



UNIVERSITI TEKNOLOGI MARA

AGR561: SOIL CONSERVATION AND MANAGEMENT

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| Course Name (English) | SOIL CONSERVATION AND MANAGEMENT APPROVED |
| Course Code | AGR561 |
| MQF Credit | 3 |
| Course Description | An advanced soil science course focused mainly on soil management and conservation with a particular reference to Malaysian soils. Aspects of managing soil fertility and conserving soil against its deterioration such as soil erosion, depletion of nutrients in soil and stresses occurring in soil that affect plant growth are covered. In addition, important features of soil with inherent problems are studied and techniques of managing and minimizing these problems are also discussed. The course will also cover different types of soil survey carry out in Malaysia, interpreting soil maps and how to utilize soil survey report in soil management. |
| Transferable Skills | Knowledge, Life-long learning |
| Teaching Methodologies | Lectures, Lab Work, Discussion, Problem-based Learning |
| CLO | <p>CLO1 Identify and explain the properties, distribution and types of Malaysian soils and able to manage these soils for optimum crop productivity</p> <p>CLO2 Describe and understand the processes that lead to soil erosion and degradation and how they affect crop performance and the environment</p> <p>CLO3 Understand and interpret important soil chemical, physical and biological data and suggest appropriate agronomic and management practices for optimum crop performance</p> <p>CLO4 Analyze and prescribe appropriate conservation measures for soil exposed to different type of problems</p> <p>CLO5 Elaborate on agricultural practices that lead to soil deterioration, degradation and carbon release and practices that enhanced soil chemical, physical and biological properties while encouraging carbon sequestration</p> |
| Pre-Requisite Courses | No course recommendations |
| Topics | |
| 1. Introduction to Malaysia Soils 1.1) Classification of Malaysian soils 1.2) Distribution and properties of Malaysian soils 1.3) Erosion studies on Malaysian soils 1.4) Conservation practices in Malaysian agriculture | |
| 2. Soil survey system in Malaysia 2.1) Purpose and importance of soil survey in plantation management 2.2) Types of soil survey and their use 2.3) Interpretation of soil map, soil terrain map and soil suitability map 2.4) Soil survey report: Their use and interpretation | |
| 3. Water and wind erosion 3.1) Type of water erosion and wind erosion 3.2) Rainfall and runoff erosivity 3.3) Soil properties affecting erodibility 3.4) Management of water erosion 3.5) Wind erosivity 3.6) Management of wind erosion 3.7) Modelling water and wind erosion | |

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| <p>4. Biological measures of soil erosion</p> <p>4.1) Roles and function of canopy cover 4.2) Cover crops 4.3) Crop residue harvesting 4.4) Manuring and soil erosion 4.5) Soil conditioners and erosion control 4.6) Cropping system and erosion 4.7) Crop intensity 4.8) Organic farming and erosion</p> |
| <p>5. Nutrient erosion and aquatic ecosystem</p> <p>5.1) Eutrophication 5.2) Factors affecting transport of pollutants 5.3) Common pollutants and their sources 5.4) Wetland and pollution 5.5) Conservation and management of non-point source pollution</p> |
| <p>6. Restoration of eroded and degraded soils</p> <p>6.1) Methods of restoration of degraded and marginal soils 6.2) Restoration of saline soil 6.3) Restoration of mined soil 6.4) Restoration of compacted soil 6.5) Indicators of soil restoration 6.6) Physical and chemical properties of restored soils</p> |
| <p>7. Erosion and soil quality</p> <p>7.1) Indicators of soil quality 7.2) Soil quality index 7.3) Soil quality assessment 7.4) Soil quality and erosion relationship 7.5) Management of soil quality 7.6) Strategies for soil and water conservation</p> |
| <p>8. Laboratory 1</p> <p>8.1) Soil pit description</p> |
| <p>9. Laboratory 2</p> <p>9.1) Determination of soil moisture content</p> |
| <p>10. Laboratory 3</p> <p>10.1) Determination of soil texture</p> |
| <p>11. Laboratory 4</p> <p>11.1) Determination of soil bulk density</p> |
| <p>12. Laboratory 5</p> <p>12.1) Determination of coarse fragments</p> |
| <p>13. Laboratory 6</p> <p>13.1) Determination of soil porosity and permeability</p> |

| Assessment Breakdown | % |
|-----------------------|--------|
| Continuous Assessment | 60.00% |
| Final Assessment | 40.00% |

| Details of Continuous Assessment | Assessment Type | Assessment Description | % of Total Mark | CLO |
|----------------------------------|-----------------|---|-----------------|------|
| | Assignment | Mini-project/ Journal review@critics/ written assignment on problem solving questions | 20% | CLO4 |
| | Lab Exercise | Project-based on Lab topics | 20% | CLO3 |
| | Online Quiz | Online Quiz | 10% | CLO1 |
| | Online Quiz | Online Quiz | 10% | CLO2 |

| Reading List | Recommended Text | <ul style="list-style-type: none"> • Humberto Blanco and Rattan Lal 2008, <i>Principle of Soil Conservation and Management</i>, Springer • Morgan, P. R. C 2007, <i>Soil Erosion and Conservation</i>, Longman Group Ltd • Gulam, M. H. 2003, <i>Managing Soil Erosion and Nutrient Depletion</i>, MARDI • Shamshuddin Jusop 2006, <i>Acid Sulfate Soils in Malaysia</i>, Universiti Putra Malaysia [ISBN: 9832871875] |
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| | Reference Book Resources | <ul style="list-style-type: none"> • Nyle C. Brady, Raymond C. Weil 2016, <i>The Nature and Properties of Soils</i>, Prentice Hall [ISBN: 9780133254488] • Humberto Blanco-Canqui, Rattan Lal 2008, <i>Principles of Soil Conservation and Management</i>, Springer [ISBN: 140208708X] |
| Article/Paper List | This Course does not have any article/paper resources | |
| Other References | This Course does not have any other resources | |