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VEER NARMAD SOUTH GUJARAT UNIVERSITY

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વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી

યુનિવર્સિટી કેમ્પસ, ઉદ્ધના-મગદલા રોડ, સુરત - ૩૯૫ ૦૦૭, ગુજરાત, ભારત.

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-: પરિપત્ર :-

વિજ્ઞાન વિદ્યાશાખા હેઠળની પ્રાણીશાસ્ત્ર વિષય યલાવતી સંલગ્ન સ્નાતક આચાર્યશ્રીઓને જણાવવાનું કે, શૈક્ષણિક વર્ષ : ૨૦૨૧-૨૨ થી અમલમાં આવનાર F.Y.B.Sc. Sem-1 & 2 તથા S.Y.B.Sc. Sem-3 & 4 ના અભ્યાસક્રમ અંગે ચર્ચા કરતા ઝૂઓલોજી વિષયની અભ્યાસસમિતિની તા.૨૨/૦૩/૨૦૨૧ની સભાનાં ઠરાવ ક્રમાંક: ૩ અન્વયે નીચે મુજબ કરેલ ભલામણ વિજ્ઞાન વિદ્યાશાખાની તા.૧૭/૦૬/૨૦૨૧ની સભાનાં ઠરાવ ક્રમાંક:૪ અન્વયે મંજૂર કરી એકેડેમિક કાઉન્સિલને કરેલ ભલામણ એકેડેમિક કાઉન્સિલે તેની તા.૨૫-૨૬/૦૬/૨૦૨૧ ની સભાના ઠરાવ ક્રમાંક: ૨૧ અન્વયે સ્વીકારી મંજૂર કરેલ છે. તેની જાણ સંબંધકર્તા શિક્ષકો અને વિદ્યાર્થીઓને કરવી, તદ્દુપરાંત તેનો અમલ કરવો.

ઝૂઓલોજી વિષયની અભ્યાસસમિતિની તા.૨૨/૦૩/૨૦૨૧ની સભાનાં ભલામણ ક્રમાંક: ૩

- :: આથી સર્વાનુમતે ઠરાવવામાં આવે છે કે, F.Y.B.Sc. Sem-1 & 2 તથા S.Y.B.Sc. Sem-3 & 4 માં ચર્ચાને અંતે આંશિક સુધારા કરવામાં આવ્યા છે. જે શૈક્ષિક વર્ષ ૨૦૨૧-૨૨ થી અમલમાં આવે તે રીતે મંજૂર કરવા વિજ્ઞાન વિદ્યાશાખાને ભલામણ કરવામાં આવે છે.

વિજ્ઞાન વિદ્યાશાખાની તા.૧૭/૦૬/૨૦૨૧ની સભાનાં ઠરાવ ક્રમાંક:૪

- :: આથી ઠરાવવામાં આવે છે કે, ઝૂઓલોજી વિષયની અભ્યાસસમિતિની તા.૨૨/૦૩/૨૦૨૧ની સભાનાં ઠરાવ ક્રમાંક: ૩ અન્વયે મંજૂર કરેલ F.Y.B.Sc.Sem-1 & 2 તથા S.Y.B.Sc. Sem-3 & 4 નો અભ્યાસક્રમ આંશિક સુધારા સહિત મંજૂર કરી શૈક્ષિક વર્ષ ૨૦૨૧-૨૨ થી અમલમાં આવે તે રીતે મંજૂર કરવા એકેડેમિક કાઉન્સિલને ભલામણ કરવામાં આવેલ છે.

એકેડેમિક કાઉન્સિલની તા.૨૫-૨૬/૦૬/૨૦૨૧ ની સભાનાં ઠરાવ ક્રમાંક: ૨૧

- :: આથી ઠરાવવામાં આવે છે કે, પ્રાણીશાસ્ત્ર વિષયની અભ્યાસસમિતિએ તેની તા.૨૨/૦૩/૨૦૨૧ ની સભાના ઠરાવ ક્રમાંક : ૩ અન્વયે ભલામણ કરેલ અને વિજ્ઞાન વિદ્યાશાખાએ તેની તા. ૧૭/૦૬/૨૦૨૧ ની સભાનાં ઠરાવ ક્રમાંક : ૪ અન્વયે સ્વીકારેલ F.Y.B.Sc.Sem-1 & 2 તથા S.Y.B.Sc.Sem-3 & 4 નો અભ્યાસક્રમ શૈક્ષણિક વર્ષ ૨૦૨૧-૨૨ થી અમલમાં આવે તે રીતે મંજૂર કરવામાં આવે છે.

