ICAR-INDIAN VETERINARY RESEARCH INSTITUTE
(Deemed University)
IZATNAGAR–243 122 (UP) INDIA

No.F.2-1/2017-B&C/AC Dated : 6.6.2017

NOTIFICATION

In pursuance of decision taken by the Academic Council, in its 60th meeting held on 5th May, 2017, the following guidelines in rules 7.2 (viii) Constitution of Students Advisory Committee & 7.9 (vii) Allotment of Advisor has been approved in addition to the existing rule of 2nd edition of Academic Regulations, as per the details given below:-

Existing Rule 7.2 (viii) & 7.9 (vii)	Revised Rule Approved by AC
Whenever the Chairman of a SAC leaves the institute or is retired/transferred from the headquarters, the second Senior most member of the SAC from the student's major field should be nominated as Chairman by the JD (Acad.) as the second member shall be closely associated even in the preliminary discussions while formulating ORW and the vacancy so caused in the membership of the major field shall be filled up by appointment of another faculty member. Further, if any disagreement between the students and the Guide arises at later stage, the second senior most member of the SAC from the student's major field should be nominated as Chairman by the JD (Acad.)/Director on the recommendations of the concerned BOS and SAC. If he/she is also not in a position to continue to act as Advisor, then fresh choice of the student may be obtained for allotting the student by the BOS accordingly.	Whenever the Chairman of a SAC leaves the institute or is retired/transferred from the headquarters, the second Senior most member of the SAC from the student's major field should be nominated as Chairman by the JD (Acad.) as the second member shall be closely associated even in the preliminary discussions while formulating ORW and the vacancy so caused in the membership of the major field shall be filled up by appointment of another faculty member. Further, if any disagreement between the students and the Guide arises at later stage, the following guidelines for consideration of the Board of Studies for acceding to such cases: 1) The request for change of guide either from student's side or from faculty should be considered within one month from the date of start of laboratory/research work. In case, after presentation and submission of ORW, no request either for change of Advisor/Thesis Research Guide or student will be considered. 2) Where the Advisor submits satisfactory report on student's work continuously for 12 months during research work, the Advisor unilaterally can not refuse to guide the student and is bound to ensure timely submission of thesis, as per university

	norms by observing codal formalities. 3) Similarly, in case where a student does not complaint in last 12 months, during research work, about his/her Advisor, the student's request for change of Advisor shall not be accepted. 4) In case where three students have requested to change a particular faculty as Advisor, which has been recommended by the BOS and allowed by the University, the particular faculty will be debarred for allotment of students for three years. 5) Similarly, in case where three consecutive Advisors refuse to guide any particular student, then the University will not further allot any Advisor to him/her and his registration will be cancelled with immediate effect by observing all the mechanism available under Academic Regulations.

The said guidelines shall be enforced with immediate effect.

Registrar &
Member Secy. (AC)

Distribution:

1. All the Chairman, BOS, IVRI, Izatnagar/Mukteswar. It is requested that the contents of the above notifications may please be brought to the notice of all the faculty members as well as the P.G. students including faculty members & P.G. Students located at other Division/Section/Campuses/Stations.
2. All the Joint Directors and Station Incharge, Bangalore/Kolkata/Palampur/Pune. It is requested that the contents of the above notifications may please be brought to the notice of all the faculty members as well as the P.G. students including faculty members & P.G. Students located at other Division/Section/Campuses/Stations.
3. The Controller of Examination Deemed University, IVRI, Izatnagar for information and necessary action.
4. The Academic Coordinator Deemed University, IVRI, Izatnagar.
5. The Incharge, ARIS Cell, IVRI, Izatnagar, with the request to upload the above notification on the Institute Website.
6. The PS to the Director, IVRI, Izatnagar.
7. PS to the Joint Director (Acad.), IVRI, Izatnagar
8. The AAO (Acad.), IVRI, Izatnagar.

