

1.3.2 Syllabus of courses that include experiential learning through project work/field work/internship.

B. Sc. Botany Sem V and VI

Laboratory Exercises:

Use Photographs / transparencies / permanent slides / charts

1. Mendel's laws using seed / plastic beads and applying chi-square.
2. Chromosome mapping using point test cross data.
3. Problems related to Lethal Genes, Co-dominance, and epistasis gene interaction (12:3:1; 13:3; 15:1; 9:6:1)
4. Sex determination in plants, *Drosophila* and humans
5. Photographs showing sex linked inheritance
6. Chloroplast variation in Four O'clock plant
7. Plant Propagation techniques – Vegetative (Layering/ Grafting/ Budding)
8. Hybridization techniques: Emasculation – types, Bagging and tagging
9. Pollen viability test - *In vitro* a. Brewbaker's medium preparation
b. Staining test in acetocarmine
In vivo – Pollen Germination on stigma (through style; through ovule)
10. Systematic description and artificial hybridization of locally available crop plants.
11. Identification of important varieties of locally available crops* - Cereals (Wheat, Rice/ Maize); millets (Sorghum); Pulses (Gram, Pea); Oil seeds (Mustard, Ground nut & Sunflower); Fiber (Cotton).

* Note: Center of origin, habit and its utility (parts used) should be taught.

1. Frequent Industrial / Laboratory visits are necessary
2. Submit Industrial / Laboratory visit report duly signed by HOD.

Suggested Readings:

1. Backcock., E.B. (2001). *Genetics and Plant breeding*. Agrobios (India), Jodhpur
2. Gardner, E.J., Simmons, M.J., Snustad, D.P. (2008): *Principles of Genetics*. VIII Edition. Wiley India.
3. Griffiths, A.J.F., Wessler, S.R., Lewontin, R.C. and Carroll, S.B. *Introduction to Genetic Analysis*. IX Edition. W. H. Freeman and Co.
4. Gupta P.K., 'Genetics'. Rastogi Publications.
5. James D. Watson, Nancy H. Hopkins. (1987): 'Molecular Biology of the Gene'. IV Edition,


Dr. L.S. Ladke
PRINCIPAL
N.S. Science & Arts College
Bhadrawati, Dist-Chandrapur

GONDWANA UNIVERSITY, GADCHIROLI
CHOICE BASED CREDIT SYSTEM (CBCS) SYLLABUS
PROGRAMME – BACHLOR OF SCIENCE (B.Sc.), SEMESTER – V
SUBJECT – ZOOLOGY PRACTICAL (CREDIT 2)
SKILL ENHANCEMENT COURSE (SEC)
PRACTICAL

Max. Marks: 35

1. To study the identification of different species of Honey bees
2. To Study different stages in life cycle of Honey bees.
3. To study the different instruments for bee keeping
4. Visit to Apiculture industry/Local Apiculture Unit

Practical Question Paper and Distribution of Marks

Time: 4 Hrs.

Max. Marks: 35

Practical

Distribution of Marks

- | | |
|--|----|
| 1. Identification of Honey bees through ICT | 10 |
| 2. Identification of instruments through ICT | 10 |
| 4. Visit tour report..... | 15 |


Dr. L.S. Ladke
PRINCIPAL
N.S. Science & Arts College
Bhadrawati, Dist-Chandrapur

1.8.2

Skill Enhancement Courses (SEC-IV)

Theory Examination Pattern

Theory Question Paper Pattern
For
B.Sc. BOTANY CBCS
SEMESTER – VI
Skill Enhancement Courses (SEC-IV)

Time: 02 Hours]

[Max. Marks- 30

- Q.1. Long question10 Marks
- Q.2. Short question
- a)5 Marks
- b)5 Marks
- Q.3. MCQ10 Marks
(Ten MCQ each of ONE mark)

Practical Examination Assessment Pattern

Assessment of practical Examination is based on the following fulfillment by the student.

