

## **CURRICULUM REVISION FOR LEVEL- 1G**

### **PRINCIPAL SUBJECT: ZOOLOGY**

**(Effective from the Academic Year 2016/2017)**

The last major curriculum revision for Zoology was done in 2014 under the Quality Innovation Grant of the Higher Education for Twenty First Century Project of the Ministry of Higher Education, Biological Science won the award in 2012 (HETC/QIG/W2/JFN Biological Sciences) for three major activities. Revising the curriculum was one of the major activities of the Biological Science study programme.

The Department of Zoology has been revising its curriculum since March 2013 under the Biological Science study programme with the guidance of subject experts. The whole set of revised curriculum for level 1G, 2G, 3G, 3M, 4M and 4X was submitted to the Faculty Board and approved at the 144<sup>th</sup> meeting held on 31<sup>st</sup> January 2014 (SFB/144/06(c)) and at the 160<sup>th</sup> meeting held on 13.06.2017 (SFB/160/06). The Senate has also approved the curriculum of Level 1G, 2G, 3G, 3M and 4M and recommended on its 389<sup>th</sup> meeting (S/389/10/d) held on 24.06.2014 and 426<sup>th</sup> meeting held on 18.09.2017 respectively.

With the introduction of the new structure of the Bachelor's Degree programmes in the Faculty of Science, the Department of Zoology has now submitted the Level-1G syllabi for the Bachelor Degree programmes for the Biological Sciences. The staff members of the Department of Zoology namely Professor S. N. Surendran, Dr. Mrs. R. Ganeswaran, Ms. R. Nithyagowry, Dr. T. Eswaramohan, Mr. W. Venkatesh Luckshman, Dr. Mrs. A. Sivaruban, Dr. K. Gajapathy, Mrs. P. Sivakumar, Dr. T. W. Shanthakumar, Ms. S. Kokila and Mr. S. Arthiyan were involved in the revising the new curriculum.

This syllabi will be effective from the Academic year 2016/2017. The level 1G syllabus was submitted to the special meeting of the Faculty board of Science (held on 06.04.2018) and then to the Curriculum Evaluation Committee (held on 03.07.2018, CEC/21/03) and approved with minor corrections. The suggested corrections have been incorporated.

Approval of the Senate is sought.

*sgd*

Dr. T. Eswaramohan  
Head / Department of Zoology  
Faculty of Science.  
31.03.2018



Department of Zoology

Faculty of Science

University of Jaffna

Sri Lanka

2016/2017

Curriculum for

Bachelor of Science in Biological Science

BSc (Biological Sciences)

Level -1G

April 2018

**List of Course units offered in Level 1G**

<b>Course code</b>	<b>Course Title</b>	<b>No. of Hours</b>		<b>No. of Credits</b>
		Theory	Practical & Field	
ZOL101G2	Origin of Life and Evolutionary Biology	20	24	2C
ZOL102G2	Ecosystems; Distribution and Characteristics	20	24	2C
ZOL103G2	Animal Cell biology and Bio-molecules	20	24	2C
ZOL104G2	Animal Diversity	20	24	2C
ZOL105G2	Animal Histology	20	24	2C
<b>Total credits</b>				<b>10 C</b>

**CURRICULUM REVISION**  
**PRINCIPAL SUBJECT – ZOOLOGY**

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**General Description**

**Theory:** (Class room lectures, tutorials, group discussion, Presentation, assignments and Field session)

**In-course assessment(s): (30%)**

Tutorials based written examination / library assignment /take home assignments / presentation/ oral examination/ Quiz/ poster presentation /online submission.

**End of course examination: (70%)**

Two hours duration should answer four questions.

**Practical:** (Laboratory sessions, field sessions, group discussion and assignment)

**In-course assessment(s): (30%)**

Spot examination/ skill evaluation/ field reports/ oral or poster presentation/ assignment/ practical records/ viva-voce examination.

