Rs - 10 -

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॥ अंतरी पेटवू ज्ञानज्योत ॥

North Maharashtra University,
Jalgaon

Syllabus for S.Y.B.Sc.

ZOOLOGY

W.E.From June, 2003

॥ ज्ञानेन पेक्षू ज्ञानज्योत ॥

उत्तर महाराष्ट्र विद्यापीठ, जळगाव
NORTH MAHARASHTRA UNIVERSITY,
P B NO 80, UMAVINAGAR, JALGAON- 425 001 (M.S)
EPABX:(0257)2252187-90 Fax No:0257-2252183Gram: UTTAMVIDYA

जा.क्र.: उमवि/१२ /विज्ञान विद्याशाखा /२३१७/२००३. दिनांक :३१/०७/२००३

प्रति,
मा.प्राचार्य,
उ.म.वि.शी संलग्नित असलेली सर्व
कला, विज्ञान आणि वाणिज्य महाविद्यालये.

यांसी...

विषय :- द्वितीयवर्ष विज्ञान-प्राणीशास्त्र विषयाच्या अभ्यासक्रमासाबत.

संदर्भ :- विद्यापीठाचे परिपत्रक क्र. १३४/२००३.जा.क्र.: उमवि/१२ /विज्ञान विद्याशाखा / १६३२/२००३,दिनांक :१८/०६/२००३

महोदय,

उपरोक्त विषया संदर्भात आपणास कळविण्यांत येते की, जून, २००३ पासून लागू झालेल्या द्वितीयवर्ष विज्ञान प्राणीशास्त्र विषयाच्या अभ्यासक्रमाची प्रत आपणास उपरोक्त संदर्भिय पत्रान्वये अधिच पाठविण्यात आली आहे. सदर विषयाचा अभ्यासक्रम निहाय तासिका व गुणदानाबाबत सविस्तर तक्ता सोबत जोडून पाठवित आहोत. तसेच सदर विषयाच्या अभ्यासक्रमासाठीच्या संदर्भ ग्रंथांची यादी सोबत जोडून पाठवित आहोत.

करिता; मा.प्राचार्य, यांना विनंती की, सदर पत्राचा आशय आपण आपल्या महाविद्यालयातील संबंधित प्राध्यापक व विद्यार्थी यांच्या निदर्शनास आणून द्यावा.

सहपत्र :- वरीलप्रमाणे.

उपकुलसचिव.

प्रतिलिपी :-

१) मा.अधिष्ठाता व सर्व सदस्य, विज्ञान विद्याशाखा, उ.म.वि., जळगांव.
२) मा.अध्यक्ष व सर्व सदस्य, प्राणीशास्त्र अभ्यासमंडळ.
३) मा.कुलगुरु कार्यालय, उ.म.वि., जळगाव.
४) मा.कुलसचिव कार्यालय, उ.म.वि., जळगाव.
५) मा.परीक्षा नियंत्रक, उ.म.वि., जळगाव.
६) मा.उपकुलसचिव, संलग्नता विभाग, उ.म.वि., जळगाव
७) मा.पध्दती विश्लेषक, संगणक विभाग, उ.म.वि., जळगाव.
८) मा.सहा.कुलसचिव,परीक्षा (गोपनीय) विभाग,उ.म.वि., जळगाव.
९) मा.सहा.कुलसचिव, परीक्षा विभाग, संलग्नित विद्याशाखा, उ.म.वि., जळगाव.
१०) मा.कक्षाधिकारी, सभा व दप्तर विभाग, उ.म.वि., जळगाव.

॥ अंतरी पेटवू ज्ञानज्योत ॥

उत्तर महाराष्ट्र विद्यापीठ, जळगाव
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EPABX:(0257)2258428-38 Fax No:0257-2258403Gram: UTTAMVIDYA

जा.क्र.: उमवि/१२ /विज्ञान विद्याशाखा /३४९४/२००३. दिनांक :१९/११/२००३

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उ.म.वि.शी संलग्नित असलेली सर्व
कला, विज्ञान आणि वाणिज्य महाविद्यालये.
यांसी...

