	ITEM *App endix	SCOR E	i	4	ii	3	iii	3	iv	3	v	4	All objectives achieved. Students are able to understand the materials of the topic.
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LECTURER		SHAFIQ RASULAN															
CODE / COURSE		SP015															
WEEK		4															
CHAPTER		2: KINEMATICS OF MOTIONS															
MODE		Practical															
CLO		CLO3: Apply the appropriate scientific laboratory skills in physics experiments															
SLT		F2F (hour):	2	NF2F (hour):	-												
DAY DATE TIME VENUE	CLASS	LEARNING OUTCOME	T&L STRAT EGIES & TOOLS	REFLECTION	REMARKS												
<div><div>K2T4 (Wed); K2T3 (Thurs) K2T4 (24/08/2022); K2T3 (25/08/2022) K2T4 (11am - 1pm); K2T3 (11am - 1pm) K2T4 (Makmal Fizik); K2T3 (Makmal Fizik)</div></div>	K2	2: Free Fall & Projectile Motion 2.3c: Determine the acceleration due to gravity, g using free fall and projectile motion. (Experiment 2: Free fall and projectile motion)	Experim ental Work	<table><tr><th>ITEM *App endix</th><th>SCOR E</th></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>4</td></tr><tr><td>iii</td><td>4</td></tr><tr><td>iv</td><td>3</td></tr><tr><td>v</td><td>3</td></tr></table>	ITEM *App endix	SCOR E	i	4	ii	4	iii	4	iv	3	v	3	All objectives achieved. Students are able to understand the materials of the topic.
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iv	3																
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**LESSON PLAN**  
**SEMESTER I SESSION 2022/2023**

LECTURER		SHAFIQ RASULAN															
CODE / COURSE		SP015															
WEEK		6															
CHAPTER		4: WORK, ENERGY AND POWER															
MODE		Practical															
CLO		CLO3: Apply the appropriate scientific laboratory skills in physics experiments															
SLT		F2F (hour):	2	NF2F (hour):	-												
DAY DATE TIME VENUE	CLASS	LEARNING OUTCOME	T&L STRAT EGIES & TOOLS	REFLECTION	REMARKS												
<div><div>K2T4 (Wed); K2T3 (Thurs)</div><div>K2T4 (14/09/2022); K2T3 (15/09/2022)</div><div>K2T4 (11am - 1pm); K2T3 (11am - 1pm)</div><div>K2T4 (Makmal Fizik); K2T3 (Makmal Fizik)</div></div>	K2	3: Energy 4.3b: Verify the law of conservation of energy.(Experiment 3: Energy)	Experim ental Work	<table><tr><th>ITEM *App endix</th><th>SCOR E</th></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>4</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>4</td></tr><tr><td>v</td><td>4</td></tr></table>	ITEM *App endix	SCOR E	i	4	ii	4	iii	3	iv	4	v	4	All objectives achieved. Students are able to understand the materials of the topic.
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**SEMESTER I SESSION 2022/2023**

LECTURER		SHAFIQ RASULAN															
CODE / COURSE		SP015															
WEEK		7															
CHAPTER		6: ROTATION OF RIGID BODY															
MODE		Practical															
CLO		CLO3: Apply the appropriate scientific laboratory skills in physics experiments															
SLT		F2F (hour):	2	NF2F (hour):	-												
DAY DATE TIME VENUE	CLASS	LEARNING OUTCOME	T&L STRAT EGIES & TOOLS	REFLECTION	REMARKS												
<div><div>K2T4 (Wed); K2T3 (Thurs) K2T4 (21/09/2022); K2T3 (22/09/2022) K2T4 (11am - 1pm); K2T3 (11am - 1pm) K2T4 (Makmal Fizik); K2T3 (Makmal Fizik)</div></div>	K2	4: Rotational Motion of Rigid Body 6.3c: Determine the moment of inertia of a flywheel. (Experiment 4: Rotational motion of rigid body)	Experim ental Work	<table><tr><th>ITEM *App endix</th><th>SCOR E</th></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>3</td></tr><tr><td>v</td><td>4</td></tr></table>	ITEM *App endix	SCOR E	i	4	ii	3	iii	3	iv	3	v	4	All objectives achieved. Students are able to understand the materials of the topic.
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**SEMESTER I SESSION 2022/2023**

LECTURER		SHAFIQ RASULAN															
CODE / COURSE		SP015															
WEEK		9															
CHAPTER		7: OSCILLATIONS AND WAVES															
MODE		Practical															
CLO		CLO3: Apply the appropriate scientific laboratory skills in physics experiments															
SLT		F2F (hour):	2	NF2F (hour):	-												
DAY DATE TIME VENUE	CLASS	LEARNING OUTCOME	T&L STRAT EGIES & TOOLS	REFLECTION	REMARKS												
<div><div>K2T4 (Wed); K2T3 (Thurs)</div><div>K2T4 (05/10/2022); K2T3 (06/10/2022)</div><div>K2T4 (11am - 1pm); K2T3 (11am - 1pm)</div><div>K2T4 (Makmal Fizik); K2T3 (Makmal Fizik)</div></div>	K2	5: Simple Harmonic Motion 7.3b: Determine the acceleration, g due to gravity using simple pendulum. (Experiment 5: SHM) 7.3c: Investigate the effect of large amplitude oscillation to the accuracy of acceleration due to gravity, g obtained from the experiment. (Experiment 5: SHM)	Experim ental Work	<table><tr><th>ITEM *App endix</th><th>SCOR E</th></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>4</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>4</td></tr><tr><td>v</td><td>3</td></tr></table>	ITEM *App endix	SCOR E	i	4	ii	4	iii	3	iv	4	v	3	All objectives achieved. Students are able to understand the materials of the topic.
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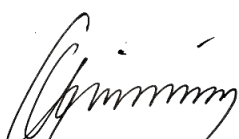
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LECTURER		SHAFIQ RASULAN															
CODE / COURSE		SP015															
WEEK		11															
CHAPTER		7: OSCILLATIONS AND WAVES															
MODE		Practical															
CLO		CLO3: Apply the appropriate scientific laboratory skills in physics experiments															
SLT		F2F (hour):	2	NF2F (hour):	-												
DAY DATE TIME VENUE	CLASS	LEARNING OUTCOME	T&L STRAT EGIES & TOOLS	REFLECTION	REMARKS												
<div><div>K2T4 (Wed); K2T3 (Thurs)</div><div>K2T4 (19/10/2022); K2T3 (20/10/2022)</div><div>K2T4 (11am - 1pm); K2T3 (11am - 1pm)</div><div>K2T4 (Makmal Fizik); K2T3 (Makmal Fizik)</div></div>	K2	6: Standing Waves 7.6c: Investigate standing wave formed in a stretched string. (Experiment 6: Standing waves) 7.6d: Determine the mass per unit length of the string.(Experiment 6: Standing waves)	Experim ental Work	<table><tr><th>ITEM *App endix</th><th>SCOR E</th></tr><tr><td>i</td><td>3</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>4</td></tr><tr><td>iv</td><td>3</td></tr><tr><td>v</td><td>3</td></tr></table>	ITEM *App endix	SCOR E	i	3	ii	3	iii	4	iv	3	v	3	All objectives achieved. Students are able to understand the materials of the topic.
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# Appendix A

**LIST OF SELECTED FORMULAE**  
**SENARAI RUMUS TERPILIH**

- |  |  |
|--|--|
| 1. $v = u + at$                                    | 19. $v = r\omega$                                      |
| 2. $s = ut + \frac{1}{2}at^2$                      | 20. $a_t = r\alpha$                                    |
| 3. $v^2 = u^2 + 2as$                               | 21. $\omega = \omega_o + \alpha t$                     |
| 4. $s = \frac{1}{2}(u + v)t$                       | 22. $\theta = \omega_o t + \frac{1}{2}\alpha t^2$      |
| 5. $p = mv$  | 23. $\theta = \frac{1}{2}(\omega_o + \omega)t$         |
| 6. $J = F\Delta t$                                 | 24. $\omega^2 = \omega_o^2 + 2\alpha\theta$            |
| 7. $J = \Delta p = mv - mu$                        | 25. $\tau = rF \sin \theta$                            |
| 8. $f = \mu N$                                     | 26. $I = \sum mr^2$                                    |
| 9. $W = \vec{F} \cdot \vec{s} = Fs \cos \theta$    | 27. $I_{\text{solid sphere}} = \frac{2}{5}MR^2$        |
| 10. $K = \frac{1}{2}mv^2$                          | 28. $I_{\text{solid cylinder/disc}} = \frac{1}{2}MR^2$ |
| 11. $U = mgh$                                      | 29. $I_{\text{ring}} = MR^2$                           |
| 12. $U_s = \frac{1}{2}kx^2 = \frac{1}{2}Fx$        | 30. $I_{\text{rod}} = \frac{1}{12}ML^2$                |
| 13. $W = \Delta K$                                 | 31. $\sum \tau = I\alpha$                              |
| 14. $P_{\text{av}} = \frac{\Delta W}{\Delta t}$    |  |
| 15. $P = \vec{F} \cdot \vec{v} = Fv \cos \theta$   |  |
| 16. $a_c = \frac{v^2}{r} = r\omega^2 = v\omega$    |  |
| 17. $F_c = \frac{mv^2}{r} = mr\omega^2 = mv\omega$ |  |
| 18. $s = r\theta$                                  |  |

**LIST OF SELECTED FORMULAE**  
***SENARAI RUMUS TERPILIH***

- |  |   |
|--|---|
| 32. $L = I\omega$  | 48. $f_n = \frac{n}{2L} \sqrt{\frac{T}{\mu}}$             |
| 33. $y = A \sin \omega t$                                      | 49. $f_n = \frac{nv}{4L}$                                 |
| 34. $v = \omega A \cos \omega t = \pm \omega \sqrt{A^2 - y^2}$ | 50. $v = \sqrt{\frac{T}{\mu}}$                            |
| 35. $a = -\omega^2 A \sin \omega t = -\omega^2 y$              | 51. $\mu = \frac{m}{L}$                                   |
| 36. $K = \frac{1}{2} m \omega^2 (A^2 - y^2)$                   | 52. $f_a = \left( \frac{v \pm v_o}{v \mp v_s} \right) f$  |
| 37. $U = \frac{1}{2} m \omega^2 y^2$                           | 53. $\sigma = \frac{F}{A}$                                |
| 38. $E = \frac{1}{2} m \omega^2 A^2$                           | 54. $\varepsilon = \frac{\Delta L}{L_o}$                  |
| 39. $\omega = \frac{2\pi}{T} = 2\pi f$                         | 55. $Y = \frac{\sigma}{\varepsilon}$                      |
| 40. $T = 2\pi \sqrt{\frac{l}{g}}$                              | 56. $U = \frac{1}{2} F \Delta L$                          |
| 41. $T = 2\pi \sqrt{\frac{m}{k}}$                              | 57. $\frac{U}{V} = \frac{1}{2} \sigma \varepsilon$        |
| 42. $k = \frac{2\pi}{\lambda}$                                 | 58. $\frac{Q}{t} = -kA \left( \frac{\Delta T}{L} \right)$ |
| 43. $v = f\lambda$   | 59. $\Delta L = \alpha L_o \Delta T$                      |
| 44. $y(x, t) = A \sin(\omega t \pm kx)$                        | 60. $\Delta A = \beta A_o \Delta T$                       |
| 45. $v_y = A\omega \cos(\omega t \pm kx)$                      | 61. $\Delta V = \gamma V_o \Delta T$                      |
| 46. $y = 2A \cos kx \sin \omega t$                             | 62. $\beta = 2\alpha$                                     |
| 47. $f_n = \frac{nv}{2L}$                                      |   |

**LIST OF SELECTED FORMULAE**  
***SENARAI RUMUS TERPILIH***

- |   |  |
|---|--|
| 63. $\gamma = 3\alpha$                                      | 69. $K_{tr} = \frac{3}{2} \left( \frac{R}{N_A} \right) T = \frac{3}{2} kT$ |
| 64. $n = \frac{m}{M} = \frac{N}{N_A}$                       | 70. $U = \frac{1}{2} f N k T = \frac{1}{2} f n R T$                        |
| 65. $v_{rms} = \sqrt{\langle v^2 \rangle}$                  | 71. $\Delta U = Q - W$   |
| 66. $v_{rms} = \sqrt{\frac{3kT}{m}} = \sqrt{\frac{3RT}{M}}$ | 72. $W = nRT \ln \frac{V_f}{V_i} = nRT \ln \frac{P_i}{P_f}$                |
| 67. $PV = \frac{1}{3} N m v_{rms}^2$                        | 73. $W = \int P dV = P(V_f - V_i)$   |
| 68. $P = \frac{1}{3} \rho v_{rms}^2$                        | 74. $W = \int P dV = 0$  |

# **SP025\_RIH**

**Contents**

**Lecture**

**Tutorials**

**Labs**

**Appendix A**



# LECTURE

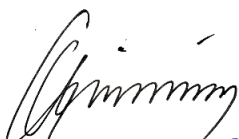
**KOLEJ MATRIKULASI SARAWAK**  
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**SEMESTER II SESSION 2022/2023**

