Soran University

Module Specification

**1.Module Title: Soil and water microbiology**

**2. Module Code**

**3-Mdule level: 4th level**

**4. Module Leader (Instructor) Dr.Salah Mahdi Saleem**

**5. Teaching Semester: First semester**

**6. Credit Rating for the module: 3 units**

**7. Prerequisites and co-requisites: General microbiology.**

**8- Module Summary**

**8. Module Summary:** This course is designed to cover the effects of soil environment and water parameter on microbial occurrence, relationships and significant of microbes to mineral transformations, plant development ,environ quality

**9- Module aims** ….This course give an overview of microorganism living in soil and water , their activities that are of agriculture and environmental significance. The interrelationship of microbes/ organic matter in soil and the cycles of C,N,P, and S elements. The importance of water microorganisms as producers or polluted agents.

**10-Lerning outcomes** ……. The topics provide students with an understanding of soil structure, soil and water organisms, their types numbers, activities. Participants able to discuss soil and water life in relation to human existence, and the environment.

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| **Learning materials** | **content** | **Delivery method** | **week** |
| Ppt & white board  Application exp.(Soil samples + glasses + oven ..) | Soil structure  Check the TOM% of soil samples and water % | Lecture  Practical | **1st** |
| Ppt & white board  Application exp.( media, soil samples ,incubator) | Microbes in soil (Bacteria, fungi, protozoa and viruses)  Estimation the TCC of fungi and bacteria in soil sample | Lecture  Practical | **2nd& 3rd** |
| Ppt &white board  Baiting method for isolating microorganism | Carbon cycle (importance, roles of soil microbes in decomposition,…    Microorganisms as plant decomposers | Lecture+**Exam**  practical | **4th** |
| Ppt &white board  Ppt slides & permanent slides | Nitrogen cycle (nitrification, ammonification, fixation of atmospheric nitrogen,…)  Bacteria involve in nitrogen cycle | Lecture  Practical | **5th** |
| Ppt &white board  Ppt slides | (P) and( S) cycles. the role of microorganisms in recycling  The importance of microbes in recycling P&S | Lecture  practicle | **6th** |
| Ppt &white board  Ppt differentiated between actino. and other bacteria | Actinomycetes( their role and importance in soil) characters of Actino.  Isolation of actinomycetes from soil | Lecture  Practical | **7th** |
| Ppt &white board  Ppt , permanent slides | Soil borne fungi & bacteria as plant pathogens  Some interest fungal and bacterial phytopathogens in soil | Lecture+**Exam**  Practical | **8th** |
| Ppt &white board  Ppt slides and video | Water borne bacteria,( free living and pathogenic).  Water quality, methods in water exam. | Lecture  Practical | **9th** |
| Ppt &white board  Ppt slides , slides, application experiments | Water borne fungi ,( free living and pathogenic).  Methods for studying water borne fungi | Lecture  Practical | **9th** |
| Ppt &white board  Ppt sides, permanent slides | Algae and their importance in aquatic habitat  Unicellular algae and water quality | Lecture  Practical | **10th** |
| Ppt &white board | Viruses in soil and water habitat  Some viral diseases disseminated by soil and water | Lecture  Practical | **11th** |
| Ppt &white board  Ppt sides, permanent slides | Protozoa in soil and water habitat and their pathogenisity  Discus some important protozoa caused water polution | Lecture  Practical | **12th** |
| Ppt &white board  Ppt slides | Drinking water, risk assessment, water safety plane  Discus the treatments of water | Lecture  Practical | **13th** |
| Ppt &white board  Ppt slides/ application experemant | Epidemiology of water borne diseases  Pools and streams as a reservoir of pathogens | Lecture  Practical | **14th** |

**12-Assesment strategy** /The assessment include one mid examinations and final examination in addition to assignment and quiz also a home works and reports.

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| Assessment Type | Description of Item | % Weighting | Grading | Tariff |
| Theory EXM  2 midterm EXM  Final EXM | By MCQ , Comparisons, definition ,explain, Matching, completing sentences | **60%**  20%  40% | Excellent:≥90  Very good:80-89%  Good:70-79%  Medium:60-69%  Fair:50-59% | 2 One hour EXM  3 hours |
| Practical EXM  midterm EXM  Final EXM | By identification of slides , definition of pointed part and explain the figure | **30%**  10%  A  20% |  | 1hour  1hour |
| **GWK**  **PRS** | Quiz +report  tutorial | 5%  5% |  |  |

**14. Learning Session Structure**

1 ×2 hr. lectures , 1×2hr. practical in 14 weeks .

**16. Bibliography**/ Introduction to environmental microbiology by Barbara K ,Waldemar A, Kazimirz,G, and Adam,P.(2006)

**17. Authored by /** Dr.Salah Mahdi Saleem

**18. Validated and Verified by**