બિડાણ: ઉપર મુજબ

ક્રમાંક : એકે./પરિપત્ર/૯૨૬૮/૨૧

તા.૦૧-૦૭-૨૦૨૧

ઈ.ચા. કુલસચિવ

પ્રતિ,

- ૧) વિજ્ઞાન વિદ્યાશાખા હેઠળની પ્રાણીશાસ્ત્ર વિષય યલાવતી સંલગ્ન કોલેજોના આચાર્યશ્રીઓ.
- ૨) અધ્યક્ષશ્રી, વિજ્ઞાન વિદ્યાશાખા
- ૩) પરીક્ષા નિયામકશ્રી, પરીક્ષા વિભાગ, વીર નર્મદ દ. ગુ. યુનિવર્સિટી, સુરત.

.....તરફ જાણ તેમજ અમલ સારૂ.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

S.Y.B. Sc. SEM – III

ZOOLOGY PAPER - Z – 301

(Effective from June 2020)

(Non-chordates, Evolution and Economic Zoology)

UNIT – I Classification:

Introduction to classification:

➤ General study of Non-Chordate Phyla up to Subclass with examples:

- Protozoa
- Porifera
- Coelenterata (Cnidaria)
- Helminthes
- Annelida

UNIT - II Type study: Earthworm:

➤ Study of the following animal type with reference to the structure and functions of various organs of all systems of **Earthworm:**

- Systematic position
- Habit and Habitat
- External features
- Body wall and its function
- Coelom – composition and function
- Food and feeding mechanism
- Digestive system and digestion
- Circulatory system
- Excretory system and excretion
- Nervous system-(central, peripheral and sympathetic)
- Sense organs- Epidermal receptors, Buccal receptors and photoreceptors
- Reproductive system-copulation, cocoon formation and development

UNIT - 3 Evolution and Adaptations:

- Variation
- Deep sea & Cave Dwelling Adaptations

UNIT – 4 Economic Zoology:

➤ Vermiculture:

- Definition of Vermiculture, Vermicomposting and Vermibed
- Limitations of traditional agricultural system
- Role of earthworm in saving environment
- Vermibreeds
- Earthworm-The Cinderella of Vermiculture
- Ecology of earthworm
- Physical, Chemical and biological parameters of Vermicast
- Vermiculture process
- Advantages and disadvantages of Vermicomposting
- Prospects of Vermiculture and Vermicomposting

➤ **Sericulture:**

- Life-History of Indian species of Mulberry silk-worm (*Bombyx mori*)
- Management of Silk industry including rearing
- Spinning and reeling
- Types and Economic importance of silk

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S.Y.B. Sc. SEM – III
ZOOLOGY PRACTICAL (Based on Paper - Z – 301)
(Non-chordates, Evolution and Economic Zoology)

The following practicals are to be taught/studied **only** with the help of charts, models, videos, photographs, permanent slides, working models etc.

1 - Classification of following animals upto sub-class.

- Trypanosoma
- Monocystis
- Vorticella
- Grantia
- Euplectella
- Spongilla
- Hydra
- Cyanea
- Gorgonia
- Planaria
- Taenia
- Ascaris
- Aphrodite
- Tubifex
- Hirudo medicinalis

2 - Earthworm:

- External features
- Digestive System
- Mounting of setae
- Reproductive system
- Mounting of Septal nephridia
- Nervous system Spermatheca
- Blood glands

3 - Permanent Slides of earthworm:

- T.S.passing through pharynx
- T.S.passing through gizzard
- T.S. passing through typhlosolar region
- T.S.passing through testis
- T.S.passing through ovary

4– Evolution and Adaptations:

- Variation:
 - Digits in man
 - Giraffe
- Deep sea adaptations:
 - Euplectella
 - Limulus
 - Feather star
 - Flat fish
- Cave dwelling adaptations:
 - True spiders
 - Proteus anguinus

5 – Economic Zoology:

- Life history of Indian mulberry silk worm (*Bombyx mori*)
 - Vermiculture (with the help of charts/ photographs/ models etc.)
 - Vermibreeds, Vermiculture process(Vermicompost practices)
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VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

S.Y.B. Sc. SEM – III

ZOOLOGY PAPER – IV (Z – 302)

(Effective from June 2020)

(Chordates, Histology and Osteology)

UNIT – 1 Classification:

- General study of the following protochordates and chordates up to subclass with examples :
 - Urochordata
 - Cephalochordate
 - Cyclostomes
 - Pisces
 - Amphibia.

