



# Government Arts and Science College

## Ratlam (M.P.) 457001



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For the session 2020-21 the syllabus have been adopted from Central Board of Studies, Bhopal and Vikram University, Ujjian for UG and PG respectively.

Krunal  
Principal

Govt. Arts and Science College

Ratlam (M.P.)  
**Principal**  
Govt. Arts & Science College  
Ratlam (M.P.)

**Department of Higher Education, Govt. of M.P.**  
**Under Graduate Syllabus for B.Sc (Bio) 3 Year**  
**AS recommended by Central Board of Studies in Zoology**

उच्च शिक्षा विभाग, म.प्र. शासन

स्नातक कक्षाओं के लिए त्रिवर्षीय पाठ्यक्रम

केन्द्रीय अध्ययन मण्डल प्राणीशास्त्र द्वारा अनुशासित

Class / कक्षा	:	B.Sc I year (Session- 2020-21)
Paper	:	I
Subject/ विषय	:	प्राणीशास्त्र
Title of Paper	:	अक्षरोंकी
Max. Mark/ अधिकतम अंक	:	40

#### इकाई I

1. प्राणीकीय नामकरण एवं अंतर्राष्ट्रीय कोड का सामान्य अध्ययन
2. निम्नर अक्षरोंकी प्रणियों का वर्गीकरण (पारकर एवं हेजवैल का 7वाँ संस्करण अनुसार )  
 (i) प्रोटोजोआ (ii) पोरीफेरा (iii) सीलेंट्रो (iv) प्लेटिहेलिमन्थीस (v) निमेटाहेलिमन्थीस
3. उच्चर अक्षरोंकी प्रणियों का वर्गीकरण (पारकर एवं हेजवैल का 7वाँ संस्करण अनुसार )  
 (i) ऐनेलिडा (ii) आर्थोपोडा (iii) मोलस्का (iv) इकाइनोडर्मेटा (v) हेमीकार्डटा

#### इकाई II

1. प्रोटोजोआ— प्लाजमोडियम का प्रारूप अध्ययन
2. प्रोटोजोआ एवं रोग
3. पोरीफेरा— साइकॉन का प्रारूप अध्ययन
4. सीलेंट्रो— ओबेलिया का प्रारूप अध्ययन
5. प्रवाल एवं प्रवाल—मित्ती का निर्माण

#### इकाई III

1. हेलिमन्थस— फेसिओला का प्रारूप अध्ययन
2. नेमेटोडा के रोग एवं रोगजनक लक्षण
3. ऐनेलिडा— केंद्रुए (फेरिटिमा) का प्रारूप अध्ययन
4. ऐनेलिडा में देह गुहा एवं मेटामेरिज्म
5. द्रोकोफोर लार्वा की संरचना एवं महत्व

#### इकाई IV

1. आर्थोपोडा — झींगे (पेलीमॉन) का प्रारूप अध्ययन
2. क्रस्टेशिया के लार्वा
3. कीटों में विभिन्न प्रकार के मुखांग
4. मानव रोगों के वाहक कीट
5. मोलस्का — पाइला का प्रारूप अध्ययन (ऐपल घोंघा)

#### इकाई V

1. इकाइनोडर्मेटा — तारा मछली की बाह्य संरचना एवं जल संवहन तंत्र
2. तारा मछली का जीवन चक्र
3. इकाइनोडर्मेटा के लार्वा
4. हेमीकार्डटा — बैलेनोलासेस का प्रारूप अध्ययन
5. बैलेनोलासेस की वंशुता

S. Shrivastava  
Dr. S. Shrivastava

(Signature)  
(Signature)

Dr. Shivesh Pratap Singh  
Prof. & Head, Dept. of Zoology

Govt. Autonomous P.G. College, Satna (M.P.)

