

डॉ. बाबासाहेब आंबेडकर मराठवाडा विद्यापीठ, औरंगाबाद**परिपत्रक क्रमांक/एस.यु./विज्ञान/अभ्यासक्रम/७४/२०१४**

या परिपत्रकाद्वारे सर्व संबंधितांना सुचित करण्यात येते की, विज्ञान विद्याशाखेने शिफारस केल्यानुसार बी. एस्सी. / एम. एस्सी. प्रथम व द्वितीय वर्षाच्या सुधारित अभ्यासक्रमास आणि बी. एस्सी. प्रथम वर्षाच्या अभ्यासक्रमात किरकोळ बदल करण्यास विद्यापरिषदेच्या वतीने मा. कुलगुरु यांनी, त्यांना प्राप्त असलेल्या विशेष अधिकार महाराष्ट्र विद्यापीठ अधिनियम-१९९४ कलम १४(७) अन्वये मान्यता दिलेली आहे. त्या अनुषंगाने सुधारीत तयार केलेल्या अभ्यासक्रमाची प्रत या परिपत्रकासोबत आपल्या पुढील कार्यवाहीसाठी पाठविण्यात येत आहे.

[1]	B.Sc. Physics	Semester-III & IV,
[2]	B.Sc. Chemistry	Semester-III & IV,
[3]	B.Sc. Botany	Semester-III & IV,
[4]	B.Sc. Zoology with minor changes	Semester-I & II,
[5]	B.Sc. Zoology	Semester-III & IV,
[6]	B.Sc. Fisheries	Semester-III & IV,
[7]	B.Sc. Electronics (Opt.)	Semester-III & IV,
[8]	B.A./B.Sc. Mathematics	Semester-III & IV,
[9]	B.Sc. Computer Science	Semester-I & II,
[10]	B.Sc. Information Technology	Semester-I & II,
[11]	B.C.A.	Semester-I & II,
[12]	B.Sc. Computer Science(Opt.)	Semester-I & II,
[13]	B.Sc. Information Technology(Opt.)	Semester-I & II,
[14]	B.Sc. Computer Application(Opt.)	Semester-I & II,
[15]	B.Sc. Computer Maintenance(Opt.)	Semester-I & II,
[16]	B.Sc. Biotechnology (Progressively)	Semester-I to VI,
[17]	B.Sc. Biotechnology (Opt.) (Progressively)	Semester-I to IV,
[18]	B.Sc. Sericulture Technology	Semester-I & II,
[19]	B.Sc. Networking Multimedia	Semester-III & IV,
[20]	B.Sc. Bioinformatics	Semester-I & II,
[21]	B.Sc. Hardware & Networking	Semester-I & II,
[22]	B.Sc. Animation	Semester-I & II,
[23]	B.Sc. Dairy Science & Technology	Semester-III & IV,
[24]	B.Sc. Biochemistry	Semester-III & IV,
[25]	B.Sc. Analytical Chemistry	Semester-III & IV,
[26]	B.Sc. Textile & Int. Decoration with minor changes	Semester-I & II,
[27]	B.Sc. Textile & Int. Decoration	Semester-III & IV,
[28]	B.Sc. Home Science with minor changes	Semester-I & II,
[29]	B.Sc. Home Science	Semester-III & IV,
[30]	B.Sc. Agro.Chem. & Fertilizers	Semester-III & IV,

S-29 Nov., 2013 AC after Circulars from Circular No.55 & onwards - 42 -
 :: [2] ::

[31]	B.Sc. Geology	Semester-III & IV,
[32]	B.A. Statistics with minor changes	Semester-I & II,
[33]	B.A. Statistics	Semester-III & IV,
[34]	B.Sc. Statistics with minor changes	Semester-I & II,
[35]	B.Sc. Statistics	Semester-III & IV,
[36]	B.Sc. Industrial Chemistry	Semester-III & IV,
[37]	B.Sc. Horticultural	Semester-I & II,
[38]	B.Sc. Dry land Agriculture	Semester-I & II,
[39]	B.Sc. Microbiology	Semester-III & IV,
[40]	M.Sc. Computer Science	Semester-I to IV,
[41]	M.Sc. Information Technology	Semester-I to IV.