**End of course examination: (70%)**

Two hours duration

**The respective marks obtained in theory component (MT) and practical component (MP) will be computed into Overall Marks as  $(6MT+4MP)/10$ .**

**Obtaining minimum of Grade D<sup>+</sup> in both practical and theory components is a requisite to qualify a pass in the Overall Marks computed in respective course.**

<b>Course code</b>	<b>ZOL101G2</b>
<b>Course title</b>	<b>Origin of Life and Evolutionary Biology</b>
<b>Credit value</b>	02 (20 L + T and 24 P+F)
<b>Prerequisites</b>	NONE
<b>Objective(s):</b>	
<ul style="list-style-type: none"> <li>• Introduce the events, concepts and theories of origin of life and evolution</li> <li>• Impart knowledge on evolutionary process and speciation</li> </ul>	
<b>Intended Learning Outcome (ILO):</b>	
<ul style="list-style-type: none"> <li>• Describe molecular and biochemical process involved in origin of life Explain theories and concepts of evolution</li> <li>• Appreciate the evolution as the force driving for the continuity of life on earth</li> <li>• Analyze the process of speciation and case studies related to the subject Describe different animal taxonomy techniques</li> </ul>	
<b>Course contents:</b>	
Theories and concepts in origin of life; Biochemical and molecular aspects and process led to the formation of life on earth; Historical background, modern theories, process and concepts involved in evolution – variation, natural selection, reproductive isolation and speciation. Essentials and principles of systematics in animal kingdom; Morphological, anatomical, cytological, fossils, chemical and molecular techniques applied in taxonomy.	
<b>Teaching and learning methods</b>	
<b>Theory:</b> Class room lectures, tutorials, group discussion, Presentation, assignments and Field session.	
<b>Practical:</b> Laboratory sessions, field sessions, group discussion and assignment.	
<b>Evaluation Methods</b>	
Theory: In-Course Assessments (30%), End of Course Examination (70%)	
Practical: In-Course Assessments (30%), End of Course Examination (70%)	
Marks obtained in theory component (MT) and practical component (MP) will be computed into Overall Marks as (6MT+4MP)/10	
<b>Recommended Readings:</b>	
<ul style="list-style-type: none"> <li>• Origins of Life; Freeman Dyson (1999); Cambridge University Press. ISBN-10: 0521626684.</li> <li>• Evolution; Nicholas H. Barton et al. (2007); Cambridge University Press. ISBN-10: 0879696842.</li> </ul>	

<b>Course code</b>	<b>ZOL102G2</b>
<b>Course title</b>	<b>Ecosystems; Distribution and Characteristics</b>
<b>Credit value</b>	02 (20 L + T and 24 P+F)
<b>Prerequisites</b>	NONE
<b>Objective(s):</b> Recognize the characters, distribution and the dynamics of the biomes and ecosystems and their anthropogenic disturbances	
<b>Intended Learning Outcome (ILO):</b> <ul style="list-style-type: none"> <li>• Describe the role of Sun as the prime components for the distribution of biomes in the world</li> <li>• Differentiate the types of Biomes and ecosystems existing in the country and the world</li> <li>• Express the dynamics of energy flow within the ecosystem</li> <li>• Analyse the human activities which cause increased stress on the ecosystems</li> </ul>	
<b>Course contents:</b> Introduction to Biomes - different types of biomes and ecosystems in the world and associated organisms, distinguishing characters of biomes; solar energy distribution - global and national (Sri Lanka) scenario and its power in the distribution pattern of biomes; terrestrial, fresh water, brackish water and marine water and arboreal ecosystems, energy flow and ecosystem stress.	
<b>Teaching and learning methods</b> <b>Theory:</b> Class room lectures, tutorials, group discussion, Presentation, assignments and Field session. <b>Practical:</b> Laboratory sessions, field sessions, group discussion and assignment.	
<b>Evaluation Methods</b> Theory: In-Course Assessments (30%), End of Course Examination (70%) Practical: In-Course Assessments (30%), End of Course Examination (70%) Marks obtained in theory component (MT) and practical component (MP) will be computed into Overall Marks as $(6MT+4MP)/10$	
<b>Recommended Readings:</b> <ul style="list-style-type: none"> <li>• Biology; S.R. Reven, G.B.Johnson, J.B.Losos &amp; .P.H.Singer (2008); Mc.Graw Hill Publishers. ISBN 0-07-243731-6.</li> <li>• Life Sciences; L. Daniel, E.P. Ortleb and A. Biggs (1994); Macmillen/ Mc.Graw Hill Publishers, OH, OS. ISBN 0-020826402-9.</li> <li>• Biology; S S Mader (1993); Brown Publishers, US. ISBN 0-697-15097-6.</li> <li>• Biology; J E Mclare, L Rotundo and L Gurley-Dilger (1991). D.C.Heathand Company Toaronto, Ontario. ISBN 0-020826402-9.</li> <li>• The Living World; G Johnson and J Losos (2008). Mc Graw Hill publishers, US (5<sup>th</sup> Edition) ISBN 978-0-07-298667-9.</li> </ul>	