(Signature)  
(Signature)

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 केन्द्रीय अध्ययन मण्डल प्राणीशास्त्र द्वारा अनुशासित

<b>Class / कक्षा</b>	:	<b>B.Sc I year (Session-2020-21)</b>
<b>Paper</b>	:	<b>II</b>
<b>Subject/ विषय</b>	:	<b>प्राणीशास्त्र</b>
<b>Title of Paper</b>	:	<b>कोशिका विज्ञान एवं औषिकी विकास</b>
<b>Max. Mark/ अधिकतम अंक</b>	:	<b>40</b>

**इकाई I**

- कोशिका विज्ञान का इतिहास, कोशिका सिद्धांत
- प्रोक्रियोटिक एवं यूक्रियोटिक कोशिका
- प्लाज्मा झिल्ली की संरचना एवं कार्य
- गोल्डी बॉडी, एन्डोप्लाज्मिक रेटिकुलम, लाइसोसोम की संरचना एवं कार्य
- माइटोकोन्ड्रियाँ, राइबोसोम, सेंट्रिओल की संरचना एवं कार्य

**इकाई II**

- केन्द्रक एवं केंद्रिका की संरचना एवं कार्य
- प्रारूपिक गुणसूत्र की संरचना एवं कार्य
- क्रोमेटिन एवं हेटरोक्रोमेटिन की आधारभूत अवधारणा
- विशेष प्रकार के गुणसूत्र – लेप्टोब्रुश एवं पॉलीटीन
- कोशिका चक्र, समसूत्री एवं अर्ध सूत्री कोशिका विभाजन

**इकाई III**

- युग्मक जनन
- निषेचन
- अनिषेचक जनन
- पुनरुद्धरण
- स्टैम कोशिका – स्त्रोत, प्रकार एवं उपयोगिता

**इकाई IV : मेढ़क का विकास**

- विदलन
- ब्लास्टुलेशन
- फेटमेप का निर्माण
- गेस्ट्रोलेशन एवं तीन जनन स्तरों का निर्माण
- टैडपल लार्वा की संरचना

**इकाई V : चूजे का विकास**

- विदलन
- ब्लास्टुलेशन
- फेटमेप का निर्माण
- गेस्ट्रोलेशन
- प्रिमिटिव स्ट्रीक बनने तक चूजे के भूरे का विकास
- चूजे में बाह्य भूरे झिल्लियाँ

*(Dr. Shivesh Pratap Singh)  
 Prof. & Head, Dept. of Zoology  
 Govt. Autonomous P.G. College, Satna (M.P.)  
 Chairman, Board of Studies.*

*(Prof. H.S. Rathore)  
 Prof. H.S. Rathore*

*(Dr. Shivesh Pratap Singh)  
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केन्द्रीय अध्ययन मण्डल प्राणीशास्त्र द्वारा अनुशसित

<b>Class / कक्षा</b>	:	<b>B.Sc. I<sup>st</sup> year (Session- 2020-21)</b>
<b>Paper</b>	:	<b>II<sup>ND</sup></b>
<b>Subject/ विषय</b>	:	<b>Zoology</b>
<b>Title of Paper</b>	:	<b>Cell Biology and Developmental Biology</b>
<b>Max. Mark/ अधिकतम अंक</b>	:	<b>40</b>

**Unit-I**

1. History of Cell Biology, Cell theory.
2. Prokaryotic and Eukaryotic Cells.
3. Structure and functions of Plasma membrane.
4. Structure and functions of Golgi body, Endoplasmic reticulum, Lysosomes.
5. Structure and functions of Mitochondria, Ribosome, Centriole.

**Unit-II**

1. Structure and functions of Nucleus and Nucleolus.
2. Structure and functions of typical Chromosome.
3. Basic concept of Chromatin and Heterochromatin
4. Structure and functions of Lampbrush and Polyteny Chromosome.
5. Cell cycle, Mitotic and Meiotic cell division.

**Unit-III**

1. Gametogenesis
2. Fertilization
3. Parthenogenesis
4. Regeneration.
5. Stem cells sources, types and their uses.

**Unit-IV**

**Development of Frog:**

1. Cleavage.
2. Blastulation.
3. Fate map construction.
4. Gastrulation and formation of three germinal layers.
5. Structure of Tadpole Larva

**Unit-V**

**Development of Chick:**

1. Cleavage.
2. Blastulation.
3. Fate map construction
4. Gastrulation
5. Development of chick embryo upto formation of primitive streaks.
6. Extra embryonic membranes in chicks

(Dr. Neeraj Sahai)  
 (Prof. H.S. Rekha)  
 (Prof. R. Singh)