LECTURER		SHAFIQ RASULAN															
CODE / COURSE		SP015															
WEEK		1															
CHAPTER		1: Electrostatics															
MODE		Lecture															
CLO		CLO 1: Describe basic concepts of mechanics, waves, heat and thermodynamics															
SLT		F2F (hour):	1	NF2F (hour):	1												
DAY DATE TIME VENUE	CLAS S	LEARNING OUTCOME	T&L STRATE GIES & TOOLS	REFLECTION	REMARKS												
Monday 1/2/2023 10am DK2	K2	1.1a: State Coulomb's Law 1.1b: Sketch the electric force diagram 1.2a: Define and use electric field strength	Q&A Discussion s	<table><tr><td>ITEM *Appendix</td><td>SCORE</td></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>4</td></tr><tr><td>v</td><td>4</td></tr></table>	ITEM *Appendix	SCORE	i	4	ii	3	iii	3	iv	4	v	4	All objectives achieved. Students are able to understand the materials of the topic.
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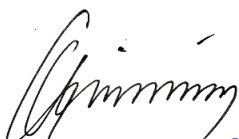
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WEEK		2															
CHAPTER		1: Electrostatics															
MODE		Lecture															
CLO		CLO 1: Describe basic concepts of mechanics, waves, heat and thermodynamics															
SLT		F2F (hour):	1	NF2F (hour):	1												
DAY DATE TIME VENUE	CLAS S	LEARNING OUTCOME	T&L STRATE GIES & TOOLS	REFLECTION	REMARKS												
Monday 1/9/2023 10am DK2	K2	1.2c: Sketch the electric field strength diagram 1.3a: Define electric potential 1.3b: Define and sketch equipotential lines and surfaces of an isolated charge and a uniform electric field.	Q&A Discussion s	<table><tr><td>ITEM *Appendix</td><td>SCORE</td></tr><tr><td>i</td><td>3</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>4</td></tr><tr><td>iv</td><td>3</td></tr><tr><td>v</td><td>4</td></tr></table>	ITEM *Appendix	SCORE	i	3	ii	3	iii	4	iv	3	v	4	All objectives achieved. Students are able to understand the materials of the topic.
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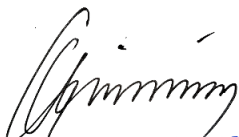
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LECTURER		SHAFIQ RASULAN															
CODE / COURSE		SP015															
WEEK		3															
CHAPTER		2: Capacitors And Dielectrics															
MODE		Lecture															
CLO		CLO 1: Describe basic concepts of mechanics, waves, heat and thermodynamics															
SLT		F2F (hour):	1	NF2F (hour):	1												
DAY DATE TIME VENUE	CLAS S	LEARNING OUTCOME	T&L STRATE GIES & TOOLS	REFLECTION	REMARKS												
Monday 1/16/2023 10am DK2	K2	2.1a: Define and use capacitance 2.2a: State physical meaning of time constant 2.2b: Sketch and explain the characteristics of Q-t and I-t graph for charging and discharging of a capacitor	Q&A Discussion s	<table><tr><td>ITEM *Appen dix</td><td>SCORE</td></tr><tr><td>i</td><td>3</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>4</td></tr><tr><td>iv</td><td>4</td></tr><tr><td>v</td><td>3</td></tr></table>	ITEM *Appen dix	SCORE	i	3	ii	3	iii	4	iv	4	v	3	All objectives achieved. Students are able to understand the materials of the topic.
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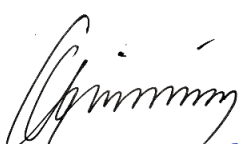
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LECTURER		SHAFIQ RASULAN																
CODE / COURSE		SP015																
WEEK		4																
CHAPTER		2: Capacitors And Dielectrics																
MODE		Lecture																
CLO		CLO 1: Describe basic concepts of mechanics, waves, heat and thermodynamics																
SLT		F2F (hour):	1	NF2F (hour):	1													
DAY DATE TIME VENUE	CLAS S	LEARNING OUTCOME	T&L STRATE GIES & TOOLS	REFLECTION	REMARKS													
Monday 1/23/2023 10am DK2	K2	2.3a: Define dielectric constant 2.3b: Describe the effects of dielectric on a parallel plate capacitor	Q&A Discussion s	<table><tr><td>ITEM *Appendix</td><td>SCORE</td></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>3</td></tr><tr><td>v</td><td>4</td></tr></table>		ITEM *Appendix	SCORE	i	4	ii	3	iii	3	iv	3	v	4	All objectives achieved. Students are able to understand the materials of the topic.
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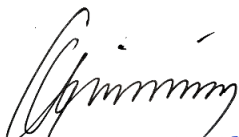
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LECTURER		SHAFIQ RASULAN															
CODE / COURSE		SP015															
WEEK		5															
CHAPTER		3: Electric Current And Direct Current Circuits															
MODE		Lecture															
CLO		CLO 1: Describe basic concepts of mechanics, waves, heat and thermodynamics															
SLT		F2F (hour):	1	NF2F (hour):	1												
DAY DATE TIME VENUE	CLAS S	LEARNING OUTCOME	T&L STRATE GIES & TOOLS	REFLECTION	REMARKS												
Monday 1/30/2023 10am DK2	K2	3.1a: Describe tmicroscopic model of current. 3.1b: Define electric current 3.2a: State ohm's law 3.2b: Define resisitvity 3.3a: Explain the effect of temperature on electrical resistance in metals	Q&A Discussion s	<table><tr><td>ITEM *Appe ndix</td><td>SCOR E</td></tr><tr><td>i</td><td>3</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>4</td></tr><tr><td>iv</td><td>4</td></tr><tr><td>v</td><td>4</td></tr></table>	ITEM *Appe ndix	SCOR E	i	3	ii	3	iii	4	iv	4	v	4	All objectives achieved. Students are able to understand the materials of the topic.
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ii	3																
iii	4																
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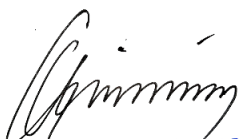
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**SEMESTER II SESSION 2022/2023**

LECTURER		SHAFIQ RASULAN															
CODE / COURSE		SP015															
WEEK		6															
CHAPTER		3: Electric Current And Direct Current Circuits															
MODE		Lecture															
CLO		CLO 1: Describe basic concepts of mechanics, waves, heat and thermodynamics															
SLT		F2F (hour):	1	NF2F (hour):	1												
DAY DATE TIME VENUE	CLAS S	LEARNING OUTCOME	T&L STRATE GIES & TOOLS	REFLECTION	REMARKS												
Monday 2/6/2023 10am DK2	K2	3.4a: Define emf and internal resistance of a battery 3.4b: State factors that influence the internal resistance 3.4c: Explain the relationship between emf of a battery and potential difference across battery terminals 3.6a: State Kirchhoff's Rules 3.8a: Explain the principle of potential divider; 3.9a: Explain principles of potentiometer and its applications	Q&A Discussion s	<table><tr><td>ITEM *Appendix</td><td>SCORE</td></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>3</td></tr><tr><td>v</td><td>4</td></tr></table>	ITEM *Appendix	SCORE	i	4	ii	3	iii	3	iv	3	v	4	All objectives achieved. Students are able to understand the materials of the topic.
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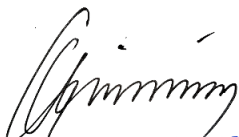
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**SEMESTER II SESSION 2022/2023**

LECTURER		SHAFIQ RASULAN															
CODE / COURSE		SP015															
WEEK		7															
CHAPTER		4: Magnetism															
MODE		Lecture															
CLO		CLO 1: Describe basic concepts of mechanics, waves, heat and thermodynamics															
SLT		F2F (hour):	1	NF2F (hour):	1												
DAY DATE TIME VENUE	CLAS S	LEARNING OUTCOME	T&L STRATE GIES & TOOLS	REFLECTION	REMARKS												
Monday 2/13/2023 10am DK2	K2	4.1a: Define magnetic field 4.1b: Identify magnetic field sources 4.1c: Sketch magnetic field lines for bar magnet, current carrying conductor (straight wire, circular coil and solenoid) and Earth magnetic field 4.2a: Sketch and determine resultant magnetic field diagram at a point 4.3a: Explain magnetic force, $F=qvB$	Q&A Discussion s	<table><tr><td>ITEM <i>*Appendix</i></td><td>SCORE</td></tr><tr><td>i</td><td>3</td></tr><tr><td>ii</td><td>4</td></tr><tr><td>iii</td><td>4</td></tr><tr><td>iv</td><td>3</td></tr><tr><td>v</td><td>3</td></tr></table>	ITEM <i>*Appendix</i>	SCORE	i	3	ii	4	iii	4	iv	3	v	3	All objectives achieved. Students are able to understand the materials of the topic.
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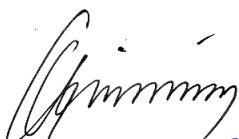
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LECTURER		SHAFIQ RASULAN															
CODE / COURSE		SP015															
WEEK		8															
CHAPTER		4: Magnetism															
MODE		Lecture															
CLO		CLO 1: Describe basic concepts of mechanics, waves, heat and thermodynamics															
SLT		F2F (hour):	1	NF2F (hour):	1												
DAY DATE TIME VENUE	CLAS S	LEARNING OUTCOME	T&L STRATE GIES & TOOLS	REFLECTION	REMARKS												
Monday 2/20/2023 10am DK2	K2	4.3c: Describe circular motion of a charge in uniform magnetic field 4.4a: Explain magnetic force, $F = Ilb$ 4.5a: Explain magnetic force per unit length of two parallel current carrying conductors 4.6a: Explain the motion of a moving charged particle in magnetic field and electric field for $v$ , $B$ and $E$ perpendicular to each other.	Q&A Discussion s	<table><tr><td>ITEM <i>*Appendix</i></td><td>SCORE</td></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>3</td></tr><tr><td>v</td><td>4</td></tr></table>	ITEM <i>*Appendix</i>	SCORE	i	4	ii	3	iii	3	iv	3	v	4	All objectives achieved. Students are able to understand the materials of the topic.
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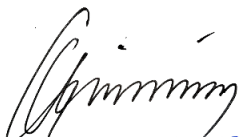
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LECTURER		SHAFIQ RASULAN															
CODE / COURSE		SP015															
WEEK		9															
CHAPTER		5: Electromagnetic Induction															
MODE		Lecture															
CLO		CLO 1: Describe basic concepts of mechanics, waves, heat and thermodynamics															
SLT		F2F (hour):	1	NF2F (hour):	1												
DAY DATE TIME VENUE	CLAS S	LEARNING OUTCOME	T&L STRATE GIES & TOOLS	REFLECTION	REMARKS												
Monday 2/27/2023 10am DK2	K2	5.1a: Define magnetic flux 5.2a: Explain induced emf by using Faraday's experiment 5.2b: State Faraday's Law	Q&A Discussion s	<table><tr><td>ITEM *Appe ndix</td><td>SCOR E</td></tr><tr><td>i</td><td>3</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>4</td></tr><tr><td>v</td><td>3</td></tr></table>	ITEM *Appe ndix	SCOR E	i	3	ii	3	iii	3	iv	4	v	3	All objectives achieved. Students are able to understand the materials of the topic.
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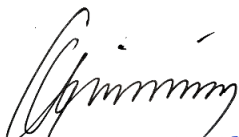
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LECTURER		SHAFIQ RASULAN																
CODE / COURSE		SP015																
WEEK		10																
CHAPTER		5: Electromagnetic Induction																
MODE		Lecture																
CLO		CLO 1: Describe basic concepts of mechanics, waves, heat and thermodynamics																
SLT		F2F (hour):	1	NF2F (hour):	1													
DAY DATE TIME VENUE	CLAS S	LEARNING OUTCOME	T&L STRATE GIES & TOOLS	REFLECTION	REMARKS													
Monday 3/13/2023 10am DK2	K2	5.2c: Sate Lenz's Law to determien the direction of induced current. 5.3a: Define self-inductance 5.5a: Define mutual inductance	Q&A Discussion s	<table><tr><td>ITEM *Appe ndix</td><td>SCOR E</td></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>4</td></tr><tr><td>iv</td><td>3</td></tr><tr><td>v</td><td>4</td></tr></table>		ITEM *Appe ndix	SCOR E	i	4	ii	3	iii	4	iv	3	v	4	All objectives achieved. Students are able to understand the materials of the topic.
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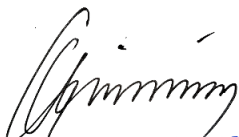
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LECTURER		SHAFIQ RASULAN															
CODE / COURSE		SP015															
WEEK		11															
CHAPTER		6: Alternating Current															
MODE		Lecture															
CLO		CLO 1: Describe basic concepts of mechanics, waves, heat and thermodynamics															
SLT		F2F (hour):	1	NF2F (hour):	1												
DAY DATE TIME VENUE	CLAS S	LEARNING OUTCOME	T&L STRATE GIES & TOOLS	REFLECTION	REMARKS												
Monday 3/20/2023 10am DK2	K2	6.1a: Define alternating current 6.1b: Sketch and interpret sinusoidal AC waveform 6.2a: Define root mean square current and voltage for AC source	Q&A Discussion s	<table><tr><td>ITEM <i>*Appendix</i></td><td>SCORE</td></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>4</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>4</td></tr><tr><td>v</td><td>3</td></tr></table>	ITEM <i>*Appendix</i>	SCORE	i	4	ii	4	iii	3	iv	4	v	3	All objectives achieved. Students are able to understand the materials of the topic.
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LECTURER		SHAFIQ RASULAN															
CODE / COURSE		SP015															
WEEK		12															
CHAPTER		6: Alternating Current															
MODE		Lecture															
CLO		CLO 1: Describe basic concepts of mechanics, waves, heat and thermodynamics															
SLT		F2F (hour):	1	NF2F (hour):	1												
DAY DATE TIME VENUE	CLAS S	LEARNING OUTCOME	T&L STRATE GIES & TOOLS	REFLECTION	REMARKS												
Monday 3/27/2023 10am DK2	K2	6.3a: Sketch and use phasor diagram and sinusoidal waveform to show the phase relationship between current and voltage for a single component circuit of resistors, capacitor and inductor. 6.3c: Define capacitive reactance, inductive reactance, impedance and phase angle 6.3d: Explain graphically the dependence of resistance, capacitive reactance, inductive reactance, impedance and frequency and relate it to resonance.	Q&A Discussion s	<table><tr><td>ITEM <i>*Appendix</i></td><td>SCORE</td></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>4</td></tr><tr><td>v</td><td>4</td></tr></table>	ITEM <i>*Appendix</i>	SCORE	i	4	ii	3	iii	3	iv	4	v	4	All objectives achieved. Students are able to understand the materials of the topic.
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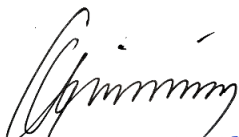
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LECTURER		SHAFIQ RASULAN															
CODE / COURSE		SP015															
WEEK		13															
CHAPTER		7: Optics															
MODE		Lecture															
CLO		CLO 1: Describe basic concepts of mechanics, waves, heat and thermodynamics															
SLT		F2F (hour):	1	NF2F (hour):	1												
DAY DATE TIME VENUE	CLAS S	LEARNING OUTCOME	T&L STRATE GIES & TOOLS	REFLECTION	REMARKS												
Monday 4/3/2023 10am DK2	K2	7.1a: State radius of curvature for spherical mirror 7.1b: Sketch ray diagrams with a minimum of two rays to determine the characteristics of image formed by spherical mirrors 7.4a: State Huygen's Principle 7.4b: Sketch and explain the wavefront of light after passing through a single slit and obstacle using Huygen's principle 7.5a: Define coherence	Q&A Discussion s	<table><tr><td>ITEM <i>*Appendix</i></td><td>SCORE</td></tr><tr><td>i</td><td>3</td></tr><tr><td>ii</td><td>4</td></tr><tr><td>iii</td><td>4</td></tr><tr><td>iv</td><td>4</td></tr><tr><td>v</td><td>3</td></tr></table>	ITEM <i>*Appendix</i>	SCORE	i	3	ii	4	iii	4	iv	4	v	3	All objectives achieved. Students are able to understand the materials of the topic.
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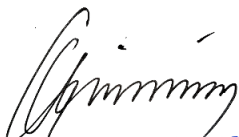
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LECTURER		SHAFIQ RASULAN															
CODE / COURSE		SP015															
WEEK		14															
CHAPTER		7: Optics															
MODE		Lecture															
CLO		CLO 1: Describe basic concepts of mechanics, waves, heat and thermodynamics															
SLT		F2F (hour):	1	NF2F (hour):	1												
DAY DATE TIME VENUE	CLAS S	LEARNING OUTCOME	T&L STRATE GIES & TOOLS	REFLECTION	REMARKS												
Monday 4/10/2023 10am DK2	K2	7.5b: State the conditions for interference of light 7.5c: State the conditions of constructive and destructive interference for inphase and antiphas sources 7.7a: Identify the occurnce of phase change upon reflection 7.7b: Describe with the aid of a diagram the interference of light in thin films at normal incidence 7.7c: Explain the application of thin films	Q&A Discussion s	<table><tr><td>ITEM *Appe ndix</td><td>SCOR E</td></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>4</td></tr><tr><td>v</td><td>4</td></tr></table>	ITEM *Appe ndix	SCOR E	i	4	ii	3	iii	3	iv	4	v	4	All objectives achieved. Students are able to understand the materials of the topic.
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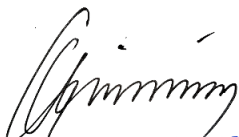
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LECTURER		SHAFIQ RASULAN					
CODE / COURSE		SP015					
WEEK		15					
CHAPTER		7: Optics					
MODE		Lecture					
CLO		CLO 1: Describe basic concepts of mechanics, waves, heat and thermodynamics					
SLT		F2F (hour):	1	NF2F (hour):	1		
DAY DATE TIME VENUE	CLAS S	LEARNING OUTCOME	T&L STRATE GIES & TOOLS	REFLECTION	REMARKS		
Monday 4/17/2023 10am DK2	K2	7.8a: Define diffraction 7.8b: Explain the diffraction of a single slit with the aid of a diagram 7.9a: Explain the formation of diffraction with the aid of a diagram	Q&A Discussion s	ITEM *Appen dix		All objectives achieved. Students are able to understand the materials of the topic.	
				i			4
				ii			3
				iii			4
				iv			3
				v			3