विषय :- द्वितीयवर्ष विज्ञान-प्राणीशास्त्र विषयाच्या अभ्यासक्रमाबाबत.

संदर्भ :- विद्यापीठाचे परिपत्रक क्र. १३४/२००३,जा.क्र.: उमवि/१२ /विज्ञान विद्याशाखा / १६३२/२००३,दिनांक :१८/०६/२००३

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2) **S.Y.B.Sc. syllabus** -

i) Paper I - Section I - Nonchordates II.
Topic I - Pilaglobosa
Chapter 5 (g) iv :- Development.

The topic of Glochidium larva should be deleted.

ii) **S.Y.B.Sc. Practicals** :-
From Nonchordate & Chordate classification only one example of each class should be taken.

करिता; मा.प्राचार्य, यांना विनंती की, सदर पत्राचा आशय आपण आपल्या महाविद्यालयातील संबंधित प्राध्यापक व विद्यार्थी यांच्या निदर्शनास आणून द्यावा.

उपकुलसचिव.

प्रतिलिपी :-
०१) मा.अधिष्ठाता व सर्व सदस्य, विज्ञान विद्याशाखा, उ.म.वि., जळगांव.
०२) मा.अध्यक्ष व सर्व सदस्य, प्राणीशास्त्र अभ्यासमंडळ.
०३) मा.कुलगुरू कार्यालय, उ.म.वि., जळगाव.
०४) मा.कुलसचिव कार्यालय, उ.म.वि., जळगाव.
०५) मा.परीक्षा नियंत्रक, उ.म.वि., जळगाव.
०६) मा.उपकुलसचिव, संलग्नता विभाग, उ.म.वि., जळगाव
०७) मा.पध्दती विश्लेषक, संगणक विभाग, उ.म.वि., जळगाव.
०८) मा.सहा.कुलसचिव,परीक्षा (गोपनीय) विभाग,उ.म.वि.,जळगाव.
०९) मा.सहा.कुलसचिव, परीक्षा विभाग, संबंधित विद्याशाखा, उ.म.वि., जळगाव.
१०) मा.कक्षाधिकारी, सभा व दप्तर विभाग, उ.म.वि., जळगाव.

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NORTH MAHARASHTRA UNIVERSITY, JALGAON

S.Y.B.Sc. ZOOLOGY

REFERENCE BOOKS

Paper I – Section - I and Section – II
Nonchordates II & Chordates II

1. A. T. B. of Zoology – Invertebrates and Vertebrates
   Vol. I & II, 1992, 7th Edn – Parker and Haswell
   Edited by Marshal and Williams, CBS Publ & distributors New Delhi.
2. Life of Vertebrates, 1992 S. N. Prasad
   Publ. Vikas Publishing house, New Delhi.
3. A. T. B. of Zoology - Vertebrates – S. N. Prasad
   Vikas Publishing house, New Delhi
4. Invertebrate - Zoology – E. L. Jordan
   S. Chand and Company, New Delhi.
5. Vertebrate Zoology – E. L. Jordan
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   2nd Edn. 1979, ELBS, EW Barrington.
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9. Life of Vertebrates, 3rd Edn. 1983
   ELBS J. Z. Young
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11. The biology of Amphibia. 1956. G. Kingsley Noble Daver Publication Inc. New York.
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    R. L. Kotpal, Rastogi Publication. Meerut.
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14. A. T. B. of Chordate Zoology 1988, R. C. Dalela Jai Prakash Nath Publications, Meerut.
15. Phylum Chordate 1987 – H. H. Newman
    Satish book Enterprises, Agra.
16. Students text books of Zoology Vol. I to III
    A. Sedgwick
17. Nonchordates by Manjupuria.
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19. A. T. B. of Zoology by R. D. Vidyarthi.
20. Proto Chordates by Misra adn Gupta

Paper II – Section I

Genetics

Principles of Human Genetics 1968. Curt Stern. Eurasia Publishing house, New Delhi.