Dr. Shivesh Pratap Singh  
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 Chairman, Board of Studies  
 Dr. R. Singh  
 (Dr. R. Singh)

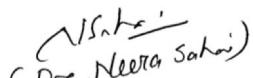
S. Shrivastava  
 Dr. Sudha Shrivastava  
 03.06.2019  
 Dr. Sudha Shrivastava  
 Dr. Sudha Shrivastava

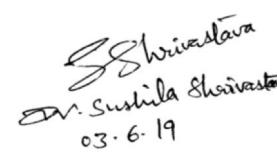
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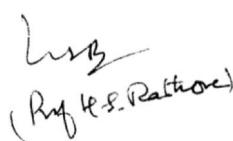
**Recommended books for B.Sc. – I Year -Zoology**

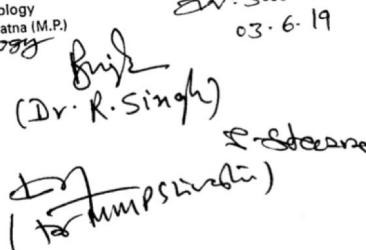
**Books of MP Hindi Granth Academy**

- |                           |  |
|---------------------------|--|
| Parker & Haswall          | : Text book of Invertebrate Zoology                    |
| Kotpal, RL                | : Invertebrate   |
| Rastogi, VB               | : Developmental Biology                                |
| Arora, MP                 | : Embryology   |
| Verma, PS and Agrawal, VK | : Chordate Embryology                                  |
| Karp                      | : Cell and molecular Biology                           |
| Sheelar & Bianchi         | : Cell and Molecular Biology                           |
| Rastogi V.B.              | : Introduction to cytology                             |
| De Robertis               | : Cell and Molecular Biology                           |
| Powar, CB                 | : Cell Biology   |
| Verma, PS and Agrawal, VK | : Cell Biology, Genetics, Molecular Biology, Evolution |

  
 Dr. Neera Sahai  
 Dr. Shivesh Pratap Singh  
 Prof. & Head, Dept. of Zoology  
 Govt. Autonomous P.G. College, Satna (M.P.)  
 Chairman, Board of Studies, zoology  
 Date: 3/6/14

  
 Dr. Sushila Srivastava  
 Date: 03-6-19

  
 Dr. R. Singh  
 Prof. K.S. Rathore

  
 Dr. L. S. Deo  
 Prof. T. M. P. Singh

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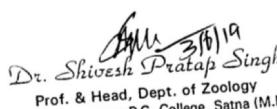
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स्नातक कक्षाओं के लिए विवरीय पाठ्यक्रम  
केन्द्रीय अध्ययन मण्डल प्राणीशास्त्र द्वारा अनुशंसित

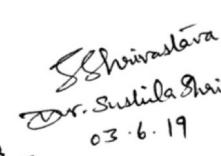
**Class / कक्षा : B.Sc. I year (Session-2020-21)**  
**Subject/ विषय : Zoology Practical**  
**Max. Mark/ अधिकतम अंक : 50**

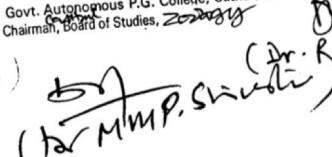
- The practical's work will be based on theory syllabus and the candidates will be required to show the knowledge of the following :-
1. Study of Museum Specimens and slides relevant to Invertebrates Studied in theory.
  2. Mounting
    - (a) Prawn statocyst
    - (b) Pila: Ctenidium /redula /osphradium
    - (c) Earthworm: Septal nephridia
    - (d) Mouth parts of insects.
  3. Dissection/ demonstration
    - (a) Earthworm: Digestive System, Nervous System, Reproductive System
    - (b) Prawn: Nervous System, Appendages
    - (c) Pila: Nervous System
  4. Exercise related to frog and Chick embryology.
  5. Exercise/ spotting related to cell biology.
    - (a) Squash preparation of onion root tip
    - (b) Stages of mitotic and meiotic cell division
    - (c) Special types of Chromosomes

**Distribution of Marks**

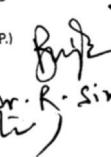
1. Dissection	08
2. Spotting	16
3. Mounting	04
4. Exercise related to Embryology	04
5. Exercise related to Cell Biology	04
6. Viva -voce	05
7. Practical Record	05
8. Collection	
<b>Total</b>	<b>50</b>

  
Dr. Shivesh Pratap Singh  
Prof. & Head, Dept. of Zoology  
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Chairman, Board of Studies, 2020-21  
03.6.19

  
Dr. Sudha Shai  
03.6.19

  
Dr. R. Singh  
L.S.

