

Circular file

- 37 -

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY**CIRCULAR NO.SU/Commerce & Management/ B.Voc./43/2019**

It is hereby inform to all concerned that, on the recommendation of the Dean, Faculty of Commerce & Management, the Hon'ble Vice-Chancellor in his emergency powers under Section-12(7) of the Maharashtra Public Universities Act, 2016 has accepted **the revised Syllabus and List of Pannel of Examiner for following curriculum under B.Voc. programmer which covers in the Faulty of Commerce & Management. The said curriculum where runs are shown against their names.**

1.	B.Voc. Accounting	Ankushrao Tope College, Jalna.
2.	B.Voc. Banking	Ankushrao Tope College, Jalna.
3.	B.Voc. Professional Accounting & Taxation	Shri Muktanand College Gangapur, Dist. Aurangabad
4.	B.Voc. Accounting & Taxation	Arts & Commerce College, Ashti.
5.	B.Voc. Banking & Financial Services	Arts, Science & Commerce, College, Ambad.
6.	B.Voc. Live Stock Production management	Arts, Science & Commerce, College, Ambad.

This is effective from the Academic Year 2018-2019 and onwards.

All concerned are requested to note the contents of this circular and bring notice to the students, teachers and staff for their information and necessary action.

University Campus,
Aurangabad-431 004.
REF.NO. SU/ COMMERCE/2018-19

Date:- 12-03-2019. 22813-26

★
★
★
★
★
★

★

*Deputy Registrar,
Syllabus Section.*

Copy forwarded with compliments to :-

- 1] **The Principals, affiliated concerned Colleges, Dr. Babasaheb Ambedkar Marathwada University.**
- 2] **The Director, University Network & Information Centre, UNIC, with a request to upload this Circular on University Website.**

Copy to :-

- 1] The Director, Board of Examination & Evaluation,
- 2] **The Section Officer, [B.Com. Unit] Examination Branch,**
- 3] The Section officer, [Eligibility Unit],
- 4] **The Programmer [Computer Unit-1] Examinations,**
- 5] **The Programmer [Computer Unit-2] Examinations,**
- 6] The In-charge, [E-Suvidha Kendra], Rajarshi Shahu Maharaj Pariksha Bhavan, Dr. Babasaheb Ambekar Marathwada University.
- 7] The Public Relation Officer,
- 8] The Record Keeper.

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



**Curriculum for B. Voc. (Livestock Production and
Management)**

UNIVERSITY GRANTS COMMISSION (UGC) PROGRAM UNDER
THE NATIONAL SKILLS QUALIFICATIONS FRAMEWORK (NSQF)

1. Introduction

It has been a long felt necessity to align higher education with the emerging needs of the economy so as to ensure that the graduates of higher education system have adequate knowledge and skills for employment and entrepreneurship. The higher education system has to incorporate the requirements of various industries in its curriculum, in an innovative and flexible manner while developing a holistic and well groomed graduate.

Ministry of HRD, Government of India has issued a notification for National Skills Qualifications Framework (NSQF). Under the National Skills Development Corporation, many Sector Skill Councils representing respective industries have/are being established. One of the mandates of Sector Skill Councils is to develop National Occupational Standards (NOSs) for various job roles in their respective industries. It is important to embed the competencies required for specific job roles in the higher education system for creating employable graduates. The University Grants Commission (UGC) has launched a scheme on skills development based higher education as part of college/university education, leading to Bachelor of Vocation (B.Voc.) degree with multiple exits such as Certificate/Diploma/Advanced Diploma/ Degree under the NSQF. The B.Voc. Programme is focused on universities and colleges providing undergraduate studies which would also incorporate specific job roles and their NOSs along with broad based general education. This would enable the graduates completing B.Voc. To make a meaningful participation in accelerating India's economy by gaining appropriate employment, becoming entrepreneurs and creating appropriate knowledge.

2. Objectives

- 2.1 To provide judicious mix of skills relating to a profession and appropriate content of general education.
- 2.2 To ensure that the students have adequate knowledge and skills, so that they are work ready at each exit point of the programme.
- 2.3 To provide flexibility to the students by means of pre-defined entry and multiple exit points.
- 2.4 To integrate NSQF within the undergraduate level of higher education in order to enhance employability of the graduates and meet industry requirements. Such graduates apart from meeting the needs of local and national industry are also expected to be equipped to become part of the global workforce.
- 2.5 To provide vertical mobility to students coming out of 10+2 with vocational subjects.

3. Curriculum

- 3.1 The curriculum in each of the years of the programme would be a suitable mix of general education and skill development components.
- 3.2 The curriculum is based on credit based system. The credits for general education and skill development component are as shown with NSQF levels

Exit Point	Duration	No. of credits for General Component	No. of credits for Skill Component	Exit point Award	Corresponding NSQF level
First Exit	After Six Months	12	18	Certificate in Livestock Production and Management	Level 4
Second Exit	After one year	24	36	Diploma in Livestock Production and Management	Level 5
Third Exit	After two years	48	72	Advanced Diploma in Livestock Production and Management	Level 6
Fourth Exit	After three years	72	108	B.Voc.in Livestock Production and Management	Level 7

4. Eligibility

A Candidate shall be admitted to the First year of the B.Voc. (Livestock Production and Management) degree course only if he/she satisfies the following condition:

1. He/ She must have passed the **H.S.C.** examination with **science / technical subjects (Biology group)**

5. Medium of Instruction: English

6. Fee Structure:

6.1 Admission Fees: 2500/-

6.2 Examination Fees: First Semester- 700/- Second Semester-800/-

7. Award of Degree/Diploma

As this course is multi-exit course, the award levels are

1. The Degree of Bachelor of Vocation B.Voc (Livestock Production and Management) shall be conferred on candidate who has pursued a regular course of study consisting of SIX semesters in the relevant subject as prescribed and has appeared at the end examination and passed under the credit based system in all the examination prescribed for the Degree course in the faculty.

2. The Advance Diploma in Livestock Production and Management shall be conferred on candidate who has pursued a regular course of study consisting of FOUR semesters in the relevant subject as prescribed and has appeared at the end examination and passed under the credit based system in all the examination prescribed for the Advance Diploma course in the faculty.

3. The Diploma in Livestock Production and Management be conferred on candidate who has pursued a regular course of study consisting of TWO semesters in the relevant subject as prescribed and has appeared at the end examination and passed under the credit based system in all the examination prescribed for the Diploma course in the faculty.

4. The Certificate in Livestock Production and Management shall be conferred on candidate who has pursued a regular course of study consisting of ONE semester in the relevant subject as prescribed and has appeared at the end examination and passed under the credit based system in all the examination prescribed for the certificate course in the faculty.

8. The class structure and pattern of the examination

- The Number of students in a theory class shall not exceed 50.
- Maximum number of students in a batch for practical in first four semesters shall consist of 20 students and for fifth & sixth semester the batch shall consist of 15 students.

- The rules for admission to the subsequent (next) semesters will be the same as per the University guidelines.
- For theory course, there will be 50 % marks for internal (tests, tutorials, assignments) and 50 % marks for Semester End Examination (SEE).
- The Theory (SEE) and Practical Examinations will be conducted by the University at the end of each semester.
- The marks of internal and practical exam should be submitted to University in the prescribed format.
- Assessment of skill component should be done by sector skill council or industry partner.

9. Infrastructure

1. One Class room to accommodate 50 students. (Approximately 250 sq.ft.)
2. A well equipped computer laboratory having a LAN system of minimum 30 nodes and having internet connectivity with broad band. All legal software, antivirus software, firewall be available for smooth functioning of the laboratory.
3. Staff room of 100 sq.ft. with one table and one Almeria for each faculty member.
4. One office space of 100 sq.ft. with appropriate furniture. .
5. One ladies room of 100 sq.ft. with attached toilet.
6. One reading room of 200 sq.ft. with seating arrangements for at least 30 people. The library may be accommodated in the library.
7. One copy of every text book among five students for each subject be available along with one copy of reference book as per the syllabus.
8. Library must subscribe for computer and scientific magazines. Appropriate general reading materials must be available for overall development of students.
9. An open space for sports activities. The college must be encouraged to have sport equipments.

Staff

1. One Assistant Professor as per UGC-B.Voc guidelines.
2. The minimum number of teachers/visiting faculties must be appointed as per the UGC-B.Voc norms. The work load may be computed on the basis of theory classes and practical per batch.
3. There must be one clerk in the office to look after administrative work. The record of all staffs must be maintained properly.
4. An appropriate number of class IV employees

10. Admission / Promotion process

In response to the advertisement for registration, interested students will have to register for this course. Admissions will be done on the basis of qualifying exam percentage, performance of students at Common Entrance Test (CET) and personal interview. The CET will be conducted in the month of June every year.

The student will be promoted to next semester of a year with full carry on. For admission to second year (Level 6), he/she has to pass minimum 75% papers of first year (first semester + second semester). For admission to third year (Level 7), he/she has to pass first year and minimum 75% papers of second year (third sem + fourth sem).

11. Earning credits and Grade system

At the end of every semester, a letter Grade will be awarded. The performance of student will be measured by the number of credits that he/she earned by weighted Grade Point Average (GPA). The semester Grade Point Average (SGPA) will be awarded after completion of respective semester and Cumulative Grade Point Average (CGPA) will be awarded at exit point.

The grade reflects student's performance in the course. A ten point rating scale shall be used for the evaluation of the performance of the student to provide letter grade for each course and overall grade for B.Voc.(Livestock Production and Management) Program. The grade points and equivalent range of marks are shown in table.

Sr. No.	Marks Obtained (in %)	Grade points	Grade	Description
1	90 -100	9.00 – 10	O	Outstanding
2	80 – 89	8.00 – 8.90	A++	Excellent
3	70 – 79	7.00 – 7.90	A+	Exceptional
4	60 – 69	6.00 6.90	A	Very Good
5	55 – 59	5.50 – 5.90	B+	Good
6	50 – 54	5.00 – 5.40	B	Fair
7	45 – 49.5	4.50 – 4.90	C+	Average
8	41 – 44	4.10 – 4.40	C	Below Average
9	40	4.00	P	Pass
10	< 40	0.0	F	Fail (Unsatisfactory)

Non-appearance for exam / assessment of any paper shall be treated as fail in that paper.