6.	Project Submission	20 Marks
7.	Project Presentation	20 Marks
8.	Assignments	10 Marks
9.	<u>Field Visit</u>	10 Marks
10.	Overall Performance	10 Marks
Total Marks		70 Marks


Dr. L.S. Ladke
PRINCIPAL
N.S. Science & Arts College
Bhadrawati, Dist-Chandrapur

GONDWANA UNIVERSITY GADCHIROLI
SEMESTER SYSTEM SYLLABUS

FOR

B.Sc. Part III

Subject- Zoology

Semester – VI

Paper - I: General Mammalian Physiology –II

Unit –I : Nerve and Muscle Physiology

1. Types of neurons, E.M. structure of neuron
2. Conduction of nerve impulse
3. Ultrastructure of striated muscle, Sliding filament theory of muscle contraction
4. Properties of muscles (Twitch, Tetanus, Tonus, Summation, All or None Principle, Muscle fatigue)

Unit-II : Excretion

1. Structure of uriniferous tubule
2. Mechanism of urine formation
3. Counter – current mechanism
4. Normal and abnormal constituents of urine; Elementary idea of dialysis

Unit-III : Endocrinology

1. Structure and functions of pituitary gland
2. Structure and functions of thyroid and parathyroid gland
3. Structure and functions of adrenal gland
4. Structure and functions of pineal gland

Unit-IV : Reproduction

1. Oestrous and menstrual cycle
2. Male and female sex hormones
3. Causes of infertility in male and female
4. Contraceptives– Mechanical and hormonal ;*In-vitro* fertilization


Dr. L.S. Ladke
PRINCIPAL
N.S. Science & Arts College
Bhadrawati, Dist-Chandrapur

Distribution of Marks**Total Marks 30**

I. Physiology experiment.....	05
II. Identification and comments on spots (Mammalian histology 3 spots)	03
III. Microtechnique - Section cutting, spreading and H-E staining of given slide	03
IV. Anatomical observation	05
V. Analysis of given biostatistical data	02
VI. Retrieval of specific literature from given information.....	02
✓ VII. Submission of slides and <u>study tour report</u>	02
VIII. Submission of certified practical record.....	03
IX. Viva voce.....	05

List of Recommended Books: (For Semester V and VI)**Physiology**

1. Human Physiology – Chatterjee A. G. vol. I & II
2. Medical Physiology – Gyton
3. T. B. of Animal Physiology – Berry
4. Introduction to Animal Physiology and Related Biotechnology – H. R. Singh
5. Animal Physiology – Arora M.P.
6. General and Comparative Physiology – Hoar W. S.
7. T. B. of Animal Physiology – Hurkat and Mathur
8. Animal Physiology – Nahbhushan and kodarkar
9. T. B. of Animal Physiology & General Biology – Thakur &Puranik
10. General Endocrinology – Turner Bagnaro
11. Reproduction and Human welfare – Greep and koblinsky
12. Animal Physiology – Shastri & Goel
13. Animal Physiology – Verma&Tyagi
14. Human Physiology - Vander and sheman
15. Applied Physiology – Keels, Neils and Joels
16. Animal Physiology – Rastogi S. C.
17. Animal Physiology – Veerbala Rastogi
18. Comparative Vertebrate Endocrinology – Beutley
19. T.Y B. Sc Zoology Sem-V- Dhamani,Bakare,Harney & Bhute


Dr. L.S. Ladke
PRINCIPAL
N.S. Science & Arts College
Bhadrawati, Dist-Chandrapur

Hymenoptera, Diptera etc. with the help of already available museum specimens, permanent slides/ ICT tools/ charts/ photographs/ models etc.

5 **Physiological Experiments:**

- a. Estimation of total proteins/carbohydrates/lipids
- b. Chromatographic separation of free amino acids
- c. Separation of proteins by electrophoresis
- d. Estimation of Na^+ and K^+ by flame photometer.
- e. Estimation of DNA and RNA.