  
Prof. K. S. Rathore

  
Dr. M. M. P. Shrivastava

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केन्द्रीय अध्ययन मण्डल प्राणीशास्त्र द्वारा अनुशंसित

<b>Class / कक्षा</b>	:	<b>B.Sc II year (Session-2020-21)</b>
<b>Paper</b>	:	<b>I</b>
<b>Subject/ विषय</b>	:	<b>प्राणीशास्त्र</b>
<b>Title of Paper</b>	:	<b>कशेरूकी और उद्विकास</b>
<b>Max. Mark/ अधिकतम अंक</b>	:	<b>40</b>

**इकाई I :**

1. रज्जुकियों की उत्पत्ति, रज्जुकियों का गण स्तर तक वर्गीकरण (पारकर एवं हेसवेल के नवीन संस्करण अनुसार)
2. यूरोकार्डेटा - हर्डमानिया का अध्ययन
3. सिफैलोकार्डेटा एम्फीऑक्सस का अध्ययन, एम्फीऑक्सस की सजातियता
4. पैट्रोमाइज़ोन एवं मिक्सीन की तुलना

**इकाई II :**

1. कशेरूकी में अध्यावरण का तुलनात्मक विवरण एवं उनके व्युत्पन्न
2. कशेरूकी में पादआस्थियाँ तथा मेखला का तुलनात्मक विवरण
3. कशेरूकी में पाचन तंत्र का तुलनात्मक विवरण
4. कशेरूकी में श्वसन तंत्र का तुलनात्मक विवरण

**इकाई III :**

1. कशेरूकी में हृदय एवं एर्डोटिक आर्चेस का तुलनात्मक विवरण
2. कशेरूकी में मस्तिष्क का तुलनात्मक विवरण
3. कशेरूकी में मूत्रजनन तंत्र का तुलनात्मक विवरण
4. स्तनधारियों के सर्वेंदी अंग (ऑख एवं कान)
5. स्तनी में जरायु विन्यास

**इकाई IV :**

1. जीवन की उत्पत्ति— आधुनिक संकल्पना
2. लेमार्कवाद, डार्विनवाद, डीवेरीज
3. आधुनिक संश्लेषण सिद्धांत - ~~सिद्धांत, जर्मनी, इंग्लैण्ड आदि~~ (विलसवाद)
4. अनुकूलन एवं अनुहरण
5. माइक्रो, मेक्रो एवं मेगा उद्विकास

**इकाई V :**

1. जीवाशम, जीवाशम बनने की विधियाँ, जीवाशम के आयु का निर्धारण
2. विलुप्त प्राणियों का अध्ययन— डाइनोसोर्स एवं आर्कियोप्टेरिक्स
3. जंतु भौगोलिक वितरण
4. मानव का उद्विकास
5. भूगर्भीय समय-तालिका और इन्सूलर जंतु-जगत

(Dr. Shivashankar Singh) (Dr. H.S. Rathore)  
 Prof. & Head, Dept. of Zoology  
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 Chairman, Board of Studies, zoology  
 Dr. Sushila Srivastava (V.S.) (Dr. R. Singh) Prof. R. Singh  
 Dr. Neeraj Srivastava (Dr. Neeraj Srivastava)  
 Dr. Neeraj Srivastava (Dr. Neeraj Srivastava) Prof. R. Singh  
 Dr. Neeraj Srivastava (Dr. Neeraj Srivastava) Prof. R. Singh

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स्नातक कक्षाओं के लिए त्रिवर्षीय पाठ्यक्रम

केन्द्रीय अध्ययन मण्डल प्राणीशास्त्र द्वारा अनुशंसित

<b>Class / कक्षा</b>	:	<b>B.Sc. II year (Session. 2020-21)</b>
<b>Paper</b>	:	<b>I</b>
<b>Subject/ विषय</b>	:	<b>Zoology</b>
<b>Title of Paper</b>	:	<b>Vertebrates and Evolution</b>
<b>Max. Mark/ अधिकतम अंक</b>	:	<b>40</b>

**UNIT I**

1. Origin of Chordates, Classification of phylum Chordata up to orders according to Parker and Haswell (Latest edition).
2. **Urochordata:** Type study of *Herdmania*.
3. **Cephalochordata:** Type study of *Amphioxus*, Affinities of *Amphioxus*.
4. Comparison between *Petromyzon* and *Myxine*.