Computation of SGPA and CGPA

The Semester Grade Point Average (SGPA) is calculated as

$$\text{SGPA} = \frac{\sum (\text{Credits of paper} \times \text{No. of grade points obtained})}{\sum (\text{All papers credits})}$$

The Cumulative Grade Point Average will be used to describe the overall performance of all semesters and will be computed as follows.

$$\text{CGPA} = \frac{\sum (\text{SGPA of all semesters})}{\sum (\text{Total no. of semesters})}$$

Grade Card:

The results will be declared by the university and the grade card will be issued after completion of every semester. The cumulative grade card with CGPA will be issued by the University at each exit point.

Course Structure**SEMESTER I**

Course code	Course Title	Contact Hours per Week		Evaluation Scheme		Total marks	Total credits
				CIA	SEE		
	Skill Paper	L	P				
LPM-101	Livestock production and management-I	4	0	20	80	100	04
LPM-102	Animal nutrition and feed technology	4	0	20	80	100	04
LPM-103	Fodder production and management	4	0	20	80	100	04
LPM-104	Lab-LPM-I	0	4	00	50	50	02
LPM-105	Lab- Animal nutrition and feed technology	0	4	00	50	50	02
LPM-106	Lab- Fodder production and management	0	4	00	50	50	02
	General Paper						
LPM-107	Communicative English-I	4	0	20	80	100	04
LPM-108	Marathi	4	0	20	80	100	04
LPM-109	Lab- Communicative English-I	0	2	00	50	50	02
LPM-110	Lab- Marathi/Hindi	0	2	00	50	50	02
	Total Credits and Marks	20	16	100	650	750	30

SEMESTER II

Course code	Course Title	Contact Hours per Week		Evaluation Scheme		Total marks	Total credits
				CIA	SEE		
	Skill Paper	L	P				
LPM-201	Livestock Production and management-II	4	0	20	80	100	04
LPM-202	Avian production management	4	0	20	80	100	04
LPM-203	Applied nutrition	4	0	20	80	100	04
LPM-204	Lab-LPM-II	0	4	00	50	50	02
LPM-205	Lab- Avian production management	0	4	00	50	50	02
LPM-206	Lab- Applied nutrition	0	4	00	50	50	02
LPM-207	Industry Training & report	0	4	-	50	50	02
	General Paper						
LPM-208	Basics of computer	2	0	20	80	100	02
LPM-209	Communicative English-II	4	0	20	80	100	04
LPM-210	Lab- Basics of computer	0	2	00	50	50	02
LPM-211	Lab- Communicative English-II	0	2	00	50	50	02
	Total Credits and Marks	18	20	100	700	800	30

SEMESTER III

Course code	Course Title	Contact Hours per Week		Evaluation Scheme		Total marks	Total credits
				CIA	SEE		
	Skill Paper	L	P				
LPM-301	Livestock and poultry breeding	4	0	20	80	100	04
LPM-302	Commercial poultry production and hatchery management	4	0	20	80	100	04
LPM-303	Milk and meat hygiene	4	0	20	80	100	04
LPM-304	Lab- Livestock and poultry breeding	0	4	00	50	50	02
LPM-305	Lab- Commercial poultry production and hatchery management	0	4	00	50	50	02
LPM-306	Lab- Milk and meat hygiene	0	4	00	50	50	02
	General Paper						
LPM-307	Personality Development	4	0	20	80	100	04
LPM-308	Human values	4	0	20	80	100	04
LPM-309	Lab- Personality Development	0	2	00	50	50	02
LPM-310	Lab- Human values	0	2	00	50	50	02
	Total Credits and Marks	20	16	100	650	750	30

SEMESTER IV

Course code	Course Title	Contact Hours per Week		Evaluation Scheme		Total marks	Total credits
				CIA	SEE		
	Skill Paper	L	P				
LPM-401	Milk and milk products technology	4	0	20	80	100	04
LPM-402	Abattoir practices and animal products technology	4	0	20	80	100	04
LPM-403	Avian pathology	4	0	20	80	100	04
LPM-404	Lab- Milk and milk products technology	0	4	00	50	50	02
LPM-405	Lab-Abattoir practices and animal products technology	0	4	00	50	50	02
LPM-406	Lab- Avian pathology	0	4	00	50	50	02
	General Paper						
LPM-407	Human rights	4	0	20	80	100	04
LPM-408	Lab- Human rights	0	2	00	50	50	02
LPM-409	Major Project/Seminars	0	2	00	100	100	02
LPM-410	On-job training/QP	0	4	00	50	50	04
	Total Credits and Marks	16	20	80	670	750	30

SEMESTER V

Course code	Course Title	Contact Hours per Week		Evaluation Scheme		Total marks	Total credits
				CIA	SEE		
	Skill Paper	L	P				
LPM-501	Epidemiology and Zoonoses	4	0	20	80	100	04
LPM-502	Meat science	4	0	20	80	100	04
LPM-503	Pet animal breeding and management	4	0	20	80	100	04
LPM-504	Lab- Epidemiology and Zoonoses	0	4	00	50	50	02
LPM-505	Lab- Meat science	0	2	00	50	50	02
LPM-506	Lab- Pet animal breeding and management	0	2	00	50	50	02
LPM-507	Project report and Seminar	0	4	-	50	50	02
	General Paper						
LPM-508	Entrepreneurship development	4	0	20	80	100	04
LPM-509	Environmental science	4	0	20	80	100	04
LPM-510	Lab-Entrepreneurship development	0	2	00	50	50	02
LPM-511	Lab-Environmental science	0	2	00	50	50	02
	Total Credits and Marks	20	16	100	700	800	32

SEMESTER VI

Course code	Course Title	Contact Hours per Week		Evaluation Scheme		Total marks	Total credits
		L	P	CIA	SEE		
	Skill Paper						
LPM-601	Environment and environmental hygiene	4	0	20	80	100	04
LPM-602	Livestock economics and marketing	4	0	20	80	100	04
LPM-603	Livestock entrepreneurship	4	0	20	80	100	04
LPM-604	Lab- Environment and environmental hygiene	0	4	00	50	50	02
LPM-605	Lab- Livestock economics and marketing	0	4	00	50	50	02
LPM-606	Lab- Livestock entrepreneurship	0	4	00	50	50	02
	General Paper						
LPM-607	Major Project/Seminars	0	4	00	100	100	04
LPM-608	On-job training (QP)	0	4	00	50	50	04
LPM-609	Industrial tour & report	0	4	00	50	50	04
	Total Credits and Marks	12	24	60	590	650	30

SEMESTER I**LPM-101****Livestock production management-I****4 Credits****Objectives:**

1. To acquaint students on basic aspects of dairying in India compared with developed countries, problems and prospectus of dairying, detailed aspects of care and management of different classes of dairy cattle and buffaloes.
2. To acquaint students on status of sheep and goat farming in India, importance of recordkeeping, principles of housing and feeding, breeding management to improve there productive efficiency and detailed account on care and management of different classes of sheep and goat

THEORY**Unit-I**

Livestock in India- association of livestock to Indian society during vedic, medieval and modern era. Demographic distribution of livestock and role in economy. Introductory animal husbandry. Common animal husbandry terms. Body conformation and identification. Dentition and ageing of animals.

Unit-II

Transport of livestock by rail, road, air and on foot. Common farm management practices including disinfection, isolation, quarantine and disposal of carcass. Introduction to methods of drug administration. Common vices of animals, their prevention and care. Livestock production systems of different agro-climatic zones. Livestock resources and resources management Livestock produce and products and their availability and their role in rural/urban hearth/economy. Organic livestock production.

Unit-III

General principles affecting the design and construction of building for housing for various livestock species. Selection of site. Arrangements of the building with special reference to Indian conditions. Utilization of local materials. Building materials used for construction of wall, roof and floor of animal houses, their characteristics, merits and demerits.

Unit-IV

Demography of cattle and buffalo population. Breeds and breed descriptors of important breeds. Important traits of cattle and buffaloes. General management and feeding practices of calves, heifers, pregnant, lactating and dry animals in bulls and working animals. Draught ability of cattle and buffaloes. Raising of buffalo mates for meat production. Housing systems, layout and design of different biddings for dairy animals inducing backyard dairy and mixed farms. Routine dairy farm operations and labour management Methods of milking and precautions. Factors

affecting quality and quantity of milk production. Clean milk production. Dairy farm accounts and records. Concepts of input and output cost of dairy farming (small and large holdings).

Unit-V

Demography of sheep and goat population and their role in economy. Breeds and breed descriptors. Important breeds for meat milk and fibre. General management and feeding-practices during different stages of growth, development and production (milk, meat and wool) in small and large holdings. Breeding schedule and management of ram and buck. Weaning and fattening of lambs and kids. Glossaries of terms in wool industry. Shearing of sheep. Physical and chemical properties of wool. Impurities in wool Factors influencing the quality of wool grading. Recovery of wool wax and its use. Housing systems, layout and design of different buildings for small ruminants Judging for the quality and confirmation of body parts of cattle, buffalo, sheep and goat Culling of animals. Preparation of animals for show.

Unit-VI

Problems and prospects of dairy, meat and wool industry in India. Animal and animal products market and marketing. Animal Fairs and Melas. Animal pounds and Goshalas.

Suggested Books:

- Devendra C & Mecleroy GB. 1982. Goat and Sheep Production in Tropics. Longman.
- Gupta JL. 2006. Sheep Production and Management. BS Publ.
- ICAR. 2002. Handbook of Animal Husbandry 3rd Ed. ICAR.
- Kaushish 1994. Sheep Production in the Tropics and Sub Tropics. Scientific Publ.
- Sastry, N.S.R. and Thomas, C.K. (2005) Livestock Production Management 4th Ed.
- Thomas, C.K. and Sastry, N.S.R (1991) Dairy Bovine Production
- Cockrill, R.W.(1974) The Husbandry and Health of the Domestic Buffalo.
- Arora SP. 1997. Feeding of Dairy Cattle and Buffaloes. Kalyani Publ.
- Dutta G. 1994. Care and Management of Dairy Cattle and Buffaloes. 3rd Ed. ICAR.

LPM-102**Animal nutrition and feed technology****4 Credits****THEORY****Unit-I**

Importance of nutrients in animal production and health. Composition of animal body and plants. Nutritional terms and their definitions. Importance of minerals (major and trace elements) and vitamins in health and production, their requirements and supplementation in feed.

Unit-II

Common feeds and fodders, their classification, availability and importance for livestock and poultry production. Measures of food energy and their applications - gross energy, digestible energy, Metabolisable energy, net energy, total digestible nutrients, starch equivalent, food units, physiological fuel value. Direct and indirect calorimetry, carbon and nitrogen balance studies.