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No.F.2-1/2017-B&C/AC

Dated : 6.6.2017

NOTIFICATION

The Academic Council, in its 60th meeting held on 5th May, 2017 approved the restart the interview of qualifying candidates who have declared successful in the All India Written Entrance Examination from academic session 2017-18 to PhD admission, is hereby conveyed as per the following details for inclusion in the existing Chapter No.5 of Admission of Post-graduate Students and Academic Calendar/Session of Academic Regulations :-

5.1 Categories of Students

The institute shall admit students to Master's and Doctoral degree programmes under three separate categories as under:

i. Open competition
ii. In service candidates from ICAR institutes, Central/State Agricultural/Veterinary Universities and other Central/State Government Organization/Departments.
iii. Foreign students

The procedures for admission under different categories are as follows

5.2 Master's Degree Programmes

a) Admission to all the seats for Master's degree programme (MVSc) including sponsored seats are to be filled-up on the basis of all India Entrance Examination conducted by Education Division, ICAR for award of Junior Research Fellowship (JRF). Therefore, the candidates need not apply to IVRI for the said programme and they shall look for the ICAR advertisement for combined competitive examination for JRF.

b) The numbers of seats available in different disciplines are announced every year through an information bulletin on the basis of the approval of the Academic Council considering the availability of infrastructure facilities, faculty members and overall students in each discipline.

c) **Eligibility criteria**

(i) The candidates for admission to Master's programme (MVSc) in 19 disciplines must have Bachelor's degree in Veterinary Science as specified in schedule 1 of the Veterinary Council of India (VCI) Act (i.e. BVSc or BVSc & AH) with a minimum of 60% marks in aggregate (50% for S.C./S.T./PH or sponsored candidate) or equivalent OGPA as mentioned in the table below:

OGPA out of	**Master's programme**	
	General/OBC	**SC/ ST/ Sponsored/ PH**
4	2.60	2.20
5	3.25	2.75
10	6.60	5.60

ii) Age limit: Minimum age limit for MVSc candidates is 21 years. There is no upper age limit. The age is reckoned as on 1st August of every year i.e. start of the academic session.

iii) Reservation

Fifteen (15%) percent seats for scheduled caste (SC), 7.5% seats for scheduled tribe (ST), 27% seats for Other Backward category (OBC), 3% for Physically Handicapped (PH) candidates and 2% seats for Under Privileged State (UPS) Category will be treated as reserved subject to their being otherwise eligible.

1. In case, seat under SC/ ST category remains vacant due to non-availability of the 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 from the merit list of ICAR AIEE.
2. In case, any OBC reserved seat remains vacant due to non-availability of eligible OBC candidates, the said OBC seats shall be filled up amongst the general category candidates of the same subject/discipline as per merit.
3. The reservation is applicable only in case of candidates admitted under open category and who are admitted through entrance examination and not under sponsored category.

The details of allocation of seats reserved for various categories will be published in the Information bulletin of each year.

5.3 (I) Doctoral Degree Programmes

a) Admission to all the seats for doctoral programmes (PhD), including sponsored seats are to be filled on the basis of all India Entrance Examination followed by an interview conducted by the institute.

b) **Number of seats:** The number of seats available in different disciplines is announced every year through an information bulletin on the basis of the approval of the Academic Council considering the availability of infrastructure facilities, faculty positions and overall students strength in each discipline.

c) **Eligibility criteria:** The candidates for admission to PhD programme must have MVSc degree in the concerned discipline as specified below with a minimum CGPA 6.50/10.00 scale, 3.25/5.00 scale, 2.60/4.00 scale for General and OBC categories and 5.50/10.00 scale, 2.75/5.00 scale, 2.20/4.00 scale for SC/ ST/ PH/ Sponsored candidates, respectively from any recognized University in India or where grade-points are not awarded and only marks are awarded, the candidate must have secured atleast 60% marks for General/ OBC category. For SC/ ST/ PH/ Sponsored category candidates, the minimum percentage of marks will be 50%. The equivalence between OGPA and percent marks, where needed, will be acceptable. The eligibility qualifications in various disciplines are as specified below:

