

Module Course

	UNIVERSITAS JEMBER FACULTY OF AGRICULTURAL TECHNOLOGY DEPARTMENT OF AGRICULTURAL PRODUCT TECHNOLOGY		KODE DOKUMEN F1.03.05
Module Course			
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			
LO – Programme 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 Learning 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 COURSE LEARNING OUTCOME (Sub-CLO)			
No Sub-CLO	Statement of 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, K_a and K_b 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 (K_a and K_b), 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 (K_c and K_p), 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)

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, K_a and K_b 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, MAg. Ph.D.
8	Evaluation Mid Semester Test	Prof. Ir. Achmad Subagio, MAg. Ph.D.
9	Ph and 'p' notation, Ionization constants of acids and bases (K_a and K_b), 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, MAg. Ph.D.
10	Ph and 'p' notation, Ionization constants of acids and bases (K_a and K_b), 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, MAg. Ph.D.
11	Equilibrium law, Equilibrium constants of concentration and pressure (K_c and K_p), direction of equilibrium, Equilibrium law for heterogeneous systems, Le Chatelier's principle in chemical equilibrium	Prof. Ir. Achmad Subagio, MAg. Ph.D.
12	Equilibrium law, Equilibrium constants of concentration and pressure (K_c and K_p), direction of equilibrium, Equilibrium law for heterogeneous	Prof. Ir. Achmad Subagio, MAg. 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

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