



Re-Accredited 'B++' 2.86 CGPA by NAAC

VEER NARMAD SOUTH GUJARAT UNIVERSITY

University Campus, Udhna-Magdalla Road, SURAT - 395 007, Gujarat, India.

વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી

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

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સંદર્ભ: યુનિવર્સિટી કાર્યાલયના તા.૩૦-૦૬-૨૦૨૩, ક્રમાંક : એસ./સાયન્સ/પરિપત્ર/૧૬૨૨૩/૨૦૨૩

-: પરિપત્ર :-

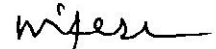
વિજ્ઞાન વિદ્યાશાખા હેઠળની સંલગ્ન તમામ કોલેજોનાં આચાર્યશ્રીઓને જણાવવાનું કે, શૈક્ષણિક વર્ષ ૨૦૨૩-૨૪ થી અમલમાં આવનાર શિક્ષણ વિભાગના રાજ્યની તમામ ઉચ્ચ શૈક્ષણિક સંસ્થાઓ માટે રાષ્ટ્રીય શિક્ષણ નીતિ ૨૦૨૦ અંતર્ગત કોમન કરીકયુલમ એન્ડ ક્રેડિટ ફ્રેમવર્ક હેઠળ ક્રેડિટ માળખું અમલીકરણ માટે નિયત કરવા બાબત અંગેના તા.૧૧/૦૭/૨૦૨૩, ઠરાવ ક્રમાંક: KCG/admin/2023-24/0607 /kh.1 અનુસાર તથા વિજ્ઞાન વિદ્યાશાખાનાં સ્ટ્રક્ચર મુજબ શૈક્ષણિક વર્ષ ૨૦૨૩-૨૪ થી અમલમાં આવનાર B.Sc. Zoology Sem - 1 નો Major, Minor, Multidisciplinary અને SEC નો અભ્યાસક્રમ ઝૂઓલોજી અભ્યાસ સમિતિ વતી અભ્યાસ સમિતિનાં ચેરમેનશ્રીએ અને વિજ્ઞાન વિદ્યાશાખાની મંજૂરીની અપેક્ષાએ વિજ્ઞાન વિદ્યાશાખા વતી વિજ્ઞાન વિદ્યાશાખાનાં અધ્યક્ષશ્રીએ મંજૂર કરી એકેડેમિક કાઉન્સિલને કરેલ ભલામણ એકેડેમિક કાઉન્સિલની તા.૧૭/૦૮/૨૦૨૩ની સભાનાં ઠરાવ ક્રમાંક: ૫ થી મંજૂર કરેલ છે. જેનો અમલ કરવા આથી જાણ કરવામાં આવે છે.

એકેડેમિક કાઉન્સિલની તા.૧૭/૦૮/૨૦૨૩ની સભાનાં ઠરાવ ક્રમાંક:૦૫

:: આથી ઠરાવવામાં આવે છે કે, શૈક્ષણિક વર્ષ ૨૦૨૩-૨૪ થી અમલમાં આવનાર B.Sc. Zoology Sem-1 નો Major, Minor, Multidisciplinary અને SEC નો અભ્યાસક્રમ ઝૂઓલોજી અભ્યાસ સમિતિ વતી અભ્યાસ સમિતિનાં ચેરમેનશ્રીએ અને વિજ્ઞાન વિદ્યાશાખાની મંજૂરીની અપેક્ષાએ વિજ્ઞાન વિદ્યાશાખા વતી વિજ્ઞાન વિદ્યાશાખાનાં અધ્યક્ષશ્રીએ મંજૂર કરી એકેડેમિક કાઉન્સિલને કરેલ ભલામણનો સ્વીકાર કરી મંજૂર કરવામાં આવે છે.

(બિડાણ: ઉપર મુજબ)

ક્રમાંક : એસ./સાયન્સ/પરિપત્ર/૨૧૪૬૪/૨૦૨૩
તા.૧૮-૦૮-૨૦૨૩


કુલસચિવ (૦૦૧)

પ્રતિ,

૧) વિજ્ઞાન વિદ્યાશાખા હેઠળની સંલગ્ન તમામ કોલેજોનાં આચાર્યશ્રીઓ.