Sl. No.	Name of Discipline	Eligibility
1.	Animal Biochemistry	BVSc & AH with Master's degree in concerned discipline
2.	Animal Biotechnology	BVSc & AH with Master's degree in Biotechnology/ Animal Biotechnology/ Animal Biochemistry/ Microbiology/ Immunology/ Virology
3.	Animal Genetics & Breeding	BVSc & AH with Master's degree in concerned discipline
4.	Animal Nutrition	BVSc & AH with Master's degree in concerned discipline
5.	Livestock Production & Management	BVSc & AH with Master's degree in concerned discipline
6.	Livestock Products Technology	BVSc & AH with Master's degree in Livestock Products Technology (LPT)/Animal Products Technology/Meat Science and Technology/Dairy Science
7.	Poultry Science	BVSc & AH with Master's degree in concerned discipline
8.	Veterinary Microbiology	BVSc & AH with Master's degree in Vet. Microbiology/ Vet. Bacteriology/ Vet. Virology/ Vet. Immunology
9.	Veterinary Extension	BVSc & AH with Master's degree in concerned discipline/

	Education	Vet. Medicine/ Vet. Gynaecology & Obstetrics/ Vet. Surgery/ Animal Nutrition
10.	Veterinary Gynaecology & Obstetrics	BVSc & AH with Master's degree in concerned discipline
11	Veterinary Medicine	BVSc & AH with Master's degree in concerned discipline
12	Veterinary Parasitology	BVSc & AH with Master's degree in concerned discipline
13	Veterinary Pathology	BVSc & AH with Master's degree in concerned discipline/ Avian Diseases
14	Veterinary Pharmacology	BVSc & AH with Master's degree in concerned discipline
15	Veterinary Physiology	BVSc & AH with Master's degree in concerned discipline
16	Veterinary Public Health & Epidemiology	BVSc & AH with Master's degree in Vety. Public Health & Epidemiology / Vety Public Health / Vety Epidemiology / Public Health / Pathobiology
17	Veterinary Surgery & Radiology	BVSc & AH with Master's degree in concerned discipline

(d) Age Limit

Minimum age limit for PhD admission is 23 years. There is no upper age limit. The age is reckoned as on 1st August of every year i.e., start of the academic session.

(e) Reservation

Fifteen (15%) percent seats for scheduled caste, 7.5% seats for scheduled tribe, 27% seats for Other Backward category (OBC) and 3% for Physically Challenged (PH) candidate.

1 In case seat under SC/ ST category 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 only. Even after that if the seat is vacant in SC/ ST category, it will not be filled from any other category candidates.

2 In case any OBC seat remains vacant due to non-availability of eligible OBC candidates, the said OBC seats shall be filled up amongst the general category candidates of the same subject/discipline as per merit.

1. 3% (2 seats) will be reserved for physically challenged candidates as per their merit on horizontal basis.
2. The reservation is applicable only in case of candidates admitted under open category and not under sponsored category.
3. The details of allocation of seats reserved for various categories will be shown in the Information Bulletin each year.

(f) Procedure for Application

1. Information bulletin and application form for admission into PhD programme can either be obtained from the Assistant Administrative Officer (Acad.), IVRI, Izatnagar-243122, Bareilly (UP) or can be downloaded from institute website (www.ivri.nic.in) and should be submitted alongwith a bank draft of Rs. 1200/- for General/ OBC/ PH category and Rs. 1000/- for SC/ST/PH category candidates drawn in favour of "ICAR Unit IVRI, IZATNAGAR" payable at State Bank of India, CARI Branch (Code No. 7027), Bareilly.
2. The application form bears a serial number at the top right corner on page no. 1. This number, the degree programme and the subject in which the admission is sought must be quoted in all future correspondences concerning admission at this institute. On downloaded application forms, the serial number may be kept blank and will be allotted by the office.
3. All applications duly completed in all respects along with all documents required should be sent, so as to reach the Assistant Administrative Officer (Acad.), IVRI, Izatnagar - 243122, Bareilly on or before the last date prescribed (i.e. closing date). The applications of candidates in the Andaman & Nicobar Island, Lakshadweep, States/Union territory in the North-eastern region, Ladakh division of J&K state and Sikkim are entertained upto the last date prescribed for them in the information bulletin. Postal delay will not be accepted as a legitimate reason to entertain application received after the last date. The envelope containing the application form should be superscripted in capital letters, **"APPLICATION FOR ADMISSION TO PhD PROGRAMME".** In case the application addressed to other designated officers or office, and not

received in the office of the Asstt. Adm. Officer (Acad.) within the scheduled date in time, the university is not responsible for this and the same will be liable to be rejected.