Introduction to Genetics 1991 T S Gopalkrishna Sambasiviah and Rao Himalaya Publ House, Bombay

Theory and Problems of Genetics 1983.

William Stanfield Mc Graw Hill Book Company New Delhi

Principles of Genetics (1986), Sinnott, Dunn and Dobzansky, Tata Mc Graw Hill Publ Co New Delhi.

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Cytology and Genetics 1990 V K Dnyansagar. Tata Mc Graw Hill Publ. Co New Delhi.

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Genetics 1975 Verma and Agrawa. S Chand & Co New Delhi.

Genetics 1997 M P Arora & Sandhu

Himalaya Publ Co Bombay

A textbook of Genetics 1974 Dalela & Verma

Jai Prakash Nath & Co. Meerut

Genetics 1990, Rastogi Agrawala

Wiley Eastern Ltd. New Delhi

Paper – II – Section II – Part I – Agricultural Pests and their control
Part – II – Apiculture.

Imms textbook of Entomology Edit. Richards & Davies.
Methew and Co London 1977 Vol I & III

Principles of Insect Morphology – R E Snodgrass
Tata Mc Graw Hill Co Bombay

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EUP and EUP London 1972.

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Applied Entomology Shrivastava Vol. I & II

Pest control – A survey A – words
Mc Graw Hill London 1974

Principles of Insect Physiology Wigglesworth

Morphology, Physiology and Endocrinology of Insects D B Tembhare.
S Chand & Company

Bee keeping in India Sardar Singh

World honey bee Ruttel C G

Communication among social bees – Lindainar M.

Anatomy of the honey bee Snodgrass

Destructive and useful insects Metcalfe & Flint

Insects – The Year book of Agriculture

Hive and honey bee Government Publication

Honey bee Dadant

Text book of bee keeping – Dr Deoras Nikam

Indian bee Journal – Published by All India Bee Keepers Association.

॥ अंतरी पेटवू ज्ञानज्योत ॥

NORTH MAHARASHTRA UNIVERSITY, JALGAON.

CORRECTIONS

S.Y. B.Sc. Zoology.

PAPER I – SECTION I – ANATOMY OF NON-CHORDATES II

Topic No.	Number of Periods alloted	Number of Marks alloted
Unit I (Pila)	20	24
Unit II Classification of Nonchordates	17	10
Unit – III General Topics	15	16
Total	52	50

Section II – Anatomy of chordates II

Unit - I (Scoliodon)	22	30
Unit – II Classification of chordates	20 10	10 10
Unit – III General topics		
Total	52	50

Paper II – Section I – Genetics

Topic Nos. (Unit)	Number of Periods alloted	Number of Marks alloted
2, 3, 4	14	16
5. 6. 7	19	16
8	8	8
9	6	6
1. 10	5	4
Total –	52	50

Section II – Agricultural Pests & their control, Apiculture

Agri. Pests & their control	25	22
1. 3. 4	5	08
2 Apiculture	22	20
1 to 6		
Total –	52	50

॥ अंतरी पेटवू ज्ञानज्योत ॥

North Maharashtra University, Jalgaon.
Syllabus For S.Y.B.Sc. Zoology
With Effect From June, 2003

Paper – I
Non – Chordates II and Chordates II
Section – I
NON – CHORDATES – II

I. Study of Pila globosa with respect to the following: - **(20 Periods)**

1] Systematic Position
2] Habits and Habitat
3] External Characters: -
   (i) Shell and its microscopic structure
   (ii) Body Parts, Head, Visceral mass and foot
4] Locomotion in Pila
5] Internal Organization: -
   a] Pallial complex
   b] Digestive system: - Food, Feeding habits, digestion and absorption
   c] Respiratory system: -
      (i) Ctenidium (gills)
      (ii) Pulmonary sac (Lung)
      (iii)Mechanism of respiration: - Aquatic, Terrestrial (Pulmonary) and anaerobic
   d] Circulatory system: - Pericardium, Heart Arteries, Sinuses, Veins, Blood, Course of Circulation.
   e] Excretory system: - anterior and Posterior renal chambers, Physiology of Excretion.
   f] Nervous system and Sense organs
   g] Reproductive system: -
      (i) Male reproductive system
      (ii) Female reproductive System
      (iii)Copulation and Fertilization
      (iv)Development – Glochidium larva