<b>Course code</b>	<b>ZOL103G2</b>
<b>Course title</b>	<b>Animal Cell biology and Bio-molecules</b>
<b>Credit value</b>	02 (20 L +T and 24 P)
<b>Prerequisites</b>	NONE
<b>Objective(s):</b>	
<ul style="list-style-type: none"> <li>• Describe biochemical and bio-molecular nature of organelles</li> <li>• Describe the types of enzymes and the kinetic properties</li> </ul>	
<b>Intended Learning Outcome (ILO):</b>	
<ul style="list-style-type: none"> <li>• Categorize the organelles in different types of cells</li> <li>• Explain the function of organelles and organization of cells in animals</li> <li>• Describe the structural and functional roles of bio-molecules of animals</li> <li>• Recognize the types of enzymes, enzymatic inhibitors and the kinetic properties</li> </ul>	
<b>Course contents:</b>	
<p>Molecular structure of cells and organelles, Cell structure and function in prokaryotes and eukaryotes (invertebrates and vertebrates), cell cycle, cell growth, cell death, cell communication, micro filaments, microtubules, transport, mobility and recent advances.</p> <p>Molecular logic of life, Introduction to bio-molecules; amino acids, protein, primary, secondary and tertiary structures; Enzyme, catalysis, kinetics, irreversible, Competitive and non-competitive inhibitors; Oxygen carriers; haemoglobin, myoglobin and their properties; Structure and function of Lipids, Carbohydrates and Nucleic acids.</p>	
<b>Teaching and learning methods</b>	
<p><b>Theory:</b> Class room lectures, tutorials, group discussion, presentation and assignments.</p> <p><b>Practical:</b> Laboratory sessions, group discussion and assignment.</p>	
<b>Evaluation Methods</b>	
<p>Theory: In-Course Assessments (30%), End of Course Examination (70%)</p> <p>Practical: In-Course Assessments (30%), End of Course Examination (70%)</p> <p>Marks obtained in theory component (MT) and practical component (MP) will be computed into Overall Marks as (6MT+4MP)/10</p>	
<b>Recommended Readings:</b>	
<ul style="list-style-type: none"> <li>• Animal Cell Biotechnology; R. E. Spier and J. B. Griffiths (1994); Elsevier Ltd, ISBN: 978-0-08-092599-8.</li> <li>• Animal Cell Culture and Technology; Michael Butler (2012); ISBN-10: 1859960499.</li> </ul>	



<b>Course code</b>	<b>ZOL104G2</b>
<b>Course title</b>	<b>Animal Diversity</b>
<b>Credit value</b>	02 (20L+T and 24P+F)
<b>Prerequisites</b>	NONE
<b>Objective(s):</b>	
<ul style="list-style-type: none"> <li>• Explain the functional design of key animal species, in relation to their ecology and life habits</li> </ul>	
<b>Intended Learning Outcome (ILO):</b>	
<ul style="list-style-type: none"> <li>• Define the basic concepts of hierarchical classification in Zoology</li> <li>• Describe the levels of organization and body plan</li> <li>• Identify general characteristics of animal groups</li> <li>• List the value of animals to the ecosystem and human wellbeing</li> <li>• Apply skills in collection and preservation of animals from their specific habitats</li> <li>• Explain adaptive radiation among animal groups</li> </ul>	
<b>Course contents:</b>	
<p>Introduction to animal kingdom; hierarchical classification and general characteristics of animal phyla and variety of animal forms - organization of animal body plan; symmetry; segmentation; size and complexity; Characteristic morphological features from different classes of protozoa through mammals.</p> <p>Animal classification based on external anatomical features, variations among the groups, their roles in the environment, their specific habitats and adaptations for their habitats. Observation and investigation of living and preserved specimens.</p>	
<b>Teaching and learning methods</b>	
<b>Theory:</b> Class room lectures, tutorials, group discussion, presentation, assignments and field session.	
<b>Practical:</b> Laboratory sessions, field sessions, group discussion and assignment.	
<b>Evaluation Methods</b>	
<p>Theory: In-Course Assessments (30%) End of Course Examination (70%)</p> <p>Practical: In-Course Assessments (30%) End of Course Examination (70%)</p> <p>Marks obtained in theory component (MT) and practical component (MP) will be computed into Overall Marks as <math>(6MT+4MP)/10</math></p>	
<b>Recommended Readings:</b>	
<ul style="list-style-type: none"> <li>• Animal Diversity; Hickman C Jr, Roberts LS and Allan Larson (2015), 8th Eds. ISBN10: 1259756882.</li> <li>• Invertebrate Zoology; Ruppert E E, Fox R S and Barnes R D (2004), 7th Eds. ISBN 9780030259821.</li> </ul>	