4. In case a candidate has appeared for the qualifying degree examination for admission and the result has not been announced in time for him/her to submit the application by the due date, he/she may still complete the application in all respects, except the academic record relating to last examination and submit it by the date specified in the schedule. The candidate will be required to submit his/her qualifying degree certificate (Provisional Degree Certificate) on his/her successful completion of the master's degree programme at the time of registration/ admission. The provisional degree certificate (PDC) is a mandatory requirement to all the candidates before admission.
5. A candidate can apply for either under OPEN or SPONSORED category, as the case may be. The choice once exercised will be final.
6. Employed candidates applying under open category, must submit their "No Objection Certificate (NOC)" alongwith relieving order from his/her employer at the time of admission, failing which their candidatures will be treated as cancelled. This is a mandatory requirement to all such candidates.
7. The candidate is advised in his/her own interest to fill up the application form carefully and accurately and to ensure that all the testimonial/certificates required to be attached with the application, are enclosed. All enclosures must be numbered. The candidates are also advised to retain at least four copies of the same photograph as pasted on the application form for subsequent use during admission.
8. The candidates are advised to retain one copy of admit card with them, paste a recent passport size self-attested photograph and note down the roll number as displayed on IVRI website. The admit card will be mandatory to be produced in the examination hall.
9. If a candidate furnishes wrong information or suppresses any relevant information, his/her candidature/ admission will liable to be cancelled.
10. (i) Self-attested photocopy of the following certificates/ documents are mandatorily required to be enclosed with the application form, failing which his/her candidature will liable to be rejected and no correspondence in the matter will be accepted:
    a) Matriculation (Class X) marksheet and certificate for date of birth
    b) Higher Secondary (10+2) or equivalent certificate and marksheet
    c) Bachelor's degree certificate and transcript
    d) Master's degree certificate and transcript (In the absence of the Master's degree/transcript, course completion certificate indicating percentage of marks or final CGPA obtained from the Registrar of the University/ Principal/ Dean of the college)/HD concerned. The MVSc course completion certificate mentioning final/tentative OGPA is mandatory requirements, failing which their candidature will be liable to be rejected and no correspondence will be accepted.
    e) The SC/ ST/ OBC certificate as per annexure-III or IV from the authority empowered to issue such certificate of verification, wherever necessary. Until the certificates are verified from the competent authority, the admission under these reserved quotas will be treated as provisional.
    (f) Documentary evidence of employment from the employer(s) in case of in-service candidates.

(ii) The following additional certificate/documents are required at the time of admission in original:
    a. Character certificate issued by the Institution/ University last attended.
    b. Migration certificate, issued by the Institution/ University last attended.
    c. Certificate of physical fitness issued not earlier than six months before the date of admission in the prescribed proforma.
    d. NOC from the employer.
    e. All original certificates and marks sheets as well as photocopy are to be produced at the time of admission. Candidates who don't produce all the original certificates and marks sheets will not be admitted.
11. All correspondence for admission should be addressed to the **Assistant Administrative Officer (Acad.), IVRI, Izatnagar-243 122, Bareilly (UP) India.**

5.3(II) Sponsored Candidates

In-service candidates from ICAR institutes, Central/State Agricultural/ Veterinary universities and other Central/ State Government Organization/Departments will be considered for PhD degree programmes only if they are sponsored by their employers on deputation terms/study leave subject to fulfillment of eligibility requirements already mentioned for open candidates in 5.3(I) c.

The in-service (sponsored) candidates may submit an advance copy of the application form alongwith the prescribed fee as per university schedule every year**.** The copy of application form through proper channel along with duly signed sponsorship certificate by the employer, should reach on or before the date of admission.

The in-service (sponsored) candidates of ICAR, Central/ State agricultural/ Veterinary universities, Central/ State Govt. Departments, etc. for promoting faculty up-gradation may depute their faculty/employees for admission to Doctoral programme, subject to the following conditions

(i) The candidate must be sponsored by his/ her employer**.** The eligible candidates will have to appear and qualify in the written examination followed by an interview for PhD admission as per university notification and information bulletin. Separate merit list will be prepared for the eligible sponsored candidates in each discipline. The result of eligible candidates will be displayed on IVRI website.