**UNIT II**

1. Comparative account of integuments and its derivatives of Vertebrates.
2. Comparative account of limbs and girdles of Vertebrates.
3. Comparative account of digestive system of Vertebrates.
4. Comparative account of respiratory system of Vertebrates.

**UNIT III**

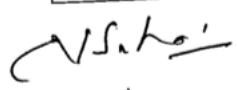
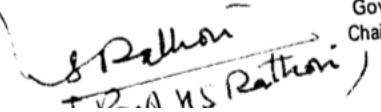
1. Comparative account of aortic arches and heart of Vertebrates.
2. Comparative account of brain of Vertebrates.
3. Comparative account of urinogenital system of Vertebrates.
4. Sense organs (eye & ear) of mammals.
5. Placentation in mammals.

**UNIT IV**

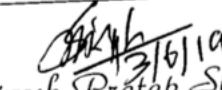
1. Origin of life: Modern concepts only.
2. Lamarckism, Darwinism, De Vries.
3. Modern synthetic theories of evolution.
4. Adaptation and Mimicry
5. Micro, macro and mega evolution.

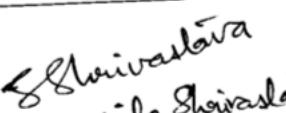
**UNIT V**

1. Fossils, methods of fossilization, determination of age of fossils.
2. Study of extinct forms: Dinosaurs and Archaeopteryx.
3. Zoogeographical distribution.
4. Evolution of man.
5. Geological time scale and Insular fauna.

  
 (Dr. Neeraj Sahni)  
  
 + Dr. A. N. S. Rathore

Dr. Shivesh Pratap Singh  
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 Govt. Autonomous P.G. College, Satna (M.P.)  
 Chairman, Board of Studies, Zoology

  
 Dr. R. Singh (Dr. R. Singh)

  
 Dr. Sunita Shrivastava

Date: 03.8.19

**Department of Higher Education, Govt. of M.P.**  
**Under Graduate Syllabus for B.Sc. (Bio) 3 Years**  
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उच्च शिक्षा विभाग, म.प्र. शासन

स्नातक कक्षाओं के लिए त्रिवर्षीय पाठ्यक्रम  
 केन्द्रीय अध्ययन मण्डल प्राणीशास्त्र द्वारा अनुशासित

<b>Class / कक्षा</b>	:	<b>B.Sc. II year (Session-2020-21)</b>
<b>Paper</b>	:	<b>II</b>
<b>Subject/ विषय</b>	:	<b>Zoology</b>
<b>Title of Paper</b>	:	<b>Animal Physiology and Bio-Chemistry</b>
<b>Max. Mark/ अधिकतम अंक</b>	:	<b>40</b>

**Unit I: Nutrition and Metabolism**

1. Physiology of digestion in Mammals.
2. Protein Metabolism: Deamination, Decarboxylation, Transamination of amino acids and Ornithine cycle.
- 3 Carbohydrate metabolism: Glycogenesis, Gluconeogenesis, Glycogenolysis, Glycolysis, and Citric acid cycle.
4. Lipid Metabolism-Beta oxidation of fatty acids.

**Unit II: Respiration, Excretion and Immune System**

1. Mechanism and Physiology of respiration in mammals (transport of gases, chloride shift).
2. Physiology of Excretion- urea and urine formation in mammals.
3. Osmoregulation and excretory product.
4. Innate and acquired immunity, immune cells and lymphoid system, immune response: cellular and humoral immunity

**Unit III: Regulatory Mechanisms of Enzymes and role of Vitamins**

1. Thermoregulation.
2. Definition, nomenclature and classification of enzymes.
3. Mechanism and regulation of enzyme action.
4. Co-enzymes
5. Vitamins

**Unit IV: Neuromuscular Co- ordination**

1. Types of neurons.
2. Physiology of nerve impulse conduction.
3. Types and structure of Muscles.
4. Theory of muscle contraction and its biochemistry.

