

ASSOCIATE DEGREE SYLLABUS

COURSE NAME:

BIOLOGY / LAB

COURSE #: BIO 102

COURSE DESCRIPTION

This course covers the basic biological anatomy and physiology of animals. Labs will include the identification of organs making up the major organ systems. The basic physiology of digestion, respiration, transport, coordination, excretion, homeostasis, reproduction and inheritance will be covered. This course is a requirement for entry into BSc. Pre-Medicine and Marine Biology courses.

Credits: 4

Prerequisite: BI 101

COURSE OBJECTIVES

1. *Describe, explain and interpret the major biological principles of anatomy and physiology of animal organ systems, using a scientific vocabulary.*
2. *Critically raise awareness of the social, economic, environmental and technological implications of animal anatomy and physiology.*
3. *Use appropriate scientific techniques to carry out experimental investigations.*
4. *Maintain more than 90% attendance at classes and labs, for visits and Guest Speakers.*
5. *Hand in all work on time, observing and meeting prescribed criteria.*
6. *Work safely at all times.*

COURSE CONTENT

I HETEROTROPHIC NUTRITION

JAN Illustrated by invertebrates and vertebrates exhibiting heterotrophic feeding methods: mutualism, parasitism and commensalism; aquatic filter-feeding; polyp tentacle-feeding; insect biting, chewing, piercing and sucking.
Mammalian holozoic feeding - Alimentary canal - Ingestion, Digestion, Absorption, Assimilation and Elimination. Role of teeth, glands, pancreas, liver.
Lab. Animal organ systems – rat, fish, dissection, organ system identification.

II BREATHING and RESPIRATORY SYSTEM

JAN Why animals need energy.
Chemical equations for Aerobic and Anaerobic respiration in animal cells.
Mitochondria – the role of cellular energy carrier adenosine triphosphate ATP.
Features of gaseous exchange surfaces for aquatic and terrestrial ecosystems.
Mechanism of breathing in humans. Nervous coordination of breathing in vertebrates.
Lab. Respiratory physiology – lung volume, breathing rate graphing.

III TRANSPORT and CIRCULATORY SYSTEM

FEB Increase in size and reducing Surface area to volume ratios explain the need for a transport system, illustrated by invertebrate and vertebrate species.
Blood and lymph circulatory systems; roles in health and ill-health.
Heart structure and physiology. The cardiac cycle.
Nervous and hormonal coordination of heart-beat; blood vessel physiology.
Lab. Transport physiology: blood tissue, vessels, heart, slides; pulse rate graphing,

IV NERVOUS & ENDOCRINE SYSTEMS

- FEB From invertebrate nerve-net to mammalian central nervous system.
Control and coordination by the vertebrate central nervous system.
- MAR Brain structure and main physiological sensory and motor functions.
Reception of stimuli by sense organs, e.g. eye, skin, ear, nasal membranes, tongue.
Response to stimuli by effector muscles and glands. Impulse transmission.
The reflex arc and reflex actions; effects of drugs on the nervous system.
Endocrine glands - ductless hormone secretions for regulation of metabolic activity by negative feedback mechanisms. Homeostasis: balancing heat energy levels and poisonous wastes of metabolism Lab. Nervous system physiology: eye/brain optical illusions, touch, hearing physiology, slides.

V URINO-GENITAL SYSTEMS

- MAR Vertebrate kidney – structure, excretory and osmoregulatory physiology.
Invertebrate and vertebrate male and female reproductive systems compared.
Reproductive structure and physiology of gamete formation and fertilization. Meiosis.
External versus internal fertilization - survival statistics.
Pregnancy, parental roles; contraception; IVF; surrogacy; cloning. Stem cell research.
Lab. Urinogenital physiology: tissue slides, review rat, fish dissections.

VI GENETIC INHERITANCE

- MAR The nucleus, chromosomes, DNA and inheritance.
- APR Mendel - Animal and plant monohybrid and dihybrid inheritance.
Human family tree genetic diagrams – genetic counseling.
Sex determination in humans; DNA profiling; genetic engineering. Lab. Genetics.

ASSESSMENT

Term Project, Laboratory Assignments, Quizzes, homework.	40%	JAN - APRIL
Mid-Term Exam	20%	FEB
Final Exam	40%	APRIL
Total	100%	

REQUIREMENTS

Text - Taylor, Green and Stout, Biological Sciences 1 and 2. CUP, most recent editions.
[available at UCCI Bookshop]

For Further Reading -

Journals in the UCCI Library & online.

Cayman Islands Reference section

for more – ask at the desk.

Biology, Anatomy, Physiology,

Bio-Chemistry, Genetics.

Webography

Internet access to ANGEL website
for Power Point presentations & links.

Also check internet browsers
& Wikipedia for *Key Terms* and *vocabulary*.

BIO102 FIELD WORK and CLASS NOTE-TAKING

YOU WILL NEED - Notebooks, files, plain, graph and writing paper, ruler, PENS, PENCILS, calculator. Lab clothing suitable for indoor and outdoor wet and dry Lab work.