Module Course



UNIVERSITAS JEMBER FACULTY OF AGRICULTURAL TECHNOLOGY DEPARTMENT OF AGRICULTURAL PRODUCT TECHNOLOGY

KODE DOKUMEN

F1.03.05

CO	UR	SE

Module Course		
Name	Basic Chemistry 2	
Kode	TPU 1202	
Credit (SKS)	2 SKS Face to Face; 0 SKS Practice	
Semester	2	

Person(s) Teaching

- Ir. Mukhammad Fauzi, M.Si.
- Prof. Ir. Achmad Subagio, MAgr. Ph.D.
- Dwi Indarti, SSi., MSi.

DESCRIPTION OF COURSE

This course discusses Metrology in Chemistry, Introduction to Measurement, Solutions and Colloids, Acid-Base and Ionic Equilibrium, Acid-Base Solubility Equilibrium, Chemical Equilibrium, Reaction Kinetics and Electrochemistry and Electrolysis

Equilibriu	m, Reaction Kinetics and Electrochemistry and Electronysis
LO – Prog	ramme Learning Outcome
No LO	Statement of Learning Outcome (LO)
LO-4	Able to design food products and agricultural products based on local
	agro-industry commodities
LO-7	Able to evaluate chemical, enzymatic, microbiological, physical changes,
	technical functional properties and health functional properties of food and
	agricultural products
Course Le	arning Outcome (CLO)
No CLO	Statement of CLO
CLO-1	Able to apply testing of physical quality, nutrition, microbiology, organoleptic
	and nutritive functional properties of food products and agricultural products
CLO-2	Explain the characteristics of agricultural food ingredients
CLO-3	Describe changes in the characteristics of foodstuffs and agricultural products
	during processing and storage
CLO-4	Explain the principles of testing agricultural products
SUB COU	RSE LEARNING OUTCOME (Sub-CLO)
No	Statement of Sub-CLO
Sub-CLO	
1	Explain the principle of measurement, types of metrology, metrological
	standards, calibration (measurement uncertainty, check between, control
	chart)
2	Explain the concept of measurement, measurement error, precision and
	accuracy, selection of measurement data, statistics in chemical analysis,
	detection limits, writing measurement results

3	Explain the dissolving process, saturated solution and solubility, factors affecting solubility, expression of solution concentration, colligative properties, colloids
4	Explain acids and bases, weak acids, weak bases, ka and kb relationships, Lewis acid-base acids, Bronsted-Lowry acids and bases, acid-base properties of salt solutions, ion-like effects, acid-base titrations, autoionization of water
5	Explain pH and 'p' notation, Ionization constants of acids and bases (Ka and Kb), pH of acids and bases (strong and weak), pH of salt solutions (hydrolysis), Buffer solutions, Polyprotic acids, Titration of acids and bases, Precipitation and separation ion
6	Explain the law of equilibrium, Equilibrium constants of concentration and pressure (Kc and Kp), the direction of equilibrium, Laws of equilibrium for heterogeneous systems, Le Chatelier's principle in chemical equilibrium
7	Able to explain factors that affect reaction rate, catalytic reaction mechanism, calculation of reaction rate, rate law, integrated rate laws, collision theory and phase transition theory of activation energy, reaction mechanism and catalyst
8	Able to explain oxidation numbers and oxidation-reduction reactions, balancing redox reaction equations, voltaic cells, cell potential under standard conditions, free energy and redox reactions, cell potential in non-standard conditions, batteries and fuel cells, corrosion, electrolysis

LEARNING TOPIC

- Metrology in Chemistry
- Introduction to Measurement
- Solutions And Colloids
- Acid-Base And Ionic Equilibrium
- Acid-base Solubility Equilibrium
- Chemical equilibrium
- Reaction Kinetics
- Electrochemistry and Electrolysis

MAIN REFERENCES

- James E. Brady, Frederick A. Senese, 2009, Chemistry: The Study of Matter and Its Changes edisi-5
- Raymond Chang, Kenneth A. Goldsby, 2012, Chemistry, Edisi-11
- Ralph H. Petrucci, William S. Harwood, F. Geoffrey Herring, 2002, General Chemistry: Principles and Modern Applications, edisi-8