Unit-III

Protein evaluation of feeds - Measures of protein quality in ruminants and non-ruminants, biological value of protein, protein efficiency ratio, protein equivalent, digestible crude protein. Calorie protein ratio. Nutritive ratio. Various physical, chemical and biological methods of feed processing for improving the nutritive value of inferior quality roughages.

Unit-IV

Preparation, storage and conservation of livestock feed through silage and hay and their uses in livestock feeding. Harmful natural constituents and common adulterants of feeds and fodders. Feed additives in the rations of livestock and poultry; Antibiotics and hormonal compounds and other growth stimulants, and their uses.

Unit-V

Importance of scientific feeding. Feeding experiments. Digestion and metabolism trial. Norms adopted in conducting digestion trial. Measurement of digestibility. Factors affecting digestibility of a feed. Feeding standards, their uses and significance, merit and demerits of various feeding standards with reference to ruminants. Nutrient requirements of livestock-energy and protein requirement for maintenance and production.

Unit-VI

Methods adopted for arriving at energy and protein requirements for maintenance and production in terms of growth, reproduction, milk, meat, wool and work. Balanced ration and its characteristics. General principles of computation of rations. Formulation of rations and feeding of dairy cattle and buffaloes during different phases of growth, development and production (neonate, young, mature, pregnant, lactating and dry animals; breeding bull and working

animals).Formulation of ration and feeding of sheep and goat during different phases of growth, development and production (milk, meat and wool).Use of NPN compound for ruminants.

Suggested Books:

- Banerjee G.C. 1988. Feeds and Principles of Animal Nutrition.
- Chahal S.M.& Kishore N. 1998. Feed Quality Evaluation Techniques. CCS Haryana Agricultural Univ. Press.
- Principles of Animal Nutrition and Feed Technology - by D.V. Reddy.
- Ranjan, S.K. Animal Nutrition in the Tropics

LPM-103**Fodder production and grassland management****4 Credits****THEORY****Unit-I**

Importance of grasslands and fodders in-livestock production. Agronomical practices for production of leguminous and non-leguminous fodders in different seasons.

Unit-II

Soil and water conservation and irrigation drainage for fodder production. Farm, power and agro-energy. Farm machinery and equipment Harvesting and post harvest techniques for fodder preservation.

Unit-III

Storage of feeds and fodders. Scarcity fodders. Feed and fodder management for individual animals. Fodder production for small units through inter-cropping or back yard cultivation.

Unit-IV

Recycling of animals washings and wastes in fodder production.

Suggested Books:

- Pathak, N.N. and Jakhmola, R.C. Forages and Livestock Production
- Chatterjee, B.N. and Das, P.K. Forage Crop Production
- Reddy, D.V. Fodder Production and Grassland Management for Veterinarians
- I.C.A.R. Handbook of Agriculture
- Merkel, J. Managing Livestock Wastes
- Wiseman, Finch and Samuel. Crop Husbandry including Grassland
- Sastry, N.S.R. Thomas, C.K. and Singh, R.A. Livestock Production Management
- Humphreys, L.R. Tropical Forages
- I.C.A.R. Grasses and Legumes
- Ranjan, S.K. Animal Nutrition in the Tropics

LPM-103**Fodder production and grassland management****4 Credits****THEORY****Unit-I**

Importance of grasslands and fodders in-livestock production. Agronomical practices for production of leguminous and non-leguminous fodders in different seasons.

Unit-II

Soil and water conservation and irrigation drainage for fodder production. Farm, power and agro-energy. Farm machinery and equipment Harvesting and post harvest techniques for fodder preservation.

Unit-III

Storage of feeds and fodders. Scarcity fodders. Feed and fodder management for individual animals. Fodder production for small units through inter-cropping or back yard cultivation.

Unit-IV

Recycling of animals washings and wastes in fodder production.

Suggested Books:

- Pathak, N.N. and Jakhmola, R.C. Forages and Livestock Production
- Chatterjee, B.N. and Das, P.K. Forage Crop Production
- Reddy, D.V. Fodder Production and Grassland Management for Veterinarians
- I.C.A.R. Handbook of Agriculture
- Merkel, J. Managing Livestock Wastes
- Wiseman, Finch and Samuel. Crop Husbandry including Grassland
- Sastry, N.S.R. Thomas, C.K. and Singh, R.A. Livestock Production Management
- Humphreys, L.R. Tropical Forages
- I.C.A.R. Grasses and Legumes
- Ranjan, S.K. Animal Nutrition in the Tropics

Lab-LPM-104**Livestock production and management-I****4 Credits****PRACTICALS**

1. Identification of various breeds of cattle, buffalo, sheep and goat Familiarization with body points of animals. Approaching, handling and restraining of cattle, buffalo, sheep and goat clipping, shearing, dipping, spraying and spotting sick animals.
2. Detection of vices. Feeding of animals. Methods of identification (marking, tattooing, branding, tagging and electronic chip). Determination of age. Determination of body weight using different measurements. Preparation of animals for show and judging. Layout plans for dairy and sheep/goat farms. Familiarization with routine farm operations.
3. Selection and culling of animals. Milking of dairy animals. Training of breeding mates. Detection of heat Identification and care of pregnant animals. Care of neonatal and young stock. Maintenance, cost accounting, economic analysis and preparation of balance sheet of dairy and sheep/goat farm records. Structure of wool and its differentiation from hair fibre.
4. Determination of staple length, crimps, diameter and strength of wool fiber. Sorting, packaging and grading of wool. Recovery of wax from wool. Scouring and carbonization of wool. Visit to different animal farms/ demonstration centers/ individual rural, urban and peri-urban animal units/ wool production centers& industries/ wool, meat and live animal markets.
5. Preparation of project proposals.

Lab-LPM-105

Animal nutrition and feed technology

4 Credits

PRACTICALS

1. Familiarization of various feed stuff, fodders and their selection.
2. Preparation and processing of samples for chemical analysis - herbage, faeces, urine and silages.
3. Weende's System of analysis - Estimation of dry matter, total ash, acid insoluble ash, crude protein, ether extract crude fibre, nitrogen free extract, Calcium and phosphorus in feed samples.
4. Demonstration of detergent methods of forage analysis. Qualitative detection of undesirable constituents and common adulterants of feed.
5. Demonstration of laboratory ensiling of green fodders. Silage pit preparation.

Lab-LPM-106**Fodder production and management****4 Credits****PRACTICALS**

1. Visit to the fodder farm. Familiarization with the various types of fodder crops utilized in the state and the samples of fodder in India.
2. Fodder cropping routines-Familiarization. Collection, preservation and storage of feed and fodder; possible damages/loss and methods to prevent them.
3. Cost calculations of fodder production. Familiarizations with the back yard fodder cropping and intercropping of fodder.
4. Livestock waste utilization and recycling.
5. Calculation on the economic aspects of fodder cropping and procurement of feed.

LPM-107**Communicative English-I****4 Credits****THEORY**

Unit 1: Communication skills: Listening, Non-verbal communication, Clarity and Concision, Friendliness, Confidence, Open-Mindedness, Respect, Feedback, Picking the right medium

Unit 2: Introduction to Soft Skills, Aspects of Soft Skills, Effective communication Skills, Classification of Communication, Personality Development.

Unit 3: Positive Thinking, Telephonic Communication Skills, Telephonic Communication Skills, Communicating Without Words, Paralanguage

Unit 4: The Language of Touch, Meta-communication, Listening Skills, Types of Listening

Unit 5: Negotiation Skills, Culture as Communication, Communicating across cultures, Organizational Communication.

Unit 6: Communication Breakdown, Communication Breakdown, Advanced Writing Skills, Principles of Business Writing, Types of Business Writing

Unit 7: Business Writing, Business Letters: Format and Style, Types of Business Letter

LPM-108

Marathi

4 Credits

उपयोजित मराठी--- I -सेमिस्टर**1. भाषेचे स्वरुप**

घटक: - 1.1 भाषा म्हणजे काय ?

1. भाषेच्या व्याख्या
2. भाषेची आवश्यकता /महत्व
3. भाषेचे वैशिष्ट्ये
4. भाषेचे कार्य

2.संवाद लेखन

घटक 2.1 संवादाचे स्वरुप

- 2.2 संवादाची गरज व महत्व
- 2.3 संवाद कौशल्ये आणि विकास
- 2.4 संवाद: एक कला

3. संभाषण कौशल्ये:-

घटक 3.1 कौटुंबिक संभाषण

- 3.2 कार्यालयीन संभाषण
- 3.3 सार्वजनिक सभा- संमेलनातील संभाषण
- 3.4 औपचारिक संभाषण
- 3.5 अनौपचारिक संभाषण

4. बातमी लेखन

घटक 4.1 वृत्तपत्राची बातमी लेखन

4.2 दुस्दर्शन वरील बातमी लेखन आकाशवाणी वरील बातमी लेखन

4.3 बातमी लेखनाची वैशिष्ट्ये

4.4 बातमी लेखनाचे महत्व व गरज

5. मुलाखत लेखन

5.1 मुलाखत स्वरूप व उद्दिष्ट्ये

5.2 मुलाखत प्रकार

5.3 मुलाखत महत्व व वैशिष्ट्ये

Lab-LPM-109**Lab-Communicative English-I****2 credits****PRACTICAL**

1. Writing resume/Letters
2. Paper Presentation/PPT
3. Group Discussion/Meetings
4. Seminars/tutorials
5. Measuring the development of soft skills in the students

Lab-LPM-110**Lab-Marathi****2 credits**

प्रत्याक्षिक विषयावर आधारित

1. मौखिक परिक्षा
2. लेखी चाचणी परिक्षा
3. प्रकल्प वही
4. गट चर्चा , वाद विवाद
5. परिचय पत्र
6. पत्रलेखन

Semester-II

Skill Education Component

SEMESTER II
LPM-201

Livestock production management-II

4 Credits

THEORY

Unit-I

Introduction and scope of swine farming in the country. Demography of swine population. Breeds and their role in economy. Management of different categories of swine for optimal production: breeding and pregnant sows; sows at farrowing and after farrowing: pig-Ms, growing stock, lactating sows, feed lot stock. Mating technique in swine. Housing of swine. Swine feeds and feeding. Economics of pig farming.

Unit-II

Equine population of India. Horses, donkeys and mules and their utility. Identification of breeds of horses. Dentition and ageing of horses. Handling, restraining, care and routine management of equines including grooming, saddling and exercise. Stable and its management. Feeding routine for horse, donkeys and mules. Vices of horses. Care of stallion. Mating of Horses broodmare and its care. Foaling and care of newborn. Breeding mules. Care of race horses and preparing horses for show. Visit to races, polo, and horse show.