**Unit V: Endocrine system**

1. Structure and functions of Pituitary gland.
2. Structure and functions of Thyroid gland.
3. Structure and functions of Adrenal gland.
4. Structure and functions of Parathyroid, Thymus and Islets of Langerhan's.
5. Physiology of Male and female Sex hormones.

(Dr. Neerasahai)  
 (Dr. Neerasahai)

Ms. Rathore

Dr. Shivesh Pratap Singh  
 Prof. & Head, Dept. of Zoology  
 Govt. Autonomous P.G. College, Satna (M.P.)  
 Chairman, Board of Studies

20-06-2019  
 Dr. R. Singh

Shrivastava  
 Dr. Sushila Shrivastava  
 03-6-19

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**Recommended books for B.Sc. – II Year -Zoology**

Books of MP Hindi Granth Academy

- |                           |  |
|---------------------------|--|
| Parker & Haswall          | : Text book of Vertebrate Zoology                      |
| Kotpal, RL                | : Vertebrate   |
| Jordan, EL and Verma, PS  | : Chordate Zoology                                     |
| Rastogi, VB               | : Organic Evolution                                    |
| Singh and Chaturvedi      | : Organic Evolution                                    |
| Ernst W. Mayr             | : Evolution and the Diversity of life                  |
| Colbert                   | : Evolution  |
| Verma, PS and Agrawal, VK | : Cell Biology, Genetics, Molecular Biology, Evolution |
| Verma PS                  | : Animal Physiology                                    |
| Nigam, HL                 | : Animal Physiology                                    |
| Wood, DW                  | : Principle of Animal Physiology                       |
| Berry, AK                 | : Animal Physiology and Biochemistry                   |
| Prosser, CL               | : Comparative Animal Physiology                        |
| Goyal and Shastri         | : Animal Physiology                                    |
| Shrivastava, HS           | : Biochemistry   |
| Lehninger                 | : Biochemistry   |

*(Dr. Neera Sahai)*

*Dr. Shivesh Pratap Singh*  
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*Shrivastava*  
*Dr. Sunita Shrivastava*  
03.6.19

*(Dr. R. Singh)* *Ir-shan*

*W. Rathore*

**Department of Higher Education, Govt. of M.P.**  
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उच्च शिक्षा विभाग, म.प्र. शासन  
स्नातक कक्षाओं के लिए त्रिवर्षीय पाठ्यक्रम  
केन्द्रीय अध्ययन मण्डल प्राणीशास्त्र द्वारा अनुशासित

**Class / कक्षा** : **B.Sc. II year (Session-2020-21)**

**Subject/ विषय** : **Zoology Practical**

**Max. Mark/ अधिकतम अंक** : **50**

1. Demonstration of commercially available species of locally available Fishes (Computer simulation technique).
2. Study of museum specimens (Vertebrates)
3. Study of specimens of evolutionary importance (*Limulus, Latimeria, Dianosaurs, Archeopteryx, Peripatus, etc.*).
4. Osteology: Limb and girdles of *Frog, Varanus, Pigeon and Rabbit*.
5. Detection of Protein, Carbohydrate and Lipid / Study of activity of Human salivary enzyme.
6. Hematological Experiment- RBC and WBC counting / Blood grouping/ Estimation of Hemoglobin.
7. Histological study of various endocrine glands: T.S. of Thyroid, T.S. of Pituitary gland ,T.S. of Adrenal gland , T.S. of Testis, T.S. of Ovary.
8. Histological study of Digestive and Visceral organs: T.S of Stomach , T.S of Intestine, T.S of Pancreas T.S. of Liver, T.S of Lungs and L.S. of Kidney.