..... આપશ્રીની કોલેજના સંબંધિત શિક્ષકોને જાણ કરી અમલ કરવા સારૂ.

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

F.Y.B.Sc. SEMESTER-I

ZOOLOGY: ZO - MJ – 101 (MJ – Major)

(Effective from JUNE-2023)

(Non-chordates and Economic Zoology) (03 credits = 03 Hours/Week)

(Total Hours = 45)

UNIT- I: Systematics: (15 Hours)

- (A) Scope and branches Zoology.
(B) Salient features of Non-chordates *i.e.* Protozoa to Hemichordata

UNIT- II: Non-Chordate Animal Diversity: (15 Hours)

Type study– Cockroach

- Systematic position, Habit and habitat
- External features, Body wall
- Digestive system, Respiratory System, Excretory system, Nervous system
- Reproductive system, Life cycle, fertilization and development

UNIT-III: Economic Zoology: (15 Hours)

(A) Vermiculture:

Vermiculture and Vermicomposting:

- Introduction
- Definition
- Scope and importance of Vermitechnology
- Suitable breeds
- Construction of Vermicompost pits (Outdoor and indoor spaces), Properties and benefits of Vermicompost
- Venice wash

(B) Pearl Culture:

- Classification of pearl
- History
- Distribution of Pearl Oyster beds
- Status of marine pearl culture of India
- Pearl producing Oyster
- Formation of Pearl Oyster (Naturally and Artificially)
- Harvesting of pearl
- Places of pearl fisheries of India

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT.
F.Y.B.Sc. SEMESTER-I
ZOOLOGY PRACTICALS – ZOP - MJ – 1(Based on Paper- ZO – MJ – 101)
(Effective from JUNE-2023) (01 credits = 02 Hours/Week)
(Total Hours = 30)

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

1. Study of the following specimens:

- Amoeba
- Euglena
- Paramecium
- Sycon
- Hyalonema
- Physalia
- Jelly fish
- Sea anemone
- Tapeworm
- Male and female Ascaris
- Nereis
- Pheretima
- Hirudinaria

2. Study of the following specimens:

- Crab
- Centipede
- King crab
- Silver fish
- Cockroach
- Butterfly
- Chiton
- Dentalium
- Pila
- Ostrea
- Octopus

- Starfish
- Brittle star
- Sea urchin
- Sea cucumber
- Balanoglossus.

3. The following practicals of Cockroach to be taught/studied only with the help of Charts/models/videos/photographs/permanent slides, working models, simulators etc.

- External features
- Digestive system
- Nervous system
- Reproductive system

4. Study of the following permanent slides:

- Abdominal Spiracle
- First thoracic spiracle
- Second thoracic spiracle
- Compound eye
- Walking leg
- Mouth parts

5. Study of Vermicompost:

Different species used in Vermicompost and Construction of pits.

6. Study of Pearl Oyster:

Types of pearls and Formation method of pearl oyster (Naturally and artificially).

Reference Books:

- (1) Ruppert and Barnes, R.D. (2006). Invertebrate Zoology, VIII Edition. Holt Saunders International Edition.
- (2) Barnes, R.S.K., Calow, P., Olive, P.J.W., Golding, D.W. and Spicer, J.I. (2002). The Invertebrates: A New Synthesis, III Edition, Blackwell Science
- (3) Kardong, K.V. (2005) Vertebrates' Comparative Anatomy, Function and Evolution. IV Edition. McGraw-Hill Higher Education.
- (4) Kent, G.C. and Carr R.K. (2000). Comparative Anatomy of the Vertebrates. IX Edition. The McGraw-Hill Companies.
- (5) Young, J. Z. (2004). The Life of Vertebrates. III Edition. Oxford University press.
- (6) Modern Text Book of Zoology (vertebrate) R.L.Kotpal, Rastogi Publication, Meerut, India.
- (7) Modern Text Book of Zoology (invertebrate) R.L.Kotpal, Rastogi Publication, Meerut, India.
- (8) Invertebrate Zoology- E.L.Jordan & P.S. Verma
- (9) Invertebrate Zoology- T.C. Majupuria, Pradeep Publication, Jalandhar, India.
- (10) Introduction to Chordates- T.C. Majupuria, Pradeep Publication, Jalandhar, India.
- (9) A manual of Practical Zoology Invertebrates- P.S.Verma, S. Chand & Co.Ltd. New Delhi, India.
- (10) A manual of Practical Zoology Chordates- P.S.Verma, S. Chand & Co. Ltd. New Delhi, India.
- (11) Cell biology, Genetics and Molecular Biology- V.B. Rastogi, Rastogi Publi. Meerut- India
- (12) Modern zoology –Dr. Ramesh Gupta, Prakash Publication, 12th Edition, Muzaaffarnagar(UP)