UNIT – 2 Type study:

- Study the *Labeo rohita* as an animal type with reference to their structure and functions of various organs of all systems.
 - External characters
 - Digestive system
 - Circulatory systems
 - Urinogenital system
 - Brain

UNIT – 3 Histology:

- Study the Ultra structure following mammalian tissues:
 - Salivary gland
 - Stomach
 - Liver
 - Intestine
 - Pancreas
 - Kidney
 - Ovary

- Testis

UNIT – 4 Osteology:

➤ Comparative study of girdles in:

- Scoliodon
- Frog
- Varanus
- Pigeon
- Rabbit

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

S.Y.B. Sc. SEM – III

ZOOLOGY PRACTICAL (Based on Paper - Z – 302)

(Chordates, Histology and Osteology)

The following practicals are to be taught/studied **only** with the help of charts, models, videos, photographs, permanent slides, working models etc.

1 - Classification of following animals upto sub-class.

- Ascidian
- Salpa
- Oikopleura
- Amphioxus
- Lamprey
- Scoliodon
- Chimaera
- Protopterus
- Eel
- Hilsa
- Pterois
- Frog
- Uruaeotyphlus
- Siren
- Rhacophorus

2 - Labeo rohita

- Digestive system
- Urinogenital system
- Brain-dorsal and ventral view

3 - To study the permanent mammalian histological slides:

- Salivary gland
- Stomach

- Liver
- Pancreas
- Intestine
- Kidney
- Ovary
- Testis

4 - Osteology:

- To study the pectoral girdles and pelvic girdles in:
 - Scoliodon
 - Frog
 - Varanus
 - Pigeon
 - Rabbit



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S.Y.B. Sc. SEM – III

ZOOLOGY PAPER – V (Z – 303)

(Effective from June 2020)

(Biochemistry, Genetics and Physiology)

UNIT – 1 Biochemistry:

➤ Introduction and structure of:

- Carbohydrates
- Proteins
- Lipids

UNIT – 2 Genetics:

- Structure and function of genetic material
- Types of RNA

UNIT – 3 Physiology:

➤ **Muscle coordination:**

- Types and structure of muscle fibres
- Physiology of muscle contraction and energetic

UNIT – 4 Hematology:

- Composition of blood
- Haemopoiesis
- Blood groups

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

S.Y.B. Sc. SEM – III

ZOOLOGY PRACTICAL (Based on Paper - Z – 303)

(Biochemistry, Genetics and Physiology)

The following practicals are to be taught/studied **only** with the help of charts, models, videos, photographs, permanent slides, working models etc.

1- Preparation of atomic models:

- Glucose
- Fructose
- Galactose
- Maltose
- Lactose
- Sucrose
- Valine
- Threonine
- Glycine
- Alanine
- Glycerol

2 - Genetics:

- To study Structure of genetic material
- Types of RNA

3 – Haematology:

- To study clotting time of human blood
- Estimation of Haemoglobin from human blood
- To study Haemin crystals from human blood

4 - Physiology

To study different types of muscle fibres and nerve fibres:

- Striated muscle fibre
 - Nonstriated muscle fibre
 - Cardiac muscle fibre
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VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

S.Y.B. Sc. SEM – III

MARINE SCIENCE (E. G.)

(Effective from June 2020)

UNIT - 1 Scope of marine science:

- Introduction to marine science and career
- Classification :
 - Prokaryotes
 - Eukaryotes - Fungi, Protista, Plant, Animalia – Five Kingdoms

UNIT – 2 Geology of the ocean:

- Physico-chemical properties of Marine Environment
- Zonations of ocean

UNIT - 3 Marine Biology:

- Adaptations:
 - Bony fish surviving in near freezing water (or adaptations in deep sea fishes)
 - Sea birds
 - Whales and their relations
- General characters of bony and cartilaginous fishes.

