

**MATA KULIAH: KIMIA 1(3 SKS)  
SEMESTER GASAL 2020/2021**  
**Pembagian Waktu tatap Muka di Kelas oleh Dosen Pengampu**

**Course: Chemistry I (3 Credits)  
FALL 2020/2021**  
**Face to Face Time Allocation by Lecturers**

<b>Minggu Ke Week</b>	<b>Pertemuan ke Meeting</b>	<b>Materi Kuliah Course Material</b>	
<b>1</b>	<b>1</b>	<p><i>Rencana Pembelajaran/Kontrak Kuliah Proses Analisis Materi (unsur, senyawa, sifat Kimia, Fisika)</i></p> <p><i>Lesson Plan / Course Contract Material Analysis Process (elements, compounds, chemical and physics properties)</i></p>	<p><i>Mahasiswa mampu menjelaskan prinsip-prinsip dasar kimia, meliputi Konsep Dasar Kimia</i></p> <p><i>Students are able to explain the basic principles of chemistry, including the basic concepts of chemistry</i></p>
	<b>2</b>	<p><i>Hukum dasar penggabungan unsur (Proust, Lavoisier, Dalton)/ Perkembangan model dan struktur atomi</i></p> <p><i>Basic law of elements compounding (Proust, Lavoisier, Dalton) / atomic models and structures development</i></p>	
<b>2</b>	<b>3</b>	<p><i>Lanjutan Perkembangan model atom dan percobaan yang mendasarinya (Dalton, Thompson, Rutherford, Bohr dan Spektrum Atom H<sub>2</sub>.)</i></p> <p><i>Continued development of the atomic model and the experiments that underlied (Dalton, Thompson, Rutherford, Bohr and H<sub>2</sub> atom spectrum)</i></p>	<p><i>Mahasiswa mampu menjelaskan prinsip-prinsip dasar kimia, meliputi Model dan Struktur Atom</i></p> <p><i>Students are able to explain the basic principles of chemistry, including Atomic Model and Structure</i></p>
	<b>4</b>	<p><i>Konfigurasi elektron suatu unsur dan ion Sistem dan Sifat Periodik Unsur</i> <b>Latihan / diskusi</b></p> <p><i>Elements and ions electron configuration The Periodic System and Properties of the Elements</i> <b>Exercise / discussion</b></p>	
<b>3</b>	<b>5</b>	<p><i>Satuan Konsentrasi (M, m, N, F, %, ppm, ppb) Perhitungan konsep mol Rumus empiris dan rumus molekul Latihan soal</i></p> <p><i>Concentration units (M, m, N, F, %, ppm, ppb) Mole concept calculation Empirical and molecular formula</i></p>	<p><i>Mahasiswa mampu menjelaskan prinsip-prinsip dasar kimia, meliputi Konfigurasi Elektron dan sifat sistem periodik unsur</i></p> <p><i>Students are able to explain the basic principles of chemistry, including Electron</i></p>

		<i>Exercise</i>	<i>Configuration and the properties of the periodic system of elements</i> Konsep Mol, Stoikhiometri dan Sifat Koligatif Larutan
	<b>6</b>	<i>Stoikhiometri dalam Larutan</i> <i>Latihan soal</i>  <i>Stoichiometry in solutions</i> <i>Exercise</i>	<i>Mole concept, Stoichiometry and solution colligative properties</i>
<b>4</b>	<b>7</b>	<i>Ikatan Kimia, ionic, kovalen momen dipol, ikatan logam, ikatan hidrogen, dan ikatan Van der Waals</i> <i>Latihan Soal</i>  <i>Chemical bonds, ionic, dipole moment covalent, metallic bonding, hydrogen bonding, and Van der Waals bonding</i> <i>Exercise</i>	Mahasiswa mampu menjelaskan prinsip-prinsip dasar kimia, meliputi Ikatan Kimia  <i>Students are able to explain the basic principles of chemistry, including Chemical Bonds</i>
	<b>8</b>	<i>Ikatan Kovalen koordinasi Struktur dan bentuk geometri molekul (struktur Lewis, dan hibridisasi)</i> <i>Latihan Soal</i>  <i>Covalent bonds, coordination structure and molecular geometry (Lewis structure and hybridization)</i> <i>Exercise</i>	
<b>5</b>	<b>9</b>	<b>QUIZ Materi sd minggu ke-3/4</b> <b>Quis Materials to 3/4<sup>th</sup> week</b>	
	<b>10</b>	<b>Teori orbital molekul</b> <b>Latihan soal</b>  <b>Molecular orbital theory</b> <b>Exercise</b>	
<b>6</b>	<b>11</b>	Wujud Gas (Hukum-hukum gas dan sifat fisiknya) <i>Latihan soal</i>  <i>Gas state (Gas laws and its physical properties)</i> <i>Exercise</i>	<i>Mahasiswa mampu menjelaskan prinsip-prinsip</i>  <i>Students are able to explain the principles</i>
	<b>12</b>	Wujud Cair (sifat fisik cairan: tekanan uap, titik didih, tegangan permukaan, viskositas, wujud padat kisi kristal kubus sederhana simple cube, kubus berpusat muka face centered cube, kubus berpusat badan body centered cube, indeks Miller, persamaan Bragg)  <i>Liquid state (liquid physical properties: vapor pressure, boiling point, surface tension, viscosity, crystal lattice solid state, simple cube, face centered cube, body centered cube, Miller index, Bragg equation).</i>	<i>dasar kimia meliputi Wujud Zat dan Perubahan Fasa</i>  <i>chemistry base including state of matters and phase changes</i>
<b>7</b>	<b>13</b>	Larutan. Teori Asam Basa (Teori Arrhenius, Brønsted-Lowry, Teori Lewis) Derajat ionisasi dan Tetapan Kekuatan Asam Basa  <i>Solution</i> <i>Acid Base Theory (Arrhenius Theory, Brønsted-Lowry, Lewis Theory) Degree of ionization and Acid</i>	Mahasiswa mampu menjelaskan prinsip-prinsip dasar kimia, meliputi Kesetimbangan Ionik dalam Larutan  <i>Students are able to explain the basic principles of chemistry, including Ionic</i>