Link:

- (1) https://prgc.ac.in/uploads/study_material/Pearl%20Oyster%20culture.pdf
 - (2) <https://www.studocu.com/in/n/21243202?sid=01686362309>
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VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT.

F.Y.B.Sc. SEMESTER-I

ZOOLOGY: ZO - MJ – 102 (MJ – Major)

(Effective from JUNE-2023)

(Chordates and Hematology) (03 credits = 03 Hours/Week)

(45 Hours)

UNIT-I:

(A) Types of Microscope: (15 Hours)

- Simple microscope
- Compound microscope

(B) Systematics:

Salient features of Chordate classes with examples:

- Protochordata
- Cyclostomata
- Pisces
- Amphibia
- Reptiles
- Aves
- Mammals

UNIT- II: Chordate Animal Diversity: (15 Hours)

Type study– Scoliodon:

- External characters
- Digestive system
- Circulatory system
- Urinogenital system
- Brain

UNIT-III: Hematology: (15 Hours)

- Blood and its components.
- Haemoglobin: Structure, types of normal and abnormal haemoglobin.
- ABO blood group system and its detection methods.
- Rh blood group system and its detection methods.
- Bombay blood group system and its detection methods:
- Blood donors' selection and rejection criteria.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT.
F.Y.B.Sc. SEMESTER- I
ZOOLOGY PRACTICALS – ZOP - MJ – 1(Based on Paper - ZO – MJ - 102)
(Effective from JUNE-2023) (01 credits = 02 Hours/Week)
(Total Hours = 30)

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

1. Types of Microscope: Simple and Compound microscope.

2. Study of the following specimens:

- Herdmania
- Branchiostoma
- Petromyzon
- Shark
- Pristis
- Torpedo
- Rohu
- Flying Fish
- Ichthyophis
- Salamander
- Bufo
- Hyla
- Chelone
- Hemidactylus
- Chamaeleon
- Russell' Vipera
- Indian Cobra
- Crocodylus
- Gavialis (Gharial)
- Pigeon
- Peacock
- Sparrow
- Platypus
- Kangaroo
- Bat

- Dolphin

3. The following practicals of Scoliodon to be taught/studied only with the help of Charts/models/videos/photographs/permanent slides, working models, simulators etc.

- External features
- Digestive system
- Male and Female Urinogenital system
- Brain (Dorsal and Ventral view)

Mounting:

- Placoid scales
- Ampulla of Lorenzini

4. To study Blood groups and Rh factor in human blood.

5. To study Blood clotting time.

6. To study of Haemin crystals in human blood.

Reference Books:

