ICAR-NATIONAL DAIRY INSTITUTE
(DEEMED UNIVERSITY)
KARNAL (HARYANA) -132001, INDIA

INFORMATION BULLETIN
Ph. D. Programme – 2019-20

1.0 About The Institute

1.1 ICAR-National Dairy Research Institute (ICAR-NDRI) Deemed University (here-in-after referred to as the Institute), serves as the prime centre for Research, Extension and Manpower Development for the country in the field of Dairying. The Institute has developed from the erstwhile Imperial Institute of Animal Husbandry and Dairying established at Bangalore in 1923. The main campus of NDRI is now located at Karnal in Haryana State. It has two regional stations: Southern Regional Station at Bangalore and Eastern Regional Station located at Kalyani (West Bengal).

1.2 The Institute offers academic programmes in the field of Dairy Science. At present the following programme, are being offered:

- Diploma in Dairy Technology
- Diploma in Animal Husbandry & Dairying.
- B. Tech. (Dairy Technology)
- Masters Programme
- Doctoral Programme

1.3. National Dairy Research Institute is located on the northern outskirts of Karnal city in Haryana, on the National Highway No. 1, about 125 km North of Delhi. It is well connected by road and rail being on the main trunk route connecting Delhi with Amritsar and Chandigarh.

2.0 DOCTOR OF PHILOSOPHY

2.1.1 The Institute offers Ph.D. programmes at ICAR-NDRI, Karnal and after doing course work the students may be placed at Main Campus, Karnal or Southern Regional Station, Bangalore/ Eastern Regional Station, Kalyani campus and also other ICAR Institutes for undertaking the thesis work. Ph.D. Programme is offered in the following disciplines:

Code	Discipline
1.	Dairy Microbiology
2.	Dairy Chemistry
3.	Dairy Technology

4. Dairy Engineering
5. Animal Biochemistry
6. Animal Biotechnology
7. Animal Genetics & Breeding
8. Livestock Production & Management
9. Animal Nutrition
10. Animal Physiology
11. Agricultural Economics
12. Agricultural Extension Education
13. Agronomy
14. Veterinary Gynecology & Obstetrics
15. Food Safety and Quality Assurance

2.1.2 Duration

The duration of the course for the degree of Doctor of Philosophy shall be at least six semesters (3 academic years) for the students with 4+2 or 3+3 UG & PG programme. The student with 3+2 background will undergo pre-requisite courses and the duration will be 8 semesters (4 academic years). The maximum period of stay of a scholar for completion of degree requirement for obtaining Doctoral degree shall be 6 years. It will be 8 years in case of scholars with one year pre-requisite courses. During the first two semesters, every scholar shall register himself/herself for the course specified in the syllabus. Scholar must pass the courses before the submission of thesis. She/He is also required to stay atleast 18 months with the Major Advisor to pursue her/his research work for thesis. Extension of time will be allowed in a very specific case with justified reasons.

2.1.3 ELIGIBILITY REQUIREMENTS

Candidates having passed (or due to appear at the final examination) their Master's degree in the concerned field with Overall Grade Point Average (OGPA) of at least 6.50/ 10.00 in ten-point scale, at least 3.25/5.00 in five-point scale, at least 2.60/ 4.00 in four-point scale for General, OBC, Economically weaker section(EWS) and UPS categories candidates whereas for SC/ ST/ Divyang candidates the said requirement is an OGPA of at least 5.50/10.00, 2.75/ 5.00, 2.20/ 4.00 respectively. In other cases, where grade-points are not awarded and only marks are awarded, the candidate must have secured at least 60% marks for General, OBC and UPS categories whereas for SC/ ST/ Divyang categories the minimum requirement is 50% marks. (Please note that equivalence between OGPA and % marks will not be acceptable). The candidate must have completed all requirements including thesis viva voce examination or project training etc., on or before 31st July 2019.

Code & Discipline	Qualifications
(1) Dairy Microbiology	• M.Sc. / M.Tech. Dairying (Dairy Microbiology) • M.Sc. (Microbiology/ Microbial Technology/Microbial Biotechnology/ Applied Microbiology / Medical Microbiology/ Industrial Microbiology/ Microbial& Food Technology/Biotechnology/ Food Science • M.V.Sc.(Bacteriology/Microbiology) • M.Sc./M.Tech. Food Safety and Quality Assurance/Food Safety and Quality Management

	• M.Sc. Hons. (Microbiology))
(2) Dairy Chemistry	• M.Sc. Dairying /M. Tech. Dairying (Dairy Chemistry / Quality Control/Dairy Technology) • M.Sc. Agric. (Dairy Sci./ Animal Husbandry & Dairying) • M.Sc. Chemistry/Applied Chemistry • M.Sc./M.Tech (Food Science / Food Technology/ Food Science & Technology)/Food Safety & Quality Assurance • M.V.Sc./M.Sc. Animal Biotechnology/Animal Biochemistry • M.V.Sc. (Animal Product Technology/Livestock Product Technology
(3) Dairy Technology	• M.Sc. Dairying/M.Tech. Dairying (Dairy Technology/Dairy Engineering/Dairy Chemistry/Dairy Microbiology) with B. Tech./B.Sc. (Dairy Technology) • M.Sc./M.V.Sc. (Dairy Science/Dairy Technology • M.Sc. (Food Science/Food Technology/Food Science & Tech.) /Food Science & Nutrition with undergraduate degree in Dairy Technology/Food Technology. • M.V.Sc. (LPT/APT) All UG qualifications should be of 4 years duration.
(4) Dairy Engineering	• M.Tech. (Agril. / Agril. Process, Chemical, Dairy, Dairy & Food, Electrical, Mechanical, Post-Harvest Engg.) • M.Sc./M.Tech. Bio Process Engineering with Bachelor's Degree in Engineering except for B. Tech (DT)
(5) Animal Biochemistry	• M.Sc./M.V.Sc./M.Tech./M.Sc. Dairying/ M.V.Sc. Dairying in(Animal Biochemistry/ Animal Biotechnology/ Bio-Chemistry/Biotechnology/ Veterinary Biochemistry/Animal Physiology/ Animal Nutrition/Dairy Bacteriology/Dairy Microbiology/ Microbiology/Dairy Chemistry/ Biomedical Sciences/Molecular Biology & Biotechnology/Zoology/Chemistry
(6) Animal Biotechnology	• M.Sc. Dairying/ M.V. Sc. Dairying (Animal • Biotechnology/ Animal Biochemistry/Animal Genetics & Breeding/ Animal Physiology/ Microbiology) • M.V.Sc./M.V.Sc. & AH (Biotechnology/ Animal Biotechnology/Molecular Biology & Biotechnology/Biochemistry/Animal Biochemistry/Genetics/Animal Genetics & Breeding / Animal Physiology/ Animal Nutriton/Microbiology) • M.Sc.(Biotechnology/ Medical Biotechnology/ Applied Microbiology & Biotechnology/ Biochemistry/ Genetics/ Genomics/ Bioinformatics/ Microbiology • M.Tech. Biotechnology/Animal Biotechnology/ Biochemistry/Animal Biochemistry

(7) Animal Genetics and Breeding	• M.Sc. Dairying /M.V.Sc. Dairying Animal Genetics & Breeding/ Animal Breeding • M.V.Sc. (Animal Breeding/ Animal Genetics & Breeding)/Animal Genetics • M.Sc. (Animal Breeding/ Animal Genetics/Animal Genetics & Breeding • M.Sc. Ag. (Animal Husbandry & Dairying) • M.Sc. (Ag.) Animal Genetics & Breeding
(8) Livestock Production and Management	• M.Sc. (Dairying)/ M.V.Sc. (Dairying) Livestock • Production & Management/Management Dairy Husbandry/ Animal Genetics & Breeding/Animal Nutrition/ Animal Physiology • M.V.Sc. Animal Sciences/ Livestock Production & • Management/Animal Production/ Animal Genetics & • Breeding/ Animal Breeding/Animal Nutrition/ Animal • Physiology/ Animal Husbandry • M.Sc. (Ag.) Animal Husbandry/ M.Sc. (Ag.) with Specialization in AH & Dairying
(9) Animal Nutrition	• M.Sc./M.V.Sc. (Animal Nutrition)
(10) Animal Physiology	• Master's Degree in Animal Physiology • M.Sc. Dairying/ M.V.Sc. Dairying (Dairy Husbandry) • M.V.Sc. (Animal Physiology/ Physiology/ Veterinary Physiology
(11) Agricultural Economics*	• M.Sc. /M.V.Sc. Dairying (Dairy Economics) • M.Sc. /M.V.Sc. Livestock Economics • M.Sc. Agri. (Agricultural Economics) • M.Sc. Animal Husbandry Economics • M.V. Sc. (Veterinary Economics) • M.Sc. / M.A. (Economics) with B.Sc./ B.A. Hons. (Economics with Mathematics at UG level) • M.Sc. (Agricultural Statistics) with Agricultural Economics as Minor
(12) Agricultural Extension Education)**	• M.Sc. Dairying/ M.V.Sc. Dairying (Dairy Extension/ Dairy Extension Edn.) • M.Sc. Agri. (Agril. Extension/ Extension Edn./Agril. Extension Education) M.Sc. (Agril. Extension Education • M.Sc. Home Science (Home Science Extension Education) • M.V.Sc. (Veterinary Extension/ Veterinary Extension Education/ VAH Extn.)
(13) Agronomy	• Agronomy (Forage Production) • M.Sc. Agronomy (Forage Production) • M.Sc.(Ag.) Agronomy and M.Sc. Agronomy
(14) Veterinary Gynecology and Obstetrics	• M.V.Sc. in Veterinary Gynaecology and Obstetrics/M.V.Sc. and in Animal Reproduction, Gynecology and Obstetrics
(15) Food Safety & Quality Assurance	• M.Sc./M.Tech. (Food Safety & Quality Assurance/Food Safety & Quality Management/Food Technology & Management/

	Dairy Microbiology / Dairy Chemistry / Bio-science / Dairy Technology) • M.Sc. Food Science/Food Technology • M.Sc. Hons. (Microbiology)/Industrial Microbiology/ Microbial Technology / Applied Microbiology • M.V.Sc. (Bacteriology/Microbiology/*Public Health/LPT)*

Note :

- Nomenclature of Degree in Dairy Economics will be M.Sc. Agricultural Economics/M. V. Sc. Livestock Economics for P.G. Programme& Ph. D. Agricultural Economics/Ph. D. Livestock Economics for Ph. D. Programme.

** Nomenclature of Degree in Dairy Extension will be M.Sc. Agriculture Extension Education/M.V.Sc. Veterinary Extension Education for P.G. Programme& Ph. D. Agriculture Extension Education/Ph. D. Veterinary Extension Education for Ph. D. Programme.

- Based on the courses covered in Master's degree programme, remedial courses may be offered in addition to the regular courses.
- One who is appearing for above Master Degree Programmes in the year 2019 can also apply subject to he/she producing certificate of Master's Degree programme on or before 31st July, 2019.
- The candidates with B.Sc. general qualification/Honours and three year degree programme at UG level will have to take, pre-requisite courses of one year and the duration of the programme will be 4 years. The candidates with Honours Qualification will have to offer additional courses.

3.0 PROCEDURE FOR APPLICATION

(1) Candidates applying for the Admissions in various Ph.D. programmes **of ICAR-National Dairy Research Institute (Deemed University) Karnal (Haryana)** are required to apply online only through the official website of NDRI, Karnal **http://www.ndri.res.in** and accessing the link **'Apply Online'**. Application will not be accepted by any other mode. Candidates are requested to read important instructions for filling up online application form before apply available on the website.

(2) All correspondence for admission should be addressed to the Academic Coordinator, ICAR-National Dairy Research Institute, Karnal-132001 (Haryana). For all important dates please see important instructions on the website **http://www.ndri.res.in**

(3) In case of SC/ST, OBC and EWS candidate, a certificate as per annexure from a first class Magistrate of a District/ Competent Authority indicating that the candidate belongs to a particular category.

(4) All original certificates and marks sheet are to be produced at the time of registration/counseling. Candidates who do not produce all the original certificates and mark sheet will be not admitted.

(5) If a candidate willfully furnishes wrong information or suppresses any relevant information, his/her candidature/ admission will automatically stand cancelled.

4.0 ENTRANCE EXAMINATION & SELECTION POCEDURE

(1) Applications are invited online for admission to Ph.D. Programme. The application Fees (**Non-refundable)** of Rs.600/- (for SC/ST/Divyang) and Rs.1200/- (for General/OBC/EWS) shall be charged.

The candidates who fulfil the minimum qualifications will be eligible to appear in the entrance examination. Name and Roll Nos. of eligible candidates will be displayed on NDRI Website. Those who are not found eligible, their names will be displayed separately.

The entrance examination will be conducted at following centres in ONLINE Mode: Karnal/Kurukshetra, Delhi, Mumbai, Bengaluru, Kolkata, Hyderabad and Thiruvananthapuram.

