

## ORDINANCE: DEPARTMENT OF ANIMAL SCIENCE

### Master Degree Programme, Dept. of Animal Science, PSB, Visva-Bharati

**Preamble:** As per suggestions from the UGC, ICAR and the Academic Council, Visva-Bharati (vide Ref. No. Aca. S-19.2/174/2009-10 dt. 08.05.09 on introduction of Semester System including the Choice Based Credit System wherever possible) at the Post-graduate Level the New Ordinance has been set forth.

### Contents

Particulars	P. No.	Particulars	P. No.
5. General	01	13. Paper Setting and Evaluation	06
6. Standing Committee	02	14. Examination and Regulation	06
7. PG Coordinator	02	15. Fees and Other Charges	07
8. Academic Session	02	16. Moderation	07
5. Courses	03	17. Scrutiny	07
7. Credit Requirements	04	18. Credit Seminar	07
7. Course Regulations	05	19. Comprehensive	08
8. Course Registration	05	20. Thesis	08
9. Advisory Committee	05	21. Rights on Thesis	09
10. Plan of Post-graduate Work (PPW)	06	22. Grading System	10
11. Outline of Research Work (ORW)	06	23. Residential Norms	10
12. Attendance	06		

**Notes:** Adhyaksha- Principal/ Dean; Bhavana- Institute of Agriculture; HOD- Head of the Department; BOS- Board of Studies; PPW- Plan of Post-graduate Work; ORW- Outline of Research Work; GP- Grade Point; OGPA- Overall Grade Point Average.

### 1. General:

- a. There shall be subjects of studies for the Master of Science in Agriculture *i.e.* a) M. Sc. (Ag.) in Agronomy, b) M. Sc. (Ag.) in Soil Science and Agril. Chemistry, c) M. Sc. (Ag.) in Agril. Extension, d) M. Sc. (Ag.) in Plant Protection e) M. Sc. (Ag.) in Horticulture and M. Sc. in Animal Science (Poultry) at Palli Siksha Bhavana (Institute of Agriculture), Visva-Bharati, Sriniketan. Introduction of any new subject(s) of studies in PG Level at the Institute will be made in due course without modification of the ordinance Part- I: (Rules and regulations).
- b. The Post-graduate Degree courses of two-year duration comprising four semesters will run under "Course and Credit System".
- c. A candidate seeking admission to M. Sc. (Ag.) Programme is required to produce a certificate that he / she has passed the four-year B. Sc. (Ag.) Honours degree examination of Visva-Bharati

or equivalent examination recognized by the ICAR and/or the UGC. For M. Sc. in Animal Science (Poultry) course; requisite qualifications are B.V. Sc. & A.H./ B.Sc. (Ag.) Hons. / B.Sc. (Zoology) Hons. degree. The other eligibility criteria like percent of marks, OGPA etc. will be decided as per University guidelines, which may vary from time to time. However, for the ICAR nominated candidates, the eligibility criteria adopted by the ICAR will be followed as such.

- d. The candidate admitted for admission to the M.Sc. (Ag.) (M.Sc. in Animal Science Poultry) Programme in various disciplines shall abide by the regulations regarding the course curricula and the academic standards as prescribed by the University from time to time.
- e. The medium of instruction and examination shall be in English.

**Department and major field of specialization:** Palli Siksha Bhavana (Institute of Agriculture), Visva-Bharati offers Master's degree in the following programmes with major studies in:

M. Sc. (Ag.) in	Major subject(s)
Agronomy	Agronomy
Soil Science & Agril. Chemistry	Soil Science and Agril. Chemistry
Plant Protection	Agril. Entomology / Plant Pathology
Agricultural Extension	Agricultural Extension
Horticulture	Fruit Science / Vegetable Science
M. Sc. in Animal Science	Poultry

## 2. Standing Committee (PG Programme):

- a. A Standing Committee (PG Programme) shall be formed for examining the issues related to M. Sc. (Ag.) / M. Sc. in Animal Science (Poultry) Programme of the Institute.
- b. The composition of the Standing Committee (PG Programme) shall be
  - j. Chairman: A Senior Professor appointed by the Principal of the Institute.
  - ii. Head(s) of the Department(s).
    - i. Vice-Principal: may act as liaison to the Principal and other members.
    - ii. PG Coordinator of each M. Sc. (Ag.) Programme (*i.e.* Agronomy, Soil Science & Agricultural Chemistry, Plant protection, Agricultural Extension and Horticulture and M. Sc. in Animal Science (Poultry)).
- c. Function of Standing Committee (PG Programme) may include:
  - iv. Looking after the general work of M. Sc. (Ag.)/ M. Sc. in Animal Science (Poultry) Programmes of the Bhavana.
  - v. Reviewing academic standards including syllabus, examinations etc.
  - vi. Looking after matters related to examinations, evaluation etc.

## 3. PG Coordinator:

- a. BOS / Departmental Committee of the concerned Department offering M. Sc. (Ag.)/ M. Sc. in Animal Science (Poultry) Programme(s), may select a faculty member as a PG Coordinator for each course.
- b. The PG Coordinator(s) will look after smooth running of M. Sc. (Ag.) /M. Sc. in Animal Science (Poultry) Programmes of the concerned Department (s).

#### 4. Academic Session and Semester Calendar:

- a. The duration of M. Sc. (Ag.)/ M. Sc. in Animal Science (Poultry) Programme(s) shall be of two academic years consisting of four semesters. The maximum allowable semesters for completion of any M. Sc. (Ag.) / M. Sc. in Animal Science (Poultry) Programme is eight (8).
- b. The academic year of M. Sc. (Ag.) / M. Sc. in Animal Science (Poultry) Programme shall be in terms of two semesters in a year.