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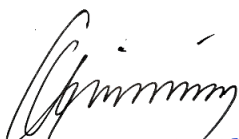
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LECTURER		SHAFIQ RASULAN															
CODE / COURSE		SP015															
WEEK		16															
CHAPTER		8: Wave Properties Of Particle															
MODE		Lecture															
CLO		CLO 1: Describe basic concepts of mechanics, waves, heat and thermodynamics															
SLT		F2F (hour):	1	NF2F (hour):	1												
DAY DATE TIME VENUE	CLAS S	LEARNING OUTCOME	T&L STRATE GIES & TOOLS	REFLECTION	REMARKS												
Monday 4/24/2023 10am DK2	K2	8.1a: State the wave-particle duality 8.2a: Describe the observations of electron diffractions in Davisson-Germer experiment 8.2b: Explain the wave behaviour of electron in an electron microscope 8.2c: State the advantages of electron microscope compared to optical microscope	Q&A Discussion s	<table><tr><td>ITEM *Appen dix</td><td>SCORE</td></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>4</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>4</td></tr><tr><td>v</td><td>4</td></tr></table>	ITEM *Appen dix	SCORE	i	4	ii	4	iii	3	iv	4	v	4	All objectives achieved. Students are able to understand the materials of the topic.
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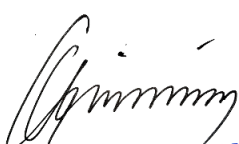
**KOLEJ MATRIKULASI SARAWAK**  
**LESSON PLAN**  
**SEMESTER II SESSION 2022/2023**

LECTURER		SHAFIQ RASULAN															
CODE / COURSE		SP015															
WEEK		17															
CHAPTER		9: Nuclear And Particle Physics															
MODE		Lecture															
CLO		CLO 1: Describe basic concepts of mechanics, waves, heat and thermodynamics															
SLT		F2F (hour):	1	NF2F (hour):	1												
DAY DATE TIME VENUE	CLAS S	LEARNING OUTCOME	T&L STRATE GIES & TOOLS	REFLECTION	REMARKS												
Monday 5/1/2023 10am DK2	K2	9.1a: Define mass defect 9.1b: Define binding energy; 9.1d: Sketch and describe graph of binding energy per nucleon against nucleon number 9.2a: Explain alpha, beta plus, beta minus and gamma decays 9.2b: State decay law 9.2c: Define activity and decay constant	Q&A Discussion s	<table><tr><td>ITEM *Appe ndix</td><td>SCOR E</td></tr><tr><td>i</td><td>3</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>4</td></tr><tr><td>iv</td><td>4</td></tr><tr><td>v</td><td>3</td></tr></table>	ITEM *Appe ndix	SCOR E	i	3	ii	3	iii	4	iv	4	v	3	All objectives achieved. Students are able to understand the materials of the topic.
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Prepared by,

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**MOHD AIMAN BIN MOHD ADLI**  
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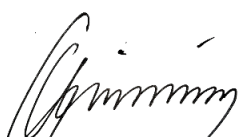
**KOLEJ MATRIKULASI SARAWAK**  
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LECTURER		SHAFIQ RASULAN																
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WEEK		18																
CHAPTER		9: Nuclear And Particle Physics																
MODE		Lecture																
CLO		CLO 1: Describe basic concepts of mechanics, waves, heat and thermodynamics																
SLT		F2F (hour):	1	NF2F (hour):	1													
DAY DATE TIME VENUE	CLAS S	LEARNING OUTCOME	T&L STRATE GIES & TOOLS	REFLECTION	REMARKS													
Monday 5/8/2023 10am DK2	K2	9.2e: Define half-life 9.3a: State the thermionic emission 9.3b: Explain the acceleration of particle by electric and magnetic field 9.3c: State the role of electric and magnetic filed in particle accelerators (linac and cyclotron) and detectors (general principles of ionisation and deflection only).; 9.3d: State the need for high energies required to investigate the structure of nucle 9.4a: Explain the standard quzrk lepton model particles (baryons, meson, leptons and hadrons); 9.4b: Explain the corresponding antiparticle for every particle.	Q&A Discussion s	<table><tr><td>ITEM *Appe ndix</td><td>SCOR E</td></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>4</td></tr><tr><td>iv</td><td>3</td></tr><tr><td>v</td><td>3</td></tr></table>		ITEM *Appe ndix	SCOR E	i	4	ii	3	iii	4	iv	3	v	3	All objectives achieved. Students are able to understand the materials of the topic.
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# TUTORIALS

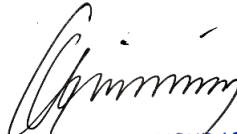
**KOLEJ MATRIKULASI SARAWAK**  
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**SEMESTER II SESSION 2022/2023**

LECTURER		SHAFIQ RASULAN															
CODE / COURSE		SP025															
WEEK		1															
CHAPTER		1: ELECTROSTATICS															
MODE		Tutorials															
CLO		CLO2: Solve problems of electricity, magnetism, optics and modern physics.															
SLT		F2F (hour):	1	NF2F (hour):	1												
DAY DATE TIME VENUE	CLASS	LEARNING OUTCOME	T&L STRATEGIES & TOOLS	REFLECTION	REMARKS												
<div><div>K2T3 (Mon); K2T4A (Tues); K2T4B (Tues)</div><div>K2T3 (02/01/2023); K2T4 (03/01/2023)</div><div>K2T3 (3PM - 4PM); K2T4A (2PM - 3PM ); K2T4B (3PM - 4PM)</div><div>K2T3 (DK1); K2T4A (DK2); K2T4B (DK2)</div></div>	K2	1.1c: Apply Coulomb's Law for a system of point charges	Class Discussion & Sample Problem Practice	<table><tr><td>ITEM <i>*Appendix</i></td><td>SCORE</td></tr><tr><td>i</td><td>3</td></tr><tr><td>ii</td><td>4</td></tr><tr><td>iii</td><td>4</td></tr><tr><td>iv</td><td>3</td></tr><tr><td>v</td><td>3</td></tr></table>	ITEM <i>*Appendix</i>	SCORE	i	3	ii	4	iii	4	iv	3	v	3	All objectives achieved. Students are able to understand the materials of the topic.
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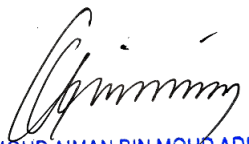
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<b>SLT</b>		<b>F2F (hour):</b>	1	<b>NF2F (hour):</b>	1												
<b>DAY DATE TIME VENUE</b>	<b>CLASS</b>	<b>LEARNING OUTCOME</b>	<b>T&amp;L STRATEGIES &amp; TOOLS</b>	<b>REFLECTION</b>	<b>REMARKS</b>												
<div><div>K2T3 (Wed); K2T4A (Wed); K2T4B (Wed) K2 (04/01/2023) K2T3 (2PM - 3PM ); K2T4A (11AM -12PM); K2T4B (12PM - 1PM) K2T3 (BT1); K2T4A (MF); K2T4B (MF)</div></div>	K2	1.2a: Define and use electric field strength. Refer to equation 2 in appendix A. 1.2b: Use equation for point charge. Refer to equation 3 in appendix A. 1.2d: Determine the electric field strength for a system of charges.	Class Discussion & Sample Problem Practice	<table><tr><td><b>ITEM *Appendix</b></td><td><b>SCORE</b></td></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>4</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>4</td></tr><tr><td>v</td><td>4</td></tr></table>	<b>ITEM *Appendix</b>	<b>SCORE</b>	i	4	ii	4	iii	3	iv	4	v	4	All objectives achieved. Students are able to understand the materials of the topic.
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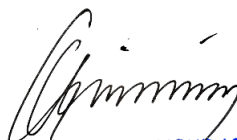
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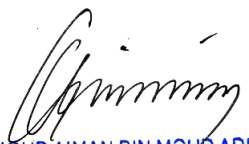
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LECTURER		SHAFIQ RASULAN															
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WEEK		2															
CHAPTER		1: ELECTROSTATICS															
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DAY DATE TIME VENUE	CLASS	LEARNING OUTCOME	T&L STRATEGIES & TOOLS	REFLECTION	REMARKS												
<div><div>K2T3 (Mon); K2T4A (Tues); K2T4B (Tues)</div><div>K2T3 (09/01/2023); K2T4 (10/01/2023)</div><div>K2T3 (3PM - 4PM); K2T4A (2PM - 3PM ); K2T4B (3PM - 4PM)</div><div>K2T3 (DK1); K2T4A (DK2); K2T4B (DK2)</div></div>	K2	1.4a: Analyse the motion of a charge qualitatively and quantitatively in a uniform electric field for each of the following cases - stationary charge, charge moving perpendicularly to the field, charge moving parallel to the field and charge in dynamic equilibrium 1.4b: use equation 9 from Appendix A for uniform electric field.	Class Discussion & Sample Problem Practice	<table><tr><td>ITEM <i>*Appendix</i></td><td>SCORE</td></tr><tr><td>i</td><td>3</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>4</td></tr><tr><td>iv</td><td>3</td></tr><tr><td>v</td><td>4</td></tr></table>	ITEM <i>*Appendix</i>	SCORE	i	3	ii	3	iii	4	iv	3	v	4	All objectives achieved. Students are able to understand the materials of the topic.
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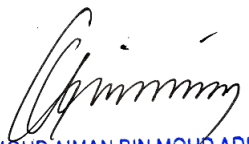
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<b>CHAPTER</b>		2: CAPACITORS AND DIELECTRICS															
<b>MODE</b>		Tutorials															
<b>CLO</b>		CLO2: Solve problems of electricity, magnetism, optics and modern physics.															
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<b>DAY DATE TIME VENUE</b>	<b>CLASS</b>	<b>LEARNING OUTCOME</b>	<b>T&amp;L STRATEGIES &amp; TOOLS</b>	<b>REFLECTION</b>	<b>REMARKS</b>												
<div><div>K2T3 (Wed); K2T4A (Wed); K2T4B (Wed)</div><div>K2 (11/01/2023)</div><div>K2T3 (2PM - 3PM ); K2T4A (11AM -12PM); K2T4B (12PM - 1PM)</div><div>K2T3 (BT1); K2T4A (MF); K2T4B (MF)</div></div>	K2	2.1a: Define and use capacitance. . Refer to equation 10 in appendix A. 2.1b: Determine the effective capacitance of capacitors in series and parallel. Refer to equation 11 and 12 in appendix A. 2.1c: Apply energy stored in a capacitor. Refer to equation 13 in appendix A.	Class Discussion & Sample Problem Practice	<table><tr><td><b>ITEM</b> <i>*Appendix</i></td><td><b>SCORE</b></td></tr><tr><td><b>i</b></td><td>3</td></tr><tr><td><b>ii</b></td><td>4</td></tr><tr><td><b>iii</b></td><td>4</td></tr><tr><td><b>iv</b></td><td>4</td></tr><tr><td><b>v</b></td><td>3</td></tr></table>	<b>ITEM</b> <i>*Appendix</i>	<b>SCORE</b>	<b>i</b>	3	<b>ii</b>	4	<b>iii</b>	4	<b>iv</b>	4	<b>v</b>	3	All objectives achieved. Students are able to understand the materials of the topic.
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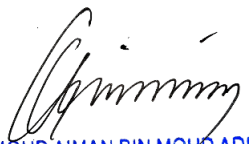
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<b>LECTURER</b>		SHAFIQ RASULAN															
<b>CODE / COURSE</b>		SP025															
<b>WEEK</b>		2															
<b>CHAPTER</b>		2: CAPACITORS AND DIELECTRICS															
<b>MODE</b>		Tutorials															
<b>CLO</b>		CLO2: Solve problems of electricity, magnetism, optics and modern physics.															
<b>SLT</b>		<b>F2F (hour):</b>	1	<b>NF2F (hour):</b>	1												
<b>DAY DATE TIME VENUE</b>	<b>CLASS</b>	<b>LEARNING OUTCOME</b>	<b>T&amp;L STRATEGIES &amp; TOOLS</b>	<b>REFLECTION</b>	<b>REMARKS</b>												
<div><div>K2T3 (Thurs); K2T4A (Thurs); K2T4B (Thurs)</div><div>K2 (12/01/2023)</div><div>K2T3 (9AM - 10AM); K2T4A (12PM - 1PM); K2T4B (11AM -12PM)</div><div>K2T3 (DK2); K2T4A (BT1); K2T4B (BT1)</div></div>	K2	2.2a: State physical meaning of time constant and use equation 13 in appendix A. 2.2c: Use equation 15 for discharging and equation 16 for charging from appendix A.	Class Discussion & Sample Problem Practice	<table><tr><td><b>ITEM</b> <i>*Appendix</i></td><td><b>SCORE</b></td></tr><tr><td><b>i</b></td><td>4</td></tr><tr><td><b>ii</b></td><td>3</td></tr><tr><td><b>iii</b></td><td>3</td></tr><tr><td><b>iv</b></td><td>3</td></tr><tr><td><b>v</b></td><td>4</td></tr></table>	<b>ITEM</b> <i>*Appendix</i>	<b>SCORE</b>	<b>i</b>	4	<b>ii</b>	3	<b>iii</b>	3	<b>iv</b>	3	<b>v</b>	4	All objectives achieved. Students are able to understand the materials of the topic.
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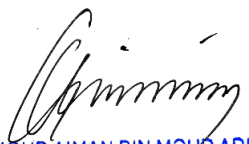
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CHAPTER		2: CAPACITORS AND DIELECTRICS															
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<div><div>K2T3 (Mon); K2T4A (Tues); K2T4B (Tues)</div><div>K2T3 (16/01/2023); K2T4 (17/01/2023)</div><div>K2T3 (3PM - 4PM); K2T4A (2PM - 3PM ); K2T4B (3PM - 4PM)</div><div>K2T3 (DK1); K2T4A (DK2); K2T4B (DK2)</div></div>	K2	2.3a: Define and use dielectric constant. Refer to equation 17 in appendix A. 2.3c: Apply capacitance of air filled parallel plate capacitor. Refer to equation 18 in appendix A.	Class Discussion & Sample Problem Practice	<table><tr><td>ITEM <i>*Appendix</i></td><td>SCORE</td></tr><tr><td>i</td><td>3</td></tr><tr><td>ii</td><td>4</td></tr><tr><td>iii</td><td>4</td></tr><tr><td>iv</td><td>4</td></tr><tr><td>v</td><td>3</td></tr></table>	ITEM <i>*Appendix</i>	SCORE	i	3	ii	4	iii	4	iv	4	v	3	All objectives achieved. Students are able to understand the materials of the topic.
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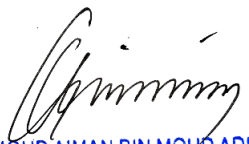
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<b>CLO</b>		CLO2: Solve problems of electricity, magnetism, optics and modern physics.															
<b>SLT</b>		<b>F2F (hour):</b>	1	<b>NF2F (hour):</b>	1												
<b>DAY DATE TIME VENUE</b>	<b>CLASS</b>	<b>LEARNING OUTCOME</b>	<b>T&amp;L STRATEGIES &amp; TOOLS</b>	<b>REFLECTION</b>	<b>REMARKS</b>												
<div><div>K2T3 (Wed); K2T4A (Wed); K2T4B (Wed)</div><div>K2 (18/01/2023)</div><div>K2T3 (2PM - 3PM ); K2T4A (11AM -12PM); K2T4B (12PM - 1PM)</div><div>K2T3 (BT1); K2T4A (MF); K2T4B (MF)</div></div>	K2	2.3d: Determine capacitance with dielectric. Refer to equation 19 in appendix A.	Class Discussion & Sample Problem Practice	<table><tr><td><b>ITEM *Appendix</b></td><td><b>SCORE</b></td></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>4</td></tr><tr><td>iii</td><td>4</td></tr><tr><td>iv</td><td>3</td></tr><tr><td>v</td><td>4</td></tr></table>	<b>ITEM *Appendix</b>	<b>SCORE</b>	i	4	ii	4	iii	4	iv	3	v	4	All objectives achieved. Students are able to understand the materials of the topic.
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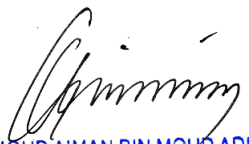
**KOLEJ MATRIKULASI SARAWAK**  
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**SEMESTER II SESSION 2022/2023**