II] Classification of Non-Chordata:- Study of general and distinguishing characters with examples of the following phyla up to classes: - **(17 periods)**

	Phylum		Class
1]	Protozoa	i]	Rhizopoda
		ii]	Mastigophora (Flagellata)
		iii]	Ciliata
		iv]	Sporozoa
2]	Porifera	i]	Calcarea
		ii]	Hexaactenellida
		iii]	Demospongiae
3]	Coelenterata	i]	Hydrozoa
		ii]	Scyphozoa
		iii]	Anthozoa
		iv]	Ctenophora
4]	Platyhelminthes	i]	Turbellaria
		ii]	Trematoda
		iii]	Cestoda

5]	Nematoda	i]	Aphasmida
		ii]	Phasmida
6]	Annelida	i]	Potychaeta
		ii]	Oligochaeta
		iii]	Hirudinea
7]	Arthropoda	i]	Crustacea
		ii]	Insecta (Hexapoda)
		iii]	Arachnida
		iv]	Myrapoda
		v]	Onychophora
8]	Mollusca	i]	Placophora
		ii]	Schaphopoda
		iii]	Gastropoda
		iv]	Pelecypoda (Bivalvia)
		v]	Cephalopoda
9]	Echinodermata	i]	Asteroidea
		ii]	Ophiuroidea
		iii]	Echinoidea
		iv]	Holothuroidea
		v]	Crinoidea
10]	Hemichordata	i]	Enteropneusta
		ii]	Pterobranchia

[II] General topics: - **(15 Periods)**

1] Nutrition in Protozoa **(04 Periods)**
2] Canal System in sponges **(04 Periods)**
3] Segmentation in Annelida **(02 Periods)**
4] Mouth parts in Insects **(04 Periods)**
5] Pedicellariae in Echinoderms **(01 Period)**

Paper – I

SECTION – II

CHORATES – II

(22 Periods)

I] Study of Scoliodon with respect to the following

1] Systematic Position
2] Habits and Habitat
3] External Characters
4] Skin : Histology and derivatives
5] Internal organization: -
   a] General viscera and Coelom
   b] Digestive system: -Food, Feeding habits, digestion and absorption
   c] Respiratory system:-
   d] Blood vascular system: -
   e] Nervous system – Central nervous system and peripheral nervous system
   f] Sense organs
   g] Urinogenital system – Organs, Copulation, Viviparity

II] Classification:- Study of general and distinguishing characters with examples upto subclasses of phylum Chordata **(20 Periods)**

a] Protochordata - Cephalochordata, Urochordata
b] Vertebrata - Agnatha – Cyclostomata
– Gnathostomata
A] Super class – Pisces
a] Class – Choridrichthyes
b] Class – Osteichthyes
B] Super class – Tetrapoda
i] Class – Amphibia: – Apoda, Urodela, Anura
ii] Class – Reptilia: – Lacertilia, Ophidia, Crocodillia, Chelonia
iii] Class – Aves: – Ratitae Carinatae
iv] Class – Mammalia: – Monotremata, Marsupialia, Placentalia

(10 Periods)

III] General Topics :-

1] Hemichordata: Affinities
2] Economics importance of – a] Poisonous snakes – Cobra, Viper, Krait
– b] Non – poisons snakes – Rat snakes
– c] Goatary
3] Food and Dental Formula of Kangaroo, Tiger/Dog , Rat, Cow, Horse, Sheep, Elephant and Man.
4] Egg laying Mammals. – Oviparous mammals
   1] Duck bill platypus
   2] Echidna

Paper – II

SECTION – I GENETICS

1] Recapitulation - **(03 Periods)**
- i] Monohybrid ratio, Dihybrid ratio, Test cross
- ii] Concept of gene.

