

Full Title:	Biological and Chemical Sciences
Module Code:	AGRI S6003
Credits:	15
Valid From:	Semester 1 - 2013/14 (September 2013)
Module Delivered in	2 programme(s)
Module Description:	This module aims to familiarise students with the basic concepts, theory and practical techniques of biological, chemical and environmental sciences, which are of particular relevance to an agricultural science oriented programme.
Learning Outcomes:	
<i>On successful completion of this module the learner should be able to</i>	
<ol style="list-style-type: none"> 1. Recognise the fundamental principles of chemistry. 2. Perform microbiological tests on a range of foods and farm produce for food poisoning and spoilage microbes. 3. Appreciate the fundamental principals of biological systems from the molecular and cellular aspects of an organism to the ecosystem. 4. Describe and relate aspects of soil biological, physical and chemical processes to soil structure and fertility, with particular emphasis alternative waste management operations in the agri-food sector. 5. Identify and appreciate environmental issues pertaining to agriculture. 	

Module Content & Assessment

Indicative Content
<p>Microbiology: Microbial types, structure and staining techniques. Microbial growth curve. Preservation methods in relation to farm produce and food processing. Pathogenic microbes; food poisoning and spoilage microbes. Enumeration of microbes by SPC, streak plate, MPN and membrane filtration. GMP and GFP in relation to farm produce and food processing. Antibiotic Sensitivity testing; Delvotest.</p>
<p>Chemistry: Periodic table and atomic structure. Chemical bonding, balancing equations and calculations. Soil chemistry. Titrations. Biomolecules (carbohydrates, proteins and lipids).</p>
<p>Environmental and Soil Sciences: Soil classification, soil genesis, geology and geomorphology, soil fertility and soil productivity, soil as a medium for plant growth, soil organic matter, plant-soil macronutrient relations, micronutrient and toxic elements, soil fertility evaluation and fertiliser use, soil surveys and nutrient management planning. Soil management and soil improvement techniques. Systems in agriculture and their environmental effects: Introduction to environmental legislation, freshwater pollution, sustainable agricultural waste management in agri-food sector, wildlife and the environment.</p>
<p>Biology: Chemistry of life and molecules of life, cell structure and function of macromolecules, energy and enzymes, DNA structure and function, protein synthesis, photosynthesis and cellular respiration, genetics and inheritance, mitosis and the reproduction of cells, meiosis and sexual life cycles, plant physiology function and reproduction, diversity of life and evolution, introduction to ecology.</p>

Assessment Breakdown	%
Course Work	50.00%
End of Module Formal Examination	50.00%

Full Time

Course Work							
Assessment Type	Assessment Description	Outcome addressed	% of total	Marks Out Of	Pass Marks	Assessment Date	Duration
Class Test	A theory assessment will take place at the end of semester 1, in the form of a multiple choice or short answer class examination which will assess course content delivered during semester 1.	1,3	20.00	0	0	Week 14	0
Practical/Skills Evaluation	Practical skills and reports	2,3	30.00	0	0	Every Week	0

No Project

No Practical

End of Module Formal Examination							
Assessment Type	Assessment Description	Outcome addressed	% of total	Marks Out Of	Pass Marks	Assessment Date	Duration
Formal Exam	End-of-Semester Final Examination	1,2,3,4,5	50.00	0	0	End-of-Semester	0

Reassessment Requirement
<p>A repeat examination Reassessment of this module will consist of a repeat examination. It is possible that there will also be a requirement to be reassessed in a coursework element.</p>

DKIT reserves the right to alter the nature and timings of assessment

Module Workload & Resources

Workload: Full Time

Workload Type	Workload Description	Hours	Frequency	Average Weekly Learner Workload
Lecture	No Description	4.00	Every Week	4.00
Practical	No Description	2.00	Every Week	2.00
Directed Reading	No Description	4.00	Every Week	4.00
Independent Study	No Description	3.00	Every Week	3.00
Total Weekly Learner Workload				13.00
Total Weekly Contact Hours				6.00

This course has no Part Time workload.

Resources
<i>Recommended Book Resources</i>
<p>Pommerville, J.C 2013, <i>Fundamentals of Microbiology</i>, 10th Ed., Prentice Hall [ISBN: 9781284039689]</p> <p>Cappucino, J.G and Sherman, N. 2010, <i>Microbiology : A laboratory manual</i>, 8th Ed., Prentice Hall</p> <p>Brown, T.L., LeMay, E., Bursten, B., Murphy, C 2009, <i>Chemistry; the central science</i>, 11 Ed., Pearson [ISBN: 0-13-235848-4]</p> <p>Burns, R.A. 2010, <i>Fundamentals of Chemistry</i>, 3rd Ed., Prentice Hall</p> <p>Manoj K. Shukla. 2011, <i>Soil hydrology, land use and agriculture: measurement and modelling</i>, CABI Cambridge, MS [ISBN: 9781845937973]</p> <p>David L. Rowell 1994, <i>Soil science: methods and applications.</i>, Longman Scientific & Technical University of Michigan [ISBN: 0582087848]</p> <p>P.C. Bandyopadhyay 2007, <i>Soil analysis</i>, Gene-Tech Books New Delhi [ISBN: 9788189729691]</p> <p>Keith A. Smith, Chris E. Mullins 2001, <i>Soil and environmental analysis: physical methods</i>, 2nd Ed., Marcel Dekker New York [ISBN: 0824704142]</p> <p>Bujang B.K. Huat, Arun Prasad, Afshin Asadi, Sina Kazemian 2013, <i>Geotechnics of Organic Soils and Peat</i>, CRC Press [ISBN: 978-0415659413]</p> <p>Mader, Sylvia S. 2013, <i>Biology</i>, 11th Ed., McGraw-Hill New York, US [ISBN: 0073525502]</p> <p>Botkin, D. and E. Keller 2010, <i>Environmental Science: Earth as a Living Planet</i>, 8th Ed., Wiley New York [ISBN: 0470646098]</p>
<i>This module does not have any article/paper resources</i>
<i>Other Resources</i>
<p>Website: n/a http://www.chemguide.co.uk</p> <p>Link: <i>Library Catalogue</i> http://tinyurl.com/ms5rsrp</p>

Module Delivered in

Programme Code	Programme	Semester	Delivery
DK_SAGRI_8	Bachelor of Science (Honours) in Agriculture	1	Mandatory
DK_SAGRI_C	Higher Certificate in Science in Agriculture	1	Mandatory