Unit-III

Importance of laboratory animal breeding care and housing standards of mice, rats and guinea pigs. General considerations on feeding and breeding of laboratory animals. Prophylactic measures for commonly occurring laboratory animal diseases. Concept of production of specific pathogen free (SPF) and germ free laboratory animals.

Unit-IV

Scope of rabbit farming in the country, breeds and their distributions in India and abroad. Limitation of rabbit animal production. Selection, care, and management of breeding stock for commercial purpose. Identification. Care and management of landing animals and kindling. Care of new born, growing stock. Harvesting of products. Breeding and selection techniques for optimal production. Feeds and feeding for rabbit production- Housing of rabbit. Shearing/slaughtering and preservation of products. Diseases and parasite control, hygienic care. Disposal, utilization and recycling of wastes etc. Economic aspects of rabbit production, accounting their expenditure, income, etc. Manpower- requirements and personnel/labour management. Preparing projects for micro (backyard) mini, and major rabbit farms.

Suggested Books:

- Sastry, N.S.R. and Thomas, C.K. (2005)-Livestock Production Management 4th Ed.
- Anderson, R.S. and Edney, A.T.B (1991)-Practical Animal Handling
- Warren, M.D. (2002)Small Animal Care and Management, 2nd Ed. Poole. T. (1994)The UFAW Handbook on the Care and Management of Laboratory Animals, 6th Ed.
- Lebas, F; Coudert, P; Rouvier, R and Rochambean, H. (1986). The Rabbit – Husbandry, Health and Production
- Brega, J. (1996)The Horse – Breeding and Young Stock
- Fielding, D. Tropical Agriculturist – Rabbits
- Wolfenson. S and Lloyd, M. (1994)Handbook of Laboratory Animal Management and Welfare
- Holness. D.H. (1993)The Tropical Agriculturist – Pigs
- Sharda, D.P.(2005)Swine Production

LPM-202**Avian production management****4 Credits****THEORY****Unit-I**

Indian Poultry industry-brief outline of the different segments-poultry statistics. Classification of poultry, common breeds of poultry including duck, quail, turkey & guinea fowl and their descriptions. Description of indigenous fowls.

Unit-II

Reproduction in fowl, male and female reproduction systems, formation of eggs, structure of eggs. Important economic traits of poultry, egg production, egg weight egg quality, growth, feed consumption and feed efficiency, fertility and hatchability, plumage characteristics and comb types. Scavenging system of management raising of chicks, scavenger feed base of village. Low input technology; backyard and semi intensive unit of various sizes; their description, management and economic achievements.

Unit-III

New colored feathered birds developed in public and private sectors for meat and egg production for rural poultry; their acceptability and assimilation in rural eco-system. Mixed farming and poultry raising.

Unit-IV

Concept of self-local market unit Brooding and rearing practices used for chicken, duck, quail, turkey and guinea fowl. Economic production of chicken and other classes of poultry. Hatching and feeding norms for different species of poultry. Marketing of poultry and poultry products. Setting of farms for different classes of poultry. Organic and hill farming.

Suggested Books:

- Scanes, C.G.; Brant, G and Ensminger, M.E. (2004) Poultry Science, 4th Ed.
- Sreenivasaiah, P.V. (2006) Scientific Poultry Production – a unique encyclopedia, 3rd Ed.
- Jull, M.A. (2003) Successful Poultry Management
- Sainsbury, D. (1984) Poultry Health and Management
- Roberts, V.J. (2003) British Poultry Standards
- Leeson, S and Summers, J.D. (1993) Commercial Poultry Production
- North, M.O and Bell, D.D. (1990) Commercial Chicken Production Manual, 4th Ed.
- Murd, L.M. (2003) Modern Poultry Farming
- Leeson, S and Summers, J.D. (1993) Commercial Poultry Nutrition
- Johari, D.C. and Hussain, K.Q. (1996) Commercial Broiler Production

LPM-203**Applied nutrition****4 Credits****THEORY****Unit-I**

Importance of scientific feeding. Feeding experiments. Digestion and metabolism trial. Norms adopted in conducting digestion trial. Measurement of digestibility. Factors affecting digestibility of a feed. Feeding standards, their uses and significance, merit and demerits of various feeding standards with reference to ruminants. Nutrient requirements of livestock-energy and protein requirement for maintenance and production.

Unit-II

Methods adopted for arriving at energy and protein requirements for maintenance and production in terms of growth, reproduction, milk, meat, wool and work. Balanced ration and its characteristics. General principles of computation of rations. Formulation of rations and feeding of dairy cattle and buffaloes during different phases of growth, development and production (neonate, young, mature, pregnant, lactating and dry animals; breeding bull and working animals). Formulation of ration and feeding of sheep and goat during different phases of growth, development and production (milk, meat and wool). Use of NPN compound for ruminants.

Unit-III

Factors affecting digestibility of a feed. Nutrient requirements in poultry, swine and equine - Energy and protein requirement for maintenance and production. Methods adopted for arriving at energy and protein requirements for maintenance and production in terms of growth, reproduction and production (egg, meat and work).

Unit-IV

Formulation of rations as per Bureau of Indian Standards (BIS), National Research Council (NRC) and Agricultural Research Council (ARC) specifications. Feeding standards, their uses and significance, merit and demerits of various feeding standards with reference to monogastric animals and poultry.

Unit-V

Feeding of swine (Piglets, Growers, Lactating and pregnant sows, Breeding boar, Fattening animals), equine (foal, yearling, broodmare, stallion and race horses) and poultry (Starter, Growers, Broilers, Layers) with conventional and unconventional feed ingredients. Feeding of ducks.

Unit-VI

Laboratory Animal Nutrition: Nutrient requirements of mice, rat, rabbit and guinea pig. Significance of carbohydrates, lipids, proteins and amino acids, minerals and vitamins in lab animal nutrition. Diet formulation and preparation and feeding practices. Feed supplements.

Suggested Readings

- Banerjee GC. 1988. Feeds and Principles of Animal Nutrition.
- Principles of Animal Nutrition and Feed Technology - by D.V. Reddy.
- Animal Nutrition (Livestock, Poultry, Pet, Rabbit and Laboratory Animal Nutrition) - by D.V. Reddy.

Lab-LPM-204**Livestock Production and management-II****4 Credits****PRACTICAL**

1. Identification of Indian and exotic breeds of swine; handling of swine; Routine inspection. Identification of diseases, examination and control of parasites, vaccination, Identification of pregnant animals. Care during pregnancy, isolation and care of farrowing sows, care of pig lings, Castration, culling, tooth cutting.
2. Calculation of profits and preparation of feasibility reports and projects for piggery. Layout plans of swine houses; routine operations of swine farms. Marketing of swine. Feeding of swines. Preparation of swines for show and judging.
3. Identification of body parts and handling of laboratory animals. Housing system and space requirements for laboratory animals. Weighing, sexing and weaning of laboratory animals. Marking for identification of laboratory animals for purpose of their individual recording. Computation and compounding of balanced diet for laboratory animal mainly Mice, Rats, Guinea -pigs and Rabbits.
4. Feeding schedule of laboratory animals for high breeding efficiency. Maintenance of breeding records of laboratory animals. Prophylactic measures against common disease of lab animate. Hygienic care and control of parasites (routines).
5. Visit to Rabbitary. Handling and restraint Body parts. Identification of breeds. Judging. Feeds and feeding. Housing requirement and equipment Farrowing. Care of newly born young ones-tagging, tattooing for identification. Shearing. Dressing of carcass. Horse riding: walking, trotting, cantering and galloping. Preparation of equines for show and judging. Layout plans for stables.

Lab-LPM-205**Avian production management****4 Credits****PRACTICAL**

1. Morphological description of common exotic poultry breeds like White Leghorn (WLH), Rhode Island Red (RIR), Plymouth Rock, Cornish and New Hampshire.
2. Diagrammatic illustration of body parts of chicken, duck, quail, guinea fowl and turkey. Descriptive specialties of indigenous birds, listing of its advantageous value in rural areas.
3. Diagrammatic representation of scavenging, backyard and semi intensive units; with habitats, feed base and shelter. Conservation of indigenous germ plasm; listing of conservation techniques.
4. Demonstration of newly developed breeds in rural environment Housing, equipments, nesting and brooding requirements. Vaccination, medication and incubation requirements. Preparation of projects for rural people on poultry and other species (duck, quail, guinea fowl and turkey).

Lab-LPM-206**Applied nutrition****4 Credits****PRACTICAL**

1. Demonstration of conducting digestion trial in ruminants. Calculation of nutritive value of different feed stuffs in terms of digestible crude protein (DCP), total digestible nutrient (TDN), Nitrogen retention (NR) and starch equivalent (SE). Calculation of requirements of nutrients in terms of DCP, TDN and Metabolisable energy (ME) for maintenance, growth, and other types of production like meat, milk, wool, reproduction and work.
2. Formulation of rations for different categories of livestock under different conditions.
3. Demonstration of the methods for improving the nutritive quality of straws and other crop residues.
4. Formulation of rations for feeding of livestock during scarcity periods. Visit to feed factories.
5. Calculation of requirements of nutrients in terms of DCP, TDN and ME for maintenance, growth, reproduction and other types of production like egg and meat.
6. Formulation of rations for poultry and swine with conventional and unconventional feed ingredients.
7. Principles of compounding and mixing of feeds.
8. Visit to poultry farms.

Semester-II

General Education Component

LPM-208**Basics of computers****THEORY****2 Credits****Unit-I**

Introduction to computers: Characteristics, history and evolution, generation and types of computers. Computer architecture; Input and output devices; primary and secondary storage devices; central processing unit. Operating system: Types, booting, DOS commands, Windows and its applications.

Unit-II

M.S. Office: Word, Excel and Power Point. Computer virus: Symptoms, detection and protection. Introduction to internet: World Wide Web, database, e-mail and chat. Role and use of computers in aquaculture.

Unit-III

Creating a database, modifying table creating forms, queries and reports and protecting the database Windows vista, MS-office 2007-2010, Internet explorer, online collaboration tools

LPM-209

Communicative English-II4 Credits

THEORY

Unit I: Writing Reports, Types of Report, and Strategies for Report Writing, Evaluation and organization of Data.

Unit II: Structure of Report, Report Style: Part, Group Communication Skills.