2] Gene interaction and modified Mendelian ratio. **(04 Periods)**
- i] Incomplete dominance (1:2:1 ratio)
- ii] Complementary factor (9:7 ratio)
- iii] Supplementary factor (9:3:4 ratio)

3] Lethal gene : **(02 Periods)**
- i] Definition and concept.
- ii] Coat colour in mice (2:1 ratio)

4] Linkage and Crossing over. **(08 Periods)**
- i] Complete and incomplete Linkage
- ii] Linkage in Drosophila
- iii] Crossing over – mechanism of crossing over and its significance.

5] Sex determination **(07 Periods)**
- i] XX- XY method in Drosophila
- ii] ZZ-ZW Method
- iii] XX-XO method
- iv] Honey bee method
- v] Environmental sex determination in Bonelia.
- vi] Gynandromorphs

6] Multiple alleles : **(09 Periods)**
- i] Definition
- ii] Characteristics of multiple alleles
- iii] ABO blood groups
- iv] Rh factor, its inheritance and significance
- v] Inheritance of ABO blood groups
- vi] Importance of blood groups
- vii] Coat colour in Rabbit

7] Polygenic inheritance **(03 Periods)**
- i] Definition
- ii] Characteristics.
- iii] Skin colour in man.

8] Human genetics : **(08 Periods)**
- i] Karyotype
- ii] Inborn errors of metabolism in human.
- iii] Syndromes – Klinfelter's , Turner's

9] Definition and Significance of the following **(06 Periods)**
- i] Eugenics
- ii] Genetic Counselling.
- iii] Gene cloning
- iv] Genetic engineering s

10] Simple examples on topic 1 and 6 **(02 Periods)**

Total 52 Periods

Paper – II

APPLIED ZOOLOGY – II

Section – II

1. AGRICULTURE PESTS AND THEIR CONTROL

(06 Periods)

1] **Introduction of pest – Aims and Scope**
- a] Definition of pest
- b] Types of pests
  - 1] Agriculture pests
  - 2] Stored grain pests
  - 3] Veternary pests
  - 4] Public health vectors
  - 5] Domestic Pests
- c] Non insect Pests – Rat, Bandicoots, Crab, Snail, Birds

2] **General characters, feeding, Breeding habits of the following insects orders** **(05 Periods)**
- i] Orthoptera
- ii] Hemiptera
- iii] Lepidoptera
- iv] Coleoptera
- v] Diptera

(10 Periods)

3] **Principles of pest control and practices –**
- i] Chemical controls:-
  - a] Stomach Poisons – Lead arseriate Paris green
  - b] Contact Poisons – B.H.C., Malathion
  - c] Systemic Poisons – Thimet, metacystos
  - d] Fumigants – Carbon tetrachloride, Ethylene dichloride
- ii] Biological Control – Parasites, Pathogens, Predators
- iii] Pheromones in Pest Control: Attractants, repellents, Sterile male technique
- iv] Pesticide Appliances – Sprayers, dusters

4] **Study of following pests with respect to their mark of identification, Nature of damage, Control measures: -** **(09 Periods)**
- i] Grasshopper – Foliage feeder on jawar
- ii] Redcotton bug
- iii] Aphid
- iv] Pyrilla
- v] Mangostem borer
- vi] Sitophilus

2. APICULTURE

(02 Periods)

1. **Habit and habitat, Nesting behavior :**
   - i] Apis indica
   - ii] Apis florea
   - iii] Apis dorsata

2. **Colony organization, Polymorphism and Life Cycle of Apis indica** **(06 Periods)**
   i] Caste differentiation - Queen, drone, worker
   ii] Division of labour
   iii] Life Cycle

3. **Anatomy** **(03 Periods)**
   i] Structure and functions of digestive system of Apis indica
   ii] Sting apparatus

4. **Communication in Bees:-** **(05 Periods)**
   i] Round Dance
   ii] Tail waging Dance
   iii] Massage Dance
   iv] DVAV Dance
   v] Alarming Dance