The odd semesters (*i.e.* First and Third) shall run in the first half of an academic year and even semesters (*i.e.* Second and Fourth) shall run in the second half of the same academic year. The broad schedule of two semesters is

Odd semesters (I & III) : July to December

Even semesters (II & IV) : January to June

- c. The commencement of each semester in a particular academic year shall be decided by the Standing Committee (PG Programme) from time to time.
- d. There shall be no semester break but summer and autumn recesses and enlisted holidays will be followed as prescribed by the University.
- e. Degree to be awarded after completion of 2 years PG programme in Poultry Science
  - i. M.Sc. in Animal Science (Poultry): students completed B.Sc. (Ag.) Hons / B.Sc. (Zoology) Hons. in UG (both cases extra credits to be covered requires as remedial)
  - ii. M.V.Sc. in Poultry Science: students completed B.V.Sc & A.H in their UG course

#### 5. Courses:

- a. Code: Each course shall bear a distinguishing code (three letters and three digits) that identifies the discipline from which it is being offered.
- b. Code numbers:
  - iv. All Master's level courses shall ordinarily belong to 500-series.
  - v. Credit seminar shall be designated by Code No. 591
  - vi. Master's research (Thesis) shall be designated by Code No. 599.
- c. There shall be two types of courses, "**credit courses**" and "**non-credit courses**". Grade points obtained only in 'credit courses' will be considered for the classification of results.

Performance in non-credit courses including Thesis will be as “Satisfactory / Non-satisfactory”

- d. There shall be four types of credit courses, “**only theory courses**”, “**only practical courses**”, “**composite courses**” and “**credit seminar**”. The composite courses will consist of both theory and practical components.
- e. The distribution of marks in various courses of M. Sc. (Ag.)/ M. Sc. in Animal Science (Poultry) shall be:

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i. <b>For ‘Only theory courses’</b>		
Semester Terminal Examination	:	80
Internal Assessment	:	20
<b>Total</b>	:	<b>100</b>
ii. <b>For ‘Only practical courses’</b>		
Semester Terminal Practical Examination	:	80
Internal Assessment	:	20
<b>Total</b>	:	<b>100</b>
iii. <b>For ‘Composite courses’ i.e. Theory &amp; Practical (70:30)</b>		
Semester Terminal Theory Examination	:	50
Internal Assessment (Theory)	:	20
Semester Terminal Practical Examination	:	30
<b>Total</b>	:	<b>100</b>
iv. <b>For ‘Credit seminar’</b>		<b>: 100</b>

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**f. Internal assessment:**

Internal assessment will be done in the form of **Continuous Evaluation** having at least two tests of different forms (tutorial, class test as Objectives, essay, viva-voce, quiz type, assignment / term paper, class seminar, group discussion, interaction, small projects etc.) per course. The tests should be spread throughout the Semester but 15 days before the commencement of Terminal Examination. At least 50 % weightage should be on written form of tests. In case of the student who fails to appear in the Terminal examination of a given semester but appears in Internal Assessment (continuous evaluation) of the courses, marks of internal assessment of the student will remain valid during his/her next chances

but if a student remains absent or scores low or nil marks even in internal assessment, he/she will not be permitted to reappear for internal assessment after the semester is over.

Within 15 days of conducting the Tests, the Course Leaders will submit marks in the prescribed form in duplicate to the HOD who will sign on both the copies, keep one copy for office use and forward the other copy to the Deputy Registrar (Examinations). The marks of the Internal Assessment should be displayed in the concerned Department for at least seven days before forwarding the same to the Deputy Registrar (Examination). Once the marks of the Internal Assessment are submitted to the Deputy Registrar (Examination) by the Department, the marks cannot be corrected or changed.

g. Marks scored in Internal Assessment are to be mentioned separately in the Mark sheet.

h. Courses:

- i) **Major courses:** The discipline in which the student shall pursue major study in his/her Master's Programme.
- ii) **Minor courses:** The discipline closely related to a student's major discipline. Split minors will be permissible.
- iii) **Supporting courses:** It could be any discipline excluding major considered relevant for student's research work or necessary for building his/her overall competence.
- iv) **Non-credit compulsory courses:** Courses are of general nature and are compulsory for M. Sc. (Ag.)/ M. Sc. in Animal Science (Poultry) Programme. Students' require to complete six courses as stated below:

CODE	COURSE TITLE	CREDITS
PGS 501	Library and Information Services	0+1
PGS 502	Technical Writing and Communication Skills	0+1
PGS 503 (e-Course)	Intellectual Property and its management in Agriculture	1+0
PGS 504	Basic Concepts in Laboratory Techniques	0+1
PGS 505 (e-Course)	Agricultural Research, Research Ethics and Rural Development Programmes	1+0
PGS 506 (e-Course)	Disaster Management	1+0

- j. One credit hour indicates one hour lecture or two hours practical work per week for the entire semester.

## 6. Credit Requirements:

- d. A student is required to complete a minimum of 60 credits of which 40 credits shall be of course work and 20 credits shall be allocated for the research (Thesis) work. In addition six (6) non-credit compulsory courses as mentioned in 5 h iv are required to be completed.
- e. A student's programme of studies shall not be more than 25 credits in any semester.
- f. The total course and credit requirements for obtaining Master's Degree shall be:

Particulars	Minimum Credits
<b>ii) Course Work</b>	
Major courses*	25
Minor courses	09
Supporting courses	05
Non-credit Compulsory courses	06
Seminar	01
<b>Total</b>	<b>46</b>
<b>ii) Comprehensive Examination</b>	Non-credit
<b>iii) Thesis</b>	20

\*For students, other than B.V.Sc. & AH Degree holders, course no PSC- 511, PSC- 512 and PSC- 514 are compulsory core courses.

- d. In addition to above a candidate may be permitted to opt for required number of credits from optional major courses and minor or supporting courses as suggested the Chairman of Advisory Committee.

#### 7. Course Regulation:

- a. The courses to be offered in a particular academic year or semester shall be decided by the BOS /HOD based on available facilities and faculty strength.
- b. Allotment of courses, designating faculties as Course Leader and Course Associates shall be decided by the BOS /HOD well in advance of the commencement of a semester. The Course Leader will be in rotation considering the workload of each teacher associated with a particular course.
- c. Towards introduction of a new course or revision of course, University rules will be followed.
- d. There shall be no rigid rule or guideline regarding the minimum number of students required for offering a course. The course will be offered even for a single student.
- e. There shall be the provision of inviting the Guest Lecturers to deliver lecture on some highly specialized topics if required.