(2) There will be only one paper based on subject matter of 2 hrs duration and of 150 marks. Paper will be objective type with multiple choice questions.

(3) The syllabus of written examination for Ph.D. programme in each of fifteen disciplines has been appended in the information Bulletin.

(4) The qualifying marks for the written examination will be 50% (45% for SC/ST and Divyang category) marks.

(5) The final selection for admission to Ph.D. will be based on merit list prepared on the basis of marks obtained in the Entrance Examination.

(6) Only those students will be allowed to register for admission who will complete their qualifying examination in all respect latest before the commencement of academic session 2019-20 (i.e. 31-07-2019).

(7) The result will be announced latest by 3rd week of June 2019 and the merit list showing marks of qualified candidates will be displayed on NDRI website.

5.0 COUNSELING PROCESS

5.1 Counseling will be offline and details will available on NDRI website (www.ndri.res.in). No separate intimation will be sent to candidates. The candidate should be physically present to mark their attendance on arrival and will be considered for counseling. Those reporting late will have to register arrival time as late entry in the attendance register and will be considered for counseling as per latest situation of seats available at that time. The seats already filled up will not be disturbed in such situation. The candidate shall forfeit the claim for admission if she/he does not appear in person for counseling.

5.2 The candidates belonging to Divyang category will be called first and offered seat against the category to which they belong (i.e. General/SC/ ST/ OBC/EWS). In case, the number of Divyang candidates available is more than the number of reserved seats for Divyang category then priority will be decided based on marks obtained in the entrance examination.

5.3 The candidates belonging to Under Privileged States (UPS) not having any State Agricultural/Veterinary University, will be called after the counseling of candidates belonging to Divyang

category and offered seat against the category to which they belong. In case, the number of UPS candidates available is more than the number of reserved seats for UPS then priority will be decided based on marks obtained in the entrance examination.

6.4 Counseling for other seats will start with unreserved category and seats will be offered as per merit list. Candidates having qualified under reserved categories (OBC/EWS/SC/ST) will subsequently offered respective seats. In case seat under SC/ST category seat is vacant due to non-availability of eligible SC/ST candidate, the seat will be interchangeable in a particular discipline amongst the eligible SC/ST candidates. Even after that if the seat is vacant in SC/ST category, it will not be filled from any other category candidates. In case the candidates from OBC/EWS category are not available, the same may be filled from general category.

6.5 Candidates shortlisted as qualifying for counseling should bring, admit card, all original certificates with marks sheets, SC/ ST/ Divyang/ UPS/ OBC/EWS category certificate (Annexure-III, IV & V) in original for verification and submission.

6.7 Immediately on offer of admission candidates are required to deposit counseling fee (Non refundable) Rs. 5000/- by Credit/Debit Card.

6.0 IN-SERVICE CANDIDATES AND THIER SELECTION PROCEDURE

Vice-Chancellors/ Directors/ Head of the Institutions concerned may depute their faculty/ employees for admission to Doctoral Programmes subject to following conditions:

(i) The candidate must be fully sponsored by his/ her employer.

(ii) The candidate must fulfill the eligibility conditions for admission to Ph.D. as indicated in para 2.1.3.

(iii) The candidates should be in permanent employment under Central/ State/ Govt. or Universities and must have two years service as on 31 July, 2019.

(iv) In-service candidates shall be admitted over and above the normal seats. This will be purely on the basis of discipline wise merit of in-service candidates in the entrance examination. A candidate can apply either as OPEN (other than in-service candidate) or as In-service candidate. The choice once exercised will be final. No reservation (i.e. SC/ST/OBC etc.) would be applicable in the seats for in-service candidates.

(v) The in-service candidate has to apply online for appearing in the entrance examination. However, the candidates must submit the application through proper channel also (forwarded by the Vice-Chancellor/ Director/Head of Institution) so as to reach the University Office on or before date of counseling.

(vi) The eligible candidates will have to appear and qualify in the written examination.

(vii) The admission of in-service candidates will be decided on merit obtained in the written examination.

7.0 NUMBER OF SEATS

Code	Discipline	UR	OBC	SC	ST	Total	EWS	Grand Total
1	DM	04	02	01	00	07	**00**	07
2	DC	02	02	01	01	06	01	07
3	DT	04	02	01	01	08	01	09
4	DE	01	00	00	01	02	**01**	03
5	ABC	05	03	01	01	10	01	11
6	ABT	06	03	01	01	11	01	12
7	AGB	04	01	01	00	06	01	07
8	LPM	03	01	01	01	06	**01**	07
9	AN	03	01	01	00	05	01	06
10	AP	02	02	01	00	05	01	06
11	DESM	01	01	01	00	03	**00**	03
12	D.Extn.	04	02	01	01	08	01	09
13	FP	02	01	01	00	04	00	04
14	VRGO	01	01	01	00	03	01	04
15	FSQA	02	01	01	00	04	00	04
SRS-NDRI		0	0	0	0	0	0	0
1	DC	01	00	00	00	01	00	01
2	DT	01	01	01	00	03	00	03
3	DE	01	01	01	00	03	00	03
4	AGB	01	01	00	00	02	00	02
5	LPM	01	01	00	00	02	00	02
6	AN	01	00	00	00	01	00	01
7	DESM	**01**	00	00	00	01	00	01
8	D.Extn.	01	01	00	00	02	00	02
9.	VRGO	01	01	00	00	02	00	02
ERS-NDRI		0	0	0	0	0	0	0
1	ABT	00	00	01	00	01	00	01
2	AGB	00	00	00	01	01	00	01
3	LPM	01	01	00	00	02	00	02
4	AN	01	01	00	01	03	00	03
5	AP	01	00	00	00	01	00	01
6	D.Extn.	01	00	00	00	01	00	01
7	VRGO	01	00	00	00	01	00	01
	Total	**58**	**31**	**17**	**9**	**115**	**11**	**126**

For In-service candidates, there will be one seat in each discipline over and above the above seats. Vacant seat in one discipline may be transferred to other discipline without changing the total number of seats for in-service candidates.

Foreign Students: Over and above the above seats.

Reservation of Seats: ST (7.5%) = 09 seats, SC (15%) = 17 seats, OBC (27%) = 31 seats, Divyang (5%) = 6 seats (*), UPS (2%) = 2 seats (*) EWS** (10% Over and Above the existing number of seats) =10 Seats

(*) The seats will be provided to the candidates against the category i.e. General/SC/ST/OBC to which they belong

(**)Seats under "Economical Weaker Section (EWS) Category" for PhD programme offered at NDRI, Karnal in reference to the OM No. 20013/01/2018-BC-II dated January 17, 2019 issued by the Ministry of Social Justice and Empowerment and the OM No. 12-4/2019-U1 dated 17.01.2019 as well as the Letters No 35-2/2019-T.S.I dated 21.01.2019, 01.02.2019, 04.02.2019 and 15.02.2019 of MHRD Department of Higher Education regarding implementation of reservation for Economically Weaker Sections (EWSs) for admission in Central Educational Institution.

Note: Course work of all Ph.D. Progrmmes will be conducted at NDRI main campus except in Dairy Engineering at SRS, NDRI, Bengaluru.

8.0 RESERVATION

9.1 Fifteen percent of total seats are reserved for bonafide candidates belonging to Scheduled Castes, 7.5% for Scheduled Tribes, 27% seats for OBC, 5% for Divyang, 10% for EWS(Over and above existing seats)as per their merit on horizontal basis. The reservation of seats is interchangeable amongst the SC/ST candidates depending upon the availability of such candidates.

9.2 Two percent Seats under Ph.D. programmes would be reserved for the candidates of the remote and Under Privileged States/ Union Territories (UT/ UPS) namely Andaman and Nicobar Islands, Arunachal Pradesh, Dadra and Nagar Haveli, Daman & Diu, Goa, Lakshadweep, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura where educational facilities in Agriculture and Allied Science subjects do not exist. However, these seats will be filled by merit amongst the qualified candidates from the State concerned those who qualify this examination. In case no qualified candidates are available in these categories, the vacant seats will be filled from general merit. Candidates from UPS will have to produce domicile certificate issued by the competent Authority at the time of counseling.

9.3 Definition for Divyang Candidates: Permanent disability of not less than 40%, provided the candidate is otherwise fit for admission. Such candidates will have to bring a certificate from a Govt. Hospital/ Medical Board (duly attested by a Gazetted Officer) of the District to which the candidates belong for verification at the time of counseling. Such candidates will also have to appear before the Medical Board constituted by the Director for determining the percentage of disability and for assessment whether they are fit to carry out the studies despite being handicapped.

9.0 AGE LIMIT

Minimum age limit for Doctoral candidates shall be 21 years on or before 31-07-2019.There will be no upper age limit

10.0 FOREIGNER STUDENTS

11.1 Foreign students seeking admission at this Institute shall have to submit their applications through their respective Embassies at New Delhi or the respective Indian Missions in their countries to the Govt. of India, Department of Agricultural Research and Education, Krishi Bhawan, New Delhi-110001 and the candidature of foreign students shall be considered if they are sponsored with financial support by :-

(a) Their respective Governments or

(b) The Government of India.

11.2 Self supported foreign students can apply through Educational Consultants India Limited (Ed.CIL) using the following contact details. Head (Placement & Secondment) Educational Consultants India Limited Educational Consultants India Limited House, 18-A, Sector-16A, Noida-201301.

Phones: 0091-120 -2515281; 0091-120 -2512001-06, Fax: 0091-120-2515372; Email: placement@edcil.co.in

11.3 The foreign candidates should have qualifications required for admission as given under clause 3.1.3. However, the percentage of marks will not be applicable. They should possess the requisite qualification in the concerned discipline and its cognate branches. The bio-data of foreign students will be examined by the respective Heads of Divisions for deciding the eligibility for admission in particular discipline.

11.4 A good knowledge of English is essential. A certificate of the candidate's proficiency in English, issued by the respective Indian Mission abroad, should accompany their application for admission. Candidates must carry a proper visa for the entire duration of the course. They should ensure that they get the correct visa from the Indian Embassy/High commission in their country. Govt. of India guidelines stipulate that if a fellow arrives without proper visa and his/her actual admission at the University/Institute does not materialize, he/she will be deported to his/her country.

11.5 All the foreign students other than those sponsored by the Government of India with suitable fellowship such as ITEC Program, ICCR, General Cultural Scholarship and Cultural Technical Exchange will be charged Institutional Economic Fee @ US $ 400/- p.m. or US $ 4000/- p.a. This fee will be over and above other usual charges and fees of the University as applicable to Indian nationals.

11.6 The foreign students may apply for admission under different fellowship programmes as per the time schedule given in the advertisement issued by the council/ICAR.

11.7 As per directive from the Govt. of India, Ministry of Health, New Delhi, health check for foreign students including that for AIDS is mandatory. Foreign students will subject themselves for health check within one month of arrival and till the results are known the students will be admitted provisionally. Their admission is to be confirmed on production of fitness certificate from the competent authority.

11.0 INSTITUTE SCHOLARSHIPS

12.1 Institute Scholarship at the rate of Rs. 25000/- per months to all the Ph.D students of Indian Nationality. Scholarship is offered to only those who do not receive any Financial Assistance/ Scholarship/ Fellowship from any other source. These scholarships will be governed by Scholarship Rules of the Institute. The students are required to submit a surety bond of Rs. 50,000/- for Ph.D in Dairying, on non-judicial stamp paper. The in-service candidates under ICAR/SAU set up are eligible for the award of Institute Scholarship @ Rs.3000/- per month subject to fulfilment of conditions prescribed by ICAR.

12.2 In order to protect intellectual property, the students admitted to Doctoral programmes at NDRI are required to submit the Secrecy Agreement.

The thesis award carries a certificate and a

12.0 SYLLABUS

14.1 The Syllabus for various courses, programmes, pre-requisite courses and rules for carrying out the research and submission of thesis are governed by the regulations of the Institute and as modified by it from time to time.

14.2 The Ph.D. students have to complete their course work essentially at NDRI, Karnal/ SRS Bangalore. However, they may be required to complete their research work at Southern Regional Station of NDRI at Bangalore or Eastern Regional Station of NDRI at Kalyani and any other ICAR Institutes depending on the facilities available. The decision of the Director, NDRI regarding placement for research will be final and binding on all the candidates admitted.

13.0 RIGHT OF REFUSE ADMISSION

The Director reserves the right to refuse admission of any candidate even though he/she may fulfil the academic requirements of admission on the basis of criteria laid down in the regulations, and/or may otherwise be eligible for admission on the basis of entrance examination without assigning any reason thereof. The decision of the Director shall be final and legally binding.

14.0 REGISTRATION

19.1 Students must report for registration on the due date mentioned in the admission letter/ e-mail or the information displayed on NDRI website, failing which offer for admission is liable to be withdrawn automatically.