<b>Course code</b>	<b>ZOL105G2</b>
<b>Course title</b>	<b>Animal Histology</b>
<b>Credit value</b>	02 (20 L +T and 24 P)
<b>Prerequisites</b>	NONE
<b>Objective(s):</b> Recognize the characters and distribution of tissue from lower invertebrates up to higher vertebrates and to learn the histological techniques	
<b>Intended Learning Outcome (ILO):</b> <ul style="list-style-type: none"> <li>• Identify the tissue types and their distribution on the animal's body.</li> <li>• Justify the distribution of tissues with respect to their characteristic features.</li> <li>• Illustrate laboratory techniques in histology.</li> </ul>	
<b>Course contents:</b> Tissues morphology and functions in epithelia, connectives tissues, muscle tissues and nervous tissues, their anatomical organizations in organ systems, their distribution and complexity from invertebrates to vertebrates ; histological techniques; fixation, sectioning and microtomy and various staining procedures.	
<b>Teaching and learning methods</b> <b>Theory:</b> Class room lectures, tutorials, group discussion, presentation and assignments. <b>Practical:</b> Laboratory sessions, group discussion and assignment.	
<b>Evaluation Methods</b> Theory: In-Course Assessments (30%), End of Course Examination (70%) Practical: In-Course Assessments (30%), End of Course Examination (70%) Marks obtained in theory component (MT) and practical component (MP) will be computed into Overall Marks as (6MT+4MP)/10	
<b>Recommended Readings:</b> <ul style="list-style-type: none"> <li>• Colour atlas of Basic Histology; I. Berman (1998); Prentice-Hall International Inc. USA, 2<sup>nd</sup> edition. ISBN 0-8385-1321-2.</li> <li>• Functional Histology; P R Wheater, H G Burkitt and V G Daniels (1994); Longman Group UK Ltd, Hong Kong; 3<sup>rd</sup> Edition, ISBN 0-44304691-3.</li> <li>• Invertebrate Zoology; P. A. Meglitsch (1972); Oxford University Press, USA. 2<sup>nd</sup> edition.</li> <li>• Invertebrates; R. C. Brusca and G. J. Brusca (2002). Sinauer Associates, Inc., Publishers, USA. 2<sup>nd</sup> Edition. ISBN 0-87893-097-3.</li> <li>• Histology: A text and atlas, with correlated cell and molecular biology. 7th edition. 2016. Wolters Kluwer Health Harper &amp; Row, publisher, J.B.Lippincott Company ISBN- 13:978-1451187427</li> <li>• Bancroft's Theory and Practice of Histological Technique. 8th Edition. Kim S Suvarna., Christopher Layton and John D. Bancroft. 2018. ISBN: 13: 978-0-7020-6864-5 Elsevier publication</li> <li>• Histological and Histochemical Methods. Theory and Practice. 5th Edition. J. Kiernan. 2015. ISBN: 978-1-907904-32-5 Scion Publishing Ltd.</li> </ul>	

List of Resource Persons contributed to develop these course units.

<b>Course Code</b>	<b>Course Title</b>	<b>Resource Person(s)</b>
ZOL101G2	Origin of Life and Evolutionary Biology	Professor S.N.Surendran Dr. T. Eswaramohan Dr. K.Gajapathy Dr. Mrs. T.W Shanthakumar
ZOL102G2	Ecosystems; Distribution and Characteristics	Dr. Mrs. A.Sivaruban
ZOL103G2	Animal Cell Biology and Bio-molecules	Dr. T. Eswaramohan
ZOL104G2	Animal Diversity	Dr. Mrs. R. Gnaneswaran
ZOL105G2	Animal Histology	Dr. Mrs. A.Sivaruban

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08.08. 2018