8. **Course Registration:** The students will have to submit their choices for course(s) for a particular Semester in writing (in prescribed format) to the HOD through the Major Advisor and PG Coordinator of concerned Department at least one week before the commencement of classes of the said Semester. Students intending to change the Course opted for once will be allowed to do so in the same process within 15 days after the initial Registration.

## **9. Advisory Committee:**

- a. The Advisory Committee consisting of at least three members from both major and minor subjects shall be constituted for each student.
- b. Every student shall have a Major Advisor who shall be from the Major Field to which the student has been admitted. The Major Advisor shall function as the Chairman of the Advisory Committee.
- c. The nomination for Chairman of the Advisory Committees of all newly admitted students shall be completed within four weeks of the first Semester by the HOD.
- d. The Advisory Committee of the student should meet frequently to monitor the progress of the student.
- e. A proposal for the formation of the students' Advisory Committee along with the Plan of Post-graduate Work (PPW) shall be forwarded in the prescribed proforma to the HOD for approval within six weeks from the date of admission of the student.
- f. The Major Advisor will select other members of the student's Advisory Committee (with the knowledge and consent of the members concerned). Co-advisor shall be from the major field of study / specialization of the concerned Department; Member(s) one each from the Department(s) offering Minor Courses; and Member(s), from any discipline, if Major Advisor feels it necessary for the student's Thesis work.
- g. Co-advisor will act as the Major Advisor of the concerned student if the original Chairman is not available due to one or more reasons (death, leaving the university, prolonged absence, ill health etc.)
- h. Replacement of members of the Advisory Committee: The Chairman of the concerned student after consultation with the HOD can replace any member of the Advisory Committee due to one or more reasons as stated in Para 9. g above.
- i. In case of newly admitted students, the HOD will discharge the functions of the Chairman of the Advisory Committee till the Chairman is selected as per procedure prescribed above.
- j. A faculty member having a minimum of one year teaching/ research experience or Doctoral degree can be the Chairman of the Advisory Committee.

## **10. Plan of Post-graduate Work (PPW):**

- a. The programme of studies indicating the PPW of each student in prescribed format shall be finalized by his / her Advisory Committee to provide considerable latitude in the choice of courses, taking into account the requirement for research in that particular field.
- b. The broad research topic of every student will be mentioned at the time of preparation of PPW. The Advisory Committee should finalize PPW within six weeks of the first Semester.

## **11. The Outline of Research Work (ORW):**

- a. The ORW in prescribed format will have to be approved by the Advisory Committee and forwarded by the Chairman of the Committee to the HOD through the PG Coordinator.
- b. The ORW will be presented in the Departmental Seminar for discussion and suggestions.

## **12. Attendance:**

- a. Candidates should have an average attendance of 75% in every Semester to be eligible to appear for the Terminal Examination of a given Semester. Candidates having 60% and more but less than 75% attendance may be allowed to appear in the Semester Examination after paying the requisite fine as decided by the University from time to time.

### 13. Paper setting and Evaluation:

- a. In the Semester Terminal examination question papers for fifty percent of the major courses in each semester shall be set externally but evaluated internally. But for only practical courses evaluation will jointly be made by the external and internal(s) examiners. For minor course(s) concerned BOS will make appropriate arrangement.
- b. In case any external examiner fails to arrive in the practical examination, the concerned HOD may exercise the option to appoint himself or any other teacher of the University or an expert available in the vicinity other than internal examiner(s).
- c. For all the non-credit compulsory courses the paper setting as well as evaluation will be made internally.

### 14. Examination and Regulation:

- a. Semester Terminal examinations for odd Semesters shall ordinarily be held in December while for even Semesters be held in the month of June in every academic year. Standing Committee (PG Programme) will fix the period of every Semester Terminal examination preferably at the beginning of the semester. It is also expected that the Semesters of all M. Sc. (Ag.) Programme in the Institute will commence at the same time.
- b. The candidates shall be required to pass all the courses mentioned in his/her PPW. He/she also needs to complete required Thesis credit hours within the stipulated period i.e. not more than eight (8) Semesters.
- c. Before appearing in the end semester theory and/or practical examinations (both theory and practical examinations for composite courses) the student must pass all the backlog paper(s).
- d. There shall be the provision for **Review System** and the evaluation will be done internally. The BOS will recommend the names of three members (HOD and other two members excluding the first examiner) for Review Examination. In case the HOD has evaluated the course, Adhyaksha will act as a member in the Board replacing the HOD.
- e. The duration for semester Terminal examination of different courses shall be as follows:
  - i. For theory courses : 3 hours
  - ii. For practical courses : 3 hours or more
- f. The candidates appearing in each Semester Terminal examination of M.Sc. (Ag.)/ M. Sc. in Animal Science (Poultry) Programme shall: (i) produce a certificate from the HOD that he/she has attended at least 75 % of the in-campus classes. Relaxation, if any, will be guided by the University Ordinance; (ii) produce a certificate from HOD that his/her conduct has been good and that he/she is fit and proper candidate for the examination.
- g. A student found adopting unfair means at the examination will be treated heavily and stringent action will be taken as per University rules.
- h. No 'make up' examination shall be permitted in lieu of the missed Terminal theory and/or practical examination.
- i. If a student fails to appear in any final theory and /or practical examination or does not secure pass marks in any course, he/she requires fresh registration for the course during the next available Semester with that course but the candidate has to complete the degree programme including all the repeat courses within eight (8) Semesters.



- j. If a candidate is compelled to drop a Semester on medical ground he/she will be allowed to repeat in the next available Semester. However, he/she has to complete all the courses within eight (8) Semesters.
- k. If a student has to drop a course on medical ground but having less than 75 % attendance the student shall be given 'I' grade, i.e. "incomplete", and will be allowed to repeat the course in the next available Semester. The 'I' grade shall be entered in the transcript also. In all other cases dropping of course will be declared 'Fail' in the course.

#### 15. Fees and other Charges:

Student admitted to PG Programme shall pay examination fees (as per University guidelines) for each Semester Terminal Examination at the time of filling up of form for the purpose.