<b>LECTURER</b>		SHAFIQ RASULAN															
<b>CODE / COURSE</b>		SP025															
<b>WEEK</b>		3															
<b>CHAPTER</b>		3: ELECTRIC CURRENT AND DIRECT CURRENT CIRCUITS															
<b>MODE</b>		Tutorials															
<b>CLO</b>		CLO2: Solve problems of electricity, magnetism, optics and modern physics.															
<b>SLT</b>		<b>F2F (hour):</b>	1	<b>NF2F (hour):</b>	1												
<b>DAY DATE TIME VENUE</b>	<b>CLASS</b>	<b>LEARNING OUTCOME</b>	<b>T&amp;L STRATEGIES &amp; TOOLS</b>	<b>REFLECTION</b>	<b>REMARKS</b>												
<div><div>K2T3 (Thurs); K2T4A (Thurs); K2T4B (Thurs)</div><div>K2 (19/01/2023)</div><div>K2T3 (9AM - 10AM); K2T4A (12PM - 1PM); K2T4B (11AM -12PM)</div><div>K2T3 (DK2); K2T4A (BT1); K2T4B (BT1)</div></div>	K2	3.1c: Use electric current, Refer to equation 21 in appendix A.	Class Discussion & Sample Problem Practice	<table><tr><td><b>ITEM</b> <i>*Appendix</i></td><td><b>SCORE</b></td></tr><tr><td><b>i</b></td><td>4</td></tr><tr><td><b>ii</b></td><td>4</td></tr><tr><td><b>iii</b></td><td>4</td></tr><tr><td><b>iv</b></td><td>3</td></tr><tr><td><b>v</b></td><td>4</td></tr></table>	<b>ITEM</b> <i>*Appendix</i>	<b>SCORE</b>	<b>i</b>	4	<b>ii</b>	4	<b>iii</b>	4	<b>iv</b>	3	<b>v</b>	4	All objectives achieved. Students are able to understand the materials of the topic.
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<b>iv</b>	3																
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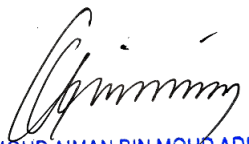
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LECTURER		SHAFIQ RASULAN															
CODE / COURSE		SP025															
WEEK		4															
CHAPTER		3: ELECTRIC CURRENT AND DIRECT CURRENT CIRCUITS															
MODE		Tutorials															
CLO		CLO2: Solve problems of electricity, magnetism, optics and modern physics.															
SLT		F2F (hour):	1	NF2F (hour):	1												
DAY DATE TIME VENUE	CLASS	LEARNING OUTCOME	T&L STRATEGIES & TOOLS	REFLECTION	REMARKS												
<div><div>K2T3 (Mon); K2T4A (Tues); K2T4B (Tues)</div><div>K2T3 (23/01/2023); K2T4 (24/01/2023)</div><div>K2T3 (3PM - 4PM); K2T4A (2PM - 3PM ); K2T4B (3PM - 4PM)</div><div>K2T3 (DK1); K2T4A (DK2); K2T4B (DK2)</div></div>	K2	3.2a: State and use Ohm's Law. Refer to equation 22 in appendix A. 3.2b: Define and use resistivity. Refer to equation 23 in appendix A.	Class Discussion & Sample Problem Practice	<table><tr><td>ITEM <i>*Appendix</i></td><td>SCORE</td></tr><tr><td>i</td><td>3</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>4</td></tr><tr><td>v</td><td>4</td></tr></table>	ITEM <i>*Appendix</i>	SCORE	i	3	ii	3	iii	3	iv	4	v	4	All objectives achieved. Students are able to understand the materials of the topic.
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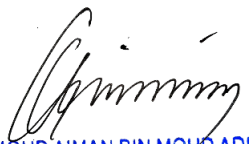
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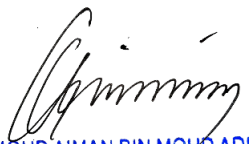
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<b>CHAPTER</b>		3: ELECTRIC CURRENT AND DIRECT CURRENT CIRCUITS															
<b>MODE</b>		Tutorials															
<b>CLO</b>		CLO2: Solve problems of electricity, magnetism, optics and modern physics.															
<b>SLT</b>		<b>F2F (hour):</b>	1	<b>NF2F (hour):</b>	1												
<b>DAY DATE TIME VENUE</b>	<b>CLASS</b>	<b>LEARNING OUTCOME</b>	<b>T&amp;L STRATEGIES &amp; TOOLS</b>	<b>REFLECTION</b>	<b>REMARKS</b>												
<div><div>K2T3 (Thurs); K2T4A (Thurs); K2T4B (Thurs)</div><div>K2 (26/01/2023)</div><div>K2T3 (9AM - 10AM); K2T4A (12PM - 1PM); K2T4B (11AM -12PM)</div><div>K2T3 (DK2); K2T4A (BT1); K2T4B (BT1)</div></div>	K2	3.4d: Use terminal voltage, Refer to equation 25 in appendix A.	Class Discussion & Sample Problem Practice	<table><tr><td><b>ITEM</b> <i>*Appendix</i></td><td><b>SCORE</b></td></tr><tr><td>i</td><td>3</td></tr><tr><td>ii</td><td>4</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>3</td></tr><tr><td>v</td><td>3</td></tr></table>	<b>ITEM</b> <i>*Appendix</i>	<b>SCORE</b>	i	3	ii	4	iii	3	iv	3	v	3	All objectives achieved. Students are able to understand the materials of the topic.
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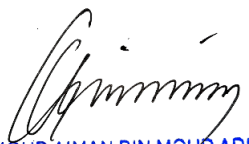
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LECTURER		SHAFIQ RASULAN															
CODE / COURSE		SP025															
WEEK		5															
CHAPTER		3: ELECTRIC CURRENT AND DIRECT CURRENT CIRCUITS															
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DAY DATE TIME VENUE	CLASS	LEARNING OUTCOME	T&L STRATEGIES & TOOLS	REFLECTION	REMARKS												
<div><div>K2T3 (Mon); K2T4A (Tues); K2T4B (Tues)</div><div>K2T3 (30/01/2023); K2T4 (31/01/2023)</div><div>K2T3 (3PM - 4PM); K2T4A (2PM - 3PM ); K2T4B (3PM - 4PM)</div><div>K2T3 (DK1); K2T4A (DK2); K2T4B (DK2)</div></div>	K2	3.5a: Determine the effective resistance of resistors in series and parallel. Refer to equation 26 and 27 in appendix A.	Class Discussion & Sample Problem Practice	<table><tr><td>ITEM <i>*Appendix</i></td><td>SCORE</td></tr><tr><td>i</td><td>3</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>4</td></tr><tr><td>iv</td><td>3</td></tr><tr><td>v</td><td>3</td></tr></table>	ITEM <i>*Appendix</i>	SCORE	i	3	ii	3	iii	4	iv	3	v	3	All objectives achieved. Students are able to understand the materials of the topic.
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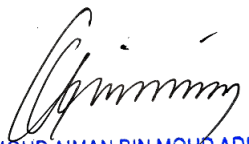
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<table border="1"><tr><td>K2T3 (Wed); K2T4A (Wed); K2T4B (Wed)</td></tr><tr><td>K2 (01/02/2023)</td></tr><tr><td>K2T3 (2PM - 3PM ); K2T4A (11AM -12PM); K2T4B (12PM - 1PM)</td></tr><tr><td>K2T3 (BT1); K2T4A (MF); K2T4B (MF)</td></tr></table>	K2T3 (Wed); K2T4A (Wed); K2T4B (Wed)	K2 (01/02/2023)	K2T3 (2PM - 3PM ); K2T4A (11AM -12PM); K2T4B (12PM - 1PM)	K2T3 (BT1); K2T4A (MF); K2T4B (MF)	K2	3.6a: State and apply Kirchhoff's Rules	Class Discussion & Sample Problem Practice	<table border="1"><tr><td><b>ITEM</b> <i>*Appendix</i></td><td><b>SCORE</b></td></tr><tr><td>i</td><td>3</td></tr><tr><td>ii</td><td>4</td></tr><tr><td>iii</td><td>4</td></tr><tr><td>iv</td><td>4</td></tr><tr><td>v</td><td>3</td></tr></table>	<b>ITEM</b> <i>*Appendix</i>	<b>SCORE</b>	i	3	ii	4	iii	4	iv	4	v	3	All objectives achieved. Students are able to understand the materials of the topic.
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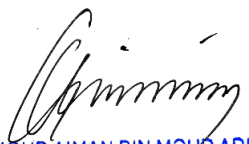
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<div><div>K2T3 (Thurs); K2T4A (Thurs); K2T4B (Thurs)</div><div>K2 (02/02/2023)</div><div>K2T3 (9AM - 10AM); K2T4A (12PM - 1PM); K2T4B (11AM -12PM)</div><div>K2T3 (DK2); K2T4A (BT1); K2T4B (BT1)</div></div>	K2	3.6a: State and apply Kirchhoff's Rules	Class Discussion & Sample Problem Practice	<table><tr><td><b>ITEM *Appendix</b></td><td><b>SCORE</b></td></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>4</td></tr><tr><td>iv</td><td>3</td></tr><tr><td>v</td><td>4</td></tr></table>	<b>ITEM *Appendix</b>	<b>SCORE</b>	i	4	ii	3	iii	4	iv	3	v	4	All objectives achieved. Students are able to understand the materials of the topic.
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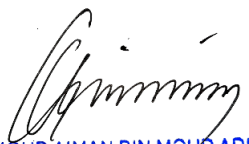
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CODE / COURSE		SP025															
WEEK		6															
CHAPTER		3: ELECTRIC CURRENT AND DIRECT CURRENT CIRCUITS															
MODE		Tutorials															
CLO		CLO2: Solve problems of electricity, magnetism, optics and modern physics.															
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DAY DATE TIME VENUE	CLASS	LEARNING OUTCOME	T&L STRATEGIES & TOOLS	REFLECTION	REMARKS												
<div><div>K2T3 (Mon); K2T4A (Tues); K2T4B (Tues)</div><div>K2T3 (06/02/2023); K2T4 (07/02/2023)</div><div>K2T3 (3PM - 4PM); K2T4A (2PM - 3PM ); K2T4B (3PM - 4PM)</div><div>K2T3 (DK1); K2T4A (DK2); K2T4B (DK2)</div></div>	K2	3.7a: Use power equation, Refer to equation 28 in appendix A. 3.7b: Use electrical energy, Refer to equation 29 in appendix A.	Class Discussion & Sample Problem Practice	<table><tr><td>ITEM *Appendix</td><td>SCORE</td></tr><tr><td>i</td><td>3</td></tr><tr><td>ii</td><td>4</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>4</td></tr><tr><td>v</td><td>3</td></tr></table>	ITEM *Appendix	SCORE	i	3	ii	4	iii	3	iv	4	v	3	All objectives achieved. Students are able to understand the materials of the topic.
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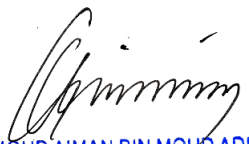
**KOLEJ MATRIKULASI SARAWAK**  
**LESSON PLAN**  
**SEMESTER II SESSION 2022/2023**

<b>LECTURER</b>		SHAFIQ RASULAN																			
<b>CODE / COURSE</b>		SP025																			
<b>WEEK</b>		6																			
<b>CHAPTER</b>		3: ELECTRIC CURRENT AND DIRECT CURRENT CIRCUITS																			
<b>MODE</b>		Tutorials																			
<b>CLO</b>		CLO2: Solve problems of electricity, magnetism, optics and modern physics.																			
<b>SLT</b>		<b>F2F (hour):</b>	1	<b>NF2F (hour):</b>	1																
<b>DAY DATE TIME VENUE</b>	<b>CLASS</b>	<b>LEARNING OUTCOME</b>	<b>T&amp;L STRATEGIES &amp; TOOLS</b>	<b>REFLECTION</b>	<b>REMARKS</b>																
<table border="1"><tr><td>K2T3 (Wed); K2T4A (Wed); K2T4B (Wed)</td></tr><tr><td>K2 (08/02/2023)</td></tr><tr><td>K2T3 (2PM - 3PM ); K2T4A (11AM -12PM); K2T4B (12PM - 1PM)</td></tr><tr><td>K2T3 (BT1); K2T4A (MF); K2T4B (MF)</td></tr></table>	K2T3 (Wed); K2T4A (Wed); K2T4B (Wed)	K2 (08/02/2023)	K2T3 (2PM - 3PM ); K2T4A (11AM -12PM); K2T4B (12PM - 1PM)	K2T3 (BT1); K2T4A (MF); K2T4B (MF)	K2	3.8b: Use equation of potential divider. Refer to equation 30 in appendix A.	Class Discussion & Sample Problem Practice	<table border="1"><tr><td><b>ITEM</b> <i>*Appendix</i></td><td><b>SCORE</b></td></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>4</td></tr><tr><td>iii</td><td>4</td></tr><tr><td>iv</td><td>4</td></tr><tr><td>v</td><td>3</td></tr></table>	<b>ITEM</b> <i>*Appendix</i>	<b>SCORE</b>	i	4	ii	4	iii	4	iv	4	v	3	All objectives achieved. Students are able to understand the materials of the topic.
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Prepared by,

