UNIVERSITI TEKNOLOGI MARA

AGR101: BASIC SOIL SCIENCE

Course Name (English)	BASIC SOIL SCIENCE APPROVED
Course Code	AGR101
MQF Credit	4
Course Description	This course will interactively engage students cognitively and scientifically in areas of soil physical, chemical and biological properties. Students will define concepts, describe theories verbally and in writing and be able to perform tests in the laboratory and discuss the results. The outcome shall be assessed through a variety of tools which include the traditional paper examination, tests, assignment, classroom discussion and laboratory engagement.
Transferable Skills	Knowledge, Communication, leadership, teamwork, life long learning
Teaching Methodologies	Lectures, Lab Work, Tutorial
CLO	CLO1 State the basic principles of soil science and its relation to plant growth and environment. CLO2 Observe, conduct and discuss the results of scientific investigations in area of soil science. CLO3 Discuss the concepts, principles and theories of soil science.
Pre-Requisite Courses	No course recommendations

Topics
1. Introduction 1.1) 1. Definition of soil, pedon, soil profile, and soil horizons. 1.2) 2. The role and function of soil. 1.3) 3. History of soil. 1.4) 4. Phase and components of soil. 1.5) 5. Fields related to soil science
2. Minerals and Rocks. 2.1) 1. Minerals in soil. 2.2) 2. Rocks cycle. 2.3) 3. Type of rocks.
3. Physical Properties of Soil. 3.1) 1. Soil color and soil texture. 3.2) 2. Soil structure and consistency. 3.3) 3. Soil particle and bulk density 3.4) 4. Soil air: porosity
4. Factors and Processes of Soil Formation. 4.1) 1. Weathering process (physical weathering and chemical weathering). 4.2) 2. Process of soil formation (dissolution, hydrolysis,, hydration, carbonation, oxidation, reduction, eluviation illuviation, 4.3) podzolization, leaching, salination, decompostion). 4.4) 3. Factor of soil formation (parent materials, climate, topography, time and biota).
5. Soil Water. 5.1) 1. Functions of soil water. 5.2) 2. Water holding capacity. 5.3) 3. Soil water condition. 5.4) 4. Measuring soil water content. 5.5) 5. Water movements in soils.

6. Soil Temperature. 6.1) 1. Importance of temperature on soils. 6.2) 2. Source of soil temperature. 6.3) 3. Temperature and its relation to plant growth and soil organism. 6.4) 4. Managing the soil temperature.
7. Soil Chemical Properties. 7.1) 1. Types of clay minerals. 7.2) 2. Sources of charge on clay minerals. 7.3) 3. Concept and definition of Cation Exchange (CE). 7.4) 4. Factors influencing CE, cation exchange capacity (CEC) and base saturation (BS). 7.5) 5. Calculation based on CEC and BS.
8. Soil pH. 8.1) 1. Types of acidity and alkalinity. 8.2) 2. Effects of pH on nutrients availability and soil organisms. 8.3) 3. Factors affecting soil pH. 8.4) 4. Lime requirement. 8.5) 5. Plant nutrients.
9. Soil Biological Characteristics. 9.1) 1. Soil micro and macro organisms. 9.2) 2. Role of organisms in enhancing soil fertility. 9.3) 3. Factors affecting soil organisms. 9.4) 4. Practices that improves soil organisms activity. 9.5) 5. Humus and soil organic matter.

Assessment Breakdown	%
Continuous Assessment	60.00%
Final Assessment	40.00%

Details of Continuous Assessment

Assessment Type	Assessment Description	% of Total Mark	CLO
Presentation	Written and video presentation	20%	CLO3
Test	Online Test	20%	CLO1
Written Report	Virtual Laboratory	20%	CLO2

Reading List	This Course does not have any book resources
Article/Paper List	This Course does not have any article/paper resources
Other References	• **n/a Plaster, E.J 1997, *Soil Science and Management*, Delmar Publishers Inc, New York** • **n/a Ashman, M.R., and Puri, G 2001, *Essential Soil Science*, Blackwell Publishing** • **n/a Jones, B.J 2001, *Laboratory Guide Conducting Soil Tests and Pl* , Analysis**