UNIT - 4 Marine organisms:

- Microorganisms:
 - Phytoplanktons
 - Zooplanktons
 - Red algae
 - Brown algae
 - Green algae
 - Multicellular algae
- Economic importance of algae

- Macro organisms:
 - ❖ Invertebrates-Economic importance
 - Marine sponges
 - Molluscs
 - Arthropods (crab and prawns).
 - ❖ Vertebrate: Economic importance
 - Scoliodon (sharks)
 - Marine mammals (whales and dolphins)
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VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
S.Y.B. Sc. SEM – IV
ZOOLOGY PAPER – III (Z – 401)
(Effective from June 2020)
(Non-chordates, Evolution and Economic Zoology)

UNIT - 1 Classification:

- General study of Non-Chordate Phyla up to Subclass with examples:
 - Arthropoda
 - Mollusca
 - Echinodermata
 - Hemichordata.

UNIT – 2 Type study:

- Study of the following animal types with reference to the structure and functions of various organs of all systems of **Pila**:
 - Classification and external characters
 - Digestive system
 - Respiratory system
 - Blood vascular system
 - Excretory system
 - Nervous system
 - Reproductive system

UNIT – 3 Evolution and adaptations:

- Evidence of evolution from comparative functional anatomy:
 - Homologous
 - Analogous and vestigial organs
 - connecting link
 - Atavism (Reversion)
 - Protective coloration and mimicry

UNIT - 4 Economic Zoology:

➤ Dairy Farming:

- Definition of Dairy and other allied aspects, Indian breeds of cows and buffaloes,
- Milk and milk by-products

➤ Apiculture:

- Life-history of Honey-bees
- Types
- Castes
- Structure of honeycomb
- Economic importance of honey and wax

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

S.Y.B. Sc. SEM – IV

ZOOLOGY PRACTICAL (Based on Paper - Z – 401)

(Non-chordates, Evolution and Economic Zoology)

The following practicals are to be taught/studied **only** with the help of charts, models, videos, photographs, permanent slides, working models etc.

1 - **Classification** of following animals upto sub-class. (with the help of specimens, photographs, charts, models etc.)

- Peripetus
- Crab
- Julus
- Palaemon
- Silverfish
- Termite
- Butterfly
- Chaetoderma
- Unio
- Aplysia
- Sepia
- Starfish
- Brittle star
- Sea cucumber
- Feather star
- Balanoglossus

2 - **Pila** to be taught/studied only with the help of charts, models, videos, photographs, permanent slides, working models, simulators etc.

- External features
- Digestive system
- Reproductive system
- Nervous system
- Mountings:

- Osphradium
- Radula
- Statocyst

3 - Evolution

- Homologous organs-Forelimbs and hind limbs of chordates
- Analogous organs-Wings of butterfly, birds and bats
- Vestigial organs-Caecum and vermiform appendix in man ,hindlimbs in python, leg bones in whale
- connecting link-Archaeopteryx,Ornithorhyncus,Peripatus
- Atavism (Reversion)- Human babies with a tail, Dolphins with legs, Iris dogman

4 - Protective coloration and mimicry

- Leaf insect
- Stick insect
- Lantern fly
- Eye spot Butterfly
- Australian seahorse
- Rattle snake

4 - Economic Zoology:

- Dairy Farming:
 - Indian breeds of cows and buffaloes
 - Apiculture:
 - To study Life history of Honey bee
 - Queen
 - Drones
 - Workers
 - Honey and Wax
 - Modern movable beehive
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VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

S.Y. B.Sc. SEM – IV

ZOOLOGY PAPER – IV (Z – 402)

(Effective from June 2020)

(Chordates, Embryology and Osteology)

UNIT – 1 Classification:

- Introduction to classification: General study of the following chordates up to subclass with examples:
 - Reptilians
 - Aves
 - Mammals

UNIT – 2 Animal Type Study:

- Study of the **Uromastix** with reference to their structure and functions of various organs of all systems:
 - External characters
 - Digestive system
 - Circulatory systems
 - Urinogenital system
 - Brain

UNIT – 3 Embryology:

- Different types of eggs
- Cleavage patterns
- Development of frog (up to neurulation)
- Metamorphosis

UNIT – 4 Osteology:

- Comparative Study in frog, varanus, pigeon and rabbit
 - Fore limbs
 - Hind limbs

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

S.Y.B. Sc. SEM – IV

ZOOLOGY PRACTICAL (Based on Paper - Z – 402)

(Chordates, Embryology and Osteology)

The following practicals are to be taught/studied **only** with the help of charts, models, videos, photographs, permanent slides, working models etc.