#### 16. Moderation:

- a. A Moderation Committee consists of at least three members may be appointed as per University rule but excluding an external moderator, shall do moderation of question papers for the Terminal Theory Examinations.
- b. Separate Moderation Committee shall be formed for each M. Sc. (Ag.) / M. Sc. in Animal Science (Poultry) Programme and that may act under the Chairmanship of HOD.

#### 17. Scrutiny:

- a. There shall be a Scrutiny Committee consisting of HOD and two other teachers of the Department to scrutinize the results of internal assessment, Terminal as well as Review examinations before finalization. The BOS of the concerned Department will approve the Committee.
- b. Each PG Programme will have separate Scrutiny Committee that will act independently.

#### 18. Credit Seminar:

- a. Each student shall be required to deliver a Seminar during the course of studies on a topic relevant to the concerned discipline.
- b. Code No. 591 shall be assigned for Credit Seminar.
- c. PG Coordinator shall act as Seminar Leader. Otherwise, HOD of concerned Department himself or may select any faculty member as Seminar Leader.
- d. Departmental students' Credit Seminar will be an open Seminar.
- e. The Seminar Leader in consultation with the HOD shall fix the schedule for the Seminars.
- f. The Seminar topic shall not be within the purview of the student's Thesis instead should cover a subject of topical interest.
- g. Each student will prepare and distribute copies of 'Abstract' to the persons attending the Seminar. The Abstract (within 300 words) should precisely state the main theme of the talk.
- h. **Seminar write-up:** The student shall prepare a full account (not normally exceeding 3000 words) on the topic covered in the seminar and submit to the Seminar Leader on or before the date of presentation of the Seminar.
- i. **Seminar evaluation:** Seminar Leader and the members of the Advisory Committee will evaluate the performance of the students, taking into account all the relevant factors like,

Introduction, Review of Literature, presentation of subject, capacity to draw general conclusion from literature and ability to answer questions raised and will award marks to the student.

**19. Comprehensive:**

- a. Every student has to appear at Comprehensive Examination to be conducted by the Advisory Committee.
- b. A candidate should be allowed for comprehensive examination after completion of 75% course work separately in major and minor subject(s) but before the submission of Thesis.
- c. Written comprehensive examination consists of one paper in major courses and one paper in minor courses each of three hours duration having 100 marks.
- d. Paper setting and evaluation will be done internally.
- e. Qualifying marks will be 50% and grading will be Satisfactory/Unsatisfactory. If the performance of a student becomes unsatisfactory he/she has to appear again to a maximum of three more attempts within eight (8) Semesters. Repeat comprehensive test(s) shall be conducted at least with a gap of 30 days of the previous test.
- f. The results of comprehensive examination shall be forwarded by the HOD to the Examination Section for record. The grade obtained will not be reflected in the Final transcript.

**20. Thesis:**

- a. The thesis for the Master's Degree shall indicate student's potentialities for conducting research.
- b. The topic of Thesis will be within the Major field of specialization under the Code No. 599.
- c. The subject of the Thesis should be approved by the student's Advisory Committee and the HOD at the time of formation of the student's PPW and then ORW.
- d. The Thesis shall be based on the results of the student's own work. A certificate to this effect from the Major Advisor shall accompany the Thesis.
- e. The Thesis shall preferably follow the following: chapters on Introduction, Review of literature, Materials and Methods, Results, Discussion, Conclusion and Summary, Future scope of research and References.
- f. **Thesis Seminar:** A student shall deliver a seminar on the research problem before the submission of Thesis and all the faculty members may be invited to participate in the discussion and make constructive suggestions on the Thesis.
- g. **Thesis submission:** After fulfilling the prescribed courses, residential requirements and minimum semester requirements (4 Semesters) and successfully completing the research work to the level of full satisfaction, a student shall submit the Thesis.
- h. The Chairman of the student's Advisory Committee shall ensure that all members of the Advisory Committee are duly consulted before submission of the manuscript of the Thesis.
- i. Each student shall submit three copies of the Thesis within the date notified by concerned HOD, one copy to deposit to the Institute Library, another to the Departmental Library, third to the Major Advisor.
- j. The Thesis shall accompany a certificate to the effect that the work has not been submitted in part or full for any other degree or diploma.
- k. The candidate shall submit the Thesis to the concerned HOD along with "no dues certificate" and other formalities.

- l. **Thesis Viva-Voce:** An External Examiner shall examine the Thesis. An arrangement for *viva voce* shall be made by the concerned Department by an Examination Committee consisted of External Examiner, HOD and the members of the Advisory Committee of the candidate. The student shall be awarded “Satisfactory” (*i.e.* pass) or “non-satisfactory” (*i.e.* fail) in Thesis Viva-Voce.
- m. The grade obtained (*i.e.* Satisfactory / Non-satisfactory) shall be shown in the final transcript but shall not be included for the purpose of calculation of OGPA.
- n. In case, the External Examiner suggests modification / re-submission, the student may be permitted to defend his/her thesis in final *viva-voce*, and as such of modifications as are finally agreed upon may be carried out after the *viva-voce*.
- o. Re-examination: If a student fails (*i.e.* non-satisfactory) in Thesis he/she may be permitted to continue the work and/or rewrite the Thesis as per comments of the Examination Committee and resubmit it to the HOD with the recommendation of the Chairman of the Advisory Committee for permission to appear a second time. Re-examination shall not take place earlier than three months after the final semester examination but within eight (8) Semesters and as far as possible the Committee as previously constituted, will conduct it. No further re-examination is permissible and a student failing to secure ‘satisfactory’ grade a second time shall not qualify for the degree.

#### 21. Rights on Thesis:

- a. The Thesis submitted by a student shall become the property of the Institute.
- b. Whenever, an extract from the Thesis is published, there should be an acknowledgement in the form of footnote stating that the results are from the Thesis submitted for the degree from the Institute of Agriculture, Visva-Bharati.
- c. All patents, designs and inventions derived from the Thesis research work shall belong to the Institute which may, at its discretion, allow or direct any benefit thereon to be retained by or given to the author of the Thesis.
- d. Copies of the Thesis submitted to the Institute Library or in the Departmental Library shall not be issued on loan for a period of two years from the date of submission.
- e. In case where student does not take care to publish the Thesis work even after three years of completion of the degree, there stands no objection of the student to publish papers/articles by the Chairman, Advisory Committee of the concerned student.