(ii) One Sponsored (In-service) candidate shall be admitted in the PhD degree programme in each discipline over and above the normal seats.

5.3 (III) Foreign Students

1. Foreign students seeking admission shall forward their applications through their respective Embassies or through their respective Indian Missions abroad to the Government of India/ DDG (Education), ICAR, Krishi Bhawan, New Delhi for consideration of their eligibility for admission. The foreign nominees are also required to possess the prescribed qualifications. However, no percentage of marks is fixed for them.
2. Foreign students having DVM Degree will have to undergo for at least one year (two semesters) deficiency courses of 30-35 credit hours, if they want to take admission to the PhD degree programme at this institute.
4. Foreign students should also have proficiency in English both written and spoken as the medium of Instructions / teaching is English. A certificate of proficiency in English language will also have to be produced by the student.
5. Foreign students sponsored for study at this institute should arrive at Bareilly, preferably one week before the opening of the academic session to acquaint themselves with the activities of the institute and to attend the orientation programme. They should contact the Assistant Administrative Officer (Acad.) at the University office upon arrival for obtaining guidance concerning registration procedure, campus information and all other matters.
6. Foreign students seeking admission to this institute are required to give an undertaking for undergoing medical examination including HIV test after arrival in India and their admission will be finalized only after the medical tests have been completed and they are declared fit.
7. The student / his/her sponsoring Government will be required to pay the Institutional Economic Fee @ **US $ 400** per month or **US $ 4000** per annum in addition to the usual fee / charges of the University**.**

5.4 Advertisement

An advertisement in the leading newspapers for wider publicity besides the institute's website, each year inviting applications for admission. The applications from the candidates including sponsored candidates are entertained up to the last date as per university schedule.

5.5 Scrutiny of Applications

The applications received for PhD admission are indexed and entered the day they are received. All the applications received are screened in the university office. After checking all the factual data furnished by the candidate, the university office will complete the data processing sheet.

The applications are scrutinized by the screening committee constituted by the Joint Director (Acad.)/ Director for screening and determining the eligibility of the candidates within the stipulated time after indicating 'found eligible' or 'not found eligible' on each application. The eligibility of applicants is judged strictly on the basis of the terms and conditions as prescribed in the information bulletin. The applications of candidates who do not fulfill the minimum prescribed eligibility requirements are rejected.

5.6 Entrance Test

There shall be one written paper of 190 marks for the subject matter and 10 marks for the interview. Candidates who qualify in the written examination in the subject, based on the academic performance are eligible to appear in the interview.

Selection Criteria

(A) Written examination (Total 190 marks)
(B) Interview (Total 10 marks))

(A) i. The candidates who fulfill the prescribed minimum qualifications are only eligible to appear in the competitive written entrance examination.

(A) ii. The minimum qualifying marks in the competitive entrance examination for appearing in the interview for admission to PhD programme shall be as under:

Examination	**Minimum qualifying marks in Competitive entrance test**		
	General Candidates	**OBC Candidates**	**SC/ST Candidates**
Subject matter of 190 marks	50% (95 marks out of 190)	48% (91.2 marks out of 190)	45% (85.5 marks out of 190)

Note: The minimum qualifying marks for PH candidates will be same as for the category he/she belongs to i.e., SC, ST, OBC or General.

ii. (a) Subjects for written examination

The candidates may appear in the written examination in any one of the subject in which admission is to be taken. The question paper will contain multiple choice questions. The syllabus for the examination will be given in the information bulletin. The medium of examination will be English only.