5. **Bee pollination and Bee products** **(03 Periods)**
   a] Nectar and pollen gathering
   b] Bee products and their uses
      i] Honey
      ii] Wax
      iii] Venom
      iv] Royal jelly
      v] Propolis

6. **Bee Keeping: - Equipments** **(03 Periods)**
   i] Bee Keeping box
   ii] Smoker
   iii] Honey extractor
   iv] Bee Veil
   v] Hive tool

- - - - -

Non – Chordates and chordate

S.Y.B.Sc Zoology Practical

I] Non Chordates: Pila globosa.
E] 1] Study of external characters, systematic position and shell of Pila
E] 2] Dissection of Pila so as to study the following systems. Digestive and Nervous systems.
E] 3] Temporary preparation of
  i] Radulla.
  ii] Statocyst and Osphradium
D] 4] Observations of the following
  i] Male and female reproductive systems of Pila
  ii] Pallial complex in Pila
  iii] Heart of Pila
  iv] Ctenidium of Pila
  v] Spicules and Gemmules in sponges,
  vi] Pedicellariae in Echinoderms.
[I Nonchordates – Classification
D] Study of general and distinguishing characters of the prescribed phyla with at least two examples form each class under paper I : Section – I
[II. Chrodates : Scoliodon
D] Study of general and distinguishing characters of the prescribed phyla with at least two examples form each class under paper I : Section – I
III] Chordates : Scoliodon
E] 1] Study of external characters of Scoliodon
  2] Dissection of Scoliodon so as to study the following :-
E] i] Digestive system,
  ii] Arterial system,
  iii] Brain of Scoliodon.
E] 3] Temporary preparation of scales and Ampullae of Lorenzini
D] 4] Observation of the followings –
  i] Cranial nerves
  ii] Eye ball muscles and their innervation
  iii] Membranous labyranth
IV] Chordates -Classification
D] Study of general and distinguishing characters of the prescribed phyla with at least two examples form each subclass under paper I : Section – II
V] General topics from chordates
D] 1] Study of dental formulae of any two mammals.
  2] Visit to any one of the following
    i] Visit to snake park
    ii] Goatary farm

Genetics

1] Study of human genetic traits (phenotypes)
E] i] Cheeks – Dimple and Non – Dimple cheeks
  ii] Ear pattern – Attached and free ear lobes
  iii] Hair pattern – Curly and Smooth
  iv] Tongue – Roller and non- roller
  2] Multiple allele –
E i] ABO blood group system and pedegree analysis
E 3] PTC tasting experiment
E 4] Simple example on Monohybrid, Dihybrid, Test cross by using colour beads
D 5] Study of normal male and female Drosophila – D

D 6] Study of mutants of Drosophila - white eye, bar eye, Vestigeal wings, Normal eye, Curly wings
D 7] Color blindness

Agriculture Pests and their Control

E 1] Study of Grasshopper as a generalized insect w.r to external characters
D 2] Study of external characters of and mouthparts of Butterfly/Moth/Plant bug / House fly
3] Study of the following pests with emphasis on appropriate stages causing damage.
i] Grasshopper
ii] RedCotton bug
iii] Pyrilla
iv] Mango Stem borer
v] Rice weevil
vi) Aphid
E 4] Study of Effect of contact insecticides on the behavior of insects
D 5] Pesticidal appliances – sprayers and dusters
6] Collection and preservation and any five pests
7] Compulsory visit to an Agriculture institute/fields/factories

Apiculture

E 1] a] Study of external morphology of honey bees
E b] Temporary preparation of
i] Mouth Parts
ii] Sting Apparatus
iii] Pollen basket
D 2] Study of Indian species of Honey bees
3] a] Study of life cycle of honeybees
b] Architecture of bee hive.
D 4] Study of bee keeping equipment
i] Beekeeping box
ii] Smoker
iii] Honey extractor
iv] Bee veil
v] Hive tool
D 5] Study of Honey bee products :- (any two)
i] Honey
ii] Wax
iii] Bee Venom
iv] Propolis
v] Royal jelly
6] Compulsory visit to observe Apiary / Apiculture institute.

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