#### 22. Grading System:

- a. There will be a ten point grading system of evaluation with grade point (GP) equals to percent marks obtained divided by 10.
- b. The conversion formula will be: Percent of marks = 10 x OGPA
- c. Minimum requirement: Grade point (GP) of 5.00 for passing a course and an Overall Grade Point Average (OGPA) of 5.00 for completing the M. Sc (Ag.) Programme. A candidate failing to secure minimum OGPA (5.00) will not be considered for the award of degree and shall be declared as ‘failed’. If a candidate fails to secure 40 % marks in Practical examination of composite course he /she will be declared as ‘fail’ in the concerned course.
- d. A candidate failing to obtain minimum GP (5.00) in not more than three courses, in a Semester, will be allowed to repeat the failed course(s) afresh not more than two times in next available Semesters. A candidate failing in more than three courses in a Semester has

to repeat the Semester. In any circumstance the student is to complete the degree Programme including all the repeat courses within the maximum of 08 Semesters.

e. Symbols to be used in the Semester Transcript:

- I = Incomplete
- S = Satisfactory
- NS = Non-Satisfactory
- R = Repeat

Specialization of the candidate needs to be mentioned in the Semester Marksheet/Transcript.

### **23. Residential Norms:**

- i. Residential requirement shall mean presence of the student continuously in working days/hours in the Institute/University (class room for classes, laboratories for practical and/or research, farm for field work, library for collecting information or placed somewhere on duties etc.).
- ii. The minimum residential requirement shall be of four Semesters from the date of admission to the University. However, with the prior written permission of the HOD / Adhyaksha, PSB through the Chairman a student may be allowed to discontinue after completion of two consecutive Semesters and renew studies even after two Semesters. Completion of semester shall mean clearing of all examinations as scheduled. He /she has to pay annual fees for the University for retention of the studentship.
- iii. A student may be allowed for discontinuance only by one break and he/she shall have to complete all courses including submission of Thesis within eight semesters from the date of admission to the University, failing which his/her studentship shall be treated as cancelled.
- iv. A student appealing discontinuance for one or two semester(s) has to vacate hostel accommodation.

Revised in the BOS meeting dated 26.04.12, reviewed on 11.04.14 in presence of external members and subject matter expert in the department of ASEPAN, PSB, Visva-Bharati and approved in the Academic Council meeting dated 20.02.2016.

## SYLLABUS: DEPARTMENT OF ANIMAL SCIENCE

Courses offered by Department of Animal Science in the M. Sc.(Ag.) in Animal Science programme

Course No.	Course Title	Credits	Semester
PSC 501	Poultry breeding and genetics	2+1	I
PSC 502	Poultry nutrition and feeding	2 + 1	I
PSC 503	Commercial layer production	2 + 1	III
PSC 504	Commercial broiler production	2 + 1	III
PSC 505	Breeder stock and hatchery management	3 + 1	II
PSC 506	Management of poultry other than chicken	2 + 1	II
PSC 507	Poultry products technology and marketing	2 + 1	III
PSC 508	Poultry economics, projects and marketing	2 + 1	III
PSC 509	Physiology of poultry production	2 + 1	I
PSC 510	Diseases of poultry and flock health	2 + 1	II
PSC 511	Avian anatomy and physiology of different systems; related to poultry production	2 + 1	I
PSC 512	Applied pharmacology and therapeutics in poultry	1 + 1	I
PSC 513	Poultry diseases, pathological changes and diagnosis	2 + 1	II
PSC 514	Poultry medicine & preventive measures	1+1	II
PSC 515	Poultry wastes management, integrated fish farming with poultry production, bio-technological intervention and environment	2 + 1	III
PSC 591	Credit seminar	0+1	IV
PSC 599	Master's Research (Thesis)	0+20	I to IV

(Course Nos PSC 501-510 and PSC- 591, 599 are at per ICAR)

### PSC 501

### Poultry breeding and genetics

2+1

#### Objectives

To impart knowledge on different systems of breeding, selection methods, design and implementation of breeding programme in developing egg-type and meat type birds. Modern tools in poultry breeding.

#### Syllabus:

##### Theory

##### UNIT I

Genetic classification of Poultry -Origin and breed characteristics of poultry- Development of Poultry Industry in India - Mendel's laws of inheritance related to poultry -Qualitative and Quantitative traits in Poultry breeding -Additive, Non Additive, Epistatic and complementary gene action - Lethal and mutations in poultry - Sex linked, Sex limited and Sex influenced traits

- Economic traits - Heritability - Quantitative inheritance -- Phenotype, Genotype & environment interactions.

#### UNIT II

Systems of Breeding - Systems of Mating - Selection methods - Breeding programme for developing egg-type and Broiler type of birds - Developing hybrids - Other species of Poultry breeding and management - Formation and Management of inbred, pure lines, grand parent and parent stock.

#### UNIT III

Industrial breeding-Artificial insemination in chicken-Autosexing-Random Sample Test. Use of molecular genetics in poultry breeding-Quantitative trait loci and marker-assisted selection-Conservation of poultry genetic resources.

#### **Practical:**

Breeds of poultry - Factors affecting inheritance of qualitative and quantitative traits in poultry - Constructing index and Osborne index-Estimating heritability - Breeding program for developing commercial hybrid layers, broilers, Japanese quail, duck, turkey, fancy birds, Guinea Fowl and Pigeons - Semen collection, evaluation & insemination in chicken & turkey - Breeding records -Use of computers to maintain breeding records and for selection.

#### **Learning Outcome:**

Students will get exposure on different systems of breeding, selection methods, design and implementation of breeding programme in developing egg-type and meat type birds. Modern tools in poultry breeding.

**PSC 502**

**Poultry nutrition and feeding**

**2+1**

#### **Objectives**

Teaching about nutrients & their functions, nutrient requirements of poultry and factors influencing the same. Imparting knowledge of different types of feeds and feeding methods.