**Distribution of Marks**

1. Dissection	06
2. Spotting related to evolution	04
3. Spotting (4 specimens, 2 Bones, 2 Slides)	16
4. Biochemical test / Enzyme activity	05
5. Hematological Experiment	05
6. Viva -voce	04
7. Record	05
8. Collection	05
<b>Total</b>	<b>50</b>

(Dr. Neeraj Sahai)

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Shivastava  
Dr. Sudha Shivastava  
03-6-19

(Dr. Mumtaz Khan)

N. Rathore

(Dr. R. Singh)

L. Sharma

(9)

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Class / कक्षा	:	B.Sc. III year (Session-2020-21)
Paper	:	I
Subject/ विषय	:	Zoology
Title of Paper	:	Genetics
Max. Mark/ अधिकतम अंक	:	42 <sup>1/2</sup>

**UNIT I : Heredity and Genetic material**

- 1.Mendel's laws of heredity.
- 2.Variations- sources and types
3. Structure, molecular organization and function of DNA and RNA and types of RNA
4. DNA replication in Prokaryotes.
5. Nucleosome (Solenoid model)

**UNIT II Gene Expression**

- 1.Genetic Code
2. Transcription in Prokaryotes
3. Translation in Prokaryotes
4. Gene expression: Regulation of protein synthesis and Lac operon model.
5. Split gene, overlapping gene, pseudo gene

**UNIT III : Linkage and Chromosomal aberration**

- 1.Linkage and crossing over- Types and significance
2. Sex determination- Chromosomal and genetic balance theory.
3. Sex linked Inheritance (Haemophilia, colour blindness)
4. Structural and numerical changes in chromosomes
5. Mutation-Types and Mutagens

**UNIT IV : Human Genetics**

- 1.Human Karyotype
2. Human Genome Project
3. Multiple allele and inheritance of blood group
3. Autosomal and Sex Chromosome Syndromes in human
4. Genetic diseases in human- Sickle cell anaemia, Albinism and Thalassemia

**UNIT V : Genetic Engineering**

- 1.Recombinant DNA technology and Gene Cloning
2. Polymerase chain reaction.
3. Blotting- Southern and Northern
4. DNA finger printing
5. Gene therapy

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A constituent A.P.S. University, Rewa

(Dr. Vinodini Nagpal)  
(Dr. Usha Patel)  
(Dr. Shashi Prakash)  
(Dr. Rakesh Singh)  
(Dr. C.S. Shrivastava)  
(Dr. M. M. Patel)  
(Dr. S. K. Srivastava)  
(Dr. S. K. Srivastava)

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 केन्द्रीय अध्ययन मण्डल प्राणीशास्त्र द्वारा अनुशसित

Class / कक्षा	:	B.sc III year (Session- 2020-21)
Paper	:	II
Subject/ विषय	:	Zoology
Title of Paper	:	Ecology and Applied Zoology
Max. Mark/ अधिकतम अंक	:	42 <sup>1/2</sup>

**Unit-I Concept of Ecology**

1. Abiotic and biotic factors, Component of ecosystem.
2. Energy flow in ecosystem : Food chain, Food web and Pyramids.
3. Biogeochemical cycle : Carbon, Oxygen, Nitrogen, Phosphorus
4. Population Concept – Characteristics of population. Factors affecting Population growth.

**Unit-II Habitat Ecology**

1. Fresh water , marine and terrestrial habitat
2. Ecological division of India.
3. Biodiversity : Natural resources and their conservation with special reference to forests.

**Unit-III Wild Life and Environment**

1. Wild life Protection Act ,National Parks and Sanctuaries of Madhya Pradesh.
2. Endangered species of India.
3. Types of pollution : Air, water, soil, thermal and noise pollution.
4. Urbanisation and effect of human population on environment.

**Unit-IV Aquaculture**

1. Prawn culture: Culture of fresh water prawn , methods of prawn fishing , preservation and processing of prawns
2. Pearl culture and pearl industry.
3. Frog culture.
4. Major carp culture : Management of ponds . preservation and processing of fishes.
5. Maintenance of Aquarium.

**Unit-V Economic Entomology**

1. Sericulture: Species of silkworm, life history of *Bombyx mori*, Sericulture Industry in India.
2. Apiculture – Life cycle of the honey bee, methods of bee keeping, products of bees, enemies of bees.
3. Lac culture: Lifecycle of lac insect and host plant of lac insects.
4. Common pests: Stored grains: *Sitophilus oryzae* and *Tribolium castaneum*, Vegetable pest: *Piers brassicae* and *Dacus cucurbitae*.
5. Biological control of insect pests.