19.2 At the time of registration, the students must produce the following documents:-

a) Original certificates and mark sheets of all the examinations passed from High School or its equivalent.

b) In case of SC/ ST candidate, a certificate from a first class Magistrate of a District/Competent Authority indicating that the candidate belongs to a particular SC/ ST category which is included in the latest list appended to the constitution of India, SC/ ST 1950 and Divyang Certificate from a Govt. Hospital/Medical Board (duly attested by a Gazetted Officer) for verification.

c) Three passport size photographs (which should not be more than 6 months old) for the preparation of ID card/ Hostel Forms.

19.3 The students and the parents will have to submit affidavits as per UGC guidelines not to indulge in ragging or other related activities.

15.0 RAGGING

Ragging in any form is totally banned. As per directives from Hon'ble Supreme Court of India, if any incident of ragging comes to the notice of the authority, the concern student shall be given liberty to explain and if his explanation is not found satisfactory, the authority would expel him from the institute.

16.0 SUMMARY CANCELLATION OF REGISTRATION

23.1 The Director may summarily cancel the registration of any student or group / batch/class of students who indulge(s) in act(s) of indiscipline, misconduct, violation of rules and regulations of the Institute, strikes, absence from classes without permission or without any valid reason or in whose case, the Director has reasons to believe that their continuance in the Institute would not be in the best interest of the Institute.

23.2 The students who have been

permanently dropped from the Institute either on account of poor academic performance or on account of acts of indiscipline, shall not be eligible to make an application for re-admission.

23.3 It is the responsibility of the candidates to furnish full and correct information on the application form. Any admission made on the basis of wrong information supplied by the candidates or through a clerical mistake in the University Office and detected subsequent to the admission and joining of the candidate, would be cancelled at the cost and risk of the student.

17.0 GENERAL INFORMATION

24.1 The selected candidates should join the course by the date indicated in the admission letter/e-mail or as displayed on the website.

24.2 The admission of a candidate who fails to join the course by the stipulated date will stand cancelled automatically.

24.3 Candidates coming from universities other than this institute should produce Migration Certificate from the university from which they have obtained the eligible qualification within three months of commencement of session.

24.4 Once the admissions are finalized for an academic session, there will be no scope for lateral entry via transfer from any other Institutes to the NDRI.

24.5 The Institute reserves the right of admission and also the right to cancel the admission of a candidate at any stage if it is found that the information furnished by the candidate in his/her application is not true or is incomplete.

24.6 While every care is taken to shortlist the eligible candidates for the Entrance Examination and admit only those who have qualified, it is the responsibility of the candidate to fully ensure his/her eligibility. NDRI will not be responsible for inadvertently calling the candidates for the Entrance Examination or in granting them admission. Candidates in their own interest should ensure that the degree of the university from where they have passed the qualifying examination is recognised by the Institute.

24.7 Admission to the Institute implies acceptance by the student and his/her parents/guardian of all provisions given in the bulletin and/or change in the Institute Rules, Regulation, Fee etc. that are made from time to time.

24.8 The information indicated in the Information Bulletin is only for general guidance and could be modified/ changed from time to time by the Institute. The Information Bulletin shall not be treated as a legal document.

24.9 The result of the Entrance Examination declared by the Institute shall be treated as final. There is no provision

for scrutiny of answer books.

24.10 In case of any legal dispute, the same shall be subject to KARNAL court's jurisdiction only.

24.11 The candidates from allied subjects will be required to take remedial courses which will be prescribed on the basis of courses studied for the qualifying degree and background.

18.0 FEES

All fees (see Table below) must be paid on the due date in each Semester. Fees cannot be adjusted against stipends/scholarship. Non-receipt of scholarship etc. will not be considered as a valid reason for late payment of fees. Fees and annual dues once paid will not be refunded to the students leaving the course for any reason what-so-ever. The Fees will be charged by the University/ICAR time to time and will be paid on the due date in each semester. The student will have to pay revised fee if any with the increase in the fellowship amount.

Fee Structure for the Academic Session 2019-20

Sr. No.	Description of Fee	Doctoral Programme
1	Caution Money	10000.00
2	Registration Fee	50.00
3	Tuition Fee (Per Annum)	4000.00
4	Continuation Fee (per semester to be paid by students who are on Physical Exemption)	1000.00
5.	Students Hostel Fee (Annually)	2000.00
6.	**Married Hostel Fee**	
	i. Hostel Fee Per Annum	6000.00
	ii. Electricity & Water Charges	Actual
7	**International Hostel Fee**	
	i. Hostel Fee Per Annum	24000.00
	ii. Electricity & Water Charges	Actual
8.	**Charges for Guest Room in Hostel:** The hostel charges for students/students guests for short stay were recommended as Rs. 50/- per day.	
	ANNUAL PAYMENTS	
9.	Students Council Fee	150.00
10.	Magazine Fee	50.00
11.	Welfare Fund	100.00
12.	Sports Fund	100.00
13.	Cultural and Literary Activities Fee	100.00
14.	Examination Fee (per Annual)	600.00
15.	Thesis Evaluation Fee	600.00
16.	Identity Card Fee	50.00

OTHER CHARGES		
17.	Provisional Degree Certificate	100.00
18.	Duplicate Degree	500.00
19.	Award of Degree in Absentia	600.00
20.	Late Registration Fee	As per rule
21.	Alumni Association	250.00
22.	Migration Certificate Fee	100.00
23.	Duplicate Migration Certificate Fee	500.00
23.	Convocation Fee	100.00

Refund of Caution Money:

Caution money will be refunded to the candidate(s), if they leave the course within one month of the closing of admission and apply for refund of caution money. Further, the caution money will be refunded to all such candidates who leave the course before the closing date of admission and their seat is filled up from the wait-listed candidates in subsequent counselling.

Remittance and Refund of Fees:

If a student chooses to withdraw from the program of study in which he/she is enrolled, the institution concerned shall follow the following four-tier system for the refund of fees remitted by the student.

Sr. No	Percentage of Refund of Aggregate fees*	Point of time when notice of withdrawal of admission is served to University Office, ICAR-NDRI, Karnal
1	100%	15 days before the formally-notified last date of admission
2	80%	Not more than 15 days after the formally-notified last date of admission
3	50%	More than 15 days but less than 30 days after formally-notified last date of admission
4	00%	More than 30 days after formally notified last date of admission

**(Inclusive of course fees and non-tuition fees but exclusive of caution money and security deposit)*

1. In case of (1) in the table above, 10% of the aggregate fees will be deducted as processing charges from the refundable amount.

2. Fees will be refunded to an eligible student within fifteen days from the date of receiving a written application from him/her in this regard.

Note :

a) In-service candidates shall also be required to pay all the fees as applicable in the case of other candidates.

b) The Institute shall reserve the right to recover any kind of dues from the fellowship amount or any other amount payable to the students.

c) Unless specially permitted by the Joint Director(A)/Director, the name of the defaulter shall

stand struck off from the rolls if he/she does not report for registration within a period of two weeks from the date of commencement of the respective semester. She/He may, however, be re-admitted at the discretion of the Joint Director (Academic)/Director on the submission of an application through the Head of Division and on payment of re-admission fee at the prescribed rate and also the fine.

d) The fee and other charges once paid are not refundable. However, the caution money will be refundable only to the passed out students, if claimed within one year of completion of the course. Caution money will not be refunded if the seat-vacated by the student remains vacant.

e) The members of Alumni Association admitted to the higher course will pay the difference, if any.

f) No migration will be required from students passing qualifying examination from NDRI Deemed University.

19.0 ACADEMIC CALENDER

2019-20 SESSION

2019		**FIRST SEMESTER**	
August	1st	Registration and payment of fees	(for fresh students)
	2nd -12th	Foundation Course for fresher	
	13th	Regular Classes Begin	
December	1st	Last Working Day	
	7th	Examination Begin (Tentative)	
2020		**SECOND SEMESTER**	
January	11th	Registration and payment of fees	
	12th	Classes begin	
May	17th	Last Working Day	
	25th	Examinations Begin (Tentative)	

20.0 SYLLABUS FOR ENTRANCE EXAMINATION FOR PH.D

DAIRY MICROBIOLOGY

Units	Unit Name	Syllabus
1.	Microbial Morphology and Taxonomy	Scope and history of Microbiology; Diversity and taxonomy of microorganisms; Cell wall, structure, synthesis and inhibition, cell membrane, ribosomes, capsule, flagella, pili; Principles and functions of light, phase, fluorescent and electron microscopes; Fungi, viruses, viriods, prions
2.	Microbial Physiology	Bacterial growth: phases and kinetics, factors affecting bacterial growth, growth measurement; Bacterial nutrition and growth factors; Active and passive transport, Electron transport chain; Metabolism and bioenergetics, respiration and fermentation, bacterial photosynthesis.
3.	Microbial Genetics	DNA and RNA, DNA structure and replication; Gene Expression and its regulation in Prokaryotes – Transcription, Genetic Code, Translation; Negative and positive regulation of gene expression; Operon Models; Mutations, physical and chemical mutagens, Damage and Repair; Plasmids, transposable elements, Insertion sequences; Bacterial Recombination; Recombinant DNA technology - Restriction enzymes, Plasmid Vectors, PCR and Real Time PCR, Application of genetic engineering in dairying.
4.	Microbiological quality of milk	Microbes in milk, sources of contamination, microbiological changes in milk during production and processing, mastitis; Antimicrobial systems in milk, Role of psychrotrophic, mesophillic, thermophilic and thermodurics in spoilage of milk; Microbiological defects and their control; Food poisoning, infections, toxi-infections and pathogens associated with milk and milk products and their prevention; Biofilms, their role in transmission of pathogens and preventive strategies, Microbiological standards and quality of dairy products (cream, butter, dried and evaporated milk, sweetened condensed milk, frozen dairy products, and indigenous dairy products).
5.	Microbiology of Processed foods	Microbiology of processed foods; Thermal processes for shelf stable-products, low temperature food preservation, concepts in irradiation technology; Biopreservation, Bacteriocins, antimicrobial and antifungal substances; Intermediate moisture foods and hurdle concept, stress induced injury, drug resistance in pathogens, industrial strategies for safe foods; Methods for controlling spoilage of foods; New emerging methods of preservation; Active/intelligent and antimicrobial packaging, modified atmosphere packaging; Milk derived bioactive proteins and peptides; Microencapsulation, GM foods, Functional foods and nutraceuticals.
6.	Starter Cultures	Lactic Acid Bacteria, characteristics of dairy starter organisms : *Lactococcus, Leuconostoc, Streptococcus, Pediococcus, Lactobacillus, Bifidobacterium, Enterococcus, Propionibacterium*; lactose, galactose

		and glucose metabolism, homo- and hetero-lactic fermentation, citrate metabolism and formation of flavouring compounds, proteolytic systems and protein metabolism, Phenotypic and genotypic characterization of LAB; Adjunct starter organisms; Genetics of starter cultures: plasmids; genetic modification of starter cultures; single, mixed, multiple strain, mesophilic, thermophilic starters, propagation and preservation, concentrated and super-concentrated starters, bulk culture systems; Inhibition of LAB by antibiotics, bacteriocins; immunoglobulins and bacteriophage
7.	Fermented milk products and Probiotics	Starter cultures of fermented milks: lactic, yeast-lactic, mould-lactic fermented milk products - dahi, lassi, yoghurt, acidophilus milk, cultured buttermilk, koumiss, kefir, starter cultures of cheeses, microbiology of fresh and ripened cheeses, accelerated cheese ripening, microbiological spoilage and safety of fermented dairy products. Nutraceuticals, probiotics and functional fermented foods (dairy and non-dairy), Mechanism of action of probiotics and their health benefits, and regulations.
8.	Quality Assurance	Microbiological criteria; Sampling methods; Establishment of microbiological standards, guidelines and specifications for milk and milk products; Indicator Organisms; Selection criteria for their use as quality and safety indicators; Conventional and rapid detection methods including commercial kits for indicator and pathogenic bacteria; Characteristics, classification and components of microbial bio-sensors; detector system; Application of microbial bio-sensors in monitoring pathogens, antibiotic and pesticide residues and aflatoxin Ml; Quality assurance in dairying; Bio-safety levels; Standard microbiological practices
9.	Fermentation Technology	Fermenter/ Bioreactor design, Types of fermentation, submerged/solid state, Batch/ continuous fermentation, Fermentation kinetics, Product recovery, Immobilization, Downstream processing, Industrial production of Lactic acid, Industrial production of Penicillin, Industrial production of enzymes, Beta galactosidase, amino acids, vitamins, ethanol and SCP.