#### **Syllabus:**

#### **Theory**

##### UNIT I

Digestive system, digestion, metabolism and absorption of feed in poultry - Factors influencing the feed consumption in birds - Macro and micro-nutrients - Nutrient requirements for various species of poultry. Partitioning of energy - Calorie: protein ratio - Nutrient interrelationships - Factors influencing the nutrient requirements.

##### UNIT II

Feed ingredients composition, feed storage technique-milling and quality control Processing of feed - Types & forms of feeds and feeding methods - Commonly occurring anti nutrients and toxicants in poultry feed ingredients - Mycotoxins and their prevention - Feeding chicks, growers, layers, broilers and breeders - Principles of computing feed- - Balanced feeds -Least

cost feed formulation and programming – Feeding in different seasons and stress conditions – Nutritional and metabolic disorders in poultry.

#### UNIT III

Systems of feeding – restricted, forced, controlled and phase feeding -Use of Additives and Non additives- enzymes, probiotics, prebiotics antibiotics, herbs, performance enhancers – Utilization of non-conventional feedstuff - Feeding of ducks, turkeys, Japanese quails, Guinea fowls.

#### UNIT IV

Organic, functional, designer & SPF feed production - Production of drug residue, pesticide residue & toxin free feeds – regulations for Import and Export of feed and feed supplements.

#### **Practical:**

Physical and sensory evaluation of feed ingredients- sampling techniques for ingredients and compounded feed-Estimation of proximate principles of feed and feed ingredients – Computing various poultry feed formulae based on commonly available feed ingredients – Estimation of Aflatoxin, Calcium, Phosphorus, Sand, Silica and Salt – Mash, pellet & crumble feed preparation – Feeding procedures. Visit to feed mills – Preparation of Project report for a feed mill–Hands on Training in feed analytical lab- Preparation & quality control of organic and designer feeds.

#### **Learning Outcome:**

Students will learn about nutrients & their functions, nutrient requirements of poultry and factors influencing the same. Imparting knowledge of different types of feeds and feeding methods.

**PSC 503**

**Commercial layer production**

**2+1**

#### **Objectives**

To impart knowledge on different systems of rearing commercial egg laying birds, care and management of commercial layers for optimal egg production.

#### **Syllabus:**

#### **Theory**

##### UNIT I

Layer Industry in India and the World – Systems of layer farming – Location – Lay out of the farm – Systems of housing – Types of roofs, roof materials, pillars, trusses for poultry houses – Design of different Poultry Houses for large & medium size layer farms – Cages & modified cages for egg type birds – Layer farm equipments –Automation in poultry houses and its maintenance – Management of layers in different systems of rearing.

##### UNIT II

Deep litter & cage system of management – Medication and vaccination schedules & procedure for layers – Lighting programme for egg type birds - Water quality standards, watering of layer and water sanitation – Brooder, grower and layer management – All in All out and Multiple batch system of rearing layers.

### UNIT III

Management of layers during peak egg production and maintaining the persistency in production-Factors causing uneven growth and low egg production -Monitoring egg production curve.

### UNIT IV

Culling of unproductive birds - Record keeping - Biosecurity & health management - Management during different seasons - Induced moulting.- HACCP application for safe egg, value added egg production - Production of eggs free from harmful microbes, Mycotoxins & drug residues- Integration in layer production.

#### **Practical:**

Layer farm lay out and blue print- Design of different chick, grower & layer houses, their specifications & blue print of deep litter and cage system- Selection & culling of layers, debeaking, dubbing, deworming, delicing, vaccination & other farm routines and operations - Farm sanitation, disinfection & waste disposal - Maintaining farm records - Visit to commercial layer farms - Record keeping - Calculating Hen day egg production, Hen housed egg production and other economic traits - Case study of production loss, reasons and corrective measures - Preparing project reports for layers under different batch systems - Calculating the cost of production of eggs.

#### **Learning Outcome:**

Students will exposure on different systems of rearing commercial egg laying birds, care and management of commercial layers for optimal egg production.

**PSC 504**

**Commercial broiler production**

**2+1**

#### **Objectives**

To deal with different systems of rearing commercial broilers, manage mental practices for higher bodyweight with best feed efficiency in commercial broilers. Marketing of broilers efficiently.

#### **Syllabus:**

#### **Theory**

##### UNIT I

Broiler Industry in India and the World - Systems of rearing broilers - Location, layout and design of Broiler houses - Broiler farm equipment.

##### UNIT II

Brooding and rearing of broilers- All in all out and multiple batch systems - Litter materials and deep litter management - Lighting for broilers - Environmentally controlled broiler houses & their management - Water quality and Watering of broiler and water sanitation- Management during different seasons.



### UNIT III

Mash, crumble and pellet feeding of Broilers – weekly growth rate, feed conversion and livability in broilers- sex separate feeding – Feeding broilers for optimum growth rate & feed efficiency- Broiler performance indices – Broiler farm records.

### UNIT IV

Broiler farm routine, medication and vaccination schedule – Bio-security and health management and their control – Systems of Integration in broiler production and marketing –transport of broilers- Different ways of marketing of broilers- Regulations and specifications for production of export quality broilers – Organic broiler meat production.

#### **Practical:**

Location and blue print for a broiler farm – Broiler house design – Preparation of project report for broiler farm – Visit to broiler farms – Judging of live broilers and ready-to-cook broilers- Broiler vaccination, medication, brooding and transportation and farm routines. Record keeping - Calculating the cost of production of broilers – Feeding of broilers at different ages – Working out Feed efficiency – Case study on low body weights, reasons and corrective measures.

#### **Learning Outcome:**

Students will exposure on different systems of rearing commercial broilers, manage mental practices for higher bodyweight with best feed efficiency in commercial broilers. Marketing of broilers efficiently.

**PSC 505**

**Breeder stock and hatchery management**

**3+1**

#### **Objectives**

To impart knowledge about care and management of breeders, hatchery operation, health management of breeder stock. And to study about common diseases and disorders of poultry, diagnosis, vaccination, prevention, control and treatment. Bio security measures in control of general & hatchery borne diseases.