ii. (b) Venue, date, time and centre of examination

1. The written entrance examination for PhD degree programme shall be held at the following centres from 11.00 AM to 1.00 PM or as specified by the Deemed University at the time of advertisement. In case sufficient number of candidates does not opt for a particular centre, it will be merged with another centre:
   (i) IVRI, Izatnagar, Bareilly (Uttar Pradesh)
   (ii) IVRI Campus, Bengaluru (Karnataka)
   (iii) IVRI Regional Centre, Palampur (Himachal Pradesh)
   (iv) IVRI Regional Centre, Kolkata (West Bengal)
   (v) IVRI Regional Station, Pune (Maharashtra)
   (vi) National Institute of High Security Animal Disease, Bhopal (Madhya Pradesh)
2. No TA/ DA for appearing in the written examination will be paid by the institute. However, only eligible un-employed SC/ ST candidates who appeared in the written examination will be paid traveling allowance on the basis of confirmed ticket limited to sleeper class railway fare by the shortest route both ways on production of caste certificate and evidence of journey performed. Payment of TA will be made through Bank draft which will be sent by post only.
3. The candidates will have to make their own arrangements for boarding and lodging during the period of stay for entrance examination.

5.7 Duration and Type of Entrance Examination

The entrance examination in the subjects as per given choice will be of 2 hours duration and will contain 190 multiple choice questions. The candidate will be given separate answer sheet to mark one correct answer out of four choices given. The candidate will have to return the question booklet and OMR Sheets after the end of examination to the invigilators.

5.8 Interview

Candidates, who qualify in the written examination in the subject, are eligible to appear in the interview. Discipline-wise list of qualifying students in the entrance examination is prepared.

1. The interview should be of maximum 10 marks. It is the mandatory to appear in the Interview for all the candidates who have declared qualified & called for interview. The Interview Board shall compulsorily give 4 marks to each student for attending the interview. Interview is meant to judge a candidate's subject matter knowledge and also discuss the research interest/area.
2. The candidates called for interview have to appear before a duly constituted Interview Board. The interview is held at IVRI, Izatnagar. Before appearing in the interview, the students have to produce their all original documents before the Admission Committee for screening. In case a candidate has already submitted an attested copy of marks-sheet of the qualifying examination issued by the Registrar of the University concerned/Principal of the college, but is unable to produce the original at the time of interview as the mark-sheet had been submitted to another university or any other bonafide reason, he/she may be allowed to appear in the interview, provided that, if selected, his/her admission would be subject to production of original certificate, failing which his admission is liable to be cancelled. An undertaken to this effect should be given by the candidate.
3. The Interview Board is constituted by the Director, IVRI in consultation with the Joint Director (Academic). Merely appearing in the written examination/interview is not the guarantee for admission to PhD programme. The marks in the written examination of the candidates remain confidential in the office of the Joint Director (Academic).
4. The constitution of the Interview Board consisting of the following:

(i)	Joint Director (Acad.)	Chairman
(ii)	Concerned Head & Faculty Chairman	Member
(iii)	One additional member either Principal Scientist or Senior Scientist from concerned discipline	Member
(iv)	Principal or Senior Scientist	Member
(v)	Principal or Senior Scientist or Scientist (SC/ST Category)	Member
(vi)	Principal Scientist or Senior Scientist (Woman)	Member
(vii)	Controller of Examination/Academic Coordinator	Member Secretary

The said guidelines shall be enforced from the academic session 2017-18 i.e. 1.8.17 onwards.

Registrar &
Member Secy. (AC)

Distribution:

1. All the Chairman, BOS, IVRI, Izatnagar/Mukteswar. It is requested that the contents of the above notifications may please be brought to the notice of all the faculty members as well as the P.G. students including faculty members & P.G. Students located at other Division/Section/Campuses/Stations.
2. All the Joint Directors and Station Incharge, Bangalore/Kolkata/Palampur. It is requested that the contents of the above notifications may please be brought to the notice of all the faculty members as well as the P.G. students including faculty members & P.G. Students located at other Division/Section/Campuses/Stations.
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4. The Academic Coordinator Deemed University, IVRI, Izatnagar.
5. The Incharge, ARIS Cell, IVRI, Izatnagar, with the request to upload the above notification on the Institute Website.
6. The PS to the Director, IVRI, Izatnagar.
7. PS to the Joint Director (Acad.), IVRI, Izatnagar
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No.F.2-1/2017-B&C/AC Dated : 6.6.2017

NOTIFICATION

The Academic Council, in its 60th meeting held on 5th May, 2017 approved the creation of **Veterinary Microbiology (VMC)** by merging Veterinary Bacteriology, Veterinary Virology and Veterinary Immunology for degree nomenclature of discipline and eligibility qualifications for PG admission, number of seats, seats distribution ratio (research area), allotment of students and course syllabus & credit hours of **Veterinary Microbiology (VMC)** is hereby conveyed as per the following details :-