Unit III: Leadership Skills, Group Discussion, Meeting Management, Adaptability & Work Ethics

Unit IV: Advanced Speaking Skills, Oral Presentation, Speeches & Debates, Combating Nervousness, Patterns & Methods of Presentation, Oral Presentation: Planning & Preparation

Unit V: Making Effective Presentations, Speeches for Various Occasions, Interviews, Planning & Preparing, Effective Resume, Drafting an Effective Resume

Unit VI: Facing Job Interviews, Emotional Intelligence & Critical Thinking, Applied Grammar

LPM-210**Basics of computer****2 Credits****PRACTICAL**

1. MS-DOS commands.
2. Windows and its applications.
3. MS Word and its applications.
4. MS Excel and its application.
5. MS Power Point and its applications.
6. Antivirus and its applications.
7. Internet – browsing, surfing, e-mail and chat.
8. Creating database
9. Windows vista, MS-office 2007-2010, Internet explorer
10. Uses and applications of computers in sericulture.

Lab-LPM-211

Lab-Communicative English-II

2 credits

PRACTICAL

1. Writing resume/Letters
2. Paper Presentation/PPT
3. Group Discussion/Meetings
4. Seminars/tutorials
5. Measuring the development of soft skills in the students

Semester-III

Skill Education Component

SEMESTER III**LPM-301****Livestock and poultry breeding****4Credits****THEORY****Unit-I**

History of Animal Breeding; Classification of breeds; Economic characters of livestock and poultry and their importance; Breeding/Selection techniques for optimal production.

Unit-II

Selection: Response to selection and factors affecting it; Bases of selection individual, pedigree, family, sib, progeny and combined; Indirect selection; Multitrait selection.

Unit-III

Classification of mating systems; Inbreeding and out breeding-genetic and phenotypic consequences viz., inbreeding depression and heterosis: Systems of utilization of heterosis; Selection for combining ability;

Unit-IV

Breeding methods for the improvement of dairy cattle and buffaloes {crossbreeding, sire evaluation, field progeny testing, open nucleus breeding system (ONBS)}, sheep, goat, swine and poultry; Breed development; Conservation of germplasm, Current livestock and poultry breeding programmes in the state and country.

Suggested Books:

- "Introduction to Quantitative Genetics" by D.S. Falconer
- "Dairy Bovine Production" by C.K. Thomas and N.S.R. Sastry
- Handbook of Animal Husbandry Sciences by Amalendu Chakraborti
- Genetics and Breeding of Farm Animals by D. P. Mukherjee and G.C. Banerjee
- Understanding Animal Breeding by Richard M. Bourdon
- Animal Breeding by Gerald Weiner
- Veterinary Genetics by F.W. Nicholas
- Handbook of Animal Husbandry 0 ICAR publication
- Principles and Practice of Poultry Husbandry by Tom Newman
- Textbook of Animal Breeding by S.S. Tomar
- Dalton's Introduction to Practical Animal Breeding by Malcolm B. Willis
- Genetics of Livestock Improvement by John F. Lasley
- Breeding and improvement of farm animal by Warwick, E.J. and Legates, J.E.

LPM-302**Commercial poultry production and hatchery management 4Credits****THEORY****Unit-I**

Housing - Location of poultry. Types of poultry houses. Different types of rearing-advantages and disadvantages. Space requirement for different age groups under different rearing systems. Environmentally controlled housing. Brooding: Types of brooders; preparation of shed to receive chicks; importance of environment (temperature, humidity and ventilation). Feeding and vaccination in early stage of chicks.

Unit-II

Rearing and management- Care and management of growing, laying/broiler birds of both breeders and commercial categories of poultry. Battery cage management different types and sizes. Poultry judging. Litter materials, litter-borne diseases and control; potential for poultry litter used as fertilizers; recycling for livestock feeding and power generation; Special management care in adverse weather conditions/ stress; summer management modification of housing light reflectors; insulators, sprinklers, loggers and other methods; dietary modification to minimize heat stress; special management during rainy and winter season; other stress management- vices in poultry and its remedial measures.

Unit-III

Water management- Standard for drinking water in terms of total solids, pH, minerals levels, sanitizers and water sanitations, diseases spread through water contamination-prevention. Biosecurity- Proactive measures to minimize entry of infections in farm premises-farm fencing, disinfectant pits, personnel management restriction of movement etc. Poultry welfare and behaviour.

Unit-IV

Feeding- digestive system and digestion in chicken. Classification, selection of common feed ingredients and their nutrient composition. Nutrient requirement for different age groups. Feed formulations, economics of feed formulation-cost/, unit nutrient Feeding systems and feeding management economization of poultry feeding. Feed restriction, separate male feeding, non-nutrient feed additives including herbal bio-enhancers; anti-nutritional factors and toxins.

Unit-V

Health care- Common poultry diseases: bacterial, viral, fungal, parasitic and nutritional deficiencies. Vaccination schedule for commercial layers and broilers: factors that govern vaccination schedule; vaccination principles type, methods, pre and post vaccination care. Medication: Types of administration-general principles and precautions with emphasis on administering medication through water and feed; commonly used drugs in poultry diseases.

Disinfection: Types of disinfectants; mode of action; recommended procedure; precaution and handling.

Unit-VI

Economics- Economics of layer and broiler production; Projects reports layer in different systems of rearing. Projects reports for broilers.-Feasibility studies on poultry rearing- in context of small units and their profitability. Designer meat and egg production. Export/import of poultry and poultry products.

Unit-VII

Breeder flock management- Layer and broiler breeder flock management housing & space requirements. Different stage of management during life cycle; Light management during growing and laying period, Artificial insemination.

Feeding: Feed restriction, separate male feeding. Nutrient requirement of layer and broiler breeders of different age groups. Healthcare: vaccination of breeder flock; difference between vaccination schedule of broilers and commercial birds. Common diseases of breeders (Infectious and metabolic disorders)-prevention. Fertility disorder- etiology, diagnosis and corrective measures. Selection and culling of breeder flocks. Economic parameters on returns from breeders- for example saleable chick/hen/production cycle etc.

Unit-VIII

Hatchery practices - Management principles of incubation. Factors affecting fertility and hatchability. Selection, care and incubation of hatching eggs. Fumigation; sanitation and hatchery hygiene. Disposal of hatchery waste; Sexing, grading, packing and dispatch of day old chicks. Economics of hatchery business; Trouble shooting hatch failure: importance of hatchery records, break even analysis of unhatched eggs. Biosecurity in the hatchery. Computer applications for hatchery management

Suggested Books :

- Scanes, C.G.; Brant, G and Ensminger, M.E. (2004) Poultry Science, 4th Ed.
- Sreenivasaiah, P.V. (2006) Scientific Poultry Production – a unique encyclopedia, 3rd Ed.
- Jull, M.A. (2003) Successful Poultry Management
- Sainsbury, D. (1984) Poultry Health and Management
- Roberts, V. (2003) British Poultry Standards
- Leeson, S and Summers, J.D. (1993) Commercial Poultry Production
- North, M.O³ and Bell, D.D. (1990) Commercial Chicken Production Manual, 4th Ed.
- Murd, L.M. (2003) Modern Poultry Farming
- Leeson, S and Summers, J.D. (1993) Commercial Poultry Nutrition
- Johari, D.C. and Hussain, K.Q. (1996) Commercial Broiler Production

LPM-303**Milk and meat hygiene****4 Credits****THEORY****Unit-I**

Milk hygiene in relation to public health. Microbial flora of milk and milk products. Sources of milk contamination during collection and transport of milk and processing of dairy products. Control of milk and milk product contamination. Hygienic handling/ management of dairy equipment. Quality control of milk and milk products. Milk hygiene practices in India and other countries. Legislation and standards for milk and milk products. Milk as a source of disease transmission.

Unit-II

Pathological conditions associated with the transport of food animals. Elements of meat inspection. Hygiene in abattoirs. Ante-mortem inspection of meat animals. Humane slaughter of animals. Postmortem inspection of meat animals. Methods of inspection of meat. Rigor mortis and examination of lymph nodes. Speciation of meat. Health implications of emergency and causality slaughter. Hygienic disposal of unsound meat.

Unit-III

Inspection of poultry foods for human consumption. Occupational health hazards in meat processing plants. Meat as a source of disease transmission. Food safety, definition, hazard analysis and critical control point (HACCP) system and chemical and microbial toxicities associated with milk, meat.

Unit-IV

Risk analysis: assessment and management and food safety measures. Toxic residues (pesticides, antibiotics, metals and hormones) and microbial toxins in food and their health hazards. Types of bio-hazards. Sanitary and phytosanitary measures in relation to foods of animal origin and aquatic foods. International and national food safety standards {Office International des Epizooties (OIE), World Trade Organisation (WTO), Sanitary and Phytosanitary (SPS) and Codex Alimentarius}.

Suggested Books:

- Dairy Microbiology* Anandakrishnan C.P., Singh R.B and Padmanabhan P.N
- Fundamentals of Dairy Microbiology* Prajapathy, J B
- The technology of food preservation - Norman W. D., and James N.D 5.
- Environmental Pollution: Impact of technology on Quality of life- Ray, M.
- Environmental Hazards and Human Health- Richard B. Philp
- Wilsons' Practical Meat Inspection- Wilson W.G
- Food Microbiology* Frazier V. and Westhoff D.C.,

- Food safety and Quality Assurance-Foods of Animal Origin- Hubbert W.T
- Meat Hygiene* Joshi.B.P
- Diseases of Animals Transmissible to Man- Thapliyal D.C.
- Applied Dairy Microbiology- Marth.E.H. and Steele J.L.
- Modern Food Microbiology- Jay. M.J
- Handbook of milk Microbiology- Srivatava.M.L.
- Basic Food Microbiology- Banwart.G.J.
- Industrial Microbiology- Prescott and Ponn
- Urban Health Research in Developing Countries- Atkigson.S., Sangsore,J and Werns,E.
- Safety Evaluation of Environmental Chemicals- Dikshith, T.S.S.
- Influence and Removal of Organics in Drinking Water- Mallevilla,Suffet and Chan

Lab-LPM-304**Livestock and poultry breeding****4 Credits****PRACTICAL**

1. Description and measurement of economic traits of Livestock & poultry.
2. Standardization of performance records, Computation of selection differential, generation interval and expected genetic gain; Construction of selection index; Sire indices.
3. Measurement of inbreeding and relationship coefficients; Estimation of heterosis.
4. A visit to breeding center

Lab-LPM-305**Commercial poultry production and hatchery management****4 Credits****PRACTICAL**

1. Male and female reproductive system. Artificial insemination, Selection of breeder flock.
2. Working of hatchery Incubation requirement; incubators working, care. Hatchery layout and equipments. Handling of eggs prior and during incubation. Candling. Fumigation.
3. Project reports of setting up a hatchery. Hatchery records and maintenance. Exposure to commercial broiler and layer farms-different system of housing.
4. Demonstration of litter and cage rearing systems. Feed equipments and maintenance; hammer mill, mixture, pellet mill-types, principle of working, comparison of different types, premix preparations, quality control of raw materials. Feed mill operation.
5. Demonstration of different types of feeder, waterer, fogger, sprinklers etc. Maintenance of farm records. Medication-demonstration of routinely employed methods of administration.
6. Vaccination practice in general and demonstration of different routes of administration in particular.