हा सुधारीत व नवीन तयार केलेल्या अभ्यासक्रमाचा आराखडा शैक्षणिक वर्ष २०१४-१५ करिता मर्यादित असेल व विद्यापरिषदेच्या अंतिम मान्यतेनंतर हे परिपत्रक नियमित ठेवण्याबाबत या कार्यालयाद्वारे नवीन परिपत्रक पारीत करण्यात येईल. तसेच सुधारीत व नवीन तयार केलेल्या अभ्यासक्रमाची प्रत विद्यापीठाच्या संकेतस्थळावर उपलब्ध आहे.

करिता, या परिपत्रकाची सर्व संबंधितांनी नोंद घ्यावी.

विद्यापीठ प्रांगण,
 औरंगाबाद-४३१ ००४.
 संदर्भ क्र.एस.यु./सा.शा./सबवि /२०१३-१४/
 ६५९९-७०२
 दिनांक :- २७-०५-२०१४.

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 संचालक,
 महाविद्यालये व विद्यापीठ
 विकास मंडळ.

या परिपत्रकाची एक प्रत :-

- १) मा. परिक्षा नियंत्रक, परिक्षा विभाग,
- २) मा. प्राचार्य, सर्व संलग्नीत महाविद्यालये,
- ३) संचालक, युनिक यांना विनंती करण्यात येते की, सदरील अभ्यासक्रम विद्यापीठाच्या संकेतस्थळावर उपलब्ध करुण देण्यात यावेत.
- ४) संचालक, ई-सुविधा केंद्र, विद्यापीठ परिसर,
- ५) जनसंपर्क अधिकारी, मुख्य प्रशासकीय इमारत,
- ६) कक्ष अधिकारी, पात्रता विभाग, मुख्य प्रशासकीय इमारत,
- ७) कक्ष अधिकारी, बी.ए. / बी.एससी./ बी.सी.एस./एम.एससी. विभाग, परीक्षा भवन,
- ८) अभिलेख विभाग, मुख्य प्रशासकीय इमारती मागे,
 डॉ. बाबासाहेब आंबेडकर मराठवाडा विद्यापीठ, औरंगाबाद.

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**Dr. Babasaheb Ambedkar Marathwada
University, Aurangabad.**



B.Sc. First Year

Zoology [Optional]

With minor Changes

First and Second Semester

Effective from 2014-2015

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.
B.Sc. Zoology Pattern in Semester System

B. Sc. I Year Zoology

Semester	Course Code	Paper No.	Title of Paper	Marks
I	ZOL-101	Paper – I	Protozoa to Annelida	50
	ZOL-102	Paper – II	Cell Biology	50
	ZOL-103	Paper – III	Practical based upon Paper I & II	50
II	ZOL-201	Paper – IV	Arthropoda to Echinodermata And Protochordata	50
	ZOL-202	Paper – V	Genetics - I	50
	ZOL-203	Paper – VI	Practical based upon Paper IV & V	50

B. Sc. II Year Zoology

III	ZOL-301	Paper – VII	Vertebrate Zoology	50
	ZOL-302	Paper – VIII	Genetics- II	50
	ZOL-303	Paper – IX	Practical based upon Paper VII	50
	ZOL-304	Paper – X	Practical based upon Paper VIII	50
IV	ZOL-401	Paper – XI	Animal Physiology (Special Emphasis on Mammals)	50
	ZOL-402	Paper – XII	Biochemistry & Endocrinology	50
	ZOL-403	Paper – XIII	Practical based upon Paper XI	50
	ZOL-404	Paper – XIV	Practical based upon Paper XII	50