#### **Syllabus:**

#### **Theory**

##### UNIT I

History of Natural and Artificial incubation- embryo development-different breeder flocks – Planning a hatchery, breeder farm – Special care of breeder flock –Collection, selection and care of hatching eggs – Breeder male and female management – Flock testing & culling - Farm and hatchery equipments –Incubation practices – Ventilation and temperature control – Hatchery; Management, Fumigation and sanitation – Breeder farm and hatchery operations, routine & schedule - Factors affecting fertility and hatchability.

##### UNIT II

Care of day old chicks and their vaccination - Restricted & controlled feeding of breeders - Sex separate feeding and nutrient supplementation. - Seasonal management of breeders - Location of hatchery - Layout and design of breeder houses, hatchery & other buildings.

### UNIT III

Biosecurity, health management and waste disposal - Vaccination & medication schedule for breeders. Control of vertically transmissible & hatchery borne diseases.

### UNIT IV

Principles of bio security- Farm sanitation and disinfection procedures-Common bacterial diseases- Salmonella, Pasteurella, E.coli, Fowl typhoid, CRD, Infectious; Coryza, Viral diseases- Newcastle, Infectious bronchitis, Infectious laryngo; tracheitis, Mareks, Fowl pox, Infectious Bursal disease, Egg drop syndrome-76; Avian Encephalomyelitis, Avian influenza, Duck viral Enteritis, Duck viral hepatitis-Fungal diseases- Aspergillosis, Mycotoxicosis, Metabolic disorders-Fatty liver haemorrhagic syndrome(FLHS), Gout and Ascites, Protozoan diseases- Coccidiosis, Ecto and endo parasitic infestation of poultry. Diagnosis, vaccination, prevention, treatment and control - Locational, structural & operational biosecurity in Poultry farms - Water sanitation & control of water borne diseases - Quarantine of poultry. Packaging and transportation of hatching eggs and chicks.

### UNIT V

Hatching egg & SPF egg import and export regulations - Maintaining Salmonella and Mycoplasma free breeding flock -Application of HACCP and Good Management Practices (GMP) in hatchery management for better chick quality.

#### **Practical:**

Breeder farms and hatchery records, selection, fumigation, care and storage of hatching eggs. Layout and blue prints for breeder farm and hatchery -Incubation requirements -Incubator management - Hatchery sanitation & fumigation procedures - Pedigree hatching - Hatchery waste disposal and recycling -Calculating cost of production of hatching eggs and day-old-chicks - Attending breeder farm routines & operation - Flock testing & culling of reactors -Analyzing hatchability results and hatchery records-Economics of layer and broiler hatchery.

#### **Learning Outcome:**

Students will get knowledge about care and management of breeders, hatchery operation, health management of breeder stock; common diseases and disorders of poultry, diagnosis, vaccination, prevention, control and treatment. Bio security measures in control of general & hatchery borne diseases.

**PSC 506**

**Management of poultry other than chicken**

**2+1**

**Objectives**

Care and management of different breeds, varieties of poultry other than chicken, methods of rearing and common diseases affecting them and their control measure.

**Syllabus:**

**Theory**

**UNIT I**

Breeds and varieties of Turkey, Duck, Goose, Pigeon, Guinea fowl, Budgerigar, Japanese quail, Emu and Ostrich - Incubation periods & incubation procedure for different species - Housing, cage & equipments for different species - Duck, Turkey, Japanese Quail, Guinea fowl, Emu, Ostrich production and rearing under different systems.

**UNIT II**

Management and rearing of Turkey, duck, goose, Guinea fowl, Japanese quail, pigeon, emu and ostrich- Feeding standards and feeding, watering and rearing systems and procedure for different species of poultry- Breeding policies of egg and meat production in different species - Preparation of Project reports for different species for commercial exploitation.

**UNIT III**

Common diseases affecting poultry other than chicken and their control -Regulations for import and export of different species of poultry - prevention of exotic diseases through import of poultry products and live birds.

**Practical:**

Layout and design of housing & cages for other species of poultry. Visit to commercial Japanese quail, turkey and duck farms. Incubation and care of hatching eggs and young ones - Rearing practices followed by duck, quails and turkey farmers under field conditions. Preparing project reports for different species and calculating the cost of production.

**Learning Outcome:**

Students will get knowledge about care and management of different breeds, varieties of poultry other than chicken, methods of rearing and common diseases affecting them and their control measure.

**PSC 507**

**Poultry products technology and marketing**

**2+1**

**Objectives**

Composition and nutritive value of eggs and chicken meat, grading and preservation methods of eggs and meat, functional and value added poultry products, marketing of eggs and poultry meat.

## **Syllabus:**

### **Theory**

#### UNIT I

Physical and chemical composition and nutritive value of eggs and meat –Grading of eggs & meat by different standards –Preservation of eggs – Egg quality deterioration - Factors affecting egg quality – Handling, processing, packaging materials, packaging, transport and marketing of eggs.

#### UNIT II

Quality control of poultry meat – Quality preservation – Marketing of egg and poultry meat – Marketing channels – Integration in poultry processing and marketing-Functional and value added eggs and meat – Further processing of eggs and meat – Various egg and meat fast foods.

#### UNIT III

Sanitary and phyto sanitary measures to ensure food safety – Post oviposition value addition to the eggs & Post processing value addition to the meat for export– Production of low cholesterol eggs – Microbial safety of poultry products –Import and export of poultry products – Further processing of poultry for export –Implementation of GMP and HACCP procedures for food safety – Codex regulations for poultry products safety.

### **Practical:**

Measuring internal and external egg qualities – Preservation of table eggs, grading of eggs – Processing of chicken – Further processing of poultry – Preservation of poultry meat – Preparation of various eggs and poultry meat products and fast foods – Preservation, packaging and transport – Quality control of value added poultry products – Estimation of pesticides, antibiotics and mycotoxin residues in eggs and meat – Measures of microbial safety of poultry products for export.

### **Learning Outcome:**

Students will get knowledge about composition and nutritive value of eggs and chicken meat, grading and preservation methods of eggs and meat, functional and value added poultry products, marketing of eggs and poultry meat.