Lab-LPM-306**Milk and meat hygiene****4 Credits****PRACTICAL**

1. Sanitary collection of samples for chemical and bacteriological examination. Grading of milk by MBR test for pasteurization and plant sanitation.
2. Microbiological examination of raw and pasteurized milk, milk products and water. Standard plate, coliform, faecal streptococcal, psychrophilic, mesophilic and thermophilic counts.
3. Detection of adulterants and preservatives in milk and milk products. Isolation and identification of organisms of public health significance from milk.
4. Visit to abattoirs, meat processing plants, marketing centers and food service establishments. Ante-mortem and post mortem inspection of food animals. Methods of slaughter (demonstration at the slaughter houses).
5. Demonstration of speciation of meat. Physical and bacteriological quality of meat and aquatic foods (fish). Demonstration of toxic chemical and microbiological residues in milk and meat.

Semester-III

General Education Component

LPM-307**Personality Development****4 Credits**

- **Learning Objective:**

The objective of the subject is bring about personality development with regard to the different behavioral dimensions that have far reaching significance in the direction of organizational effectiveness.

- **Learning Outcome:**

To create awareness in the participants with regard to the different aspects of Interpersonal relations based on the ideas envisaged in Transactional Analysis and their relative significance in the context of the functional effectiveness of organizations.

THEORY**Unit-I**

Self-Analysis: SWOT Analysis, Who am I, Attributes, Importance of Self Confidence, Self Esteem.

Unit-II

Creativity: Out of box thinking, Lateral Thinking.

Unit-III

Attitude: Factors influencing Attitude, Challenges and lessons from Attitude, Etiquette.

Unit-IV

Motivation: Factors of motivation, Self-talk, Intrinsic & Extrinsic Motivators.

Unit-V

Goal Setting: Wish List, Smart Goals, Blue print for success, Short Term, Long Term, Life Time Goals. Time Management Value of time, Diagnosing Time Management, Weekly Planner to do list, Prioritizing work.

LPM-308**Human values****4 Credits****THEORY**

Unit-I: Human values: Introduction, Concept, Types of values, Personality development: Introduction, Meaning, Elements, Nature and Importance

Unit-II: Social work, Concept, Ideals of Social work objectives and nature, Need and importance

Unit-III: Constitutional Values, Democracy, Types, Duties, Responsibilities Fundamental Rights and Power Importance.

Unit-IV: Self dependency and Self-management Meaning Objectives/ Purpose, Importance Self-Strength and weaknesses.

Lab-LPM-309

Personality Development

2 Credits

ASSESSMENT

1. A practical and activity oriented course which has continuous assessment for marks based on class room interaction, activities etc.
2. Extempore.
3. Technical Topic Presentation

LPM-310

Human Values

2 Credits

ASSESSMENT

1. A practical and activity oriented course which has continuous assessment for marks based on class room interaction, activities etc.
2. Seminar
3. Tutorial
4. Presentation

Semester-IV

Skill Education Component

SEMESTER IV**LPM-401****Milk and milk products technology****4 Credits****THEORY****Unit-I**

Milk Industry in India. Layout of milk processing plant and its management, Composition and nutritive value of milk and factors affecting composition of milk. Physico-chemical properties of milk.

Unit-II

Microbiological deterioration of milk and milk products. Collection, chilling, standardization, pasteurization, homogenization, bacteriostatic. Principles of dehydration.

Unit-III

Preparation of butter, paneer/channa, ghee, khoa, lassi, dahi, ice-cream, Cheddar cheese and dairy byproducts, Good Manufacturing Practices. Implementation of HACCP. Toxic/pesticides residues in milk and milk products.

Unit-IV

Packaging, transportation, storage and distribution of milk and milk products. Organic milk food products. Legal and BIS standards of milk and milk products. Sanitation in milk plant

Suggested Book:

- Outline of Dairy Technology by Sukumar De (1985) – Oxford University Press, Delhi.
- The Technology of Milk Processing by Anantha Krishnan C.P., Khan A.Q.,
- Padmanabhan P.N. (1991) – Shri Lakshmi Publication, Chennai.
- Milk Products Preparation and Quality Control by Anantha Krishnan C.P., Khan A.Q.,
- Padmanabhan P.N. (1993) – Shri Lakshmi Publication, Chennai.
- Milk and Dairy Products properties and processing by Rosenthal I (1991), VCH New York.
- Milk and Milk processing by Herrington B.L. (2000). Greenworld Publ., New Delhi.

LPM-402**Abattoir practices and animal products technology****4 Credits****THEORY****Unit-I**

Layout and management of rural, urban and modern abattoirs. BIS standards on organization and layout of abattoirs, Pre-slaughter care, handling and transport of meat animals including poultry.

Unit-II

Ante-mortem and post-mortem examination. Slaughtering and dressing of carcasses. Evaluation, grading and fabrication of dressed carcasses including poultry.

Unit-III

Abattoir byproducts: meat, bone, fish meal and byproducts of pharmaceutical value. Skin and hides: methods of flaying, defects and preservation. Management of organic wastes emanating from animal industries, fallen animals and abattoir effluent. HACCP concepts in abattoir management.

Unit-IV

Introduction to wool, fur, pelt and specialty fibers with respect to processing industry. Glossary of terms of wool processing. Basic structure and development of wool follicle. Post shearing operations of wool, classification and grading of wool, physical and chemical properties of wool. Impurity of wool, factors influencing the quality of wool. Brief outline of processing of wool, tests for Identification of wool.

LPM-403**Avian pathology****4 Credits****THEORY****Unit-I**

Viral Diseases: Pathogenesis, gross and microscopic pathology of Ranikhet disease, infectious bursal disease, infectious bronchitis, infectious laryngotracheitis, fowl pox, avian influenza, Marek's disease, leukosis/sarcoma group of diseases, avian encephalomyelitis, inclusion body hepatitis, hydro-pericardium syndrome, chicken infectious anaemia Avian nephritis, egg drop" syndrome, infectious stunting syndrome, reovirus infections.

Unit-II

Bacterial Diseases: Pathogenesis, gross and microscopic pathology of Colibacillosis (colisepticaemia, yolk sac infection, egg peritonitis, coligranuloma). infectious coryza, clostridial diseases (botulism, necrotic enteritis, gangrenous dermatitis, ulcerative enteritis), salmonellosis (Pullorum disease, fowl typhoid, paratyphoid infection), fowl cholera, tuberculosis and spirochaetosis

Unit-III

Mycoplasmal and Chlamydial Diseases: Pathogenesis, gross and microscopic pathology of Mycoplasma gallisepticum infection (chronic respiratory disease), Mycoplasma synoviae infection, Avian chlamydiosis (psittacosis).

Unit-IV

Fungal Diseases: Pathogenesis, gross and microscopic pathology of aspergillosis, thrush and favus. Mycotoxicosis: Pathogenesis, gross and microscopic pathology of Aflatoxicosis, ochratoxicosis and trichothecenes.

Unit-V

Parasitic Diseases: Pathogenesis, gross and microscopic pathology of Helminthic diseases (flukes, cestodes, nematodes), protozoal diseases (coccidiosis, histomoniasis), ectoparasites, Avian malaria
Nutritional and metabolic diseases: Pathogenesis, gross and microscopic pathology of major diseases due to deficiency/excess of carbohydrates, proteins, minerals and vitamins in poultry
Vices and Miscellaneous Diseases: Pathology of important vices and miscellaneous conditions. Pathology of exotic and emerging poultry diseases.

Suggested books:

- Revised edition Handbook Of Veterinary Clinicians- By: Dr.A.U.Bhikane
- Second Revised & Enlarged edition Poultry Diseases: A guide for Farmers & Poultry Professionals-By:J.L.Vegad
- Poultry Diseases and Their Control-By: Dr.Mohd.OsamahKalim

LPM-404**Milk and milk products technology****4 Credits****PRACTICAL**

1. Sampling of milk, estimation of fat, solid not fat (S.N.F.) and total solids. Platform tests.
2. Cream separation.
3. Detection of adulteration of milk.
4. Determination of efficiency of pasteurization.
5. Microbiological quality evaluation of milk and milk products.
6. Preparation of milk products like curd, ghee, paneer/channa, khoa, ice-cream, milk beverages.
7. Visit to Modern milk processing and milk manufacturing plants.

LPM-405**Abattoir practices and animal products technology****4 Credits****PRACTICAL**

1. Methods of ritual and humane slaughter, flaying and dressing of food animals including poultry. Carcass evaluation.
2. Determination of meat yield, dressing percentage, meat bone ratio and cut up parts.
3. Preparation of different abattoir byproducts.
4. Visit to leather processing unit and slaughterhouses/meat plants.
5. Woof sampling techniques, determination of fleece density, fiber diameter, staple length, crimp and modulation percentage, scouring/clean fleece yield.
6. Visit to wool production/ processing centre.

LPM-406

Avian pathology

4 Credits

PRACTICAL

1. Post mortem examination and diagnosis of poultry diseases based upon clinical signs and gross lesions.
2. Collection, preservation and dispatch of morbid materials in poultry diseases.
3. Clinical examination of blood, faeces and other tissues/fluids for poultry disease diagnosis.
4. Submission of feed samples for analysis.
5. Study of gross specimens and histo-pathological slides of different diseases of poultry.

Semester-IV

General Education Component

LPM-407**Human Rights****4 Credits****THEORY**

Unit-I A Conceptual Understanding of Human Rights: Human Rights Concept, Definition, Meaning, Nature and Human Values: Liberty, Equality and Justice.

Unit-II Historical Foundation of Human Rights: Historical Development: Magna Carta, British Bill of Rights, American Bill of Rights French Revolution and its Goal of Liberty Equality and Fraternity, Marxist Revolution.