6 **Visits to agricultural fields, national parks and forests for observations of insect population dynamics, behavior and diversity.**

Note: Student should submit insect photographs of 10 locally available species at the time of examination.

Distribution of Marks	Marks
1. Anatomical observations	10
2. Physiological Experiment	10
3. Identification of histological slides and insects (1-15)	30
4. Mounting	05
5. Class records and submission of insect photographs	10
6. Submission of histological slides	05
7. Viva-voce	10
Total marks	80

Semester -III

Paper-X, Special Group-Fish and Fisheries -I

(CREDIT - 4)

General studies

Unit-I

- 1.1 Origin and Evolution of fishes: Fossil record, classification, cyclostoms, ostracoderms, placoderms, Sharklike fisher, Bony fishes
- 1.2 Development of jaws and limbs in fishes.
- 1.3 Classification and general characters of Placoderms: Acanthodii, Coccostei, Pterychthyes, Stegoselachii, Palaeospondyli.
- 1.4 Affinities of Placoderms and fossil record.

Unit-II

- 2.1 Classification and general characters of Elasmobranch/Chondrichthyes: Sharks and Rays, Holocephali
- 2.2 Affinities of Elasmobranchs, specialized characters of Elasmobranchs.
- 2.3 Classification and general characters of Actinopterygii/Ray finned

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Dr. L.S. Ladke
PRINCIPAL
N.S. Science & Arts College
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Unit-III

- 3.1 Insect pathogenic bacteria used in biological control programmes, biological relationship, mass production and examples.
- 3.2 Insect pathogenic viruses used in biological control programmes, biological relationship, mass production and examples
- 3.3 Use of radiation, chemosterilants, hormones and pheromones in pest control programmes.
- 3.4 Integrated pest managements: principles, modeling, application and examples.

Unit-IV

- 4.1 Pest of horse and cattle: Nature of damage, life cycle and control measures.
- 4.2 Mosquitoes causing disease in man: life cycle, mode of transmission of pathogen and control measures.
- 4.3 Flies causing disease in man: life cycle, mode of transmission of pathogen and control measures.
- 4.4 Lice and fleas causing disease in man: life cycle, mode of transmission of pathogen and control measures.

Semester-IV, Practical-VII, Special Group-Entomology

- 1 Anatomical observations, demonstration and detailed explanation of the silkgland in mulberry and non mulberry silkworms with the help of already available permanent slides/ ICT tools/ models/ charts/ photographs etc.
- 2 Anatomical observations, demonstration and detailed explanation of the male and female reproductive system in silk moths with the help of ICT tools/ models/ charts/ photographs etc.
- 3 Anatomical observations, demonstration and detailed explanation of the salivary, pharyngeal glands and sting apparatus in honey bees with the help of ICT tools/ models/ charts/ photographs etc.
- 4 Demonstration of disease causing pathogens in insects.
- 5 Histopathological Study of baculovirus and protozoan infected tissues with the help of already available permanent slides/ ICT tools/ models/ charts/ photographs etc.
- 6 Collection of insect photographs, identification and classification of harmful insects, parasitic hymenopteran and other beneficial insects.
- 7 Listing of insects of different orders of central India.
- 8 Study of various systems of insects and their functional significance with the help of ICT tools/ charts/ models/ photographs etc.
- 9 Preparation of photographic life history of economical important insects.
- 10 Preparation of insect biodiversity register of a specific area by photographic collection/ observation.
- 11 Visit to Apiculture, Sericulture, Lac culture centers and entomology research laboratory/center.