- (1) Ruppert and Barnes, R.D. (2006). Invertebrate Zoology, VIII Edition. Holt Saunders International Edition.
- (2) Barnes, R.S.K., Calow. P., Olive, P.J.W., Golding, D.W. and Spicer, J.I. (2002). The Invertebrates: A New Synthesis, III Edition, Blackwell Science
- (3) Kardong, K.V. (2005) Vertebrates' Comparative Anatomy, Function and Evolution. IV Edition. McGraw-Hill Higher Education.
- (4) Kent, G.C. and Carr R.K. (2000). Comparative Anatomy of the Vertebrates. IX Edition. The McGraw-Hill Companies.
- (5) Young, J. Z. (2004). The Life of Vertebrates. III Edition. Oxford University press.
- (6) Modern Text Book of Zoology (vertebrate) R.L.Kotpal, Rastogi Publication, Meerut, India.
- (7) Modern Text Book of Zoology (invertebrate) R.L.Kotpal, Rastogi Publication, Meerut, India.
- (8) Invertebrate Zoology- E.L.Jordan & P.S. Verma
- (9) Invertebrate Zoology- T.C. Majupuria, Pradeep Publication, Jalandhar, India.
- (10) Introduction to Chordates- T.C. Majupuria, Pradeep Publication, Jalandhar, India.
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- (10) A manual of Practical Zoology Chordates- P.S.Verma, S. Chand & Co. Ltd. New Delhi, India.
- (11) Cell biology, Genetics and Molecular Biology- V.B. Rastogi, Rastogi Publi. Meerut- India
- (12) Modern zoology –Dr. Ramesh Gupta, Prakash Publication, 12th Edition, Muzaffarnagar (UP)

Link:

- (1) https://prgc.ac.in/uploads/study_material/Pearl%20Oyster%20culture.pdf
 - (2) <https://www.studocu.com/in/n/21243202?sid=01686362309>
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VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
F.Y.B.Sc. SEMESTER- I
ZOOLOGY: ZO - ME – 101 (ME – Minor Elective)
(Effective from JUNE-2023)
(Non-chordates and Chordates) (02 credits = 02 Hours/Week)
Total Hours = 30

UNIT- I: (A) - Systematics: (15 Hours)

(A) Scope and branches Zoology.

(B) Salient features of Non-chordates *i.e.* Protozoa to Hemichordata

(B) - Systematics:

Salient features of Chordate classes with examples:

- Protochordata
- Cyclostomata
- Pisces
- Amphibia
- Reptiles
- Aves
- Mammals

UNIT- II: (A) - Non-Chordate Animal Diversity: (15 Hours)

Type study– Cockroach

- Systematic position, Habit and habitat
- External features, Body wall
- Digestive system, Respiratory System, Excretory system, Nervous system
- Reproductive system, Life cycle, fertilization and development

UNIT- II: (B) - Chordate Animal Diversity:

Type study– Scoliodon:

- External characters
 - Digestive system
 - Circulatory system
 - Urinogenital system
 - Brain
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VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT.
F.Y.B.Sc. SEMESTER- I
ZOOLOGY PRACTICALS – ZOP - ME – 1(Based on Paper- ZO – ME – 101)
(Effective from JUNE-2023) (02 credits = 04 Hours/Week)
(Total Hours = 60)

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

1. Study of the following specimens:

- Amoeba
- Euglena
- Paramecium
- Sycon
- Hyalonema
- Physalia
- Jelly fish
- Sea anemone

2. Study of the following specimens:

- Tapeworm
- Male and female Ascaris
- Nereis
- Pheretima
- Hirudinaria

3. Study of the following specimens:

- Crab
- Centipede
- King crab
- Silver fish
- Cockroach
- Butterfly

4. Study of the following specimens:

- Chiton

- Dentalium
- Pila
- Ostrea
- Octopus

5. Study of the following specimens:

- Starfish
- Brittle star
- Sea urchin
- Sea cucumber
- Balanoglossus.

6. The following practicals of Cockroach to be taught/studied only with the help of Charts/models/videos/photographs/permanent slides, working models, simulators etc.

- External features
- Digestive system
- Nervous system
- Reproductive system

7. Study of the following permanent slides:

- Abdominal Spiracle
- First thoracic spiracle
- Second thoracic spiracle
- Compound eye
- Walking leg
- Mouth parts

8. Study of the following specimens:

- Herdmania
- Branchiostoma
- Petromyzon
- Shark
- Pristis
- Torpedo
- Rohu

- Flying Fish

9. Study of the following specimens:

- Ichthyophis
- Salamander
- Bufo
- Hyla
- Chelone
- Hemidactylus
- Chamaeleon
- Russell' Vipera
- Indian Cobra
- Crocodylus
- Gavialis (Gharial)

10. Study of the following specimens:

- Pigeon
- Peacock
- Sparrow
- Platypus
- Kangaroo
- Bat
- Dolphin

11. The following practicals of Scoliodon to be taught/studied only with the help of Charts/models/videos/photographs/permanent slides, working models, simulators etc.