VETERINARY MICROBIOLOGY (VMC)

1. Degree Nomenclature:

Name of the Degree	Number of Seats
1. M.V.Sc. Veterinary Microbiology	15
2. Ph.D. Veterinary Microbiology	13

2. Course Credits:

a) Core Courses for M.V. Sc : 10 Credit hours + 1 Credit hour Seminar

Master's Programme : Total credit hours – 60

i. **Major discipline**
16 Credit Hours (including a minimum of 10 Credit Hours of core courses and one Credit Hour of seminar)

ii. **Minor discipline (any one of the approved discipline)**
7 Credit Hours including one Credit Hour of seminar

iii. **Supporting courses**
7 Credit Hours

iv. **Research for thesis**
30 Credit Hours

b) Core Courses for Ph.D : 10 Credit hours + 1 Credit hour Seminar

Ph.D. Programme : Total credit hours – 75

i. **Major discipline**
16 Credit Hours including a minimum of 10 Credit Hours of core courses and one Credit Hour of Seminar

ii. **Minor disciplines (any two of the approved discipline)**
14 Credit Hours (a minimum of 7 credit hours from each minor subject)

iii. **Research for thesis**
45 Credit Hours,

3. Eligibility for M.V. Sc Admission :

The candidates for admission to Master's programme must have Bachelor's Degree in Veterinary Science in the concerned discipline as specified by the Veterinary Council of India (VCI).

4. Eligibility for Ph.D. Admission:

The candidates for admission to Doctoral programme must have BVSC &AH with Master's Degree in Veterinary Microbiology/Veterinary Bacteriology/ Veterinary Virology/ Veterinary Immunology.

5. Seats distribution:

Specialization/Research area	**Number of seats for MVSc**	**Number of seats for PhD**
Veterinary Bacteriology	5	5
Veterinary Virology	6	6
Veterinary Immunology	4	2
Total	**15**	**13**

6. Board of Studies:

Board of Studies in the discipline of Veterinary Microbiology will be as under:-

i.	*Senior most HD/Incharge Bacteriology/Virology/Immunology	Chairman
ii.	Other HD & In-charge	Member
ii.	One Scientist, Principal Scientist	Member
iii.	One Scientist, Senior Scientist	Member
iv.	One Scientist, Scientist	Member
v.	One Student Representative(Veterinary Microbiology)	Member

*The senior most HD among the three Divisions i.e. B&M, Virology & Immunology will be Chairman of BOS. Other HD/Incharge will be the permanent member of BOS, Microbiology (VMC) discipline.

7. Allotment of students:

i) The students will be allotted as per existing guide allotment rules 7.9 without exceeding the ceiling limit of the individual specialization i.e. research area namely Bacteriology, Virology and Immunology.

ii) The students have to opt their research area on the basis of their rank/merit (in the prescribed format) and choice on the date of admission in case of PhD and on the date of counseling in case of MVSc.

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FORMAT FOR OPTING RESEARCH AREA

1. Name of student:
2. Degree sought: MVSc / PhD
3. Roll No.:
4. Rank/Merit:
5. Discipline :
6. Choice of the research area in order of preference:
   (Veterinary Bacteriology/ Veterinary Immunology/ Veterinary Virology)

   1.
   2.
   3.

Signature of Student

Note: Available seats in Veterinary Microbiology with ceiling limit for each research area: -

Specialization	No. of seats for MVSc	No. of seats for PhD
Veterinary Bacteriology	5	5
Veterinary Virology	6	6
Veterinary Immunology	4	2
Total	15	13

LIST OF FACULTY MEMBERS IN THE DISCIPLINE OF VETERINARY MICROBIOLOGY (VMC) WITH THEIR RESEARCH AREA

A) Chairman of the BOS will be the senior most HD among the three Divisions i.e. B&M, Virology & Immunology.