Distribution of Marks:		Marks
1.	Anatomical observations	10
2.	Identification, classification and economic importance of spots (1 to 10)	20
3.	Demonstration of microbial pathogen in insect	10
4.	Whole mount preparation	10
5.	Class record and submission of slides	10
6.	Submission of life history	10
7.	Viva-voce	10

Total marks	80

	100

✓ **• Project work**

(80 marks project evaluation including viva + 20 marks Internal assessment)

• Suggested Readings

Entomology

1. Imms General text book of Entomology, Eds. O. W. Richards and R. G. Davis Chapman and Hall, London.
2. General and Applied Entomology, K.K. Nayar, T. N. Ananthkrishan and B.V. Davis Tata McGraw -Hill Co.Ltd. Bombay.
3. The Insect: Structure and function, R.F. Chapman, Cambridge University Press.
4. The Physiology of Insect , Ed. M.Rockstein ,Vol. 1-5, Academic Press, New York.
5. The Physiology of Insect Reproduction, F, Englemann, Pergamon Press, New York.
6. Comprehensive Insect Physiology , Biochemistry and Pharmacology , Eds. G.A. Kerkut and I. A. Gillberd, VOL. 1-13, Pergamon Press, New York.
7. Analytical Biochemistry of Insect, Ed. R. B. Turner, Elsevier, Amsterdam.
8. Insect Hormone, M. J. A. Novak. Chapman and Hall, London.
9. Modern Entomology(Second edition): D. B. Tembhare, Himalaya Publication House, Bombay.
10. Destruction and Useful Insect, Their Habits and Control, C. L. Metcalf, W. P. Flint and R. I. Metcalf, Mc Grow I III Co. New York.
11. Integrated Pest Management, J.L. Apple and R. E. Smith, Plenum Publication Co., New Delhi.
12. An Introduction Of Biological Control RVD Boarscho, P. S. Y. Messenger and A. P. Gaiter, Plenum Publication Co.
13. Text Book of Entomology, K. P. Shivastava, Vol. 1 And 2 Kalyani Publication, Ludhiana.
14. Agriculture Entomology, H. S. Dennis, Timber Press Inc.
15. Entomology and Pest Management, Larry P. Pedigo, Prentice Hall.
16. Text Book of Agriculture Entomology, Alford V. David, Blackwell Science.
17. Biopesticides In Insect Pest Management, S. J. Ignacimulha and AlokSen , Phoenix Publishing House Pvt, Ltd.

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Dr. L.S. Ladke
PRINCIPAL
N.S. Science & Arts College
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- 6 Study of histochemical localization of lipids in rat / mouse ovary by Sudan Black-B method (Propylene glycol method) with the help of already available permanent slides/ ICT tools/ charts/ models/ photographs etc.
- 7 Experimental (histological slides for identification) study of the following with the help of already available permanent slides/ ICT tools/ charts/ models/ photographs etc.
 - a) Effects of ovariectomy and oestrogen replacement on pituitary, uterus and vagina.
 - b) Effects of some female antifertility drugs on ovary and adrenal gland
- 8 Histology: (Identification of slides) Histological changes in female reproductive organs during different phases of oestrous cycle in continuous and seasonal breeder with the help of already available permanent slides/ ICT tools/ charts/ models/ photographs etc.
- 9 Embryology: Study of various stages of development of mammalian egg, development of foetal membranes, different types of placenta, progestational changes in uterus with the help of already available permanent slides/ ICT tools/ charts/ models / photographs etc.
- 10 Field work: Visit to laboratory for embryo transfer and family planning clinics.

Distribution of marks

	Marks
1. Surgical operation	15
2. Anatomical observations	15
3. Vaginal smear and oestrous cycle stages	10
4. Experimental analysis	10
5. Identification and comment on spots	10
6. Practical Record	10
7. Viva voce	10

Total marks	80

• Project work

(80 marks project evaluation including viva + 20 marks Internal assessment)

• Suggested Readings

1. A textbook of in vitro fertilization and assisted reproduction edited by P.R. Brinsden and P. A. RainsburJaypee brothers 1992.
2. Advances in Reproductive Physiology, Vol. 1 to 6: McLaren, (1968). Logos Press Ltd., London.
3. Advances in Reproductive Toxicology eds. S. C. Joshi and A. S. Ansari Pointer publishers.
4. Andrology. 2nd Edition Male Reproductive health and dysfunction (Eds. E. Nieschlag & H.M. Behre) 2000.
5. Biochemistry of Mammalian Reproduction: Zanveld, L.J.D. & R.T. Chatterton (1982). John Wiley & sons, New York. The Ovary. Vol. I, II & III: Zuckerman, S, (1962). Academic Press, London.