DAIRY CHEMISTRY

Units	Unit Name	Syllabus
1.		Milk constituents, their normal contents and physical and chemical nature. Specific compositional differences among milk from various species; Variations in milk composition due to breed, feed, season, stage of lactation and mastitis; Colostrum and abnormal milks, physical properties of milk; Acid base equilibria, oxidation -reduction potential, density, viscosity, interfacial tension, freezing point, electrical conductivity, thermal conductivity, refractive index, milk buffering capacity, physical equilibria among milk salts; Effect of various treatments on salt equilibria.Water activity, and its effect or shelf life; Colloids, properties and colloidal stability of milk; Emulsions, foams

		and gels formation, their stability and importance in dairy processing. Lactose-structure, isomers, physical, chemical and biochemical properties. Browning mechanisms. Estimation and biosynthesis. Lactose intolerance. Significance of carbohydrates in milk and milk products. Distribution of trace elements in milk and their technological and nutritional importance; Water soluble vitamins molecular structure and their levels in milk and milk products, biological significance, and factors affecting their levels.
2.		Nomenclature of milk proteins, Levels, distribution, isolation and genetic polymorphism of different milk proteins; Casein micelles — structure, size distribution, stability and physico-chemical properties; Casein models. Amino acid composition and physico-chemical properties of different fractions of caseins;Whey process,denaturation of milk proteins as influenced by temperature, pH and additives; Biosynthesis, structure, function and physico-che mical properties of α-lactalbumin and β-lactoglobulin , immunoglobulins, lysozyme, lactoferrins, lipoproteins and fat-globule membrane proteins and their importance; Milk protein allergenicity ; Role in immune response; Chemistry of milk enzymes and their significance with reference to milk processing and milk products. Kinetics of chemical reactions and enzyme kinetics; Casein hydrolysate, co-precipitates, and whey protein concentrates; bioactive peptides.
3.		Milk lipids-classification, composition, structure and general physical and chemical properties. Auto-oxidation - definition, theories, factors affecting, prevention and measurement. Antioxidants - mechanism of reaction and estimation. Lipolysis. Fatty acid - profile, properties and affecting factors. Unsaponifiable matter. Cholesterol structure, forms, importance and level in milk. Chemistry of phospholipids and their role in milk and milk products. Fat - soluble vitamins - chemistry, physiological functions, levels in milk, cream, butter and ghee. Biosynthesis of milk fat. CLA biosynthesis and its nutritional and health benefits.
4.		Cream — Size distribution of fat globules, creaming phenomenon, composition and properties of cream and dry cream. Chemistry of neutralization and ripening. Butter. Mechanism of churning during butter preparation. Desi and creamery butter composition, properties, microstructure, grading, standards and defects. Ghee: Compositional differences in ghee prepared by different methods and variations in ghee and butter oil, Analytical constants and factors affecting them. Differences in cow and buffalo ghee. Hydrolytic and oxidative deterioration of ghee, their causes and prevention. Ghee grading, Antioxidants: natural and synthetic. Physico-che mical characteristics of butter milk and ghee residue.
5.		Salt balance and its importance in processing of milk. Heat stability of milk as affected by various milk constituents and additives. Role of protein-protein interaction and age gelation of UHT milk. Physical and chemical changes during preparation of concentrated milk and

		subsequent storage. Compositional differences between condensed and evaporated milk. Dried milk; Structure and physico-chemical properties. Physical properties of instant powder, Infant food. Spoilage of milk powder and its control. Khoa: composition and changes during manufacture. Composition and changes during preparation of chhana and paneer.
6.		Cheese: Composition and varietal differences. Chemistry of rennin action. Influence of acidity, renneting and heat on the process of cheese manufacture. Changes during manufacture and ripening. Role and mechanism of action of stabilizers and emulsifiers, rheological properties and defects of cheese. Milk clotting enzymes from different sources - microbial, animal and plant. Theories and metabolic pathways of fermentation.Dahi, yoghurt and Acidophilus Milk : Composition and specific differences, chemical changes during fermentation, flavour development. Composition of Lassi and buttermilk. Nutritional and therapeutic significance of fermented milk products. Ice cream: Composition and physical structure, changes during ageing, freezing, hardening and defects. Role and mechanism of stabilizers and emulsifiers. Kulfi: composition and differences with ice-cream.
7.		Milk adulteration and detection methods; Adulteration of ghee and methods of detection.Estimation methods for antibiotics, pesticides, heavy metals, lactose, lactate, protein, fat, total solid, salt, vitamin C, calcium, phosphorous, iron, citric acid in milk and milk products. Estimation of vitamin A, total phospholipids and free fatty acids in ghee. Measurement of BOD and COD in dairy waste. Composition and legal standards of milk and milk products.
8.		Definition of quality, quality control and assurance. Standards, statutory and voluntary organization. FAASI act 2006, sampling, labelling, and AGMARK, BIS, standards for milk products. Total quality management, sensory evaluation of milk and milk products. Calibration of glasswares (lactometer, butyrom eter, milk pipette, thermometer) used in Quality control laboratory, legal requirements of packaging material and product information, nutrition labelling.
9.		Principles, theory and applications of spectroscopy-visible, infrared and Ultraviolet. Chromatography-thinlayer chromatography (TLC) gas liquid chromatography (GLC) , High performance liquid chromatography (HPLC), gel filtration, ion exchange and affinity chromatography. Elisa, Atomic Absorption Spectroscopy (AAS), Lateral Flow technique, Electrophoresis (PAGE, SDS-PAGE); Iso-electric focusing, U l t r a - centrifugation, Potentiometry – pH meter and Ion selective electrodes.
10.		Forms of water in foods, water solute interactions, and food stability, solute mobility and food stability; role of ice in the stability of food at sub-freezing temperatures, Starch: Forms, swelling, gelatinization food applications and their role in breadmaking; modification of starches for industrial applications, physico-chemical changes taking place during malting, mutual interactions of hydrocolloids and interactions

		with proteins and lipids; role of hydrocolloids in different food preparations; Functional properties of food proteins; structure-function relationship and their modifications, denaturation of food proteins; effect of pressure on food proteins, enzymes & their application in food industry; physico-chemical properties of food lipids and their modifications; Indigenous and synthetic food pigments; legal requirements for food colourants; flavour compounds of different foods and flavour enhancers; Changes taking place during fermentation; drying and roasting of chocolate and cocoa; chemistry of tea manufacture; composition of coffee beans; physicochemical changes during roasting of coffee beans.

DAIRY TECHNOLOGY

Units	Unit Name	Syllabus
1.	Advanced in Preservation of Milk	Recent advances in dairy industry, unit processes used in the dairy/food industry, chemical preservation of raw milk, bioactive components &bio-protective factors present in milk, application of hurdle technology in dairy processing.
2.	Newer Concepts in Dairy Processing	Microfluidization and its uses in dairy technology, freeze drying and its applications in dairy, UHT processing, condensing and drying of milk and milk products, application of membrane technology in dairy processing, application of microencapsulation in dairy industry.
3.	Fermented Foods	Recent developments in the manufacture of cheeses, fermented milks products, alcoholic beverages, sausages, pickles, fat rich dairy products.**(**
4.	Development in Traditional Dairy Products	Recent developments in the production, processing, packaging and shelf life extension of traditional Indian dairy products.Preparation of dairy by-products and their applications.Physico-chemical, rheological and sensory changes during processing and storage of milk and milk products.
5.	Dairy and Food Additives	Food additives, stabilizers, emulsifiers, acidulants, antioxidants, enzymes, flavouring compounds and texture improvers.Applications of bio-processing aids such as microbial rennets, ripening enzymes, starter cultures, bio-preservation, bioadditivesetc in dairy industry.
6.	Dairy Food Rheology & Alternate Processes in Milk Processing	Rheology and structure of dairy and food products (foam, gels, emulsions). Recent developments in food preservation technologies viz. microwave heating, ohmic heating, ultrasound treatment to foods, high pressure processing, irradiation, pulsed electric field.
7.	Advanced Food Processing	Post-harvest management of fruits and vegetables, slaughtering of animals, post-mortem changes in meat, preservation of meat, curing and smoking of meat.Extrusion processing, bakery and confectionary products.Genetically modified foods, organic foods, oligosaccharide and fiber-enriched dairy products. Phytochemicals in food, herbal supplemented dairy foods.
8.	Functional Dairy	Low calorie foods, food fortification, artificial sweeteners, probiotics,

	Foods	prebiotics, synbiotic dairy products, functional foods, new product development strategies.
9.	Hygiene & Safety of Dairy Products	Cleaning and sanitation of dairy and food processing equipments, ultrasonic cleaning, bacterial bio-films and their removal.HACCP, good manufacturing practices (GMP).
10.	Dairy Food Packaging	Different types of packaging materials, forms and testing of packaging material, modified atmospheric packaging, aseptic packaging, biodegradable and edible packages, active, intelligent and smart packaging technologies, methods of disposal of used packages, migration of toxic materials from packages to the products, packaging of beverages, labelling and coding on packages.

DAIRY ENGINEERING

Units	Unit Name	Syllabus
1.	Fluid mechanics, Rheology, Food Freezing	Basics of fluid mechanics, pumps, Concept of rheology: ideal elastic, plastic and viscous behaviour, viscoelasticity, rheological properties, Food texture, Freezing, freezing curves, freezing time, freezing equipment, freeze drying, freeze concentration.
2.	Evaporation and drying	Evaporation techniques and evaporators, drying fundamentals and type of dryers, spray dryer, equipments for separation and product recovery.
3.	Water activity, Packaging, Membrane technology, Microwave heating	Water activity and its measurement methods, water sorption isotherms, sorption hysteresis, IMF and their application; Permeability and shelf-life, permeability to gases and vapours, measurement methods, permeability of multilayer materials, Membrane types, properties and selection of membrane; microwave heating processes and parameters.
4.	Thermodynamics, Heat and mass transfer	Basics of thermodynamics and heat transfer, vapour and gas power cycles, fins, fin efficiency, effectiveness. Heat Exchangers: classification, LMTD, effectiveness-NTU approach, Fick's law of diffusion, equimodal diffusion, mass transfer coefficients. Dimensionless numbers used in heat and mass transfer
5.	Design of process equipments	Dairy processing equipments, equipment for aseptic processing and packaging, Pressure vessels: codes and regulations, design for pressure and temperature, allowable stress, corrosion control, cylindrical and spherical shells, formed heads, reinforcement openings, tests and non-destructive examination, design and stress evaluation; milk storage tank: horizontal silos, vertical silos, insulated and un-insulated, nozzles and mountings; constructional features and material for high pressure vessels; multi shell construction; solid walled vessel; bracket support; leg support, skirt support, saddle support; construction codes and design considerations for heat exchangers.
6.	Refrigeration and Air Conditioning	Vapour compression refrigeration system: major components and their different types; theoretical and actual vapour compression

		cycle; Effect of operating parameters on COP; multi-pressure commercial refrigeration systems; Vapour absorption refrigeration system. Heat Pumps: Design and construction of cold storage and air-conditioning systems: cooling loads and calculation, Psychometry. equipment selection, insulating materials, vapour barriers, Ice bank tank.
7.	Instrumentation and process control	Elements of generalized measurement system, static and dynamic characteristics of instruments. Transducers for measurement of process variables like temperature, pressure, flow, level, consistency, pH and humidity. Indicating and Recording Devices: Digital indicators, strip and circular chart recorders. Principles of Automatic Process Control: Process characteristics, control system parameters, discontinuous, continuous and composite control modes, PLC.