B. Sc. III Year Zoology

V	ZOL-501	Paper –XV	Ecology		50
	ZOL-502	Pape XVI (Elective)	A	Fishery sciences –I	50
			B	Animal culture –I	
			C	Entomology-I	
			D	Parasitic protozoa & helminthes-I	
			E	Computer Application & Laboratory Technology-I	
			F	Biotechnology-I	
			G	Dairy sciences -I	
			H	Poultry Sciences -I	
	ZOL-503	Paper XVII	Practical based upon Paper XV		50
ZOL-504	Paper XVIII	Practical based upon Paper XVI		50	
VI	ZOL-601	Paper XIX	Evolution		
	ZOL-602	Paper XX	A	Fishery sciences –II	50
			B	Animal culture –II	
			C	Entomology-II	
			D	Parasitic protozoa & helminthes-II	
			E	Computer Application & Laboratory Technology-II	
			F	Biotechnology-II	
			G	Dairy sciences -II	
			H	Poultry Sciences -II	
	ZOL-603	Paper XXI	Practical based upon Paper XIX		50
ZOL-604	Paper XXII	Practical based upon Paper XX		50	

B. Sc. First Semester
Course Code - ZOL- 101
Zoology Paper: I
PROTOZOA TO ANNELIDA

1.	Introduction to animal kingdom Definition of Zoology, Outline classification Protozoa, Parazoa, Metazoa and Major Phyla.	03
2.	Protozoa : - General characters <i>Plasmodium vivax</i> : - Structure of sporozoite, Life cycle; pathogenicity, Control, Prevention and Treatment of Malaria. <i>Entamoeba histolytica</i> : Structure, Life cycle and Control. <i>Euglena</i> : Morphology and Reproduction. <i>Paramecium</i> : Morphology and Reproduction	09
3.	Porifera : - General characters <i>Sycon</i> (Scypha): - Morphology, Different types of cells in sycon, canal system in Porifera.	08
4.	Coelenterata: - General characters <i>Obelia</i> : - Morphology of Obelia colony, Development of Hydra, Polymorphism in coelenterates.	06
5.	Helminths: - General characters <i>Fasciola hepatica</i> : - Structure, Life cycle, Pathogenicity & Control Measures <i>Taenia solium</i> : - Structure of scolex, Mature and gravid proglottids, Life cycle, pathogenicity, and control measures. <i>Ascaris lumbricoides</i> : - Structure of male & female, Life cycle, Pathogenicity & control measures.	12
6.	Annelida: - General characters <i>Leech</i> : - Morphology, Digestive, Excretory & Reproductive systems.	07
Total Periods: -		45

B. Sc. First Semester**Course Code - ZOL- 102****Zoology Paper: II****CELL BIOLOGY**

1. General structure of cell.	12
Structure of prokaryotic cell.	
Ultra structure of eukaryotic cell.	
Cell Cycle, Mitosis, Meiosis	
2. Organization of cell	20
A) Study of Various cell organelles	
Plasma Membrane: - Structure, unit membrane theory and function.	
Endoplasmic reticulum: - Structure and function.	
Golgi Bodies: - Structure and function	
Mitochondria: - Morphology, Ultra-Structure, function and biogenesis.	
Nucleus: - Structure and function.	
DNA Structure.	
Types of RNA	
Lysosome: - Structure, function and polymorphism	
Ribosome: - Structure and function	
B) Cytology of Cancer, Types of Cancer.	
3. Methods in Cell Biology (in brief)	13
A) Light Microscope	
Phase contrast microscope	
Electron microscope	
B) Micro techniques, (Microtomy) Fixation & Staining.	
	Total Periods: - 45

Recommended books
Protozoa to Annelida

- Kotpal, R.L. Modern Text Book of Zoology Invertebrates, Rastogi Publication, Meerut.
 - Parker & Hashwell, Textbook of Zoology Vol. I (Invertebrates) A.Z.T.B.S. Publishers & Distributors. New Delhi.
 - E.L. JORDEN & P.S. VERMA, Invertebrate Zoology, S. Chand & Co. Ltd. New Delhi.
 - Hickman C. P. Jr., Hickman & L.S. Roberts. Integrated principles of zoology, Mosby college publication. St. Louis.
 - Ayur, E.K., And T.N. Ananthakrishnan, Manual of zoology Vol. I, Invertebrata, Part I and II S.Viswanathan (Printers and Publishers) Pvt. Ltd. Madras.
 - Balinsky, an Introduction to Embryology (CBS College Publishers).
 - Grant- Biology of Development Systems (Holt. Reihart, Winston).
 - Dr. S.S. Lal Practical Zoology Invertebrates 9th edition Rastogi Publications Meerut.
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Cell biology