- External features
- Digestive system
- Male and Female Urinogenital system
- Brain (Dorsal and Ventral view)

Mounting:

- Placoid scales
 - Ampulla of Lorenzini
-

Reference Books:

- (1) Ruppert and Barnes, R.D. (2006). Invertebrate Zoology, VIII Edition. Holt Saunders International Edition.
- (2) Barnes, R.S.K., Calow, P., Olive, P.J.W., Golding, D.W. and Spicer, J.I. (2002). The Invertebrates: A New Synthesis, III Edition, Blackwell Science
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- (10) A manual of Practical Zoology Chordates- P.S.Verma, S. Chand & Co. Ltd. New Delhi, India.
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- (12) Modern zoology –Dr. Ramesh Gupta, Prakash Publication, 12th Edition, Muzaaffarnagar(UP)

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VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
F.Y.B.Sc. SEMESTER- I
ZOOLOGY: ZO - MDC – 101 (MDC – Multidisciplinary)
(Effective from JUNE-2023)
(Clinical Biology) (02 credits = 02 Hours)
(30 Hours)

Unit:I

(15 Hours)

- **Types of Microscope:**
 - Simple microscope
 - Compound microscope
 - Fluorescence Microscope

Unit:II

(15 Hours)

- **Liquid Connective Tissue:**
 - Blood and its components
 - ABO blood group system and its detection methods
 - Rh blood group system and its detection methods
 - Genetic blood disorders: Sickle cell Anemia, Thalassemia

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
F.Y.B.Sc. SEMESTER- I
ZOOLOGY: ZOP - MDC – 1 (Based on Paper- ZO – MDC – 101)
(Effective from JUNE-2023) (02 credits = 04 Hours)
(60 Hours)

- Principle, parts, uses, Limitation of Simple microscope, Compound microscope, Fluorescence Microscope
 - To study Blood groups and Rh factor in human blood
 - To study Blood clotting time
 - To study of Haemin crystals in human blood
 - Sickle cell Anemia: Symptoms, Treatment, Drugs
 - Thalassemia: Types, Symptoms, Treatment, Drug
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Reference Books:

- 1) Modern Text Book of Zoology (vertebrate) R.L.Kotpal, Rastogi Publication, Meerut, India.
 - 2) Modern Text Book of Zoology (invertebrate) R.L.Kotpal, Rastogi Publication, Meerut, India.
 - 3) Invertebrate Zoology- E.L.Jordan & P.S.Verma.
 - 4) Invertebrate Zoology- T.C. Majupuria, Pradeep Publication, Jalandhar, India.
 - 5) <https://www.moh.gov.sa/en/HealthAwareness/EducationalContent/Diseases/Hematology/Pages/005.aspx>
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VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
F.Y.B.Sc. SEMESTER-I
ZOOLOGY: ZO - MDC – 102 (MDC – Multidisciplinary)
(Effective from JUNE-2023)
(Economic Zoology and Hematology) (02 credits = 02 Hours)
(30 Hours)

UNIT-I: Economic Zoology: (15 Hours)

(A) Vermiculture:

Vermiculture and Vermicomposting:

- Introduction
- Definition
- Scope and importance of Vermitechnology
- Suitable breeds
- Construction of Vermicompost pits (Outdoor and indoor spaces), Properties and benefits of Vermicompost
- Venice wash

(B) Pearl Culture:

- Classification of pearl
- History
- Distribution of Pearl Oyster beds
- Status of marine pearl culture of India
- Pearl producing Oyster
- Formation of Pearl Oyster (Naturally and Artificially)
- Harvesting of pearl
- Places of pearl fisheries of India

UNIT-II: Hematology: (15 Hours)

- Blood and its components.
 - Haemoglobin: Structure, types of normal and abnormal haemoglobin.
 - ABO blood group system and its detection methods.
 - Rh blood group system and its detection methods.
 - Bombay blood group system and its detection methods.
 - Blood donors' selection and rejection criteria.
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VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT.
F.Y.B.Sc. SEMESTER- I
ZOOLOGY: ZOP - MDC – 2 (Based on Paper- ZO – MDC – 102)
(Effective from JUNE-2023) (02 credits = 04 Hours)
(60 Hours)