ANIMAL BIOCHEMISTRY

Units	Unit Name	Syllabus
1.	Cell Biology & Physical biochemistry	Importance of biochemistry, Cell, structure and function; Chromatin structure. Molecular aspects of cell division and cell cycle. Cellular regulation, development and differentiation. pH, water, Henderson-Hasselbalch equation, buffers
2.	Basic Biochemistry	Chemistry, classification, structure and biological importance of carbohydrates, lipids, amino acids, proteins and nucleotides, protein and nucleotide sequencing.
3.	Enzymology	Enzymes: chemistry, kinetics, Factors affecting enzyme action, mechanism of action, metabolic inhibition and regulation; Enzyme immobilization, industrial applications of enzymes
4.	Metabolism	Bioenergetics and biological oxidation, Glycolysis, gluconeogenesis, pentose phosphate pathway, glycogen metabolism, citric acid cycle, oxidative phosphorylation, glyoxylate cycle, fatty acid metabolism, lipid biosynthesis, metabolism of amino acids and nucleotides integration of metabolisms
5.	Nutritional Biochemistry	Fundamental principles of nutrition, nutritional requirements, balanced diet, nutritive value of foods, importance of dietary fiber, assessment of protein quality, deficiency diseases and metabolic disorders; diabetes, food toxins; Vitamins; chemistry and metabolic role of vitamins, vitamins and antioxidants.
6.	Biochemistry of tissues	Connective tissue, muscle, nervous system, skin, blood and other body fluids. Water, electrolyte and acid-base balance. Biochemistry of respiration.
7.	Hormones	Biosynthesis and mechanism of action of steroid and peptide hormones; Feedback mechanisms, Growth factors and their role
8.	Immunochemistry	Adaptive and innate immunity, B and T cell receptors, chemistry of antigen and antibody, molecular basis of immune reaction, major histocompatibility complex, antigen processing and presentation, cytokines, complement system, vaccines, autoimmunity;hybridoma technology;

9.	Molecular biology	DNA replication, transcription and translation; RNA splicing; Genetic code; Mutation: types and induction of mutation, DNA repair, physical and chemical mutagens; Regulation of gene expression in prokaryotes and eukaryotes. Gene transfer: transduction, transformation, conjugation, protoplast fusion. Recombinant DNA technology: DNA sequencing, vectors, plasmids, expression vectors.
10.	Biochemical Techniques	Chromatography:partition,ion-exchanges, adsorption and affinity, TLC, HPTLC, HPLC, Gel Filtration and GLC. Electrophoresis: PAGE, SDG PAGE, agarose gel electrophoresis and isoelectrofocusing; Blotting techniques; Electroblotting, Northern, Southern and Western blotting; Radiotracer techniques: beta and gamma emitters and their detection, solid and liquid counting, autoradiography and phosphor image analysis, isotope dilution technique; Binding assays: RIA and ELISA; Spectroscopy: UV-visible, fluorescence, ORD, CD, NMR, ESR and Mass; PCR & RT-PCR, EMSA and ChiP on Chip

ANIMAL BIOTECHNOLOGY

Units	Unit Name	Syllabus
1.	Basic cell structure:	Cellular organelles structure and function. Chromatin structure.Molecular aspects of cell division and cellcycle. Cellular regulation, development anddifferentiation.DNA as the genetic material. Gene as the unit of mutation and recombination. Identification of Structure of DNA and RNA. DNA replication, kinetics, repair and gene amplification.
2.	Gene Regulation:	Transcription and processingof RNA. Control of transcription andtranslation. Recombination control, modelsand mechanisms. Gene as the unit ofexpression. Colinearity of gene andpolypeptide. Regulation of gene expression.The operon concept, positive and negativecontrol, attenuation control, controlsequences: promotor, operator, terminator and attenuator.
3.	Genetics of prokaryotes :	transformation,transduction and conjugal gene transfer.Extrachromosomal heredity; Biology ofplasmidsdiscovery, types and structure of F,RIF, co-factors. Replication and partitioning.Plasmid vectors of various types. Biology ofbacteriophages. Lambda, P1 and M13. Invitro construction of Bacteriophage vectors.Phages as in vivo vectors. Cosmid vectors andtheir applications. Specialized vectors, expression vectors, promoter probe vectors,gene fusion vectors. Biology of Yeast vectorsand applications.
4.	Genetics of eukaryotes:	Gene linkage and chromosome mapping,crossing over, three point cross, tetradanalysis. Complementation. Organization ofchromosomes, specialized

		chromosomes.Chromosome abnormalities, quantitativeinheritance, population genetics. Somatic cellgenetics.Organization of Eukaryotic genome. Unique and repeat sequences. DNAfingerprinting, RFLP and marker assistedselection.
5.	Techniques in gene manipulation	:cutting and joining DNA, introduction of DNAinto cells. Cloning strategies, construction ofgenomic libraries and cDNA libraries. Probeconstruction, recombinant selection andscreening. Analysis of gene expression. Analysisof recombinant DNA, sequencing, mutagenesis,altered expression. PCR and analysis ofamplified products. Applications of PCR.
6.	Animal tissue culture:	preparation of primaryculture, maintenance of secondary cultureand evaluation of culture dynamics. Cellsynchronization, preservation and revival ofcells. Hybridoma technology and monoclonalantibody production.
7.	History and scope of Immunology	: Types of immunity, innate,acquired, passive and active. Physiology ofimmune response, MI and CMI specificity andmemory. Antigen-antibody reactions.Antigens types, Hapten, immunoglobulinstructure, distribution and function. Cellularinteractions in immune response.
8.	Enzyme Engineering:	Enzyme nomenclature andclassification. General properties of enzymeslike effect of pH, temperature, ions etc.Extraction, assay and purification of enzymes.Enzyme inhibitors. Mechanism of enzymeaction e.g. Lysozyme, chymotrypsin, DNA polymerase, RNase, etc. Zymogens and enzymeactivation. Clinical and Industrial applications of enzymes, Immobilization of enzymes and their applicatons.
9.	Bioinformatics, LPR and Biosafety issues:	Use of Databases in biology sequence database, structural databases, Squence Analysis, protein and nucleic acids, Structural comparisons,genome projects. WTO-GATT & TRIPS.
10.	Application of biotechnology	in Livestockproduction, agriculture, dairying, food,medicine, environment & pollution control,animal biotechnology: embryo transfertechnology, transgenic animal productionand cloning.

ANIMAL GENETICS & BREEDING

Units	Unit Name	Syllabus
1.	Cell Division and Inheritance	Cell structure and function. Mitosis and meiosis, Laws of inheritance, gene interaction, multiple alleles and multiple factors. Maternal effects and cytoplasmic inheritance. Chromosomal theory of inheritance. Sex determination, linkage and crossing over. Mutation-its induction and significance.
2.	Chromosome and Blood Profile of Livestock	Chromosome number and structure, chromosomal aberrations, karyotyping. Structure, replication, transcription and translation of DNA. Blood groups of farm animals. Eukaryotic genome organization.
3.	Polymorphism and its application	Genetic markers and DNA polymorphism, Recombinant DNA technology and its application. Gene mapping in farm animals. Concept of quantitative trait loci, Marker Assisted selection and genomic Selection.
4.	Disease Resistance and Reproductive Bio-techniques	Major histocompatibility complexes and their significance in farm animals. Molecular and reproductive bio-techniques and their applications in livestock improvement. Genetic divergent analysis.
5.	Livestock and Poultry Breeds, Population and Conservation	Breeds of livestock and poultry, Population and performances statistics of livestock and poultry and conservation of animal genetic resources.
6.	Population Genetics	Variance and its analysis. Genetic and non-genetic components of variance. Genotypic-environmental correlation and interaction. Heritability, repeatability, genetic, phenotypic and environmental correlations. Gene and genotypic frequencies; Hardy Weinberg Law; forces changing gene frequency. Theory of path coefficients and its application.
7.	Linear Models and Selection	Linear models-concept and application in animal Improvement programme. Effective population size, genetic load, genetic drift. Basis of selection, individual, pedigree, family and progeny performance, combined selection,
8.	Genetic Evaluation	Progeny testing programme and sire evaluation, sire and animal models, Different methods of selection, selection differential, selection intensity, response to selection, correlated response. Threshold characters.
9.	Breeding Plans, Strategies and Schemes	Systems of breeding; inbreeding and out-breeding; crossbreeding- its impact. General and specific combining ability, heterosis, diallel crossing. Recurrent and Reciprocal Recurrent selection. Breeding plans and schemes of livestock improvement. Role of breed associations in dairy animal improvement.

LIVESTOCK PRODUCTION & MANAGEMENT

Units	Unit Name	Syllabus
1.	CATTLE AND BUFFALO PRODUCTION AND MANAGEMENT	Development of Dairy Industry in India and world –Present status and future prospects of livestock development in India. Important breeds of cattle and buffalo, traits of economic importance and their inter-relationships. Selection of high quality animals. Breeding Management: System of breeding. Methods of Breeding. Prenatal and postnatal care and management of cattle and buffalo. Care of neonate and young calves. Management strategies for reducing mortality in calves, age at first calving and calving interval in cattle and buffaloes. Management of labour, Different laws governing the livestock sectors to produce quality products on par with international standards. Technique of harvesting clean and hygienic livestock products, health management. Wallowing in buffaloes. Management of draught animals and summer management. Feed and fodder resources used for feeding of cattle and buffaloes. Scientific technique of feeding, watering. Computation of practical and economical ration, supply of green fodder around the year and enrichment of poor quality roughages.
2.	LIVESTOCK REPRODUCTION MANAGEMENT	Functional morphology of male and female reproductive organs of farm animals. Managemental strategies for attaining early maturity in farm animals. Heat detection methods, associated problems and their management. Oestrus synchronization, methods and limitations. Artificial breeding and its economic importance. Post A.I. management, pregnancy development and diagnosis. Management of down calvers. Post-partum care. Factors influencing reproductive efficiency in buffalo and crossbred cattle and measures for improvement. Management of calving problem, dystocia, prolapse and retained placenta. Management of breeding bulls. Methods of semen collection, factors affecting quality semen, production, evaluation, processing and preservation of semen. Merits and demerits of different extenders. Planning and management of frozen semen bank and bull station. Handling of frozen semen. Maintenance of records for artificial breeding and frozen semen bank.
3.	LIVESTOCK SHELTER MANAGEMENT	General principles in planning animal houses. Farmstead and animal houses. Selection of site and planning; layouts for livestock farm of different sizes in different climatic zones in India. Farm structures -General principles of construction of enclosures, floor and road. Housing requirements of different classes of Livestock -Preparation of layouts, plans, arrangement of alleys. Fitting and facilities in the houses for horses, dairy cattle, calves, bulls, work cattle, dogs, pigs, sheep, goats, and poultry. Improvement of existing buildings; water supply; feed and fodder delivery systems. Economics of Livestock housing. Housing -Disease control measures and sanitation of all classes of livestock.

4.	POULTRY AND RABBIT PRODUCTION AND MANAGEMENT	Poultry housing systems, litter management and lights for poultry, rearing turkey, duck and quails. Management of chicks, growing, laying and breeding flocks, broiler production, selection and culling of laying flocks. Procuring, care and pre-incubation storage of hatching eggs. Method of incubation, sanitation, disinfection and management of hatchery. Embryonic development and factors effecting fertility and hatchability of eggs. Chick sexing, packing and hatchery business. Importance of rabbit for meat and fur production. Common breeds and strains. System of housing. Common diseases and their control measure. Management of specific pathogen free and gnotobiotic animals, concepts to related to welfare of laboratory animals. Breeding - age at maturity, litter size - Weaning – Feeding of growers – Selection of replacement stock, Transportation of poultry and rabbit.
5.	CLIMATOLOGY AND ANIMAL PRODUCTION	Climate and classification of climatic regions -Climatic factors - Assessment of climate -Study of climatic factors in relation to animal production. Light, natural and artificial light-mechanism of light action - photo period and light responses. Importance of light in production of animals and birds. Introduction of breeds into different climatic regions. Agro meteorology and weather forecasting for Animal Husbandry activities - Micro climate modification in animal houses. Estimation of microclimatic conditions in Animal house. Measurement of Temperature, Relative humidity, Air Velocity and Mean temperature of the surrounding, measurement of intensity of light in animal houses. Construction of climographs and hythergraphs - Estimation of cooling power of atmosphere heat tolerance test in bovines.

ANIMAL NUTRITION

Units	Unit Name	Syllabus
1.	Energy and protein:	The classification and chemistry of carbohydrates, fats, proteins and their sources. Chemistry of cell wall constituents. Recent methods such as CNCP for feed analysis . Fundamental concepts of Digestion and metabolism of Carbohydrate Fat and Protein in different species of animals. Metabolism of Volatile fatty acids. Gluconeogenesis, Recent advances in glucogenic precursors on acetate utilization. NPN metabolism, urea fermentation potential and metabolizable protein. Amino acids imbalance, antagonism and toxicity. Measurements of digestibility and feed energy. Partitioning of feed energy. Energy balance, Fasting catabolism. Direct and indirect calorimetry. Metabolizable and net energy systems and their relevance for tropical situation. Prediction of energy value of feeds. Factors affecting energy and protein utilization.Efficiency of energy and Protein utilization. Feeding standards- comparative appraisal and limitations. Rumen degradable Protein (RDP), and rumen undegradable protein (UDN) and Kinetics. Energetics of protein synthesis and turn