1 - Classification of following animals upto sub-class. (with the help of specimens, photographs, charts, models etc.)

- Calotes
- Draco
- Testudo
- Python
- Krait
- Aligator
- Pigeon
- Wood packer
- Vulture
- King fisher
- Echidna
- Kangaroo
- Loris
- Porcupine
- Squirrel
- Dolphin

2 - The following practicals of **Uromastrix** to be taught/studied only with the help of charts, models, videos, photographs, permanent slides, working models, simulators etc.:

- Digestive system
- Circulatory system
- Urinogenital system
- Dorsal and ventral view of brain

3 – Study of frog embryology (with the help of models /charts /specimens /photographs /permanent slides etc).

- Uncleaved egg
- 2 cell stage
- 4 cell stage
- 8 cell stage
- 16 cell stage
- Blastula
- Gastrula
- Metamorphosis (Tadpole larva)

4 - Osteology:

- Comparative Study in frog, varanus, pigeon and rabbit
 - Fore limbs
 - Hind limbs
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VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
S.Y. B.Sc. SEM – IV
ZOOLOGY PAPER – III (Z – 403)
(Biochemistry, Genetics and Animal Physiology)

UNIT – 1 Biochemistry

- Classification of
 - Carbohydrates
 - Proteins
 - Lipids

UNIT – 2 Genetics:

- Epistasis genes
- Concept of lethal alleles and pseudo alleles

UNIT – 3 Physiology:

- **Nervous coordination:**
 - Synapse and mechanism of nerve impulse conduction
 - Structure and function of sense organs (human) eye & ear

UNIT – 4 Physiology:

- **Excretion and osmoregulation:**
 - Structure of uriniferous tubule
 - Physiological process of excretion (including counter current mechanism) and urine formation; hormonal control (rennin angiotensin system and ADH); Osmoregulation in fresh and marine waters
 - Osmosis, diffusion and Donnan's equilibrium

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

S.Y. B. Sc. SEM – IV

ZOOLOGY PRACTICAL (Based on Paper - Z – 403)

(Biochemistry, Genetics and Animal Physiology)

The following practicals are to be taught/studied **only** with the help of charts, models, videos, photographs, permanent slides, working models etc.

1. Qualitative test for organic compound:

➤ Carbohydrates:

- Glucose
- Fructose
- Maltose
- Lactose
- Sucrose

➤ Proteins:

- Albumin
- Casein

2. Genetics:

- To study Epistasis genes, lethal alleles, pseudo alleles by chart.

3. Physiology:

- To determine normal constituents of urine.
- To determine abnormal constituents of urine.

4. Physiology:

- To study different types of Sensory organs –human eye and ear.
Different types of nerve cells.
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VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
S.Y. B.Sc. SEM – IV
MARINE SCIENCE (EG)

UNIT-1

➤ Types of seashores and their fauna:

- Sandy shore
- Rocky shore
- Estuaries

UNIT-2

➤ Coral and coral reefs:

- Types
- Economic importance and threats.

➤ Voyage of green sea turtle.

UNIT- 3

➤ Introduction to aqua culture:

- History
- Scope
- Present status

General idea of different aquaculture practices:

- Monoculture
- Polyculture
- Extensive culture
- Intensive culture

UNIT-4

➤ Marine Pollution:

- Causative factors and impacts
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Reference Books for Z-301 & 401

1. Living Invertebrates, 1987: Pearse, Buchsbaum, Blackwell Scientific Publication, California.
 2. A Text book of Zoology Invertebrates, Vol. I 1992, 7th Edn. Parker and Haswell edited by Marshall William, C B S publishers and distributors, New Delhi.
 3. Invertebrate Zoology, 1992; S. N. Prasad, Vikas Publishing House, New Delhi.
 4. Life of Invertebrates, 1992; S.N. Prasad, Vikas Publishing House, New Delhi.
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