Unit-III Theories and Classification of Human Rights: Three Generation of Human Rights, Theory of Natural Rights, Legal/Positive Theory of Rights, Marxist Theory of Rights, Feminist Perspectives of Human Rights.

Unit-IV Rule of Law and Human Rights: Rule of Law and Human Rights: Concept, Origin, Historical development in Greek and English Civilization and its Contribution to the development of Rights.

Lab-LPM-408

Human Rights

3Credits

ASSESSMENT

1. A practical and activity oriented course which has continuous assessment for marks based on class room interaction, activities etc.
2. Seminar
3. Tutorial
4. Presentation

Semester-V

Skill Education Component

SEMESTER V
LPM-501

Epidemiology and Zoonosis

4 Credits

THEORY

Unit-I

Definitions and aims of epidemiology. Factors influencing occurrence of livestock diseases and production. Ecological basis and natural history of diseases. Sources, Storage, retrieval and representation of disease information/data. Epidemiological hypothesis.

Unit-II

Epidemiological methods: descriptive, analytical (observational), experimental, theoretical (modeling), serological and molecular.

Unit-III

Survey of animal diseases. Surveillance and monitoring of livestock diseases. Animal disease forecasting. Strategies of disease management: prevention, control and eradication. Economics of animal diseases. National and International regulations on livestock diseases. Role of OIE and laws on international trade on animals and animal products.

Unit-IV

Definition, history and socio-economic impact of zoonotic diseases. Classification of zoonoses and approaches to their management. New, emerging, re-emerging and occupational zoonoses. Role of domestic, wild, pet and laboratory animals and birds in transmission of zoonoses.

Unit-V

Zoonotic pathogens as agents of bio-terrorism. Reservoirs, clinical manifestations in animals and humans, and the management of the following zoonoses: rabies, Japanese encephalitis, Kyasanur forest disease, influenza, anthrax, brucellosis, tuberculosis, leptospirosis, listeriosis, plague, rickettsiosis, chlamydiosis and dermatophytosis. Food borne zoonoses: salmonellosis, staphylococcosis, clostridial food poisoning, campylobacteriosis, helmintriosis, toxoplasmosis and sarcocystosis.

Suggested Books:

- Zoonoses - Mahendra Pal
- Fundamentals of Parasitic Zoonoses- Pathak K.M.L
- Zoonoses: Recognition Control and Prevention- Martin.E., Jones.E.H., Hubbart,W.T and Hagstard H.V
- Zoonoses: Infectious diseases Transmitted from Animals to Human Being Krauss H
- Dogs Zoonoses and Public Health- Calum N.L., Macpharson, Fracois,X., Moslin and Wandeler

LPM-502**Meat science****4 Credits****Theory****Unit-I**

Retrospect and prospect of meat Industry in India, Structure and composition of muscle (Including poultry muscle), conversion of muscle to meat, nutritive value of meat.

Unit-II

Fraudulent substitution of meat, preservation of meat and aquatic foods - drying, salting, curing, smoking, chilling, freezing, canning, IpASfatJon, antibiotic and chemicals. Ageing of meat

Unit-III

Modern processing technologies of meat and meat products. Packaging of meat and meat products. Formulation and development of meat and sea foods -kabab, sausages, meat bails/patties, tandoori chicken, soup, pickles, surimi, smoked fish.

Unit-IV

Basics of sensory evaluation of meat products. Nutritive value, preservation, packaging of egg and egg products. Laws governing national international trade of meat and meat products. Organic meat food products. Food products of genetically modified animals.

Suggested Books:

- Meat Hygiene for Developing countries by Joshi BP (1994) – Almora Book Depot, UP.
- Processing and utilization of animal by-products by Mann I (1962) – FAO Rome.
- Animal Blood Processing & Utilization by Divakaran S (1982) – FAO Rome
- Meat Hygiene (10th ed.) by Gracey JF, Collins DS and Huey RJ (2000) – WBSaunders Co. Ltd.
- Meat Science – An Introductory Text by Warris PD (2000) – CABI Publ. Co., UK.
- Principles of Meat Science (3rd Ed) by Hedrick HB, Aberle ED, Forrest JC, Judge MD and Markel RA (1994) – WH Freeman & Co., New York.
- Meat Science (6th Ed.) by Lawrie RA (2002). – Pergmon Press UK.
- The Technology of Food Preservation (First Edition) Desrosier MW and Desrosier JN-CBS Publ. N.Delhi.

LPM-503**Pet animal breeding and management****4 Credits****THEORY****Unit-I**

Breeds of dogs- international pedigree breeds and those commonly seen in India. Pedigree sheet and major breed traits. Detection of oestrus and Breeding of dogs. Selecting a breed to keep, selection of a pup.

Unit-II

Feeding of dogs- nutritional requirements of important breeds and different age groups. Management of dogs-kennels, care of pups and pregnant bitch. Dog shows- preparation for the shows, kennel clubs, important characters for judgment. Whelping.

Unit-III

Utility of dogs-guarding, defense, patrolling, riot control, scouting, espionage, mine detection, tracking, guiding, hunting, races, retrieving, rescue, and other uses. Principles of training of dogs.

Unit-IV

Common diseases affecting dogs (bacterial, viral, parasitic, fungal, nutritional etc.) their clinical manifestations, diagnosis, treatment and control. Vaccination/ deworming schedules. Common surgical interventions in dogs- docking, ear cropping, nail cutting, sterilization. Common anaesthetics and anaesthesia in dogs.

Unit-V

Common breeds of cats, their habits, feeding, breeding and management. Common diseases of cats-their diagnosis, treatment and control. Common surgical interventions in cat. Common pet birds seen in India. Introduction to their caging, breeding, feeding, management, disease control and prevention.

LPM-504**Epidemiology and Zoonosis****4 Credits****PRACTICAL**

1. Collection of epidemiological samples. Measurement of disease: determination of morbidity and mortality rates/ratios.
2. Generation of epidemiological protocols and reports. Demonstration of selected software programmes/models e.g. EPIZOO, HandiSTATUS and India-Admas-EPITRAK. Evaluation of vaccines and diagnostic tests.
3. Determination of Associations and risks: relative risk, Odd's ratio and attributable risk. Survey of an animal disease on a farm.
4. Field survey of zoonotic diseases. Concurrent isolation and identification of important pathogens of zoonotic importance from animal and human sources including foods of animal origin and their interpretation.
5. Study of rural environment and health status of rural community.
6. Visit to primary health center/human hospital and study of the common diseases affecting rural/urban population, and probable relationships of these human disease conditions with animal diseases present in the area.

LPM-505

Meat science

2 Credits

PRACTICAL

1. Chilling/freezing of meat, meat products and aquatic foods.
2. Ageing of meat preservation and packaging of meat aquatic foods and shell eggs and their products.
3. Determination of microbial loads in various animal food products, estimation of deteriorative changes in meat and meat products.
4. Preparation of ready-to-eat meat/poultry products.
5. Evaluation of external and internal egg quality, preservation technique of eggs.

LPM-506**Pet animal breeding and management****2 Credits****PRACTICAL**

1. Recognizing various breeds. Handling of dogs. Types and use of leads and collars. Brushing/grooming and bathing of dogs. Restraining of dogs for examination/medication.
2. Detection of oestrus, mating, whelping (through demonstration). Care of pups, weaning, administration of medicine. Nail and tooth care, clipping of hairs for show purposes. Hygiene of kennel/pens, feeding utensils.
3. Visit to dog shop
4. Vaccination and surgical interventions (nail clipping, docking, sterilization).
5. Common breeds of cats, handling, restraint, examination, medication and surgical intervention in cats and kittens.
6. Identification of common pet birds. Handling of pet birds, their examination and administration of medicines.

Semester-V

General Education Component

LPM- 507

Project Report & Seminar

4 Credits

PROJECT REPORT

Project Report The structure of the project report shall be in the format is as follows:

i) The Cover Page - It should have

Title of the project

Name and address of Group Leader and team members

Name and address of Supervisor/Guide teacher

ii) Abstract - 500 words

iii) Contents

iv) Introduction- Description on background of the study

v) Aims and Objectives

vi) Relevance of the project work

vii) Methodology

viii) Observations: This shall include the observations during the experiment. Observation can be both qualitative as well as quantitative.

ix) Data analysis and interpretation: The data generated/ obtained from the experiments/observations should be processed for better understanding in a more structured manner. Tools and methods (e.g. statistical methods) may be used for analyzing data to understand the patterns that emerges from it to form results and conclusions.

x) Results: Results are the output of compilation of the data into meaningful outcomes/ interpretations and sometimes, there is a need to redo the experiments to get consistent results. In case it is not possible to "repeat the experiments", there should be adequate replicates so that adequate data is available for interpretation, and arriving at results.

xi) Conclusions: This is the logical end of the project to arrive at specific conclusions from the observed phenomena. In a way, the whole objective of the project is to arrive at some conclusion, either positive or negative which would lead to a better understanding of the problem.

xii) Acknowledgement

xiii) References 29

SEMINAR

- Seminar on Technical Topic of Livestock Production and Management shall be delivered by individual student.
- The Seminar topic shall be decided by respective Guide/Advisor.
- Students will be responsible for collection of necessary information, preparation of synopsis and Power Point Presentation and discussion by each student allotted topic.
- The evaluation of Seminar shall be done by Team of Academic members (at least 3) nominated by Associate Dean & Principal/University.

LPM-506**Entrepreneurship Development****4 Credits****THEORY**

Module 1: Concepts of entrepreneur: Entrepreneur- Definitions-Characteristics of entrepreneur- Classification of entrepreneur-Entrepreneurial traits- Entrepreneurial functionsrole of entrepreneurs in the economic development- Factor effecting entrepreneurial growthEntrepreneurship - Meaning- definition- Entrepreneur VsIntrapreneur- Women Entrepreneurs. Recent development Problems-Entrepreneurial Development Programmes- Objectives of EDP-Methods of training- Phases of EDP

Module 2: Institutional support and incentives to entrepreneurs- Functions of Department of Industries and Commerce (DIC) - Activities of Small Industrial Development Corporation (SIDCO)-Functions of National Small Industries Corporation(NSIC)-Functions of Small Industries Development Bank of India (SIDBI)-Khadi Village Industry Commission (KVIC)- Small Industries Service Institute (SISI)- Functions and services of Maharashtra Industrial Technical Consultancy Organization-Activities of Science and Technology Entrepreneurship Development Project (STEDP)-Strategies of National entrepreneurship Development Board(NEDB)-Objectives of National Institute for entrepreneurship and small business development (NIESBUD)- Techno park-Functions of techno park IncentivesImportance- Classification of incentives- Subsidy- Types of Subsidy

Module 3: Micro Small and Medium Enterprises- Features- Objectives- Importance- Role of SME in the economic development- MSME Act 2006- Salient features- Credit Guarantee Fund Trust Scheme for MSMEs - Industrial estates-Classification-Benefits-Green channelBridge capital- Seed capital assistance-Margin money schemes -Single Window SystemSickness- Causes -Remedies- Registration of SSI

Module 4: Setting up of Industrial unit-(Only Basic study) Environment for Entrepreneurship - Criteria for selecting particular project- Generating project ideas-Market and demand analysis- Feasibility study- Scope of technical feasibility- Financial feasibilitySocial cost benefit analysis- Government regulations for project clearance- -Import of capital goods- approval of foreign collaboration-Pollution control clearances- Setting up of micro small and medium enterprises- Location decision- Significance.