		over. Quantification of microbial protein synthesis. Protein quality determination in monogastrics and ruminants.Energy and protein interrelationship. Determination of energy and protein requirements. Energy and protein requirement for maintenance, growth, pregnancy and lactation in ruminants, companion animals and poultry.
2.	Vitamins and minerals:	Essential minerals, general role of minerals. Macro elements and micro elements, their distribution, metabolism, physiological functions, deficiencies and excesses, requirements and sources. Probable essential minerals. Toxic minerals. Soil-plant-animal-human relationship, requirement of minerals, factors affecting requirements. Distribution of minerals in different herbages, in different agro-climatic zones. Mineral surplus / deficient regions. Definition, history, classification, chemistry, functions, deficiencies and excesses, requirements and sources of water soluble and fat-soluble vitamins. Vitamin content of different feeds. Mineral content of feeds. Critical minerals for ruminants and non-ruminants, content of different vitamin feeds, chelates and chelated minerals. Inter-relationship of minerals with other nutrients. Impact of minerals arising from industrial affluent on animal health and production. Critical limits of minerals in edible herbages. Bioavailability studies in minerals. Impact of minerals on reproduction. Minerals and immunity status of animals. Micronutrients and immunity status of animals. Area specific minerals. Relationship of vitamins with hormones. Critical vitamins for ruminants and non-ruminants. Feed additives including probiotics Prebiotics, Symbiotics and feed enzymes. Research techniques in mineral and vitamin nutrition.
3.	Monogastric system:	Nutrients, their metabolism and requirements for poultry and swineduring different stages of growth and production. Limiting iminoacids-lysine and methionine.Feeding systems and feed additives, feed formulations for different purposes including least cost rations.Quality control of poultry and swine rations for efficient egg and meat production.Nutrition in relation to disease and stress.Nutritional factors affecting quality of the products. Hind gut fermentation and its importance, Nutrient requirements of rabbits and equines, Nutritional manipulation for producing value added egg, meat / pork. formulation and compounding of general and least cost rations.
4.	RUMINANT NUTRITION:	Nutrients and their metabolism with special reference to milk, meat and wool production. Feeding standards, their history, comparative appraisal and limitations.Classification of feedstuffs. Nutrient requirements for calves, heifers, dry, pregnant and lactating cows, buffaloes, sheep and goat.Introduction to rumen microflora and fauna. Development

		of rumen. Defaunation and animal productivity rumen fungi, NPN compounds,microbial Protein synthesis. Role of milk replacers and calf starters Feed formulation of large and small ruminants for different physiological stages. Concept of complete feed. Limiting nutrients and strategic feeding of high yielding ruminants. Concept of by-pass nutrients and their impact on production, reproduction and immune status. Importance of CLA, omega fatty acids, Scope for value addition in milk, Different systems of feeding buffalo for beef production.. Feeding during natural calamities, feeding in various agro-climatic zones of India.
5.	Feed Technology:	Importance of feed technology in relation to animal productivity and constraints in India. Procurement, sampling, quality control, storage of feeds and Inventory control. Familiarisation of various feed mill equipments, layout and operations. Problems of feed manufacturing units and control measures. Safety aspects. Introduction to least cost formula feed manufacturing including principals of material handling, grinding, mixing, pelleting block (frequents) and other major processing operations. Testing of efficiency of equipments, Crumbling, Flaking, Popping, Extrusion. BIS specifications of feeds and good manufacturing practices. Automated feed mill. Personal management in feed plants, laws and regulation of feed manufacturing industry. Codex alimentarius , HACCP. Organizational charts for small, medium and large feed plants, labour standard planning and production programme, handling of plant equipment. Merits and demerits of automated feed plant. Hazards in feed plants. Feed packaging. Safety and Health loss control management. Processing of crop residues and fodders for their preservation and enhanced nutrient utilization.
6.	Antimetabolites and toxic principles:	Present and future feed requirements and current availability for livestock and poultry. Use of non-traditional feeds - By-products of agricultural, industrial, food processing units and forest by-products. Evaluation by chemical and biological methods. Formulation of economical rations. Level of inclusion of various non conventional feeds in livestock ration Classification of toxic principles in animal feedstuffs. Chemico-physical properties of various toxins. Effect of toxins on biological system and nutrients utilization in different species of livestock. Detoxification of toxin principles by various physical, chemical and biological techniques. Insecticide and pesticide residue detection.

ANIMAL PHYSIOLOGY

Units	Unit Name	Syllabus
1.	Digestion physiology	Digestion, absorption and metabolism of nutrients in ruminants and non-ruminants, role of saliva, Digestion of bypass fat and protein, GI hormones, digestion, avian digestion. Physiological role of fat and water soluble vitamins and minerals.
2.	Renal functions and respiratory physiology	Control of respiration, diffusion and transport of gases. Kidney functions and urine concentration. Water and electrolyte homeostasis.
3.	Blood circulatory system	Cardiac cycle and function. Dynamics of blood circulation and control of cardiac functions. ECG Haematopoesis, haemostasis and micro-circulation.
4.	Nervous system	Nerve conduction and impulse transmission, receptors, central nervous system, autonomic nervous system. Skeletal muscle and muscle contraction. Special senses.
5.	Environment physiology	Environmental components and their effect on animal production. Thermal balance, Homeothermy and heat tolerance in dairy animals. Macro and microclimates. Animal housing zone of comfort, high attitude Acclimatization.
6.	Bioenergetics and growth	Thermodynamic laws and energy transformation. Growth curve, energetic efficiency of work, growth and milk production, prenatal and postnatal growth.
7.	Endocrinology	Anatomy and histology of endocrine glands, their secretions and functions. Neuro-endocrine mechanisms. Mode of action of protein and steroid hormones. Hypothalamo-hypophyseal gonadal relationship. Endocrine disorders. Puberty and its endocrine control,
8.	Semen physiology	Spermatogenesis and oogenesis. Functional anatomy of spermatozoa. Factors affecting sperm production and maturation,. Sperm capacitation and fertilization.
9.	Reproductive physiology	Anestrus and estrous cycle, Folliculogenesis, ovulation and corpus luteum formation. Factors affecting conception rate and reproductive efficiency. Role of placenta, physiology of parturition. Induction of parturition. Biotechniques in animal reproduction.
10.	Lactation physiology	Anatomy of mammary system. Mammary gland development. Hormonal control of mammogenesis, lactogenesis, galactopoiesis and homeorhesis, neural control of lactation. Mammary involution. Synthesis of milk constituents, residual milk, milking frequency and milking rates. Clean milk production, Somatic Cell Counts, factors affecting yield and composition of milk. Induced lactation.

AGRICULTURAL ECONOMICS / LIVESTOCK ECONOMICS

Units	Unit Name	Syllabus
1.	Microeconomics	Theory of demand, firm, market and distribution, general equilibrium and welfare economics
2.	Macroeconomics	National income accounting; consumption function, income and spending: multiplier, theory of money, investment, employment and inflation, monetary and fiscal policy, basic concepts of international trade, WTO
3.	Production Economics	Farm management principles and decisions; farm business analysis; production function; production relationships, duality of production function, cost concepts; economic efficiency and optimization, risk and uncertainty
4.	Research Methodology and Statistical methods	Methods of sampling, data collection and presentation of results. Elements of statistics, Index numbers, time series, Correlation.
5.	Linear Programming and Mathematical methods	Linear programming: Decision making, simplex method, economic applications of differential calculus and matrices.
6.	Econometrics	Regression, least squares estimation and problems in estimation of parameters; BLUE properties of least square estimates, tests of significance, forecasting, problems of multicollinearity, auto-correlation and heteroscedasticity
7.	Agricultural development Policy analysis	Economic development and growth; Theory of agricultural development and various growth models; Development issues and policies
8.	Agricultural Marketing & Price analysis	Market and marketing functions, systems efficiency and margins, price behaviour and analysis of farm products
9.	Agricultural finance	Capital and credit availability, requirement and management; financial tests, Project appraisal techniques
10.	Indian Economy	Agricultural/ dairy cooperatives, Indian and global economic scenario, recent public and private initiatives for agricultural, dairy and rural development

AGRICULTURAL EXTENSION EDUCATION / VETERINARY EXTENSION EDUCATION

Units	Unit Name	Syllabus
1.	Extension Education	Concept, Importance, history of Extension in India and abroad with special emphasis to Dairy development, Extension education, adult education and distance education. Various extension methods and approaches. Theories of adult learning. Scope and role of extension in Dairy and rural development in India. ICAR and SAU systems, various agencies involved in Extension in India. Teaching and learning process. ITKs. Various development programmes in India. Linkages-concept and implications in Dairy extension.
2.	Communication	Concept, theories, channels models. Communication competence, empathy, message design and treatment, social networks.Innovation decision process. Diffusion an adoption – a critical appraisal. AV aids and Multi-media projection and computer aided teaching aids for dairy and animal husbandry extension. ICTs in agricultural and rural development problems, prospects and types. Information kiosks. AKIS, Basics of Agricultural Journalism.
3.	Extension Management	Concept, theories. Evolution of management sciences. Administration and supervision. Functions of management. Communication in management. Decision making. Organizational behaviour, Organizational climate, Organizational development. MBO, LFA and project management techniques. Stress management and conflict management.
4.	Programme planning	Objectives, principles and steps in programme planning process. Role of extension agencies, local leaders, farmers and institutions in planning and implementation of need-based programmes. Genesis, nature and principles of planning. Five Year Plans with reference to dairy and animal husbandry development. Concept, principles, types and methods of evaluation. Importance of monitoring various dairy development programmes. Needs assessment–meaning, importance, classification and steps. Concept of FSR, Participatory Approaches- Rapid Rural Appraisal (RRA) and Participatory Rural Appraisal (PRA) Project management techniques- PERT,CPM. Project formulation, logical frame work.
5.	Training Methods	Training for HRD: Concept, present status, future needs. Models, typology, methods and evaluation. Training institutes in India. Experiential learning techniques. Capacity building in relation to livestock farming. TNA and CONA. Entrepreneurship development – concept and importance.
6.	Psychology in Extension	Meaning, scope and importance of psychology. Concept, nature, theories and measurement of Attitude, aspiration,

		motivation, perception, Personality. Learning principles, theories of learning and experiential learning.
7.	Rural Sociology	Basics of rural sociology, rural structure, culture, norms, institutions, group dynamics, rural leadership. Theories of social change. Concept and types of groups; attraction, coalition, communication and power; Factors affecting group performance; Conflicts in groups; Group belongingness.
8.	Research Methodology	Research methods in extension science: Social research – concept, types, importance. Scientific approach, characteristics of scientific methods. Theory and hypothesis. Variables – Concept and Construct. Steps in research formulation. Research designs. Data collection – methods and tools. Measurement – concept, levels and tools. Reliability and validity. MAX-MIN-CON principle. Processing of data. Report writing. Action research and participatory research.
9.	Statistical Methods	Statistics in Extension Science: Sampling, distribution, tests of significance, ANOVA, correlation, regression, discriminative scale construction. Parametric and nonparametric statistics. Statistical packages for analysis in social sciences.
10.	Advances in Extension	Recent advances in Extension science: Public private partnership in extension. Privatization of extension in India. Market led extension initiatives. Agri-clinics and Agribusiness centres. NATP, NAIP, SREP, FSRE, Kisan call centres, expert system in extension.

VETERINARY GYNAECOLOGY & OBSTETRICS

Units	Unit Name	Syllabus
1.	Anatomy of male and Female reproductive organs	Development of male and female reproductive system, sex determination and differentiation. Functional anatomy of male and female reproductive system of farm animals.
2.	Neuro-endocrine regulation of reproduction	Hormonal regulation of male and female reproduction, Reproductive hormones, Source of hormones, hormones and their classification, mechanism of action of hormones, effect of hormones on different target organs and clinical uses of hormones.
3.	Reproductive cycles in female animals	Growth, puberty and sexual maturity, Physiology of puberty, Factors affecting the attainment of puberty and sexual maturity, strategies to reduce age at sexual maturity. Reproductive cycles (oestrous cycle) in farm animals, Phases of estrous cycle, endocrine control of estrous cycle, folliculogenesis, oogenesis, follicular dynamics, endocrine, autocrine and paracrine factors involved in follicle development, ovulation and its mechanism, corpus luteum, and its dynamics.

4.	Gamet transport, fertilization and post fertilization events in female reproductive tract.	Transport of male and female gametes in female reproductive tract, fertilization, implantation and maternal recognition of pregnancy. Embryonic and fetal developments, placentation, different types of placentation, functions of placenta, pregnancy, hormonal changes during pregnancy and its diagnosis by various methods. Pseudo-pregnancy and its treatment. Accidents during the gestation period, abortion- causes, diagnosis and prevention.
5.	Parturitions and post parturient events in farm animals	Pelvis and pelvimetry, Parturition–Signs approaching parturition, initiation and stages of parturition, induction of parturition and postpartum period. Normal fetal disposition, Causes and forms of dystocia and its handling, epidural anesthesia, Obstetrical maneuvers including fetotomy and Caesarean section. Postpartum complications in domestic animals, retention of placenta, uterine proplapse, and their etiopathology, and treatment, etiology and pathogenesis of postpartum uterine infections and therapeutic approach. Postparturient metabolic disorders and management.
6.	Fertility and forms of Infertility in female animals	Fertility, infertility and sterility, Evaluation of herd fertility, Incidence and economic role of infertility, forms of infertility, congenital and hereditary defects, infectious diseases, Pathological conditions of ovary, oviduct, uterus, cervix and vulva. Managemental causes of infertility, Hormonal causes of infertility, anestrus, repeat breeding, cystic ovarian degeneration. Immunological causes of infertility. Immuno-modulation of fertility. Sexual health control and reproductive health programmes, sexually transmitted diseases.
7.	Thermoregulation of testes, spermatogenesis process and seminal plasma composition in farm animals. Sexual behavior and evaluation of semen parameters.	Thermoregulation of testis and blood testis barrier, Spermatogenesis, sperm transport, maturation and storage in male genital tract, accessory glands and their secretion. Sexual / mating behavior, Training of bulls for semen collection, methods of semen collection, Semen and its composition, biochemistry of semen and sperm metabolism, Sperm abnormalities and its classification, evaluation of semen, sperm function tests. Semen preservation and extenders for semen preservation at different temperature. Semen additives. Cryopreservation of semen, cold shock and ultra-low temperature shock, cryoprotectants, evaluation of frozen semen.
8.	Handling of Frozen semen	Handling of frozen semen. Factors affecting semen quality, fertilizing capacity of spermatozoa.