  
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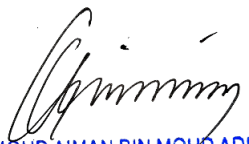
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<b>DAY DATE TIME VENUE</b>	<b>CLASS</b>	<b>LEARNING OUTCOME</b>	<b>T&amp;L STRATEGIES &amp; TOOLS</b>	<b>REFLECTION</b>	<b>REMARKS</b>												
<div><div>K2T3 (Thurs); K2T4A (Thurs); K2T4B (Thurs)</div><div>K2 (09/02/2023)</div><div>K2T3 (9AM - 10AM); K2T4A (12PM - 1PM); K2T4B (11AM -12PM)</div><div>K2T3 (DK2); K2T4A (BT1); K2T4B (BT1)</div></div>	K2	3.9b: Use related equations for potentiometer, Refer to equation 31 in appendix A.	Class Discussion & Sample Problem Practice	<table><tr><td><b>ITEM *Appendix</b></td><td><b>SCORE</b></td></tr><tr><td>i</td><td>3</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>3</td></tr><tr><td>v</td><td>3</td></tr></table>	<b>ITEM *Appendix</b>	<b>SCORE</b>	i	3	ii	3	iii	3	iv	3	v	3	All objectives achieved. Students are able to understand the materials of the topic.
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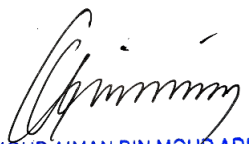
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<b>WEEK</b>		7															
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<b>DAY DATE TIME VENUE</b>	<b>CLASS</b>	<b>LEARNING OUTCOME</b>	<b>T&amp;L STRATEGIES &amp; TOOLS</b>	<b>REFLECTION</b>	<b>REMARKS</b>												
<div><div>K2T3 (Mon); K2T4A (Tues); K2T4B (Tues)</div><div>K2T3 (13/02/2023); K2T4 (14/02/2023)</div><div>K2T3 (3PM - 4PM); K2T4A (2PM - 3PM ); K2T4B (3PM - 4PM)</div><div>K2T3 (DK1); K2T4A (DK2); K2T4B (DK2)</div></div>	K2	3.9b: Use related equations for potentiometer, Refer to equation 31 in appendix A.	Class Discussion & Sample Problem Practice	<table><tr><td><b>ITEM *Appendix</b></td><td><b>SCORE</b></td></tr><tr><td><b>i</b></td><td>3</td></tr><tr><td><b>ii</b></td><td>3</td></tr><tr><td><b>iii</b></td><td>3</td></tr><tr><td><b>iv</b></td><td>4</td></tr><tr><td><b>v</b></td><td>4</td></tr></table>	<b>ITEM *Appendix</b>	<b>SCORE</b>	<b>i</b>	3	<b>ii</b>	3	<b>iii</b>	3	<b>iv</b>	4	<b>v</b>	4	All objectives achieved. Students are able to understand the materials of the topic.
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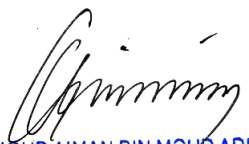
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**SEMESTER II SESSION 2022/2023**

<b>LECTURER</b>		SHAFIQ RASULAN															
<b>CODE / COURSE</b>		SP025															
<b>WEEK</b>		7															
<b>CHAPTER</b>		4: MAGNETISM															
<b>MODE</b>		Tutorials															
<b>CLO</b>		CLO2: Solve problems of electricity, magnetism, optics and modern physics.															
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<b>DAY DATE TIME VENUE</b>	<b>CLASS</b>	<b>LEARNING OUTCOME</b>	<b>T&amp;L STRATEGIES &amp; TOOLS</b>	<b>REFLECTION</b>	<b>REMARKS</b>												
<div><div>K2T3 (Wed); K2T4A (Wed); K2T4B (Wed)</div><div>K2 (15/02/2023)</div><div>K2T3 (2PM - 3PM ); K2T4A (11AM -12PM); K2T4B (12PM - 1PM)</div><div>K2T3 (BT1); K2T4A (MF); K2T4B (MF)</div></div>	K2	4.2a: Sketch and determine the resultant magnetic field diagram at a point 4.2b: Determine the direction of magnetic field by using right hand rule	Class Discussion & Sample Problem Practice	<table><tr><td><b>ITEM *Appendix</b></td><td><b>SCORE</b></td></tr><tr><td>i</td><td>3</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>3</td></tr><tr><td>v</td><td>3</td></tr></table>	<b>ITEM *Appendix</b>	<b>SCORE</b>	i	3	ii	3	iii	3	iv	3	v	3	All objectives achieved. Students are able to understand the materials of the topic.
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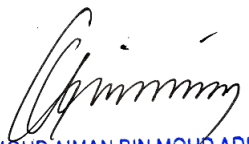
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<div><div>K2T3 (Thurs); K2T4A (Thurs); K2T4B (Thurs)</div><div>K2 (16/02/2023)</div><div>K2T3 (9AM - 10AM); K2T4A (12PM - 1PM); K2T4B (11AM -12PM)</div><div>K2T3 (DK2); K2T4A (BT1); K2T4B (BT1)</div></div>	K2	4.2c: Determine the magnitude of magnetic field for long straight wire, at the center of solenoid, at the centre of circular coil and at the end of solenoid. Refer to equation 32 -34 from appendix A.	Class Discussion & Sample Problem Practice	<table><tr><td>ITEM <i>*Appendix</i></td><td>SCORE</td></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>4</td></tr><tr><td>v</td><td>4</td></tr></table>	ITEM <i>*Appendix</i>	SCORE	i	4	ii	3	iii	3	iv	4	v	4	All objectives achieved. Students are able to understand the materials of the topic.
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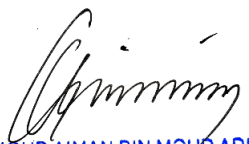
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DAY DATE TIME VENUE	CLASS	LEARNING OUTCOME	T&L STRATEGIES & TOOLS	REFLECTION	REMARKS												
<div><div>K2T3 (Mon); K2T4A (Tues); K2T4B (Tues)</div><div>K2T3 (20/02/2023); K2T4 (21/02/2023)</div><div>K2T3 (3PM - 4PM); K2T4A (2PM - 3PM ); K2T4B (3PM - 4PM)</div><div>K2T3 (DK1); K2T4A (DK2); K2T4B (DK2)</div></div>	K2	4.3a: Explain and use magnetic force. Refer to equation 36 in appendix A. 4.3b: Determine the direction of magnetic force. 4.3d: Use relationship of magnetic force equals to centripetal force.	Class Discussion & Sample Problem Practice	<table><tr><td>ITEM *Appendix</td><td>SCORE</td></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>4</td></tr><tr><td>iii</td><td>4</td></tr><tr><td>iv</td><td>4</td></tr><tr><td>v</td><td>3</td></tr></table>	ITEM *Appendix	SCORE	i	4	ii	4	iii	4	iv	4	v	3	All objectives achieved. Students are able to understand the materials of the topic.
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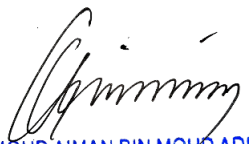
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<div><div>K2T3 (Wed); K2T4A (Wed); K2T4B (Wed)</div><div>K2 (22/02/2023)</div><div>K2T3 (2PM - 3PM ); K2T4A (11AM -12PM); K2T4B (12PM - 1PM)</div><div>K2T3 (BT1); K2T4A (MF); K2T4B (MF)</div></div>	K2	4.4a: Explain and use magnetic force, refer to equation 37 from appendix A. 4.4b: Determine the direction of force.	Class Discussion & Sample Problem Practice	<table><tr><td><b>ITEM *Appendix</b></td><td><b>SCORE</b></td></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>3</td></tr><tr><td>v</td><td>3</td></tr></table>	<b>ITEM *Appendix</b>	<b>SCORE</b>	i	4	ii	3	iii	3	iv	3	v	3	All objectives achieved. Students are able to understand the materials of the topic.
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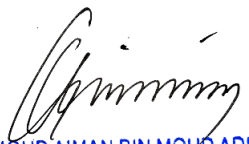
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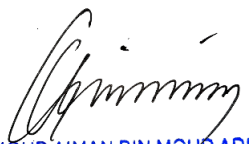
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WEEK		9															
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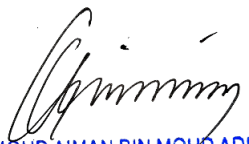
**KOLEJ MATRIKULASI SARAWAK**  
**LESSON PLAN**  
**SEMESTER II SESSION 2022/2023**

<b>LECTURER</b>		SHAFIQ RASULAN															
<b>CODE / COURSE</b>		SP025															
<b>WEEK</b>		9															
<b>CHAPTER</b>		4: MAGNETISM															
<b>MODE</b>		Tutorials															
<b>CLO</b>		CLO2: Solve problems of electricity, magnetism, optics and modern physics.															
<b>SLT</b>		<b>F2F (hour):</b>	1	<b>NF2F (hour):</b>	1												
<b>DAY DATE TIME VENUE</b>	<b>CLASS</b>	<b>LEARNING OUTCOME</b>	<b>T&amp;L STRATEGIES &amp; TOOLS</b>	<b>REFLECTION</b>	<b>REMARKS</b>												
<div><div>K2T3 (Wed); K2T4A (Wed); K2T4B (Wed)</div><div>K2 (01/03/2023)</div><div>K2T3 (2PM - 3PM ); K2T4A (11AM -12PM); K2T4B (12PM - 1PM)</div><div>K2T3 (BT1); K2T4A (MF); K2T4B (MF)</div></div>	K2	4.6b: Use velocity equation (equation 40 from appendix A), in a velocity selector.	Class Discussion & Sample Problem Practice	<table><tr><td><b>ITEM *Appendix</b></td><td><b>SCORE</b></td></tr><tr><td>i</td><td>3</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>4</td></tr><tr><td>v</td><td>4</td></tr></table>	<b>ITEM *Appendix</b>	<b>SCORE</b>	i	3	ii	3	iii	3	iv	4	v	4	All objectives achieved. Students are able to understand the materials of the topic.
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i	3																
ii	3																
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iv	4																
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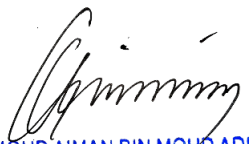
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**LESSON PLAN**  
**SEMESTER II SESSION 2022/2023**

<b>LECTURER</b>		SHAFIQ RASULAN															
<b>CODE / COURSE</b>		SP025															
<b>WEEK</b>		9															
<b>CHAPTER</b>		5: ELECTROMAGNETIC INDUCTION															
<b>MODE</b>		Tutorials															
<b>CLO</b>		CLO2: Solve problems of electricity, magnetism, optics and modern physics.															
<b>SLT</b>		<b>F2F (hour):</b>	1	<b>NF2F (hour):</b>	1												
<b>DAY DATE TIME VENUE</b>	<b>CLASS</b>	<b>LEARNING OUTCOME</b>	<b>T&amp;L STRATEGIES &amp; TOOLS</b>	<b>REFLECTION</b>	<b>REMARKS</b>												
<div><div>K2T3 (Thurs); K2T4A (Thurs); K2T4B (Thurs)</div><div>K2 (02/03/2023)</div><div>K2T3 (9AM - 10AM); K2T4A (12PM - 1PM); K2T4B (11AM -12PM)</div><div>K2T3 (DK2); K2T4A (BT1); K2T4B (BT1)</div></div>	K2	5.1a: Define and use magnetic flux. Refer to equation 41 from appendix A. 5.1b: Use magnetic flux linkage, Refer to equation 42 from appendix A.	Class Discussion & Sample Problem Practice	<table><tr><td><b>ITEM *Appendix</b></td><td><b>SCORE</b></td></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>3</td></tr><tr><td>v</td><td>3</td></tr></table>	<b>ITEM *Appendix</b>	<b>SCORE</b>	i	4	ii	3	iii	3	iv	3	v	3	All objectives achieved. Students are able to understand the materials of the topic.
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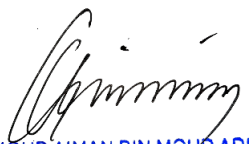
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LECTURER		SHAFIQ RASULAN															
CODE / COURSE		SP025															
WEEK		10															
CHAPTER		5: ELECTROMAGNETIC INDUCTION															
MODE		Tutorials															
CLO		CLO2: Solve problems of electricity, magnetism, optics and modern physics.															
SLT		F2F (hour):	1	NF2F (hour):	1												
DAY DATE TIME VENUE	CLASS	LEARNING OUTCOME	T&L STRATEGIES & TOOLS	REFLECTION	REMARKS												
<div><div>K2T3 (Mon); K2T4A (Tues); K2T4B (Tues)</div><div>K2T3 (13/03/2023); K2T4 (14/03/2023)</div><div>K2T3 (3PM - 4PM); K2T4A (2PM - 3PM ); K2T4B (3PM - 4PM)</div><div>K2T3 (DK1); K2T4A (DK2); K2T4B (DK2)</div></div>	K2	5.2b: State and use Faraday's Law, Refer to equation 43 from appendix A. 5.2c: State and use Lenz's law to determine the direction of induced current	Class Discussion & Sample Problem Practice	<table><tr><td>ITEM *Appendix</td><td>SCORE</td></tr><tr><td>i</td><td>3</td></tr><tr><td>ii</td><td>4</td></tr><tr><td>iii</td><td>4</td></tr><tr><td>iv</td><td>4</td></tr><tr><td>v</td><td>4</td></tr></table>	ITEM *Appendix	SCORE	i	3	ii	4	iii	4	iv	4	v	4	All objectives achieved. Students are able to understand the materials of the topic.
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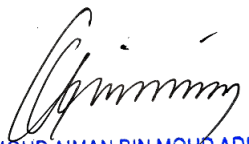
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**SEMESTER II SESSION 2022/2023**