- Albert B. et.al - Molecular Biology of the cell (Sinauer)
- Lodish. H. et al – Molecular Cell Biology.
- Gupta P.K. Cell and Molecular Biology Rastogi Publication Meerut.
- Dr. S.P. Singh, Dr. B.S. Tomar, Cell Biology 9th revised edition Rastogi Publication Meerut.
- Gerald Karp Cell and Molecular biology- Concepts and Experiments. John Wiley, 2007.

B. Sc. First Semester**Course Code - ZOL- 103****Zoology Paper: III****PROTOZOA TO ANNELIDA & CELL BIOLOGY (PRACTICAL)**

1. Study of slides from Ciliates, Opalينات, and Flagellates(any five)	01
2. Study of museum specimen and slides from Porifera to Annelida. (Three from each phyla)	02
3. Dissection: Dissection of Leech for Digestive, Excretory & Reproductive systems. Dissection of Earthworm for Nervous System & Reproductive system	05
4. Mounting of any five of the following. Sponge spicules, Gemmule, Obelia colony, Jaws of Leech. Spermatoca, testes nerve ring of Earthworm, Parapodia of Nereis.	01
5. Study of cell organelles by using Models, Charts, Slides & Electron micrographs.	01
6. Squash preparation of Onion root tip to study Mitosis.	01
7. Preparation of polytene chromosome in chironomous larva/fruit flies.	01
8. Microtechnique: - Fixation, dehydration, Block preparation, Microtomy and Staining of Vertebrate tissue.	02
9. Study of Microscopy: - Simple, Compound, & Phase Contrast Microscope	01
Total Practical Periods: -	15

Pattern of Question Paper
B. Sc. First Semester
Course Code – ZOL- 101
Zoology Paper: I
PROTOZOA TO ANNELIDA

Time: 03:00 hours

Max. Marks: 50

- N.B. 1) Attempt all questions.
2) All question carry equal marks.
3) Illustrate your answer with suitable labeled diagram.
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| Q.1. Long answer question.
OR
Short Notes on:
a)
b) | Based on chapter 1 & 2
OR
Based on chapter 1 & 2 |
| Q.2. Long answer question.
OR
Short Notes on:
a)
b) | Based on chapter 3 & 4
OR
Based on chapter 3 & 4 |
| Q.3. Long answer question.
OR
Short Notes on:
a)
b) | Based on chapter 5&6
OR
Based on chapter 5&6 |
| Q.4. Long answer question.
OR
Short Notes on:
a)
b) | Based on all chapters
OR
Based on all chapters |
| Q.5. Multiple choice questions:
1)
2)
3)
4)
5)
6)
7)
8)
9)
10) | Based on all chapters |

Pattern of Question Paper**B. Sc. First Semester****Course Code – ZOL- 102****Zoology Paper: II****CELL BIOLOGY****Time: 03:00 hours****Max. Marks: 50**

- N.B. 1) Attempt all questions.
2) All question carry equal marks.
3) Illustrate your answer with suitable labeled diagram.
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|--|--|
| Q.1. Long answer question.
OR
Short Notes on:
a)
b) | Based on chapter 1
OR
Based on chapter 1 |
| Q.2. Long answer question.
OR
Short Notes on:
a)
b) | Based on chapter 2
OR
Based on chapter 2 |
| Q.3. Long answer question.
OR
Short Notes on:
a)
b) | Based on chapter 3
OR
Based on chapter 3 |
| Q.4. Long answer question.
OR
Short Notes on:
a)
b) | Based on all chapters
OR
Based on all chapters |
| Q.5. Multiple choice questions:
1)
2)
3)
4)
5)
6)
7)
8)
9)
10) | Based on all chapters |