9.	Insemination Techniques in farm animals and Forms of infertility in male animals.	Insemination techniques for farm animals. Diseases transmitted through semen. Assessment of male fertility, Factors affecting male fertility. Causes of male infertility, impotentia coeundi, generandi, testicular hypoplasia, testicular degeneration, vices of male animals. Breeding soundness evaluation.
10.	Assisted Reproductive Technologies in Farm Animals	Synchronization of estrous cycle in domestic animals, control of ovulation, Embryo transfer technology, in-vitro fertilization, Micromanipulation of embryos, Embryo splitting and cloning, Stem cells and production of transgenic animals, applications of ultrasonography, laparoscopy and ovum-pick up technology in animal reproduction. Sexing of spermatozoa.

AGRONOMY

Units	Unit Name	Syllabus
1.	Crop Ecology and Physiology	Crop plants in relation to environment, concepts involved in growth analysis; seed and germination; transport and partitioning; quantitative agro-biological principles and their validity; classification of climate, agro-climatic zones of India, their characteristic features; physiological limits of crop yield and variability in relation to the agro-ecological optimum; Concepts of photosynthesis, respiration, transpiration, photoperiodism, vernalization, plant growth hormones and climate resilient agriculture.
2.	Crop Production	Importance of Agriculture in national economy; basic principles of crop production; climate change impacts on crop production; cultivation of major cereals, pulses, oilseeds, forage and commercial crops; agrostology and agroforestry; Introduction, origin, history, production, distribution, improved package and practices of crop production, varieties, quality biomass production and bioenergetics of major field and forage crops, Grassland and Pasture Management, Year round fodder production systems and their management, Importance and methods of fodder conservation in animal nutrition. Anti-quality factors and their management in fodder crops. Principles of field preparation and crop establishment, Tillage – concepts and types, Resource conservation technologies (RCT's), conservation agricultural and carbon sequestration. Use of common farm implements- primary and secondary tillage implements, seed drills, seed planters, zero till implements, fertilizer broad casters, bailers, chaff cutters, harvesters, reapers and combines. Principles and practices of organic farming, contract farming, protected, precision and sustainable agriculture.

3.	Weed Management	Principles and practices of weed control in component crops and cropping systems; herbicide classification, crop weed competition, weed shifts in cropping system, herbicide resistance, herbicide-formulations, their classification, selectivity and mode of action, bio-herbicide, integrated weed management, herbicide residue management
4.	Soil Fertility and Fertilizer Use	Soil and its physical, chemical and biological properties, factors affecting the soil fertility and productivity. Major soils of India and its characteristics, land capability classification. Soil fertility and its management; Indices of soil health, essential plant nutrients, their functions and deficiency symptoms in plants; Recycling of organic waste and residue management, organic manures, chemical and bio-fertilizers and fertilizer usage. Measures to improve fertilizer use efficiency, concept of slow release fertilizers, nano fertilizers, principles involved in time and methods of fertilizer application. Nutrient requirements of important crops and cropping systems. Integrated nutrient management. Problem soil and their distribution in India, reclamation and management of problem soils, use of amendments and conditioners and environmental concerns related to higher use of agro-chemicals.
5.	Agricultural Statistics and Economics	Elements of statistics, Principles of experimental designs, analysis and interpretation of data, methods of statistical analysis and statistical designs. Techniques for increasing the precision for an experiments. Principles of agricultural economics, structural transformation in economy and its globalization; contribution of agriculture in world and Indian economy; principles of Farm Management; Important rural development programmes in India; organizational set up of agricultural research, education and extension in India
6.	Irrigation water management	Water resources in India, major irrigation projects, history of irrigated agriculture, soil-water plant relationship, crop water requirements, soil moisture stress and plant growth; concept of irrigation scheduling, physiology of water uptake, drought resistance and mechanisms of drought tolerance and crop adaptability under stress, soil moisture conservation techniques, water harvesting and other agro techniques; measurement of soil moisture, measurement of flowing/ storage/discharge of water, methods of scheduling irrigation, methods of irrigation, quality of irrigation water; watershed management concepts; management of excess soil water, agricultural drainage- conjunctive use of water, irrigation efficiencies, design of irrigation structure.
7.	Sustainable land use system	Concept of sustainability, alternate land use system, cropping systems - principles and practices; changing cropping patterns in

		different agro climatic zones; concept and practices; shifting cultivation, agro-forestry, social forestry, concepts and practices viz agri-silviculture, agri-horticulture, silvi-pastoral, agri-silvi-pastoral, agrihorti-silvipastoral, pisciculture, apiculture, alley cropping etc.
8.	Dryland agronomy	Concept of Dryland and rainfed farming, constraints in dryland agricultural, rainfall analysis and length of growing season, types of drought and its management, crop adaptations, crop diversification, conservation cropping and mid season correction for aberrant weather condition, in-situ moisture conservation techniques, runoff and infiltration, top dressing, foliar application, aqua-fertigation, importance of watershed in Dryland areas, antitranspirant, wind-brakes and shelter belts. Soil erosion, water erosion, use of poor quality water for irrigation, wasteland management

FOOD SAFETY & QUALITY ASSURANCE

Units	Unit Name	Syllabus
1.	Basic Concepts of Food Safety and Quality Assurance	Definition and Terminology; Current changes in global food safety standards and their harmonization; HACCP concept, principle and application in food industry; General Principles, Fundamentals and Standards requirements of QMS (ISO: 9000:2000); TQM tools and techniques; Biosafety concept, principles and safety levels; EMS/Laboratory Management System-ISO: 17025; NABL Accreditation of Food Laboratory; Statistical Quality Control.
2.	Concept of Risk Analysis	Microbiological risk profile of pathogen/toxins, ICMSF Risk Ranking of Dairy Products; Risk Management Issues and Control Strategies for dairy products; Food infection, intoxication and toxi-infection; Growth /survival of pathogens, their pathology of illness, mode of transmission, virulence and infectivity.
3.	General Principles of Food Law	Integrated Food Law and its harmonization; Standards, Specifications and guidelines; 2 and 3 class sampling plan; FSSAI Microbiological criteria for different foods including dairy products; Conventional / rapid detection methods/commercial kits for hygiene and safety indicators; Bio-sensors and their current application in food safety evaluation.

4.	Food Microbiology	Classification of food related microorganisms, Sources of contamination, Types of food spoilages of raw and processed fruits, vegetables, meat and fish and milk products, preservative principle, microbial defects and their control measures, Role of different Bacteria in food fermentation; Clean milk production and antimicrobial systems in raw milk; Microbiological aspects of bactofugation, thermization, pasteurization, sterilization, boiling, UHT, non-thermal processes and membrane filtration techniques; Microbiological quality of cream and butter, ice cream, evaporated and condensed milk, dried milks, infant dairy foods, heat desiccated, acid coagulated, fermented and frozen products.
5.	Food Quality Analysis	Setting up of quality control labs; Accreditation of Quality control laboratory and Role of national & International organization viz. IDF; CAC; AOAC; WTO, BIS; CCFS; FSSAI and Agmark; Sampling techniques for chemical analysis of foods with respect to Macro & micro food nutrient analysis by colorimetric, spectrophotometric, flourimetric and chromatographic techniques; Definition and importance of sensory evaluation and General rules of sensory evaluation; Requirements of sensory evaluation; Techniques of sensory evaluation: types of tests and ranking, scoring techniques; Detection of Chemical contaminants /residues: pesticides; antibiotics; heavy metals; radionuclides etc.
6.	Chemistry of milk and milk products	Definition, composition and level of various constituents of milk; Physical properties of milk; Chemistry of major milk constituents- carbohydrates; proteins, enzymes, lipids, vitamins and salts; Effect of various processing variables on the constituents of milk; Chemistry of milk products; Composition and legal standards of milk and milk products; Reaction kinetics; Role of enzymes as a biological catalysts; Water activity and its role on shelf-life of milk products; Chemistry of oxygen in relation to auto-oxidation of milk fat, thermal oxidation; Emulsions, foams, gels-their formation, structure and stability; Functional properties of major food ingredients- starch, proteins and lipids; Hydrocolloids and interactions with proteins; legal requirements for food colorants.
7.	Research techniques	Principles, theory and applications of spectroscopy - visible, infrared and ultraviolet; Chromatography - thin layer, gas liquid, high pressure liquid chromatography (HPLC), gel filtration, ion exchange and affinity; Electrophoresis (PAGE, SDS-PAGE); iso-electric focusing, ultra-centrifugation, potentiometry - pH meter and ion selective

ANTI-RAGGING MEASURES: SUBMISSION OF AFFIDAVIT BY THE STUDENTS/PARENT/GUARDIAN

Dear Parents/Guardian/Student,

You are fully aware of the orders of the Government and of Hon'ble Supreme Court on the Anti-Ragging measures. As per the latest policy all students and parent/guardians are required to submit an affidavit before a student is allowed registration in the University. The Format of Affidavits isgiven at Annexure- I and Annexure-II and to be submitted on a Non-Judicial paper of Rs.10/- duly attested by the oath commissioner.All parents/guardian/students may get them duly attested by the Oath commissioner and bring it on the day of student's registration. Kindly note that there are two Affidavits as Annexure-I&II.The Annexure-Iis to be signed by the student and Annexure-II shall be signed by the parent / guardian.

In case a student does not submit the same he/she shall not be allowed to proceed with the registration. It is further, requested that this information be passed amongst friends.

Best wishes, Sd/-Director

ANNEXURE-I

AFFIDAVIT BY THE STUDENT

1) I, _____(full name of student with admission/ registration/enrolment number) S/o D/o Mr. /Mrs. /Ms. _____ , having been admitted to (name of the institution) , have seen the UGC Regulations on Curbing the Menace of Ragging in Higher Educational Institutions, 2009, as placed on the NDRI website**www. ndri.res.in** (hereinafter called the —Regulations) carefully read and fully understood the provisions contained in the said Regulations.

2) I have, in particular, perused clause 3 of the Regulations and am aware as to what constitutes ragging.

3) I have also, in particular, perused clause 7 and clause 9.1 of the Regulations and am fully aware of The penal and administrative action that is liable to be taken against me in case I am found guilty of or abetting ragging, actively or passively, or being part of a conspiracy to promote ragging.

4) I hereby solemnly aver and undertake that –

a) I will not indulge in any behaviour or act that may be constituted as ragging under clause 3of the Regulations.

b) I will not participate in or abet or propagate through any act of commission or omission that may be constituted as ragging under clause 3 of the Regulations.

5) I hereby affirm that, if found guilty of ragging, I am liable for punishment according to clause9.1 of the Regulations, without prejudice to any other criminal action that may be taken against me under any penal law or any law for the time being in force.

6) I hereby declare that I have not been expelled or debarred from admission in any institution in the country on account of being found guilty of, abetting or being part of a conspiracy to promote, ragging; and further affirm that, in case the declaration is found to be untrue, I am aware that my admission is liable to be cancelled.

Declared this _____day of _____ month of _____year.

Signature of Deponent

& Name

VERIFICATION

Verified that the contents of this affidavit are true to the best of my knowledge and no part of the affidavit is false and nothing has been concealed or misstated therein. Verified at ……(place)…….on this the…… (day……..) of ……. (month),……(year).

Signature of Deponent

Solemnly affirmed and signed in my presence on this the (day) of (month), (year) after reading the contents of this affidavit.

OATH COMMISIONER

ANNEXURE-II

AFFIDAVIT BY PARENT /GUARDIAN

1) I, Mr. /Mrs. /Ms. _____ (full name of parent/guardian) father/mother/guardian of , (full name of student with admission /registration /enrolment number), having been admitted to the ICAR-National Dairy Research Institute , have been informed about the UGC Regulations on Curbing the Menace of Ragging in Higher Educational Institutions, 2009, (hereinafter called the Regulations),carefully read and fully understood the provisions contained in the said Regulations as placed on NDRI website (www.ndri.res.in).

2) I have, in particular, perused clause 3 of the Regulations and am aware as to what constitutes ragging.

3) I have also, in particular, perused clause 7 and clause 9.1 of the Regulations and am fully aware of the penal and administrative action that is liable to be taken against my ward incase he/she is found guilty of or abetting ragging, actively or passively, or being part of a conspiracy to promote ragging.