GONDWANA UNIVERSITY, GADCHIROLI

M.Sc.-II Semester III, IV (Chemistry)

(Effective from 2017-18) (CBCS)

1. There will be four theory papers in every semester which will carry 80 marks each of 3 hrs. duration.
2. In semester III student will opt for special paper from four options available.
3. In semester IV student will opt for an elective paper out of the five options available.
4. There will be internal assessment of 20 marks per paper per semester.
5. Each paper per semester with total of 100 marks(80+20 i.e. theory+internal assessment) will carry 4 credits.
6. The internal assessment will be based on Attendance, Home assignment, Unit test Terminal test and participation in departmental activities.
7. There will be two practical examinations in semester III i.e. Pract I(special) and Pract II(Elective) of 6-8 hours duration of 80 marks with 4 credits each. Every practical will be having 20 internal practical marks.
8. In semester IV there will be one practical (Special) and another as Project of 80 marks each. ✓
9. In each semester, the student will have to deliver a seminar on any topic relevant to the syllabus / subject encompassing the recent trends and development in that field / subject. This will carry 25 marks per seminar with one credit.
10. So, the total marks allotted to the Chemistry subject per semester is 625 marks:
Theory (320 marks) + Internal assessment (120 marks) + Practicals (160 Marks)+ Seminar (25Marks)= 625marks (total)
11. Each theory paper consists of four units of fifteen hours per unit.

The following syllabi are prescribed on the basis of four hours per week of each paper and nine practical periods per batch per week.

General scheme for distribution of marks in practical examination

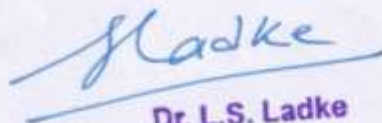
Time : 6-8 h (One day Examination) Total Marks : 80)

Exercise-1 - 30 Marks

Exercise-2 - 20 Marks

Viva-Voce -15Marks

Record -15 Marks



Dr. L.S. Ladke
PRINCIPAL
N.S. Science & Arts College
Bhadrawati, Dist-Chandrapur

UNIT-III: 15 h

- A) Histamines and Antihistamic agents: Introduction, histamine H₁-receptor antagonists. Inhibitors of histamine release. Synthesis of: alkyl amines, phenothiazines, piperzines derivatives.
- B) Antibiotics: Introduction, β -lactam antibiotics, classification, SAR and chemical degradation of penicillin, cephalosporins-classification, tetracycline antibiotics-SAR, miscellaneous antibiotics. Synthesis of ampicillin, cephadrine, methacycline, chloramphenicol

UNIT-IV: 15 h

- A) Anthelmintics and antiamebic drugs: Introduction to Helminthiasis, Anthelmintics, drugs used in cestode infection, drugs used in trematode infection, origin of antiamebic drug, drugs used in nematode infection. Synthesis of: Clioquinol, Iodoquinol, Haloquinol, Dichlorphen, Niclosamide.
- B) Anti-inflammatory drugs: Introduction, etiology of inflammatory diseases. The inflammatory response, biochemical response. Synthesis of: Phenyl butazone and its derivatives, pyrazolone derivatives, pyrole and indole acetic acid derivatives.

PSCChP11 Practical-XI Project

9 h/week 80 Marks

Project is a part of practical examination. Project should be carried out by the student under the supervision of Guide/Teacher. The examination shall be conducted by External and Internal Examiners. Students are supposed to present their work either on LCD Projector / OHP or blackboard.

The division of marks will be as follows:

External examiner: 40 marks

Internal examiner (Guide/ Teacher): 40 marks


Dr. L.S. Ladke
PRINCIPAL
N.S. Science & Arts College
Bhadrawati, Dist-Chandrapur