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

1. Study of Vermicompost:

Different species used in Vermicompost and Construction of pits

2. Study of Pearl Oyster:

Types of pearls and Formation method of pearl oyster (Naturally and artificially)

3. To study Blood groups and Rh factor in human blood.

4. To study Blood clotting time.

5. To study of Haemin crystals in human blood.

Reference Books:

- 1) Cell biology, Genetics and Molecular Biology - V.B. Rastogi, Rastogi Publi. Meerut-India
- 2) Modern zoology –Dr. Ramesh Gupta, Prakash Publication, 12th Edition, Muzaaffarnagar (UP)

Link:

- (1) https://prgc.ac.in/uploads/study_material/Pearl%20Oyster%20culture.pdf
 - (2) <https://www.studocu.com/in/n/21243202?sid=01686362309>
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VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

F. Y.B.Sc. SEMESTER- I

ZOOLOGY: ZO - SEC – 101 (Skill Enhancement Course)

(Effective from JUNE-2023)

(Human Health and Management) (02 credits = 02 Hours/Week)

(Total Hours = 30)

1. Common Human Diseases: (15 Hours)

- Basic concept of congenital and acquired disease with their examples and types
- Abiotic and biotic diseases causing factors/components
- Pathogens and parasites
- Vectors
- Addictions

2. (A). Causes and Prevention of some common diseases: (15 Hours)

- Influenza
- Malaria
- Typhoid
- Diabetes
- Cardiovascular Diseases
- Stroke
- Cancer
- AIDS
- Role of immune system.

(B). Prevention and Management:

- Hygiene and sanitation
- Stress management (through exercise, yoga, meditation etc)
- Vaccines; Medicinal drugs in daily use and basic awareness of few diagnostic techniques

Reference:

1. Diseases of the Human Body: 3rd Edition Carol D. Tampo and Marcia A. Lewis F.A. Davis Company (2000)
 2. Human Body - Immune System And Common Diseases (2020) Wonder House Books.2020
 3. Anatomy Physiology and health education. Rohini Agrawal CBS Publication (2021)
 4. Public Health, Food Hygiene And Sanitation. SIA Publishers & Distributors Pvt Ltd (2023)
 5. Stress Management. Dreamland Publications (2022)
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VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
F. Y.B.Sc. SEMESTER- I
ZOOLOGY: ZO - SEC – 102 (Skill Enhancement Course)
(Effective from JUNE-2023)
(Apiculture) (02 credits = 02 Hours/Week)
(Total Hours = 30)

Program Outcome:

1. The programme shall help students to understand importance and role of animals in an ecosystem.
2. Understand the applications of techniques to various fields of biology.
3. The programme shall provide subject based skills of various fields that provide a base for future career in disciplines such as Health Sciences, Aquaculture, Agriculture, Environmental Management, Biotechnology, Publishing, Teaching and Research.

Course Outcome:

1. The student shall have basic knowledge about morphology and life cycle of honey bee.
2. The student shall have basic knowledge identification and importance of honey bee in apiculture.

Unit I:

(15 Hours)

- Introduction, history and importance of apiculture.
- Classification, morphology and diversity of honey bees.
- Life history and social organization in honey bee.
- Selection criteria of honey bee for apiculture.

Unit II:

(15 Hours)

- A typical bee hive (natural)
- Methods of Bee Keeping – Old and Modern.
- Appliances for modern method.
- Products of bee keeping: Honey & Bee Wax.

Reference:

1. Economic Zoology: G. S. Shukla & V. B. Upadhyay, Rastogi Publication, Meerut.
2. Economic and Applied Entomology: Kumar and Nigum, Emkay Publication, Delhi.

Further Reading:

1. Graham, J M (1992) The hive and the honey bee. Dadant and Sons, Hamilton, Illinois.
 2. Mishra R.C. (1995) Honey bees and their management in India. ICAR Publication, Delhi.
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