4) I hereby solemnly aver and undertake that

a) My ward will not indulge in any behavior or act that may be constituted as ragging under clause 3 of the Regulations.

b) My ward will not participate in or abet or propagate through any act of commission or omission that may be constituted as ragging under clause 3 of the Regulations.

5) I hereby affirm that, if found guilty of ragging, my ward is liable for punishment according to clause 9.1 of the Regulations, without prejudice to any other criminal action that may be taken against my ward under any penal law or any law for the time being in force.

6) I hereby declare that my ward has not been expelled or debarred from admission in any institution in the country on account of being found guilty of, abetting or being part of a conspiracy to promote, ragging; and further affirm that, in case the declaration is found to be untrue, the admission of my ward is liable to be cancelled.

Declared this_____day of_____ month of _____year.

_____

Signature of Deponent

Name & Address:
Telephone/Mobile No:

VERIFICATION

Verified that the contents of this affidavit are true to the best of my knowledge and no part of theaffidavit is false and nothing has been concealed or misstated therein.
Verified at _____(place) on this the _____ (day) of _____ (month),_____(year).

Signature of Deponent

Solemnly affirmed and signed in my presence on this the _____(day) of _____(month),_____(year) after reading the contents of this affidavit.

OATH COMMISSIONER

ANNEXURE-III

SCHEDULED CASTE/TRIBE CERTIFICATE

FORMAT CASTE CERTIFICATE

1. This is to certify that Shri/Smt/Kumari.....Son/Daughter of ..... Date of Birth ..... of village/town .....in District/Division of State/Union Territory .....belongs to the .....Caste/Tribe which is recognized as SC/ST under The Constitution (Scheduled Caste) Order, 1950. The Constitution (Scheduled Caste) Union Territories Order, 1951. The Constitution (Scheduled Tribes) Union Territories Order. 1951, as amended by the SCs And STs List (Modification) Order. 1950. The Bombay Re-organisation Act, 1960; The Punjab Reorganization Act, 1966; The State Of HP Act, 1970; The North Eastern Areas (Re-organisation) Act, 1971 and the SCs And STs Order (Amendment) Act, 1976. The Constitution (Jammu & Kashmir) SC Order, 1956. The Constitution (Andaman & Nicobar Islands) SC Order 1959 as amended by SCs and STs Order (Amendment) Act, 1976. The Constitution (Dadra And Nagar Haveli) SCs Order, 1962. The Constitution (Dadra And Nagar Haveli) STs Order, 1962. The Constitution (Pondicherry) SCs Order, 1964. The Constitution Scheduled Tribes (Uttar Pradesh) Order. 1967. The Constitution (Goa, Daman & Diu) SCs Order, 1968. The Constitution (Nagaland) STs Order. 1970. The Constitution (Sikkim) SCs Order, 1968.

2. Shri/Smt/Kumari .....and/or his/her family ordinarily reside(s) in Village/ Town ..... of District.....of State/Union Territoryof.....

3. Applicable in the case of SC/ST persons who have migrated from State/Union Territory Administration to another State/Union Territory. The certificate is issued on the basis of the SC/ST Certificate toShri/Smt.....father/mother of Shri/Smt/Kumari..... of Village/Town ..... in District/ Division..... of theState/Union Territory ..... who belongs to the .... Scheduled Caste/ Scheduled Tribe in the State/Union Territory issued bythe ..... (Name of the prescribed authority) vide their No ..... Dated.....

Signature
Designation (With Seal of Office)

Place..... (State/Union Territory)
Date.....

*Please delete the words which are not applicable. Please quote specific presidential order.
NOTE: The term ordinarily reside(s) used here has the same meaning as in section 20 of the representation of the people's act, 1950.

List of Authorities Empowered to Issue SC/ST Certificates

1. District Magistrate/Additional District Magistrate/Deputy Commissioner/Additional DeputyCommissioner/ Deputy Collector/1st Class Stipendiary Magistrate/City Magistrate/Sub-divisionalMagistrate/Taluka Magistrate/Executive Magistrate/Extra Assistant Commissioner not below therank of 1st class Stipendiary Magistrate.
2. Chief Presidency Magistrate/Additional Chief Presidency Magistrate/Presidency Magistrate
3. Revenue Officers, not below the rank of Tehsildar
4. Sub-divisional Officer of the area where the candidate and/or his family normally resides
5. Administrator/Secretary to Administrator/Development Officer (Lakshadweep Islands)

ANNEXURE-IV

FORM OF CERTIFICATE TO BE PRODUCED BY OTHER BACKWARD CLASS (OBC APPLYING FOR ADMISSION TO CENTRAL EDUCATIONAL INSTITUTIONS (CEIs), UNDER THE GOVE RNMENT OF INDIA

This is to certify that Shri/Smt./Kum. _____ Son/Daughter of Shri/Smt. _____ of Village/Town _____ District/Division _____ in the _____ State belongs to the _____ Community which is recognized as a backward class under:

(i) i. Resolution No. 12011/68/93-BCC(C) dated 10/09/93 published in the Gazette of India Extraordinary Part I Section I No186 dated 13/09/93.

ii. Resolution No. 12011/9/94-BCC dated 19/10/94 published in the Gazette of India Extraordinary Part I Section I No. 163 Dated 20/10/94.

iii. Resolution No. 12011/7/95-BCC dated 24/05/95 published in the Gazette of India Extraordinary Part I Section I No. 88 Dated 25/05/95.

iv. Resolution No. 12011/96/94-BCC dated 9/03/96.

v. Resolution No. 12011/44/96-BCC dated 6/12/96 published in the Gazette of India Extraordinary Part I Section I No. 210 Dated 11/12/96.

vi. Resolution No. 12011/13/97-BCC dated 03/12/97.

vii. Resolution No. 12011/99/94-BCC dated 11/12/97.

viii. Resolution No. 12011/68/98-BCC dated 27/10/99.

ix. Resolution NO. 12011/88/98-BCC Dated 6/12/99 published in the Gazette of India Extraordinary Part I Section INo. 270 dated 06/12/99.

x. Resolution NO. 12011/36/99-BCC dated 04/04/2000 published in the Gazette of India Extraordinary Part I Section I No. 71 dated 04/04/2000.

xi. Resolution NO. 12011/44/99-BCC Dated 21/09/2000 published in the Gazette of India Extraordinary Part I Section I No. 210 dated 21/09/2000.

xii. Resolution NO. 12015/9/2000-BCC dated 06/09/2001.

xiii. Resolution NO. 12011/1/2001-BCC dated 19/06/2003.

xiv. Resolution NO. 12011/4/2002-BCC dated 13/01/2004.

xv. Resolution NO. 12011/9/2004-BCC dated 16/01/2006

xvi. Published in the Gazette of India Extraordinary Part I Section I No. 210 dated 16/01/2006.

xvii. Resolution NO. 12011/14/2004-BCC dated the 12th March, 2007, published in the Gazette of India-Extraordinary-Part I, Section 0-I, No.67 dated 12th January, 2007.

Shri/Smt./Kum. _____and/or his family ordinarily reside(s) in the_____ District/Division of_____ State. This is also to certify thathe/she does not belong to the persons/sections (Creamy Layer) mentioned in Column 3 of the Schedule to the Government of India, Department of Personnel & Training O.M. No. 36012/22/93-Estt.(SCT) Dated 08/09/93 which is modified vide OM No. 36033/3/2004 Estt.(Res.) dated 09/03/2004

Dated: .....

DISTRICT MAGISTRATE/
DEPUTY COMMISSIONER, ETC.SEAL

NOTE:

(a) The term ‗Ordinarily'used here will have the same meaning as in Section 20 of the Representation of the People Act, 1950.

(b) The authorities competent to issue Caste Certificates are indicated below:

(i) District Magistrate / Additional Magistrate / Collector / Deputy Commissioner / Additional Deputy Commissioner / Deputy Collector / I Class Stipendiary Magistrate / Sub-Divisional Magistrate / Taluka Magistrate /Executive Magistrate / Extra Assistant Commissioner (Not Below The Rank Of I Class Stipendiary Magistrate).

(ii) Chief Presidency Magistrate / Additional Chief Presidency Magistrate / Presidency Magistrate.

(iii) Revenue Officer not below the rank of Tehsildar' and

(iv) Sub-Divisional Officer of the area where the candidate and / or his family resides.

DECLARATION /UNDERTAKING - FOR OBC CANDIDATES ONLY

I,_____Son/Daughter of Shri _____ ____resident of Village/Town/City _____ District _____ State hereby declare that I belong to the _____ Community which is recognized as a Backward Class by the Government of India for the purpose of reservation in services as per orders contained in Department of Personnel and Training Office Memorandum No.36012/22/93- Estt. (SCT), dated 8/9/1993. It is also declared that I do not belong to persons/Sections (Creamy Layer) mentioned in Column 3 of The Schedule to the above referred Office Memorandum, Dated 8/9/1993, which is Modified vide Department of Personnel and Training Office Memorandum No.36033/3/2004 Estt. (Res.)Dated 9/3/2004.

Place: ..... Signature of the Candidate

Date: .....

- **Declaration/undertaking not signed by candidate will be rejected.**
- **False declaration will render the applicant liable for termination of enrolment at any time.**

Creamy Layer Definition

OBC Creamy layer is defined comprehensively at http://ncbc.nic.in/html/creamylayer.htmlall candidates for the OBC reserved seats should make sure that they do not satisfy any of the creamy layer criteria as listed in the website. Some general exclusion for quick reference (no way comprehensive) is as follows.

1. Any of the parents holds a constitutional position in Govt. of India
2. Any one of the parents is a class I officer. 3. Both the parents are class II officers.
4. Any one of the parents is employed in an equivalent rank to class I officer or both parents equivalent to class II officer in a public sector, insurance companies, banks, universities or in other organizations
5. Land holdings on irrigated land is 85% or more of the statutory ceiling area.
6. Parents income is more than Rs. 4.5 lakhs per year.

ANNEXURE-V
FORM OF CERTIFICATE TO BE PRODUCED BY ECONOMICALLY WEAKER SECTIONS

Government of _____
(Name & Address of the Authority issuing the certificate)

Certificate No._____ Date:_____

VALID FOR THE YEAR_____

This is to certify that Shri/Smt./Kumari,_____Son/Daughter/wife of Shri _____ permanent resident of Village/Town/City _____, Post Office_____ District _____ in the State/Union Territory _____ Pin Code_____ whose photograph is attested below belongs to Economically Weaker Section, Since the gross annual income* of his/her family** is below Rs. 8 Lakh (Rs. Eight Lakh only) for the financial year_____. His/her family does not own or possess any of the following assests***:

i. 5 acres of agricultural land and above;
ii. Residential flat of 1000 sq.ft. and abov.;
iii. Residential plot of 100 sq.yards and above in notified municipalities;
iv. Residential plot of 200 sq.yards and above in areas other than the notified municipalities

2. Shri/Smt./Kumari_____ belongs to the _____ caste which is not recognized as a Scheduled Caste, Scheduled Tribe and Other Backward Classes (Central List)

Signature with seal of office_____
Name_____
Designation_____

Recent Passport size attested photograph of the applicant

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*Note1: Income covered all sources i.e. salary, agriculture, business, profession, etc.

**Note2: The term 'finally' for this purpose include the person, who seeks benefit of reservation, his/her parents and siblings below the age of 18 years as also his/her spouse and children below the age of 18 years.

***Note 3: The property held by a "family" in different locations or different placed/cities have been clubbed while applying the land or property holding test to determine EWS status.

GENERAL ADMINISTRATION

1.	R.R.B. Singh, Ph.D	Director(Acting) and Vice Chancellor
2.	R.R.B. Singh, Ph.D	Joint Director (Academic)
3.	Latha Sabhiki, Ph.D	Joint Director (Research) - Acting
4.	Susanta Saha, MBA	Joint Director (Administration) & Registrar
5.	S.K. Tomar, Ph. D.	Academic Coordinator
6.	A.P. Ruhil, Ph.D	Controller of Examinations
7.	D.D. Verma, M.Com, PGDFM	Comptroller

HOSTELS

1.	J.K. Kaushik, Ph.D	Chief Hostel Warden
2.	Rubina Kumari Baithalu, Ph.D.	Hostel Warden (Kaveri Girls Hostel)
3.	Manoj Kumar Singh, Ph.D.	Hostel Warden (Sutlej Hostel)
4.	Shaik Abdul Hussain Ph.D.	Hostel Warden (Brahamputra Hostel)
5.	Rakesh Kumar, Ph.D.	Hostel Warden (Narmada Hostel)
6.	Pradip V. Behare, Ph.D.	Hostel Warden (Alkandnda & Krishna Hostels)

SRS of NDRI, BENGALURU

1.	K.P. Ramesha, Ph.D	Head
2.	Mukund A. Kataktalware, Ph.D	Incharge, Education and Training Section

ERS of NDRI, KALYANI

1.	T.K.Datta, Ph.D	Head
2.	Sukhdev Singh	Asst. Admn. Officer