B. Sc. Second Semester**Course Code – ZOL- 201****Zoology Paper: IV****ARTHROPODA TO ECHINODERMATA AND PROTOCHORDATA**

1. Arthropoda: - General characters	15
Prawn: - Structure, Digestive, Nervous, & Reproductive systems.	
Cockroach: External Characters, Digestive, Respiratory and Reproductive systems.	
2. Mollusca: - General characters	06
Pila: - External Characters, Respiratory, Circulatory, Nervous and Reproductive systems	
3. Echinodermata: - General characters	10
Asterias (Sea Star): - Morphology of oral & aboral view, Water vascular system, Reproductive system including development.	
4. General characters and Classification of Protochordata	14
Amphioxus: - External features, Digestive, Circulatory, Reproductive systems including development.	
Hemichordata: - General characters and affinities	
Herdmania: - General characters and morphology	
Total Periods: -	45

B. Sc. Second Semester**Course Code – ZOL- 202****Zoology Paper: V****GENETICS – I**

1. Elements of heredity & variation	04
Definition of genetics and variation	
Mendel's laws of heredity in short	
2. Gene interaction	05
Definition- modifications in Mendelian phenotypic ratio like,	
Epitasis	
Supplementary gene	
Complementary gene	
3. Multiple Alleles	05
Coat Colour in rabbit.	
ABO Blood group in man, Rh factor	
4. Cytoplasmic inheritance.	08
Definition of maternal effect. Coiling shell in snail (<i>Limnea peregra</i>)	
Male sterility.	
CO ₂ sensitivity in <i>Drosophila</i> .	
Kappa particles in <i>Paramecia</i> .	
5. Sex Determination	08
Chromosome theory in sex determination	
Genic balance theory of sex determination	
Triploid intersexes and Gynandromorphs in <i>Drosophila</i> .	
Sex linked inheritance: X linked and Y linked	
6. Mutation	15
Brief introduction	
Gene mutation: - Definition and classification	
Chromosomal aberration (structural & numerical)	
Spontaneous & induced mutation	
Total Periods: -	45

Recommended Books.**ARTHROPODA TO ECHINODERMATA &PROTOCHORDATA**

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- Kotpal, R.L. Modern Text Book of Zoology Invertebrates, Rastogi Publication, Meerut.
 - Parker & Hashwell, Textbook of Zoology Vol. I (Invertebrates) A.Z.T.B.S. Publishers & Distributors. New Delhi.
 - E.L. JORDEN & P.S. VERMA, Invertebrate Zoology, S. Chand & Co. Ltd. New Delhi.
 - Hickman C. P. Jr., Hickman & L.S. Roberts. Integrated principles of zoology, Mosby college publication. St. Louis.
 - Ayur, E.K., And T.N. Ananthakrishnan, Manual of zoology Vol. I, Invertebrata,
 - Part I and II S.Viswanathan (Printers and Publishers) Pvt. Ltd. Madras.
 - Balinsky, An Introduction to Embryology (CBS College Publishers).
 - Grant- Biology of Development Systems (Holt. Reihart, Winston).
 - Dr. S.S. Lal Practical Zoology Invertebrates 9th edition Rastogi Publications Meerut.
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GENETICS - I

- P.K. Gupta, Genetics- Rastogi Publications Meerut.
- P.K. Gupta, Genetics Classical to Modern- Rastogi Publications Merrut.
- Verma P.S. and V.K. Agarwal, Genetics, S.Chand and Publication.
- Levin O.D. and Lewin R. Biology of Gene McGraw Hill Troppan Co.Ltd.
- Gunther S. Stent. Molecular Genetics McMillan Publication Co.Inc.
- Goodenough V. Genetics New York, Holt Rinchart and Winston.
- Winchester, Genetics Oxford HBH Publication.
- Strikberger, Genetics McMillan Publication
- Sinnott Dunn and Dobzansky- Principles of Genetics

B. Sc. Second Semester**Course Code – ZOL- 203****Zoology Paper: VI****ARTHROPODA TO ECHINODERMATA AND PROTOCHORDATA & GENETICS – I
(PRACTICAL)**