		<i>Base Strength Constant</i>	<i>Equilibrium in Solutions</i>
	<b>14</b>	<i>Latihan soal-soal Exercises</i>	
<b>8</b>	<b>15 16</b>	<b><i>ETS Materi minggu ke-4 – ke-6 Mid Term Evaluation Material week 4 – 6</i></b>	
<b>9</b>	<b>17</b>	Larutan Buffer, Ksp, Keseimbangan ionik antara zat padat dan larutan  <i>Buffer solution, Ksp, Ionic equilibrium between solids and solutions</i>	Mahasiswa mampu menjelaskan prinsip-prinsip dasar kimia, meliputi Keseimbangan Kimia  <i>Students are able to explain the basic principles of chemistry, including Chemical Equilibrium</i>
	<b>18</b>	Latihan soal <i>Exercise</i>	
<b>10</b>	<b>19</b>	Konsep termodinamika (prinsip, keadaan dan proses) Hukum I Termodinamika: energi dalam, kerja dan kalor Kapasitas panas, kalorimetri dan entalpi latihan soal  <i>Thermodynamics concept (principles, states and processes) The first law of Thermodynamics: internal energy, work and heat Heat capacity, calorimetry and enthalpy Exercise</i>	Mahasiswa mampu menjelaskan prinsip-prinsip dasar ilmu kimia meliputi,  <i>Students are able to explain the basic principles of chemistry including,</i>
	<b>20</b>	Hukum II Termodinamika dan spontanitas Termokimia serta penggunaannya untuk menjelaskan kespontanan reaksi kimia, Energi bebas Gibbs, Entropi  <i>The second law of Thermodynamics and spontaneity thermochemistry and its use to explain chemical reactions, Gibbs free energy, Entropy</i>	<b><i>Termodinamika Kimia dan Termokimia</i></b>  <i>Chemistry Thermodynamics and Thermochemistry</i>
<b>11</b>	<b>21</b>	Perhitungan yang berkaitan dengan aplikasi mesin Carnot Latihan soal  <i>Calculations related to the Carnot engine application Exercise</i>	
	<b>22</b>	Konsep kinetika kimia Laju dalam reaksi kimia Penentuan laju reaksi, orde dan konstanta laju reaksi  <i>Chemical kinetics concept Rate of chemical reaction Determine reaction rate, order and reaction rate constant</i>	
<b>12</b>	<b>23</b>	Pengaruh suhu pada laju reaksi Reaksi elementer Katalis  <i>Effect of temperature on reaction rate Elementary reaction</i>	

		<i>Catalyst</i>	
	<b>24</b>	Latihan soal <i>Exercise</i>	
<b>13</b>	<b>25</b>	<b>QUIZ</b> <b>Quiz</b>	
	<b>26</b>	Konsep reaksi redoks Sel elektrokimia (elektroda dan larutan elektrolit dalam sel elektrokimia) <i>Latihan soal</i>  <i>Redox reactions concepts</i> <i>Electrochemical cell (electrode and electrolyte solution in electrochemical cell)</i> <i>Exercise</i>	
<b>14</b>	<b>27</b>	Pengaruh konsentrasi dan persamaan Nerst Penggunaan konsep elektrokimia untuk aplikasi sel volta (baterei dan Fuel Cells) serta elektrolisis Aktivitas dan Latihan soal-soal  <i>Concentration effect and Nerst equation</i> <i>Use of electrochemical concepts for voltaic cell applications (battery and fuel cells) as well as electrolysis</i> <i>Activity and exercises</i>	
	<b>28</b>	Latihan soal <i>Exercise</i>	
<b>XV</b>	<b>29,30</b>	<b>EAS</b> <b>Final Term Evaluation</b>	
<b>XVI</b>	<b>31,32</b>	<b>EAS</b> <b>Final Term Evaluation</b>	

## Penilaian

### Assessment

No No	Macam Evaluasi <i>Types of Evaluation</i>	Bobot penilaian <i>Assessment Load</i>
1.	Tugas-tugas (distribusi per bab) <i>Assignments (distribution per chapter)</i>	20 %
2.	Q u i z I <i>Quiz I</i>	15 %
3.	Evaluasi Tengah Semester <i>Mid Term Evaluation</i>	25 %
4.	Q u i z. II <i>Quiz II</i>	15 %
5.	Evaluasi Akhir Semester <i>Final term</i>	25 %

## Daftar Pustaka

### References

Tim Dosen Departemen Kimia ITS. **2019**. *Kimia 1*. edisi kedua. Penerbit Media Bersaudara.