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<b>WEEK</b>		10																			
<b>CHAPTER</b>		5: ELECTROMAGNETIC INDUCTION																			
<b>MODE</b>		Tutorials																			
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<b>DAY DATE TIME VENUE</b>	<b>CLASS</b>	<b>LEARNING OUTCOME</b>	<b>T&amp;L STRATEGIES &amp; TOOLS</b>	<b>REFLECTION</b>	<b>REMARKS</b>																
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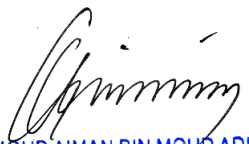
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<b>WEEK</b>		10															
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<b>MODE</b>		Tutorials															
<b>CLO</b>		CLO2: Solve problems of electricity, magnetism, optics and modern physics.															
<b>SLT</b>		<b>F2F (hour):</b>	1	<b>NF2F (hour):</b>	1												
<b>DAY DATE TIME VENUE</b>	<b>CLASS</b>	<b>LEARNING OUTCOME</b>	<b>T&amp;L STRATEGIES &amp; TOOLS</b>	<b>REFLECTION</b>	<b>REMARKS</b>												
<div><div>K2T3 (Thurs); K2T4A (Thurs); K2T4B (Thurs)</div><div>K2 (16/03/2023)</div><div>K2T3 (9AM - 10AM); K2T4A (12PM - 1PM); K2T4B (11AM -12PM)</div><div>K2T3 (DK2); K2T4A (BT1); K2T4B (BT1)</div></div>	K2	5.3b: Apply self inductance for coil and solenoid. Refer to equations 49-51 from appendix A.	Class Discussion & Sample Problem Practice	<table><tr><td><b>ITEM *Appendix</b></td><td><b>SCORE</b></td></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>4</td></tr><tr><td>v</td><td>4</td></tr></table>	<b>ITEM *Appendix</b>	<b>SCORE</b>	i	4	ii	3	iii	3	iv	4	v	4	All objectives achieved. Students are able to understand the materials of the topic.
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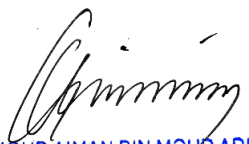
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LECTURER		SHAFIQ RASULAN															
CODE / COURSE		SP025															
WEEK		11															
CHAPTER		5: ELECTROMAGNETIC INDUCTION															
MODE		Tutorials															
CLO		CLO2: Solve problems of electricity, magnetism, optics and modern physics.															
SLT		F2F (hour):	1	NF2F (hour):	1												
DAY DATE TIME VENUE	CLASS	LEARNING OUTCOME	T&L STRATEGIES & TOOLS	REFLECTION	REMARKS												
<div><div>K2T3 (Mon); K2T4A (Tues); K2T4B (Tues)</div><div>K2T3 (20/03/2023); K2T4 (21/03/2023)</div><div>K2T3 (3PM - 4PM); K2T4A (2PM - 3PM ); K2T4B (3PM - 4PM)</div><div>K2T3 (DK1); K2T4A (DK2); K2T4B (DK2)</div></div>	K2	5.4a: Apply the energy stored in an inductor, Refer to equation 52 from appendix A.	Class Discussion & Sample Problem Practice	<table><tr><td>ITEM <i>*Appendix</i></td><td>SCORE</td></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>4</td></tr><tr><td>iv</td><td>4</td></tr><tr><td>v</td><td>4</td></tr></table>	ITEM <i>*Appendix</i>	SCORE	i	4	ii	3	iii	4	iv	4	v	4	All objectives achieved. Students are able to understand the materials of the topic.
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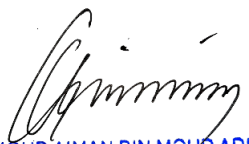
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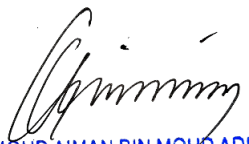
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<b>WEEK</b>		11															
<b>CHAPTER</b>		6: ALTERNATING CURRENT															
<b>MODE</b>		Tutorials															
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<div><div>K2T3 (Thurs); K2T4A (Thurs); K2T4B (Thurs)</div><div>K2 (23/03/2023)</div><div>K2T3 (9AM - 10AM); K2T4A (12PM - 1PM); K2T4B (11AM -12PM)</div><div>K2T3 (DK2); K2T4A (BT1); K2T4B (BT1)</div></div>	K2	6.1c: Use sinusoidal voltage and current equations. Refer to equations 54 & 55 from appendix A.	Class Discussion & Sample Problem Practice	<table><tr><td><b>ITEM *Appendix</b></td><td><b>SCORE</b></td></tr><tr><td>i</td><td>3</td></tr><tr><td>ii</td><td>4</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>3</td></tr><tr><td>v</td><td>4</td></tr></table>	<b>ITEM *Appendix</b>	<b>SCORE</b>	i	3	ii	4	iii	3	iv	3	v	4	All objectives achieved. Students are able to understand the materials of the topic.
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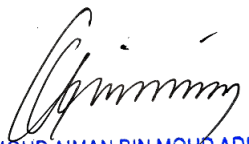
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WEEK		12															
CHAPTER		6: ALTERNATING CURRENT															
MODE		Tutorials															
CLO		CLO2: Solve problems of electricity, magnetism, optics and modern physics.															
SLT		F2F (hour):	1	NF2F (hour):	1												
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<div><div>K2T3 (Mon); K2T4A (Tues); K2T4B (Tues)</div><div>K2T3 (27/03/2023); K2T4 (28/03/2023)</div><div>K2T3 (3PM - 4PM); K2T4A (2PM - 3PM ); K2T4B (3PM - 4PM)</div><div>K2T3 (DK1); K2T4A (DK2); K2T4B (DK2)</div></div>	K2	6.2b: Use equations for rms voltage and rms current. Refer to equations 56-57 from appendix A.	Class Discussion & Sample Problem Practice	<table><tr><td>ITEM <i>*Appendix</i></td><td>SCORE</td></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>4</td></tr><tr><td>v</td><td>3</td></tr></table>	ITEM <i>*Appendix</i>	SCORE	i	4	ii	3	iii	3	iv	4	v	3	All objectives achieved. Students are able to understand the materials of the topic.
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 KOLEJ MATRIKULASI SARAWAK  
 KEMENTERIAN PENDIDIKAN MALAYSIA

Endorsed by,

  
**MOHD AIMAN BIN MOHD ADLI**  
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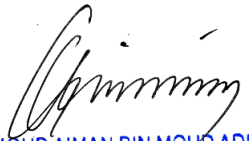
**KOLEJ MATRIKULASI SARAWAK**  
**LESSON PLAN**  
**SEMESTER II SESSION 2022/2023**

LECTURER		SHAFIQ RASULAN															
CODE / COURSE		SP025															
WEEK		12															
CHAPTER		6: ALTERNATING CURRENT															
MODE		Tutorials															
CLO		CLO2: Solve problems of electricity, magnetism, optics and modern physics.															
SLT		F2F (hour):	1	NF2F (hour):	1												
DAY DATE TIME VENUE	CLASS	LEARNING OUTCOME	T&L STRATEGIES & TOOLS	REFLECTION	REMARKS												
<div><div>K2T3 (Wed); K2T4A (Wed); K2T4B (Wed)</div><div>K2 (29/03/2023)</div><div>K2T3 (2PM - 3PM ); K2T4A (11AM -12PM); K2T4B (12PM - 1PM)</div><div>K2T3 (BT1); K2T4A (MF); K2T4B (MF)</div></div>	K2	6.3a: Sketch and use phasor diagram and sinusoidal waveform to show the phase relationship between current and voltage for a single component circuit of resistor, capacitor, and inductor 6.3b: Use phasor diagram to analyse voltage, current, and impedance of series circuit of RL, RC and RLC.	Class Discussion & Sample Problem Practice	<table><tr><td>ITEM *Appendix</td><td>SCORE</td></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>4</td></tr><tr><td>iii</td><td>4</td></tr><tr><td>iv</td><td>4</td></tr><tr><td>v</td><td>3</td></tr></table>	ITEM *Appendix	SCORE	i	4	ii	4	iii	4	iv	4	v	3	All objectives achieved. Students are able to understand the materials of the topic.
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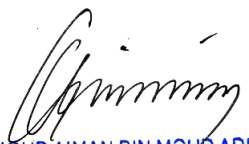
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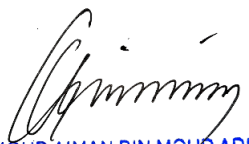
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<div><div>K2T3 (Mon); K2T4A (Tues); K2T4B (Tues)</div><div>K2T3 (03/04/2023); K2T4 (04/04/2023)</div><div>K2T3 (3PM - 4PM); K2T4A (2PM - 3PM ); K2T4B (3PM - 4PM)</div><div>K2T3 (DK1); K2T4A (DK2); K2T4B (DK2)</div></div>	K2	6.4a: Apply in AC circuit consisting of R, RC, RL and RLC in series average power (also known as power loss that only occurs in resistor), instantaneous power, and power factor. Refer to equations 63-65 from appendix A.	Class Discussion & Sample Problem Practice	<table><tr><td>ITEM <i>*Appendix</i></td><td>SCORE</td></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>4</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>3</td></tr><tr><td>v</td><td>4</td></tr></table>	ITEM <i>*Appendix</i>	SCORE	i	4	ii	4	iii	3	iv	3	v	4	All objectives achieved. Students are able to understand the materials of the topic.
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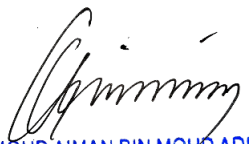
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**SEMESTER II SESSION 2022/2023**

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<b>CLO</b>		CLO2: Solve problems of electricity, magnetism, optics and modern physics.															
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<b>DAY DATE TIME VENUE</b>	<b>CLASS</b>	<b>LEARNING OUTCOME</b>	<b>T&amp;L STRATEGIES &amp; TOOLS</b>	<b>REFLECTION</b>	<b>REMARKS</b>												
<div><div>K2T3 (Wed); K2T4A (Wed); K2T4B (Wed) K2 (05/04/2023) K2T3 (2PM - 3PM ); K2T4A (11AM -12PM); K2T4B (12PM - 1PM) K2T3 (BT1); K2T4A (MF); K2T4B (MF)</div></div>	K2	7.1a: State radius of curvature for spherical mirror. Refer to equation 66 from appendix A. 7.1c: Use mirror equation, for real object only, (positive f and R for concave mirror; and negative f and R for convex mirror). Refer to equation 67 from appendix A. 7.1d: Apply magnification. Refer to equation 68 from appendix A.	Class Discussion & Sample Problem Practice	<table><tr><td><b>ITEM *Appendix</b></td><td><b>SCORE</b></td></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>3</td></tr><tr><td>v</td><td>4</td></tr></table>	<b>ITEM *Appendix</b>	<b>SCORE</b>	i	4	ii	3	iii	3	iv	3	v	4	All objectives achieved. Students are able to understand the materials of the topic.
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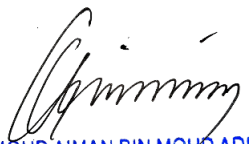
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<div><div>K2T3 (Thurs); K2T4A (Thurs); K2T4B (Thurs)</div><div>K2 (06/04/2023)</div><div>K2T3 (9AM - 10AM); K2T4A (12PM - 1PM); K2T4B (11AM -12PM)</div><div>K2T3 (DK2); K2T4A (BT1); K2T4B (BT1)</div></div>	K2	7.2a: Use equation for spherical surface. (positive R for convex surface; negative R for concave surface). Refer to equation 69 from appendix A.	Class Discussion & Sample Problem Practice	<table><tr><td><b>ITEM *Appendix</b></td><td><b>SCORE</b></td></tr><tr><td>i</td><td>3</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>4</td></tr><tr><td>v</td><td>3</td></tr></table>	<b>ITEM *Appendix</b>	<b>SCORE</b>	i	3	ii	3	iii	3	iv	4	v	3	All objectives achieved. Students are able to understand the materials of the topic.
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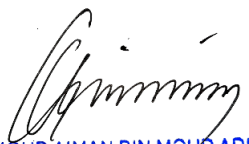
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DAY DATE TIME VENUE	CLASS	LEARNING OUTCOME	T&L STRATEGIES & TOOLS	REFLECTION	REMARKS												
<div><div>K2T3 (Mon); K2T4A (Tues); K2T4B (Tues)</div><div>K2T3 (10/04/2023); K2T4 (11/04/2023)</div><div>K2T3 (3PM - 4PM); K2T4A (2PM - 3PM ); K2T4B (3PM - 4PM)</div><div>K2T3 (DK1); K2T4A (DK2); K2T4B (DK2)</div></div>	K2	7.3a: Use thin lens equation, for real object only. : (positive f for convex lens; negative f for concave lens). Refer to equation 67 from appendix A. 7.3b: Determine the focal length of a convex lens (Experiment 5)	Class Discussion & Sample Problem Practice	<table><tr><td>ITEM *Appendix</td><td>SCORE</td></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>4</td></tr><tr><td>iii</td><td>4</td></tr><tr><td>iv</td><td>3</td></tr><tr><td>v</td><td>3</td></tr></table>	ITEM *Appendix	SCORE	i	4	ii	4	iii	4	iv	3	v	3	All objectives achieved. Students are able to understand the materials of the topic.
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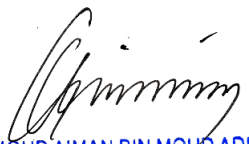
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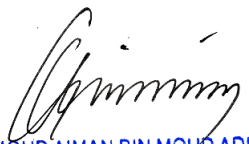
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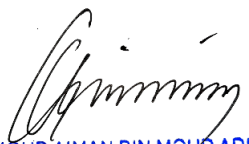
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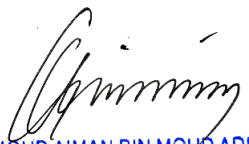
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<b>DAY DATE TIME VENUE</b>	<b>CLASS</b>	<b>LEARNING OUTCOME</b>	<b>T&amp;L STRATEGIES &amp; TOOLS</b>	<b>REFLECTION</b>	<b>REMARKS</b>																
<table border="1"><tr><td>K2T3 (Wed); K2T4A (Wed); K2T4B (Wed)</td></tr><tr><td>K2 (19/04/2023)</td></tr><tr><td>K2T3 (2PM - 3PM ); K2T4A (11AM -12PM); K2T4B (12PM - 1PM)</td></tr><tr><td>K2T3 (BT1); K2T4A (MF); K2T4B (MF)</td></tr></table>	K2T3 (Wed); K2T4A (Wed); K2T4B (Wed)	K2 (19/04/2023)	K2T3 (2PM - 3PM ); K2T4A (11AM -12PM); K2T4B (12PM - 1PM)	K2T3 (BT1); K2T4A (MF); K2T4B (MF)	K2	7.6b: Use equation 73 from appendix A and explain the effect of changing any of the variables.	Class Discussion & Sample Problem Practice	<table border="1"><tr><td><b>ITEM *Appendix</b></td><td><b>SCORE</b></td></tr><tr><td>i</td><td>3</td></tr><tr><td>ii</td><td>4</td></tr><tr><td>iii</td><td>4</td></tr><tr><td>iv</td><td>3</td></tr><tr><td>v</td><td>3</td></tr></table>	<b>ITEM *Appendix</b>	<b>SCORE</b>	i	3	ii	4	iii	4	iv	3	v	3	All objectives achieved. Students are able to understand the materials of the topic.
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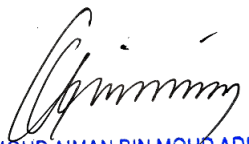
**KOLEJ MATRIKULASI SARAWAK**  
**LESSON PLAN**  
**SEMESTER II SESSION 2022/2023**

<b>LECTURER</b>		SHAFIQ RASULAN															
<b>CODE / COURSE</b>		SP025															
<b>WEEK</b>		15															
<b>CHAPTER</b>		7: OPTICS															
<b>MODE</b>		Tutorials															
<b>CLO</b>		CLO2: Solve problems of electricity, magnetism, optics and modern physics.															
<b>SLT</b>		<b>F2F (hour):</b>	1	<b>NF2F (hour):</b>	1												
<b>DAY DATE TIME VENUE</b>	<b>CLASS</b>	<b>LEARNING OUTCOME</b>	<b>T&amp;L STRATEGIES &amp; TOOLS</b>	<b>REFLECTION</b>	<b>REMARKS</b>												
<div><div>K2T3 (Thurs); K2T4A (Thurs); K2T4B (Thurs)</div><div>K2 (20/04/2023)</div><div>K2T3 (9AM - 10AM); K2T4A (12PM - 1PM); K2T4B (11AM -12PM)</div><div>K2T3 (DK2); K2T4A (BT1); K2T4B (BT1)</div></div>	K2	7.7a: Identify the occurrence of phase change upon reflection. (from lower to higher refractive index, phase change = $\pi$ rad or path difference = $0.5 \times \text{wavelength}$ ) 7.7c: Use the following equations for reflected light with no phase difference (non-reflective coating) – Constructive interference (equation 74), Destructive interference (equation 75). Refer to equations 74-75 from appendix A.	Class Discussion & Sample Problem Practice	<table><tr><th>ITEM <i>*Appendix</i></th><th>SCORE</th></tr><tr><td>i</td><td>3</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>4</td></tr><tr><td>iv</td><td>3</td></tr><tr><td>v</td><td>4</td></tr></table>	ITEM <i>*Appendix</i>	SCORE	i	3	ii	3	iii	4	iv	3	v	4	All objectives achieved. Students are able to understand the materials of the topic.
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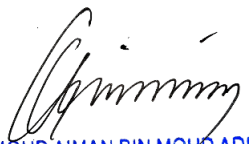
**KOLEJ MATRIKULASI SARAWAK**  
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**SEMESTER II SESSION 2022/2023**