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| 1. Study of museum specimen & slides of relevant Invertebrates & Protochordata. (At least 3 from each phyla) | 03 |
| 2. Dissections:
Dissection of Prawn for Nervous system
Dissection of Cockroach for Digestive and Nervous Systems.
Dissection of Pila for Nervous system.
Dissection of Sea Star for Water Vascular System. | 05 |
| 3. Mounting of any five of the following.
Mouthparts of Cockroach, Mosquito, House fly, Bed bug and Honeybee.
Salivary glands of cockroach.
Redula of Pila, Pedicillaria of Star fish. | 01 |
| 4. Culture of Drosophila- experimental organism in genetics
Observation of common mutants of drosophila | 01 |
| 5. Determination of human blood groups A, B, AB, and O, Rh factor. | 01 |
| 6. Major and minor problems in genetics | 04 |

Practical Periods: - 15

Pattern of Question Paper
B. Sc. Second Semester
Course Code – ZOL- 201
Zoology Paper: IV

ARTHROPODA TO ECHINODERMATA AND PROTOCHORDATA

Time: 03:00 hours

Max. Marks: 50

- N.B. 1) Attempt all questions.
2) All question carry equal marks.
3) Illustrate your answer with suitable labeled diagram.
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| Q.1. Long answer question.
OR
Short Notes on:
a)
b) | Based on chapter 1
OR
Based on chapter 1 |
| Q.2. Long answer question.
OR
Short Notes on:
a)
b) | Based on chapter 2 & 3
OR
Based on chapter 2 & 3 |
| Q.3. Long answer question.
OR
Short Notes on:
a)
b) | Based on chapter 4
OR
Based on chapter 4 |
| Q.4. Long answer question.
OR
Short Notes on:
a)
b) | Based on all chapters
OR
Based on all chapters |
| Q.5. Multiple choice questions:
1)
2)
3)
4)
5)
6)
7)
8)
9)
10) | Based on all chapters |

Pattern of Question Paper
B. Sc. Second Semester
Course Code – ZOL- 202
Zoology Paper: V
GENETICS - I

Time: 03:00 hours

Max. Marks: 50

- N.B. 1) Attempt all questions.
2) All question carry equal marks.
3) Illustrate your answer with suitable labeled diagram.
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- | | |
|--|--|
| Q.1. Long answer question.
OR
Short Notes on:
a)
b) | Based on chapter 1 to 3
OR
Based on chapter 1 to 3 |
| Q.2. Long answer question.
OR
Short Notes on:
a)
b) | Based on chapter 4 & 5
OR
Based on chapter 4 & 5 |
| Q.3. Long answer question.
OR
Short Notes on:
a)
b) | Based on chapter 6
OR
Based on chapter 6 |
| Q.4. Long answer question.
OR
Short Notes on:
a)
b) | Based on all chapters
OR
Based on all chapters |
| Q.5. Multiple choice questions:
1)
2)
3)
4)
5)
6)
7)
8)
9)
10) | Based on all chapters |

Skeleton of question paper
B. Sc. I & II semester
Course Code - ZOL- 103 & 203
Zoology Paper: III + VI
PROTOZOA TO ECHINODERMATA
AND PROTOCHORDATA, CELL BIOLOGY AND GENETICS - I (PRACTICAL)

Time: - 4:00 hrs

Total marks:-100

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- | | |
|---|-----------|
| Q.1. Dissect the.....so as to expose it'ssystem | 20 |
| Q.2. Mounting of squash preparation of Onion root tip, identify the stage and give the reasons | 10 |
| OR | |
| Mounting of Salivary glands from Chironomus larva / Fruit fly. | |
| Q.3. Mounting of the given material | 05 |
| Q.4. Genetics – Major problem | 15 |
| Q.5. Identify the given spots and comments on it
(Protozoa to Echinodermata & Protochordata, cell organelles and common mutants) | 30 |
| Q.6. Submission of permanent slides | 05 |
| Q.7. Record book | 10 |
| Q.8. Vivo-vice | 05 |

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