Module 5: Project Report-Meaning-Definition-Purpose of project reports-Requirements of good report-Methods of reporting-General principles of a good reporting system-Performa of a project report-Sample project report.

LPM-509**Environmental Science****4 Credits****THEORY****Unit-I**

Environment: Environment Science, Scope and importance, Components of environment – i) Atmosphere, Composition of atmosphere, ii) lithosphere – Structure of lithosphere, soil formation, soil composition and properties of soil, iii) Hydrosphere – distribution of water on earth, global water balance and hydrological cycle.

Unit-II

Environment Problems: A) Air pollution – concept, source of air pollution, major atmospheric pollutants, air quality standards monitoring of major air pollutants. B) Water pollution – sources of water pollution, river pollution, underground water pollution, oil pollution, thermal pollution, water pollution due to sewage, effects of water pollution, waste water treatment. C) Noise pollution – sources of noise, effects of noise pollution, noise pollution, noise pollution control equipment silencers and noise absorbing devices, noise standards and industrial noise control. D) Soil pollution – causes of soil pollution major soil pollutants, industrial waste and their role in soil pollution. E) Radiation pollution – sources of radioactive pollution, effects of radioactive pollution on health.

Unit-III

Impact of industries on Environment: Water pollution episodes due to industrial pollutants, effects of industrial pollutants on aquatic organisms, industrial and underground water quality. Air pollution episodes due to industries-Bhopal gas tragedy, Photochemical smog, Acid Rivers etc. Industrial noise pollution and workers health problems.

Unit-IV

Water Conservation: water use pattern-water use in industry, Water conservation-methods of water conservation, rain water harvesting, Reuse and recycle of water.

Suggested Books:

- Environmental Hazards and Human Health- Richard B.Philp
- Industrial Hygiene Evaluation Methods- Bisese S and James P.K.
- Health and health care in Third world- Phillips D.R
- Infectious Waste Management-A practical guide.-Garvin M. L.
- Environmental Pollution: Impact of technology on Quality of life- Ray,M.

Lab-LPM-510**Entrepreneurship development****2 Credits****ASSESSMENT**

1. A practical and activity oriented course which has continuous assessment for marks based on class room interaction, activities etc.
2. Seminar
3. Tutorial
4. Presentation

Lab-LPM-511**Entrepreneurship development****2 credits****PRACTICAL**

1. Major equipment available in environmental analysis laboratory
2. Preparation of charts and models of earth showing different layers
3. Determination of pollutions using various techniques/instruments
4. Demonstration of water cycle, rain harvesting methods
5. Internal assessment/Seminar/Tutorials
6. A visit to an industrial unit

Semester-VI

Skill Education Component

SEMESTER VI**LPM-601****Environment and environmental hygiene****4 Credits****THEORY****Unit-I**

Definition, scope and importance. Ecosystem: types, structure and functions. Food chains. Bio-diversity uses, threats and conservation. Natural resources: forest, mineral, soil and water-their uses and abuses.

Unit-II

Environmental pollution-causes, and effects. Control measures of air, water, soil, marine, thermal and noise pollution. Nuclear hazards. Bio-safety and risk assessment Environment Protection Acts and related issues. Disaster management Sources of water supply and water quality, Sources of water contamination.

Unit-III

Bacteriology of water. Physical, chemical, microbiological and biological evaluation of water. Water purification. Disposal of sewage and farm wastes. Health implications of farm wastes. Sanitation and disinfection of animal houses. Recycling of farm wastes.

Unit-IV

Sources of air pollution within animal houses and its effect on animal health and production Ventilation and ventilation systems within animal houses and specialized laboratories.

Unit-V

Prevention and control of air and water-borne diseases. Problems of atmospheric pollution (acid rain, depletion of ozone layer, methane production, green house effect and global warming). Tannery, wool, bone and blood meal industry pollution and its control. Stray and fallen animal management Pollution due to industrial wastes.

Suggested Books:

- Environmental Hazards and Human Health- Richard B. Philp
- Industrial Hygiene Evaluation Methods- Bisese S and James P.K.
- Health and health care in Third world- Phillips D.R
- Infectious Waste Management-A practical guide.-Garvin M. L.
- Environmental Pollution: Impact of technology on Quality of life- Ray, M.

LPM-602**Livestock economics and marketing****4 Credits****THEORY****Unit-I**

Economics: Introduction, definition and scope (production, consumption, exchange and distribution) of economic principles as applied to livestock. Common terms - wants, goods, wealth, utility, price, value, real and money income. Important features of land, labour, capital and organization.

Unit-II

Livestock produce and products. Livestock contributions to national economy. Demand projections of livestock produce. Theory of consumer behaviour law of diminishing marginal utility and indifference curve analysis. Theory of demand; meaning, types of demand, demand curve and law of demand, individual and market demand, elasticities of demand and factors affecting demand. Laws and types of supply. Elasticity of supply. Cost concepts and principle of fixed and variable costs. Theory of production, law of diminishing returns, laws of returns to scale and concept of short and long run periods. Economics of animal disease and disease losses.

Unit-III

Marketing: Livestock business-concepts, nature and scope. Components, characteristic of small business. Marketable livestock commodities. Concept of market; meaning and classification of markets. Market price and normal price, price determination under perfect competition in short and long run. Marketing of livestock, and perishable and non-perishable livestock products. Merchandising-product planning and development Marketing functions; exchange functions-buying, selling and demand creation. Physical functions- grading, transportation, storage and warehousing. Facilitative functions -standardization, risk bearing, market information and market intelligence.

Unit-IV

Market opportunities - marketing channels of livestock and livestock products, organized/unorganized markets and cattle fairs. Import and export of animal and animal products. International Agreements/Regulations (WTO and General Agreement on Trade and Tariff-GATT) for marketing/trade of live animals and products. Management: Resource Management-Organizational aspects of livestock farms, sources and procurement of inputs and financial resources. Break- even - analysis. Personnel (Labour) Management-Identification of work and work (job) analysis/division of labour.

Unit-V

Accounting: Definition, objectives, common terms. Different systems of book keeping- single and double entry system. Various types of account books including books of original entry. Classification of accounts and rules of debit and credit Recording of business transactions. Analysis of financial accounts- income and expenditure accounts, trading account, profit and loss accounts.

LPM-603**Livestock entrepreneurship****4 Credits****THEORY****Unit-I**

Livestock Entrepreneurship. Avenues of entrepreneurship/employment in private and public sectors. Key concepts and theories of self-employment and entrepreneurship.

Unit-II

Essential criteria for development of entrepreneurship in livestock sector - basic requirements for entrepreneurship initiatives in livestock and allied sectors (i.e. techno economic feasibility of the enterprises under different conditions, training and management skills, business acumen, business communication, inter-personnel skills for establishing an enterprise, etc.).

Unit-III

Entrepreneurial training/development programmes at the State and National level. Animal Insurance. Bank support for entrepreneurship. Financial credit and financial management-general Principles and practices, analyzing project appraisals and reports, capital, expenditure decisions, reinvestment and payback. Preparing projects for bank appraisal, banking requirements. Assessing project profits. Procurement management quality issues, standardisation, grading and packaging.

Unit-IV

Marketing channels. Retail marketing, sales operations and management advertising, marketing of services. Eco-jobs and sustainable development through livestock. Approach to preparation of Entrepreneurial Project on livestock.

Suggested Books:

- Acharya, S. S & Agarwal N.L (1994) Agriculture marketing in India, Oxford.
- Johl, S. S. & Kapur, T.R. (2005) Fundamentals of farm business management
- Indian Society (1989) Livestock Economy of India Agricultural Economics: Oxford and IBH Publications Sadhu & Singh (1989) Fundamentals of Agricultural Economics: Himalaya Publishing House.
- Singh, G.N. Singh .D.S & Ram Iqbal Singh (1987) Agricultural Marketing in India: Chugh Publications
- Maheswari & Maheswari (1993) Advanced Accountancy 5th ed. Volume -I
- Seth. M.L. (1994) Micro Economics 12th Ed.
- Dewitt, K.K. (1984) Modern Economic Theory 21st Edition.
- James, A.F. Stoner & Charles Wankel (1988) Management 3rd Edition

Lab-LPM-604**Environment and environmental hygiene****4 Credits****PRACTICAL**

1. Sampling of water for sanitary examination.
2. Physical examination of water estimation of colour, turbidity, total hardness, solids, alkalinity and acidity of water.
3. Chemical and Microbiological evaluation of water quality.
4. Disinfection of animal houses.
5. Determination of the efficacy of disinfectants.
6. Demonstration of water purification system.
7. Disposal of carcasses, Pathogenic microbes in air.
8. Demonstration of various ventilation systems in animal houses.
9. Demonstration of toxic residues in water and air.
10. Visit to local polluted sites and documentation of local environmental problems.

Lab-LPM-605**Livestock economics and marketing****4 Credits****PRACTICAL**

1. Book keeping; general entry, writing of journal and ledger, cash book (two and three column), purchase-safe and purchase-sale return registers, trading account, profit and loss accounts, income and expenditure accounts, balance sheet bills of exchange (bill of receivable and bill of payable), bank reconciliation statement.
2. Economics of a dairy unit poultry, piggery, sheep and goat units.
3. Visit to" farms, markets and cattle fairs, backyard units and preparation of report.

Lab-LPM-606**Livestock entrepreneurship****4 Credits****PRACTICAL**

1. Preparing projects for bank appraisal.
2. Preparation of Entrepreneurial Project on livestock.