LECTURER		SHAFIQ RASULAN															
CODE / COURSE		SP025															
WEEK		16															
CHAPTER		7: OPTICS															
MODE		Tutorials															
CLO		CLO2: Solve problems of electricity, magnetism, optics and modern physics.															
SLT		F2F (hour):	1	NF2F (hour):	1												
DAY DATE TIME VENUE	CLASS	LEARNING OUTCOME	T&L STRATEGIES & TOOLS	REFLECTION	REMARKS												
<div><div>K2T3 (Mon); K2T4A (Tues); K2T4B (Tues)</div><div>K2T3 (24/04/2023); K2T4 (25/04/2023)</div><div>K2T3 (3PM - 4PM); K2T4A (2PM - 3PM ); K2T4B (3PM - 4PM)</div><div>K2T3 (DK1); K2T4A (DK2); K2T4B (DK2)</div></div>	K2	7.7d: Use the following equations for reflected light of phase difference $\pi$ rad (reflective coating) – Constructive interference (equation 75 ), Destructive interference (equation 74). Refer to equations 74 - 75from appendix A.	Class Discussion & Sample Problem Practice	<table><tr><td>ITEM <i>*Appendix</i></td><td>SCORE</td></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>4</td></tr><tr><td>iii</td><td>4</td></tr><tr><td>iv</td><td>4</td></tr><tr><td>v</td><td>3</td></tr></table>	ITEM <i>*Appendix</i>	SCORE	i	4	ii	4	iii	4	iv	4	v	3	All objectives achieved. Students are able to understand the materials of the topic.
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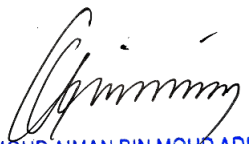
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<b>WEEK</b>		16															
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<b>MODE</b>		Tutorials															
<b>CLO</b>		CLO2: Solve problems of electricity, magnetism, optics and modern physics.															
<b>SLT</b>		<b>F2F (hour):</b>	1	<b>NF2F (hour):</b>	1												
<b>DAY DATE TIME VENUE</b>	<b>CLASS</b>	<b>LEARNING OUTCOME</b>	<b>T&amp;L STRATEGIES &amp; TOOLS</b>	<b>REFLECTION</b>	<b>REMARKS</b>												
<div><div>K2T3 (Wed); K2T4A (Wed); K2T4B (Wed)</div><div>K2 (26/04/2023)</div><div>K2T3 (2PM - 3PM ); K2T4A (11AM -12PM); K2T4B (12PM - 1PM)</div><div>K2T3 (BT1); K2T4A (MF); K2T4B (MF)</div></div>	K2	7.8a: Define diffraction. 7.8c: Use equation for dark fringes (minima) and equation for bright fringes (maxima), where $m = \pm 1, \pm 2, \pm 3, \dots$ Refer to equations 76-77 from appendix A.	Class Discussion & Sample Problem Practice	<table><tr><td><b>ITEM</b> <i>*Appendix</i></td><td><b>SCORE</b></td></tr><tr><td><b>i</b></td><td>4</td></tr><tr><td><b>ii</b></td><td>3</td></tr><tr><td><b>iii</b></td><td>4</td></tr><tr><td><b>iv</b></td><td>3</td></tr><tr><td><b>v</b></td><td>4</td></tr></table>	<b>ITEM</b> <i>*Appendix</i>	<b>SCORE</b>	<b>i</b>	4	<b>ii</b>	3	<b>iii</b>	4	<b>iv</b>	3	<b>v</b>	4	All objectives achieved. Students are able to understand the materials of the topic.
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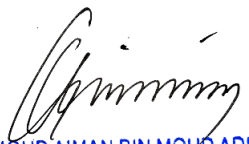
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**SEMESTER II SESSION 2022/2023**

<b>LECTURER</b>		SHAFIQ RASULAN															
<b>CODE / COURSE</b>		SP025															
<b>WEEK</b>		16															
<b>CHAPTER</b>		7: OPTICS															
<b>MODE</b>		Tutorials															
<b>CLO</b>		CLO2: Solve problems of electricity, magnetism, optics and modern physics.															
<b>SLT</b>		<b>F2F (hour):</b>	1	<b>NF2F (hour):</b>	1												
<b>DAY DATE TIME VENUE</b>	<b>CLASS</b>	<b>LEARNING OUTCOME</b>	<b>T&amp;L STRATEGIES &amp; TOOLS</b>	<b>REFLECTION</b>	<b>REMARKS</b>												
<div><div>K2T3 (Thurs); K2T4A (Thurs); K2T4B (Thurs)</div><div>K2 (27/04/2023)</div><div>K2T3 (9AM - 10AM); K2T4A (12PM - 1PM); K2T4B (11AM -12PM)</div><div>K2T3 (DK2); K2T4A (BT1); K2T4B (BT1)</div></div>	K2	7.9b: Apply equation 78 -79 from appendix A	Class Discussion & Sample Problem Practice	<table><tr><td><b>ITEM *Appendix</b></td><td><b>SCORE</b></td></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>4</td></tr><tr><td>v</td><td>4</td></tr></table>	<b>ITEM *Appendix</b>	<b>SCORE</b>	i	4	ii	3	iii	3	iv	4	v	4	All objectives achieved. Students are able to understand the materials of the topic.
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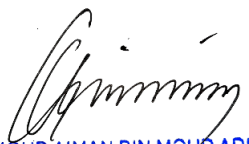
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<b>LECTURER</b>		SHAFIQ RASULAN															
<b>CODE / COURSE</b>		SP025															
<b>WEEK</b>		17															
<b>CHAPTER</b>		8: WAVE PROPERTIES OF PARTICLE															
<b>MODE</b>		Tutorials															
<b>CLO</b>		CLO2: Solve problems of electricity, magnetism, optics and modern physics.															
<b>SLT</b>		<b>F2F (hour):</b>	1	<b>NF2F (hour):</b>	1												
<b>DAY DATE TIME VENUE</b>	<b>CLASS</b>	<b>LEARNING OUTCOME</b>	<b>T&amp;L STRATEGIES &amp; TOOLS</b>	<b>REFLECTION</b>	<b>REMARKS</b>												
<div><div>K2T3 (Mon); K2T4A (Tues); K2T4B (Tues)</div><div>K2T3 (01/05/2023); K2T4 (02/05/2023)</div><div>K2T3 (3PM - 4PM); K2T4A (2PM - 3PM ); K2T4B (3PM - 4PM)</div><div>K2T3 (DK1); K2T4A (DK2); K2T4B (DK2)</div></div>	K2	8.1b: Use de Broglie wavelength, refer to equations 84-85 in Appendix A.	Class Discussion & Sample Problem Practice	<table><tr><td><b>ITEM *Appendix</b></td><td><b>SCORE</b></td></tr><tr><td><b>i</b></td><td>3</td></tr><tr><td><b>ii</b></td><td>3</td></tr><tr><td><b>iii</b></td><td>4</td></tr><tr><td><b>iv</b></td><td>3</td></tr><tr><td><b>v</b></td><td>3</td></tr></table>	<b>ITEM *Appendix</b>	<b>SCORE</b>	<b>i</b>	3	<b>ii</b>	3	<b>iii</b>	4	<b>iv</b>	3	<b>v</b>	3	All objectives achieved. Students are able to understand the materials of the topic.
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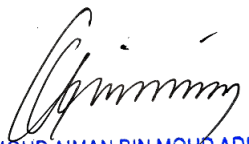
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**SEMESTER II SESSION 2022/2023**

<b>LECTURER</b>		SHAFIQ RASULAN															
<b>CODE / COURSE</b>		SP025															
<b>WEEK</b>		17															
<b>CHAPTER</b>		8: WAVE PROPERTIES OF PARTICLE															
<b>MODE</b>		Tutorials															
<b>CLO</b>		CLO2: Solve problems of electricity, magnetism, optics and modern physics.															
<b>SLT</b>		<b>F2F (hour):</b>	1	<b>NF2F (hour):</b>	1												
<b>DAY DATE TIME VENUE</b>	<b>CLASS</b>	<b>LEARNING OUTCOME</b>	<b>T&amp;L STRATEGIES &amp; TOOLS</b>	<b>REFLECTION</b>	<b>REMARKS</b>												
<div><div>K2T3 (Wed); K2T4A (Wed); K2T4B (Wed)</div><div>K2 (03/05/2023)</div><div>K2T3 (2PM - 3PM ); K2T4A (11AM -12PM); K2T4B (12PM - 1PM)</div><div>K2T3 (BT1); K2T4A (MF); K2T4B (MF)</div></div>	K2	9.1a: Define and use mass defect, equation 87 in Appendix A 9.1b: Define and use binding energy, equation 88 in Appendix A	Class Discussion & Sample Problem Practice	<table><tr><td><b>ITEM</b> <i>*Appendix</i></td><td><b>SCORE</b></td></tr><tr><td><b>i</b></td><td>4</td></tr><tr><td><b>ii</b></td><td>3</td></tr><tr><td><b>iii</b></td><td>3</td></tr><tr><td><b>iv</b></td><td>4</td></tr><tr><td><b>v</b></td><td>3</td></tr></table>	<b>ITEM</b> <i>*Appendix</i>	<b>SCORE</b>	<b>i</b>	4	<b>ii</b>	3	<b>iii</b>	3	<b>iv</b>	4	<b>v</b>	3	All objectives achieved. Students are able to understand the materials of the topic.
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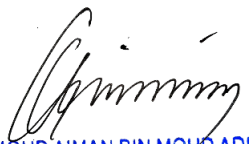
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**SEMESTER II SESSION 2022/2023**

<b>LECTURER</b>		SHAFIQ RASULAN															
<b>CODE / COURSE</b>		SP025															
<b>WEEK</b>		17															
<b>CHAPTER</b>		9: NUCLEAR AND PARTICLE PHYSICS															
<b>MODE</b>		Tutorials															
<b>CLO</b>		CLO2: Solve problems of electricity, magnetism, optics and modern physics.															
<b>SLT</b>		<b>F2F (hour):</b>	1	<b>NF2F (hour):</b>	1												
<b>DAY DATE TIME VENUE</b>	<b>CLASS</b>	<b>LEARNING OUTCOME</b>	<b>T&amp;L STRATEGIES &amp; TOOLS</b>	<b>REFLECTION</b>	<b>REMARKS</b>												
<div><div>K2T3 (Thurs); K2T4A (Thurs); K2T4B (Thurs)</div><div>K2 (04/05/2023)</div><div>K2T3 (9AM - 10AM); K2T4A (12PM - 1PM); K2T4B (11AM -12PM)</div><div>K2T3 (DK2); K2T4A (BT1); K2T4B (BT1)</div></div>	K2	9.1c: Determine binding energy per nucleon, equations 86 & 88 in Appendix A	Class Discussion & Sample Problem Practice	<table><tr><td><b>ITEM *Appendix</b></td><td><b>SCORE</b></td></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>4</td></tr><tr><td>iv</td><td>4</td></tr><tr><td>v</td><td>3</td></tr></table>	<b>ITEM *Appendix</b>	<b>SCORE</b>	i	4	ii	3	iii	4	iv	4	v	3	All objectives achieved. Students are able to understand the materials of the topic.
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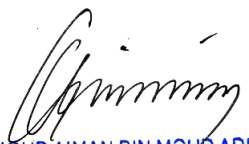
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LECTURER		SHAFIQ RASULAN															
CODE / COURSE		SP025															
WEEK		18															
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MODE		Tutorials															
CLO		CLO2: Solve problems of electricity, magnetism, optics and modern physics.															
SLT		F2F (hour):	1	NF2F (hour):	1												
DAY DATE TIME VENUE	CLASS	LEARNING OUTCOME	T&L STRATEGIES & TOOLS	REFLECTION	REMARKS												
<div><div>K2T3 (Mon); K2T4A (Tues); K2T4B (Tues)</div><div>K2T3 (08/05/2023); K2T4 (09/05/2023)</div><div>K2T3 (3PM - 4PM); K2T4A (2PM - 3PM ); K2T4B (3PM - 4PM)</div><div>K2T3 (DK1); K2T4A (DK2); K2T4B (DK2)</div></div>	K2	9.2b: State and use decay law, equation 89 in Appendix A	Class Discussion & Sample Problem Practice	<table><tr><td>ITEM <i>*Appendix</i></td><td>SCORE</td></tr><tr><td>i</td><td>3</td></tr><tr><td>ii</td><td>4</td></tr><tr><td>iii</td><td>4</td></tr><tr><td>iv</td><td>4</td></tr><tr><td>v</td><td>4</td></tr></table>	ITEM <i>*Appendix</i>	SCORE	i	3	ii	4	iii	4	iv	4	v	4	All objectives achieved. Students are able to understand the materials of the topic.
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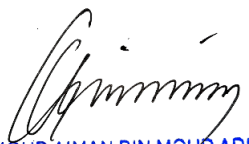
**KOLEJ MATRIKULASI SARAWAK**  
**LESSON PLAN**  
**SEMESTER II SESSION 2022/2023**

<b>LECTURER</b>		SHAFIQ RASULAN															
<b>CODE / COURSE</b>		SP025															
<b>WEEK</b>		18															
<b>CHAPTER</b>		9: NUCLEAR AND PARTICLE PHYSICS															
<b>MODE</b>		Tutorials															
<b>CLO</b>		CLO2: Solve problems of electricity, magnetism, optics and modern physics.															
<b>SLT</b>		<b>F2F (hour):</b>	1	<b>NF2F (hour):</b>	1												
<b>DAY DATE TIME VENUE</b>	<b>CLASS</b>	<b>LEARNING OUTCOME</b>	<b>T&amp;L STRATEGIES &amp; TOOLS</b>	<b>REFLECTION</b>	<b>REMARKS</b>												
<div><div>K2T3 (Wed); K2T4A (Wed); K2T4B (Wed)</div><div>K2 (10/05/2023)</div><div>K2T3 (2PM - 3PM ); K2T4A (11AM -12PM); K2T4B (12PM - 1PM)</div><div>K2T3 (BT1); K2T4A (MF); K2T4B (MF)</div></div>	K2	9.2c: Define and determine activity, A and decay constant, Z. (consider decay curve)	Class Discussion & Sample Problem Practice	<table><tr><td><b>ITEM *Appendix</b></td><td><b>SCORE</b></td></tr><tr><td>i</td><td>3</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>4</td></tr><tr><td>iv</td><td>3</td></tr><tr><td>v</td><td>3</td></tr></table>	<b>ITEM *Appendix</b>	<b>SCORE</b>	i	3	ii	3	iii	4	iv	3	v	3	All objectives achieved. Students are able to understand the materials of the topic.
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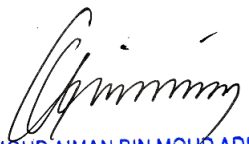
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**SEMESTER II SESSION 2022/2023**

<b>LECTURER</b>		SHAFIQ RASULAN															
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<b>CHAPTER</b>		9: NUCLEAR AND PARTICLE PHYSICS															
<b>MODE</b>		Tutorials															
<b>CLO</b>		CLO2: Solve problems of electricity, magnetism, optics and modern physics.															
<b>SLT</b>		<b>F2F (hour):</b>	1	<b>NF2F (hour):</b>	1												
<b>DAY DATE TIME VENUE</b>	<b>CLASS</b>	<b>LEARNING OUTCOME</b>	<b>T&amp;L STRATEGIES &amp; TOOLS</b>	<b>REFLECTION</b>	<b>REMARKS</b>												
<div><div>K2T3 (Thurs); K2T4A (Thurs); K2T4B (Thurs)</div><div>K2 (11/05/2023)</div><div>K2T3 (9AM - 10AM); K2T4A (12PM - 1PM); K2T4B (11AM -12PM)</div><div>K2T3 (DK2); K2T4A (BT1); K2T4B (BT1)</div></div>	K2	9.2d: Use equations 90 - 91 from appendix A 9.2e: Define and use half-life, equation 92 in Appendix A.	Class Discussion & Sample Problem Practice	<table><tr><td><b>ITEM *Appendix</b></td><td><b>SCORE</b></td></tr><tr><td>i</td><td>3</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>3</td></tr><tr><td>v</td><td>4</td></tr></table>	<b>ITEM *Appendix</b>	<b>SCORE</b>	i	3	ii	3	iii	3	iv	3	v	4	All objectives achieved. Students are able to understand the materials of the topic.
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**LABS**