**PSC 508**

**Poultry economics, projects and marketing**

**2+1**

### **Objectives**

To study about measures of performance efficiency in poultry farms and its allied sector, components of project reports and preparation of viable projects related to poultry Industry.

## **Syllabus:**

### **Theory**

## UNIT I

Glossary of terms used in poultry economics & projects – Measures of performance efficiency in broiler, layer, breeder and other poultry species, hatcheries and other poultry related operations – Production standards and goals.

## UNIT II

Planning poultry enterprise –Bank norms for poultry projects – Poultry insurance – Methods to improve the production efficiency and reduce the production cost - Components of project reports and preparing projects.

## UNIT III

Integration in Poultry production – Marketing channels for eggs and meat –Integration in marketing of eggs and meat - Cost of production of egg, broiler, hatching egg, day-old chick, compounded feed - Effect of new economic policies on poultry industry – Viability of poultry projects.

### **Practical:**

Preparing different poultry projects for bank finance – Calculating the cost of production of various products under various systems-case study – Preparation of Balance sheet, break even points, benefit: cost ratio & other farm economic indices - Preparation of feasibility & viability reports.

### **Learning Outcome:**

Students will get knowledge about measures of performance efficiency in poultry farms and its allied sector, components of project reports and preparation of viable projects related to poultry Industry.

**PSC 509**

**Physiology of poultry production**

**2+1**

### **Objectives**

To study the basic principles of physiology of poultry production in relation to egg formation, production, incubation, stress and role of environment.

### **Syllabus:**

#### **Theory**

##### UNIT I

Skeletal system of poultry – Comb pattern, plumage - Physiology of poultry digestive system- Digestion, metabolism and absorption of feed and water – Role of enzymes – Poultry circulatory system – Respiratory system – Physiology of growth- muscle growth-bone growth and growth of body parts-Types of muscle fibre and functions.

## UNIT II

Poultry nervous system and its function – Excretory system – Male and female reproductive system-Reproductive tract-Semen production-semen characteristics; Artificial insemination-Semen extenders-reproductive tract-egg formation-egg laying pattern-photo periodic responses – Role of endocrine glands and their functions. Thermoregulatory mechanism – Stress due to adverse environmental factors –Acid –base balance – Poultry ethology.

## UNIT III

Neuro-endocrine control of egg production-Ovulation and Oviposition – Clutch and Pause.

**Practical:** Demonstration of various systems of birds – structure of feather- Identification of endocrine glands –hormones in poultry production and reproduction-Haematology of poultry species - SGOT, SGPT, free fatty acids - Morphology of Poultry spermatozoa.

### **Learning Outcome:**

Students will get knowledge about basic principles of physiology of poultry production in relation to egg formation, production, incubation, stress and role of environment.

**PSC 510**

**Diseases of poultry and flock health**

**2+1**

### **Objectives**

To study about common diseases and disorders of poultry, their diagnosis, vaccination, prevention & treatment, emphasis on control of emerging poultry diseases of zoonotic importance, disease diagnostic techniques.

### **Syllabus:**

#### **Theory**

##### UNIT I

The concepts of disease prevention in poultry – Emerging and reemerging avian diseases -Factors influencing immuno suppression and stimulation – Developing immunity in poultry

##### UNIT II

Water sanitation, hatchery sanitation procedures - Control of vertically transmissible diseases – non-infectious and metabolic diseases in poultry and their control – Bio security – Mycotoxins and their control.

##### UNIT III

Stress alleviation – prevention and control of bacterial and viral diseases in poultry – Biosecurity measures – Control measures of problematic re-emerging diseases of poultry like Ranikhet, Avian influenza, Marek's disease, Infectious bursal disease, Infectious Bronchitis, Infectious laryngo tracheitis.



**Theory:**

Antimicrobial agents-General principles of antimicrobial therapy, Sulfonamides, combination of sulphonamide with trimethoprim or ormethoprim, nitrofurantoin, beta lactam antibiotic, aminoglycoside, tetracyclines polypeptide antibiotic, fluoroquinolone, miscellaneous antibacterial –Isoniazid, Rifampin etc..., Antifungal agent, Anthelmintic antiprotozoal drug-Source, Chemistry, Mechanism of action, toxicity and drug reaction, clinical application in poultry diseases.

**Practical:**

Relevant courses as stated above, field visit, diagnosis, trial of medicines, preventive and controlling of diseases

**PSC- 513 – Poultry diseases, pathological changes and diagnosis****2+1****Objectives:**

To study about poultry diseases, pathological changes and diagnosis

**Syllabus:****Theory****Bacterial diseases**

Infectious Coryza, Chronic respiratory diseases, Fowl cholera, Fowl typhoid, Fowl paratyphoid, Pullorum diseases, Staphylococcosis, Streptococcosis, Diseases due to Escherichia coli etc.

**Viral diseases:** Newcastle disease, Avian Influenza, Marek's disease, Gumboro disease, Avian pox, Avian infectious bronchitis, Infectious laryngotracheitis etc

**Fungal diseases-**Aspergillosis (Brooder pneumonia), Candidiasis, Mucormycosis, etc.

**Mycotoxigenesis-**Aflatoxicosis, Ochratoxicosis, Rubratoxicosis, Mouldy corn disease

**Parasitic disease-**Round worm, Cestodes, Trematodes, Ectoparasites, Protozoan disease

**Nutritional disease-**Protein, fat, vitamin, mineral deficiency, etc

**Miscellaneous diseases** –Heat stroke, Digestive system, respiratory system, reproductive system etc.

Common vices of poultry and their prevention-Cannibalism, Egg eating, Pica etc.

Managemental problems and tips for their prevention-Rainy season, Summer season, General managemental tips

**Disinfection**

**Common duck diseases and their control-**Viral diseases, Bacterial diseases, Fungal diseases, Protozoan diseases, Parasites, Vitamin and mineral deficiency.

**Practical :**

Diagnosis of diseases on the basis of symptom, Material required for post mortem examination, Post mortem examination, Collection of blood sample, Methods for Total leucocytic count,