ADDITIONAL REFERENCES

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PREREQUISITES COURSE (If any)

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TIMELINE

WEEK(s	Components	Person(s)
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1	Measurement principle, kind of metrology, metrological standard, calibration (measurement uncertainty, check between, control chart)	Ir. Mukhammad Fauzi, M.Si.
2	Measurement principle, kind of metrology, metrological standard, calibration (measurement uncertainty, check between, control chart)	Ir. Mukhammad Fauzi, M.Si.
3	Measurement concepts, measurement error, precision and accuracy, measurement data selection, statistics in chemical analysis, detection limits, writing measurement results	Ir. Mukhammad Fauzi, M.Si.
4	Measurement concepts, measurement error, precision and accuracy, measurement data selection, statistics in chemical analysis, detection limits, writing measurement results	Ir. Mukhammad Fauzi, M.Si.
5	Dissolving process, saturated solution and solubility, factors affecting solubility, expression of solution concentration, colligative properties, colloids	Ir. Mukhammad Fauzi, M.Si.
6	Dissolving process, saturated solution and solubility, factors affecting solubility, expression of solution concentration, colligative properties, colloids	Ir. Mukhammad Fauzi, M.Si.
7	Acids and bases, weak acids, weak bases, ka and kb relationships, lewis acid-base acids, bronsted-lowry acids and bases, acid-base properties of salt solutions, ion-like effects, acid-base titrations, autoionization of water	Prof. Ir. Achmad Subagio, MAgr. Ph.D.
8	Evalution Mid Semester Test	Prof. Ir. Achmad Subagio, MAgr. Ph.D.
9	Ph and 'p' notation, Ionization constants of acids and bases (Ka and Kb), ph of acids and bases (strong and weak), ph of salt solutions (hydrolysis), Buffer solutions, Polyprotic acids, Titration of acids and bases, Precipitation and separation of ions	Prof. Ir. Achmad Subagio, MAgr. Ph.D.
10	Ph and 'p' notation, Ionization constants of acids and bases (Ka and Kb), ph of acids and bases (strong and weak), ph of salt solutions (hydrolysis), Buffer solutions, Polyprotic acids, Titration of acids and bases, Precipitation and separation of ions	Prof. Ir. Achmad Subagio, MAgr. Ph.D.
11	Equilibrium law, Equilibrium constants of concentration and pressure (Kc and Kp), direction of equilibrium, Equilibrium law for heterogeneous systems, Le Chatelier's principle in chemical equilibrium	Prof. Ir. Achmad Subagio, MAgr. Ph.D.
12	Equilibrium law, Equilibrium constants of concentration and pressure (Kc and Kp), direction of equilibrium, Equilibrium law for heterogeneous	Prof. Ir. Achmad Subagio, MAgr. Ph.D.

	systems, Le Chatelier's principle in chemical equilibrium	
13	Factors affecting reaction rate, catalytic reaction mechanism, calculation of reaction rate, rate law, integrated rate laws, collision theory and phase transition theory of activation energy, reaction mechanism and catalyst	Dwi Indarti, SSi., MSi.
14	Factors affecting reaction rate, catalytic reaction mechanism, calculation of reaction rate, rate law, integrated rate laws, collision theory and phase transition theory of activation energy, reaction mechanism and catalyst	Dwi Indarti, SSi., MSi.
15	Oxidation number and oxidation-reduction reactions, balancing redox equations, voltaic cells, cell potential under standard conditions, free energy and redox reactions, cell potentials under non-standard conditions, batteries and fuel cells, corrosion, electrolysis	Dwi Indarti, SSi., MSi.
16	Oxidation number and oxidation-reduction reactions, balancing redox equations, voltaic cells, cell potential under standard conditions, free energy and redox reactions, cell potentials under non-standard conditions, batteries and fuel cells, corrosion, electrolysis	Dwi Indarti, SSi., MSi.

Jember, October 2022

Chief of Department

Person(s) coordinator

Dr. Triana Lindriati, S.T., M.P NIP 3509205408680001 Ir. Mukhammad Fauzi, M.Si NIP 3509210107630117