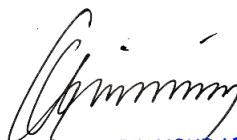
**KOLEJ MATRIKULASI SARAWAK**  
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**SEMESTER II SESSION 2022/2023**

LECTURER		SHAFIQ RASULAN															
CODE / COURSE		SP025															
WEEK		2															
CHAPTER		2: CAPACITORS AND DIELECTRICS															
MODE		Practical															
CLO		CLO3: Apply the appropriate scientific laboratory skills in physics experiments															
SLT		F2F (hour):	2	NF2F (hour):	-												
DAY DATE TIME VENUE	CLASS	LEARNING OUTCOMES	T&L STRATEGIES & TOOLS	REFLECTION	REMARKS												
<div>K2T4 (Tuesday); K2T3 (Friday)</div> <div>K2T4 (13/01/2023); K2T3 (10/01/2023)</div> <div>K2T4 (11am - 12pm); K2T3 (9am-11am)</div> <div>K2T4 (Makmal Fizik); K2T3 (Makmal Fizik)</div>	K2	1: Capacitor 2.2d: Determine the time constant of an RC Circuit. 2.2e: Determine the capacitance of a capacitor using an RC Circuit	Experimental Work	<table><tr><td>ITEM <i>*Appendix</i></td><td>SCORE</td></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>4</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>4</td></tr><tr><td>v</td><td>4</td></tr></table>	ITEM <i>*Appendix</i>	SCORE	i	4	ii	4	iii	3	iv	4	v	4	All objectives achieved. Students are able to understand the materials of the topic.
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LECTURER		SHAFIQ RASULAN															
CODE / COURSE		SP025															
WEEK		5															
CHAPTER		3: ELECTRIC CURRENT AND DIRECT CURRENT CIRCUITS															
MODE		Practical															
CLO		CLO3: Apply the appropriate scientific laboratory skills in physics experiments															
SLT		F2F (hour):	2	NF2F (hour):	-												
DAY DATE TIME VENUE	CLASS	LEARNING OUTCOMES	T&L STRATEGIES & TOOLS	REFLECTION	REMARKS												
<div>K2T4 (Tuesday); K2T3 (Friday)</div> <div>K2T4 (03/02/2023); K2T3 (31/01/2023)</div> <div>K2T4 (11am - 12pm); K2T3 (9am-11am)</div> <div>K2T4 (Makmal Fizik); K2T3 (Makmal Fizik)</div>	K2	2: Ohm's Law 3.2c: Sketch V-I graph 3.2d: Verify Ohm's Law 3.2e: Determine the effective resistance of resistors in series and parallel by graphing method.	Experimental Work	<table><tr><td>ITEM <i>*Appendix</i></td><td>SCORE</td></tr><tr><td>i</td><td>3</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>4</td></tr><tr><td>iv</td><td>3</td></tr><tr><td>v</td><td>3</td></tr></table>	ITEM <i>*Appendix</i>	SCORE	i	3	ii	3	iii	4	iv	3	v	3	All objectives achieved. Students are able to understand the materials of the topic.
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**LESSON PLAN**  
**SEMESTER II SESSION 2022/2023**

LECTURER		SHAFIQ RASULAN															
CODE / COURSE		SP025															
WEEK		6															
CHAPTER		3: ELECTRIC CURRENT AND DIRECT CURRENT CIRCUITS															
MODE		Practical															
CLO		CLO3: Apply the appropriate scientific laboratory skills in physics experiments															
SLT		F2F (hour):	2	NF2F (hour):	-												
DAY DATE TIME VENUE	CLASS	LEARNING OUTCOMES	T&L STRATEGIES & TOOLS	REFLECTION	REMARKS												
<div>K2T4 (Tuesday); K2T3 (Friday)</div> <div>K2T4 (10/02/2023); K2T3 (07/02/2023)</div> <div>K2T4 (11am - 12pm); K2T3 (9am-11am)</div> <div>K2T4 (Makmal Fizik); K2T3 (Makmal Fizik)</div>	K2	3: Potentiometer  3.9c: Determine the internal resistance of a dry cell by using potentiometer	Experimental Work	<table><tr><th>ITEM *Appendix</th><th>SCORE</th></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>4</td></tr><tr><td>iii</td><td>3</td></tr><tr><td>iv</td><td>4</td></tr><tr><td>v</td><td>3</td></tr></table>	ITEM *Appendix	SCORE	i	4	ii	4	iii	3	iv	4	v	3	All objectives achieved. Students are able to understand the materials of the topic.
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LECTURER		SHAFIQ RASULAN															
CODE / COURSE		SP025															
WEEK		8															
CHAPTER		4: MAGNETISM															
MODE		Practical															
CLO		CLO3: Apply the appropriate scientific laboratory skills in physics experiments															
SLT		F2F (hour):	2	NF2F (hour):	-												
DAY DATE TIME VENUE	CLASS	LEARNING OUTCOMES	T&L STRATEGIES & TOOLS	REFLECTION	REMARKS												
<div><div>K2T4 (Tuesday); K2T3 (Friday)</div><div>K2T4 (24/02/2023); K2T3 (21/02/2023)</div><div>K2T4 (11am - 12pm); K2T3 (9am-11am)</div><div>K2T4 (Makmal Fizik); K2T3 (Makmal Fizik)</div></div>	K2	4: Magnetic Field  4.1d: Determine the horizontal component of the earth magnetic field.	Experimental Work	<table><tr><td>ITEM *Appendix</td><td>SCORE</td></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>4</td></tr><tr><td>iv</td><td>3</td></tr><tr><td>v</td><td>3</td></tr></table>	ITEM *Appendix	SCORE	i	4	ii	3	iii	4	iv	3	v	3	All objectives achieved. Students are able to understand the materials of the topic.
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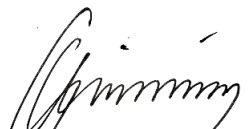
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LECTURER		SHAFIQ RASULAN															
CODE / COURSE		SP025															
WEEK		10															
CHAPTER		7: OPTICS															
MODE		Practical															
CLO		CLO3: Apply the appropriate scientific laboratory skills in physics experiments															
SLT		F2F (hour):	2	NF2F (hour):	-												
DAY DATE TIME VENUE	CLASS	LEARNING OUTCOMES	T&L STRATEGIES & TOOLS	REFLECTION	REMARKS												
<div>K2T4 (Tuesday); K2T3 (Friday)</div> <div>K2T4 (17/03/2023); K2T3 (14/03/2023)</div> <div>K2T4 (11am - 12pm); K2T3 (9am-11am)</div> <div>K2T4 (Makmal Fizik); K2T3 (Makmal Fizik)</div>	K2	5: Geometrical Optics  7.3b: Determine the focal length of a convex lens (Experiment 5).	Experimental Work	<table><tr><td>ITEM <i>*Appendix</i></td><td>SCORE</td></tr><tr><td>i</td><td>4</td></tr><tr><td>ii</td><td>3</td></tr><tr><td>iii</td><td>4</td></tr><tr><td>iv</td><td>4</td></tr><tr><td>v</td><td>3</td></tr></table>	ITEM <i>*Appendix</i>	SCORE	i	4	ii	3	iii	4	iv	4	v	3	All objectives achieved. Students are able to understand the materials of the topic.
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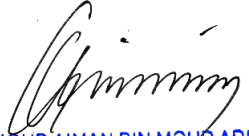
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LECTURER		SHAFIQ RASULAN															
CODE / COURSE		SP025															
WEEK		11															
CHAPTER		7: OPTICS															
MODE		Practical															
CLO		CLO3: Apply the appropriate scientific laboratory skills in physics experiments															
SLT		F2F (hour):	2	NF2F (hour):	-												
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# **APPENDIX A**

## Appendix A.

### LIST OF SELECTED FORMULAE

$$1. \quad F = \frac{Qq}{4\pi\epsilon_0 r^2} = \frac{kQq}{r^2}$$

$$2. \quad E = \frac{F}{q_0}$$

$$3. \quad E = \frac{kQ}{r^2}$$

$$4. \quad V = \frac{W}{q_0}$$

$$5. \quad V = \frac{kQ}{r}$$

$$6. \quad \Delta U = q\Delta V$$

$$7. \quad U = k\left(\frac{q_1 q_2}{r_{12}}\right)$$

$$8. \quad U = k\left(\frac{q_1 q_2}{r_{12}} + \frac{q_1 q_3}{r_{13}} + \frac{q_2 q_3}{r_{23}}\right)$$

$$9. \quad E = \frac{\Delta V}{d}$$

$$10. \quad C = \frac{Q}{V}$$

$$11. \quad \frac{1}{C} = \frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3} + \dots + \frac{1}{C_n}$$

$$12. \quad C = C_1 + C_2 + C_3 + \dots + C_n$$

$$13. \quad U = \frac{1}{2}CV^2 = \frac{1}{2}QV = \frac{1}{2}\frac{Q^2}{C}$$

$$14. \quad \tau = RC$$

$$15. \quad Q = Q_0 e^{\frac{-t}{RC}}$$

$$16. \quad Q = Q_0 \left(1 - e^{\frac{-t}{RC}}\right)$$

$$17. \quad \epsilon_r = \frac{\epsilon}{\epsilon_0}$$

$$18. \quad C_0 = \frac{\epsilon_0 A}{d}$$

$$19. \quad C = \epsilon_r C_0$$

$$20. \quad I = \frac{dQ}{dt}$$

$$21. \quad Q = ne$$

$$22. \quad V = IR$$

$$23. \quad \rho = \frac{RA}{l}$$

$$24. \quad R = R_0 [1 + \alpha(T - T_0)]$$

$$25. \quad V = \mathcal{E} - Ir$$

$$26. \quad R = R_1 + R_2 + R_3 + \dots + R_n$$

$$27. \quad \frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \dots + \frac{1}{R_n}$$

$$28. \quad P = IV, P = I^2 R, P = \frac{V^2}{R}$$

$$29. \quad E = IVt$$

$$30. \quad V_1 = \left(\frac{R_1}{R_1 + R_2 + \dots + R_n}\right)V$$

$$31. \quad \frac{\varepsilon_1}{\varepsilon_2} = \frac{l_1}{l_2}$$

$$32. \quad B = \frac{\mu_o I}{2\pi r}$$

$$33. \quad B = \frac{\mu_o I}{2r}$$

$$34. \quad B = \mu_o nI$$

$$35. \quad B = \frac{1}{2} \mu_o nI$$

$$36. \quad F = qvB \sin \theta$$

$$37. \quad F = IlB \sin \theta$$

$$38. \quad \frac{F}{l} = \frac{\mu_o I_1 I_2}{2\pi d}$$

$$39. \quad \tau = NIAB \sin \theta$$

$$40. \quad v = \frac{E}{B}$$

$$41. \quad \phi = BA \cos \theta$$

$$42. \quad \Phi = N\phi$$

$$43. \quad \varepsilon = -\frac{d\phi}{dt}$$

$$44. \quad \varepsilon = Blv \sin \theta$$

$$45. \quad \varepsilon = -NA \frac{dB}{dt}$$

$$46. \quad \varepsilon = -NB \frac{dA}{dt}$$

$$47. \quad \varepsilon = NAB\omega \sin \omega t$$

$$48. \quad \varepsilon = -L \left( \frac{dI}{dt} \right)$$

$$49. \quad L = \frac{N\phi}{I}$$

$$50. \quad L_{\text{coil}} = \frac{\mu_o N^2 A}{2r}$$

$$51. \quad L_{\text{solenoid}} = \frac{\mu_o N^2 A}{l}$$

$$52. \quad U = \frac{1}{2} LI^2$$

$$53. \quad M = \frac{\mu_o N_1 N_2 A}{l}$$

$$54. \quad V = V_o \sin \omega t$$

$$55. \quad I = I_o \sin \omega t$$

$$56. \quad I_{\text{rms}} = \frac{I_o}{\sqrt{2}}$$

$$57. \quad V_{\text{rms}} = \frac{V_o}{\sqrt{2}}$$

$$58. \quad X_C = \frac{1}{2\pi fC}$$

$$59. \quad X_L = 2\pi fL$$

$$60. \quad Z = \sqrt{R^2 + (X_L - X_C)^2}$$

$$61. \quad \phi = \tan^{-1} \left( \frac{X_L - X_C}{R} \right)$$

$$62. \quad \cos \phi = \frac{R}{Z}$$

$$63. \quad P_{\text{av}} = I_{\text{rms}} V_{\text{rms}} \cos \phi$$

$$64. \quad P_{\text{inst}} = IV$$

$$65. \quad \cos \phi = \frac{P_r}{P_a} = \frac{P_{\text{av}}}{I_{\text{rms}} V_{\text{rms}}}$$

$$66. \quad R = 2f$$

$$67. \quad \frac{1}{f} = \frac{1}{u} + \frac{1}{v}$$

$$68. \quad m = \frac{h_i}{h_o} = -\frac{v}{u}$$

$$69. \quad \frac{n_1}{u} + \frac{n_2}{v} = \frac{n_2 - n_1}{R}$$

$$70. \quad \frac{1}{f} = \left( \frac{n_{\text{material}}}{n_{\text{medium}}} - 1 \right) \left( \frac{1}{R_1} - \frac{1}{R_2} \right)$$

$$71. \quad y_m = \frac{m\lambda D}{d}$$

$$72. \quad y_m = \frac{\left( m + \frac{1}{2} \right) \lambda D}{d}$$

$$73. \quad \Delta y = \frac{\lambda D}{d}$$

$$74. \quad 2nt = m\lambda$$

$$75. \quad 2nt = \left( m + \frac{1}{2} \right) \lambda$$

$$76. \quad y_n = \frac{n\lambda D}{a}$$

$$77. \quad y_n = \frac{\left( n + \frac{1}{2} \right) \lambda D}{a}$$

$$78. \quad d \sin \theta = n\lambda$$

$$79. \quad d = \frac{1}{N}$$

$$80. \quad E = hf = \frac{hc}{\lambda}$$

$$81. \quad \frac{1}{2} mv_{\text{max}}^2 = eV_s = hf - hf_o$$

$$82. \quad W_o = hf_o$$

$$83. \quad K_{\text{max}} = eV_s = hf - W_o$$

$$84. \quad \lambda = \frac{h}{p}$$

$$85. \quad \lambda = \frac{h}{\sqrt{2meV}}$$

$$86. \quad A = Z + N$$

$$87. \quad \Delta m = (Zm_p + Nm_n) - m_{\text{nucleus}}$$

$$88. \quad E_B = \Delta mc^2$$

$$89. \quad \frac{dN}{dt} = -\lambda N$$

$$90. \quad N = N_o e^{-\lambda t}$$

$$91. \quad A = A_o e^{-\lambda t}$$

$$92. \quad T_{\frac{1}{2}} = \frac{\ln 2}{\lambda}$$