Dr. Shivesh Pratap Singh

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 a/cman, Board of Studies, A.P.S. University, Bhopal

(Dr. N. S. Patel) (Dr. Vinod Kumar Nigam)  
 (Dr. Rakesh Singh)  
 (Dr. Rakesh Singh)  
 (Dr. Rakesh Singh)

Dr. Ulfat Yadev (Yadev)  
 (Yadev)  
 (Yadev)  
 (Dr. Rakesh Singh)  
 (Dr. Rakesh Singh)

## B.Sc. – III Year – Zoology

Books of MP Hindi Granth Academy

Lewin	: Genetics (Latest Edition Strickberger : Genetics)
Gardner, MJ	: Principles of Genetics
Singh, BD	: Genetics
Singh, BD	: Biotechnology
Gupta, PK	: Genetics
Gupta, PK	: Molecular Biology and Genetic Engineering
Verma, PS and Agrawal, VK	: Genetics
Purohit	: Biotechnology
Kohli and Ansar	: Economic Zoology
Kohli	: Ecology
Odum, EP	: Fundamental of Ecology
Sharma PD	: Environmental Biology and Toxicology
Natrajan, SS	: A Manual of Fresh Water Aquaculture
Upadhyaya	: Economic Zoology

Pal Ajay

Pragya Khanna

Ins. Seetham  
28.4.17

(Prof H.S. Rathore)

Brijendra  
28.4.17

(Dr. Rakesh Singh)

(VS Ahir)  
(Dr. N. Ahir)(Dr. Anita Solanki)Pal Ajay  
Pragya Khanna  
28.4.17Dr. C. S. Shrivastava  
28.4.17(Dr. Rajiv Srivastava)  
28.4.17(Dr. Virodini Nigam)  
28.4.17(Dr. Anita Solanki)  
28.4.17Dr. Shivesh Pratap Singh  
Prof. & Head, Dept. of Zoology  
Govt. Autonomous P.G. College, Satna (M.P.)  
Chairman, Board of Studies, A.P.S. University, Rewa(Dr. Celica Yadav)  
28.4.17(Dr. Shobha Shoueli)  
28.4.17

(Dr. C. S. Ahir)

Under Graduate Syllabus for B.Sc. (Bio) 3 Years

(12)

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उच्च शिक्षा विभाग, म.प्र. शासन

स्नातक कक्षाओं के लिए त्रिवर्षीय पाठ्यक्रम

केन्द्रीय अध्ययन मण्डल प्राणीशास्त्र द्वारा अनुशसित

**Class / कक्षा : B.Sc. III year (Session- 2020-21)**

**Subject/ विषय : Zoology Practical**

**Max. Mark/ अधिकतम अंक : 50**

The practical's work will be as per theory syllabus and the candidates will be required to show the knowledge of the following :-

1. Study of fresh water, marine and terrestrial fauna, Major carps, Common stored grain pest and vegetable pest
2. Water analysis – Dissolve Oxygen, pH, Hardness, Turbidity.
3. Study of Ecosystems and maintenance of Aquarium
4. Study of instrument related to Genetics- Centrifuge, PCR, Gel electrophoresis, DNA finger printing.
5. Wild life - Endangered species.
6. Life cycle of silkworm, Honey Bee, Lac insect

**Distribution of Marks**

1. Spotting	12
2. Analysis of water	04
3. Exercise based on wildlife	05
4. Ecosystem	04
5. Study of Instruments	05
6. Problem on Genetics	05
7. Life Cycle	05
8. Viva -voce	05
9. Practical Record and collection	05

**Total 50**

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*Dr. Ultee Yadav* *Gach*  
*Shashank* *28/4/17*

*Dr. Shobha Shashank*

*Brijesh* *28/4/17*

*Dr. C. S. Shrivastava* *(Dr. M. S. Chouhan)* *(Dr. Rakesh Singh)*

*Rajiv Kantanayak* *28/4/17* *(Dr. Vinodini Singh)*

*Shashi* *28/4/17* *Chandani*

*(Prof. H. S. Rathore)*

*Mr. L. K. J.*

*(Dr. Raju Shekhar)*