B) Faculty with research area in Veterinary Bacteriology

Sl. No.	Name of Scientists, Mb No. & Email ID	Qualification	Designation
1.	Rana, Rajneesh, 9412826658, rana@ivri.res.in	MVSc, Ph.D.	PS
2	Viswas, K.N., 8954525012, vkn111@gmail.com	MVSc, Ph.D.	Sr. Sci.
3.	Abhishek, 9456600623, abhivbm@gmail.com	MVSc, Ph.D.	Sci.
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9	Sanyal, A., 09917532049 aniket.sanyal@gmail.com	MVSc, Ph.D.	PS & JD

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Outline of Course Catalogue – PG Syllabus

Course No.	Title of the Courses	T/P	Credit hours	Semester
VMC-501	**General Bacteriology and Mycology**	**T**	**2**	**I**
VMC-502	**General Bacteriology and Mycology**	**P**	**1**	**I**
VMC-503	**General Virology**	**T**	**2**	**I/ II**
VMC-504	**General Virology**	**P**	**1**	**I/ II**
VMC-505	**Principles of Immunology and Clinical Implications**	**T**	**2**	**I**
VMC-506	**Principles of Immunology and Clinical Implications**	**P**	**1**	**I**
VMC-508	**Techniques in Microbiology**	**P**	**1**	**I/ II**
VMC-509	Systemic Bacteriology	T	2	I
VMC-510	Systemic Bacteriology	P	1	I
VMC-511	Mycoses	T	2	II
VMC-512	Mycoses	P	1	II
VMC-513	Systematic Animal Virology	T	2	II
VMC-514	Systematic Animal Virology	P	1	II
VMC-516	Animal Cell Culture	P	1	I/ II
VMC-600	Seminar	-	1	I/ II
VMC-601	Special Problem	-	1	I/ II
VMC-602	Clinical Bacteriology	P	2	I
VMC-603	Antibacterial Agents and their action	T	1	II
VMC-604	Antibacterial Agents and their action	P	1	II
VMC-606	Biosafety & Biosecurity in Veterinary Microbiology	T	1	I/ II
VMC-607	Viral Vaccines	T	1	I/II
VMC-608	Viral Vaccines	P	1	I/II
VMC-609	Viral Pathogenesis and Immunity	T	2	I/ II
VMC-611	Antiviral Agents	T	1	II
VMC-613	Avian Viruses	T	2	I/ II
VMC-615	Viral Zoonoses	T	1	II
VMC-618	Viral Bioinformatics	P	1	II
VMC-619	Molecular Immunology	T	1	I
VMC-620	Molecular Immunology	P	1	I
VMC-621	Cellular Immunology	T	1	I
VMC-622	Cellular Immunology	P	1	I
VMC-623	Immunomodulation	T	1	II
VMC-624	Immunomodulation	P	1	II
VMC-625	Mucosal Immunology	T	1	II
VMC-626	Mucosal Immunology	P	1	II
VMC-627	Avian Immunology	T	1	II
VMC-628	Avian Immunology	P	1	II
VMC-629	Bacterial Genetics	T	1	I
VMC-630	Bacterial Genetics	P	1	I
VMC-631	Oncogenic Viruses	T	2	II
0VMC-633	Slow Viral Infections and Prions	T	2	II
VMC-699	Research (M.V.Sc)			I/II

VMC-700	Seminar	-	1	I/ II
VMC-701	Special Problem	-	1	I/ II
VMC-704	**Advanced Techniques in Microbiology**	**P**	**1**	**I/ II**
VMC 705	**Advanced Bacteriology and Mycology**	**T**	**2**	**I/ II**
VMC-706	**Advanced Bacteriology and Mycology**	**P**	**1**	**I/ II**
VMC-707	**Advances in Virology**	**T**	**2**	**I/ II**
VMC-708	**Advances in Virology**	**P**	**1**	**I/ II**
VMC-709	**Advances in Cellular and Molecular Immunology**	**T**	**2**	**I/ II**
VMC-710	**Advances in Cellular and Molecular Immunology**	**P**	**1**	**I/ II**
VMC-711	Bacterial Toxins	T	1	II
VMC-712	Bacterial Toxins	P	1	II
VMC-713	Anaerobic Infections	T	1	I
VMC-714	Anaerobic Infections	P	1	I
VMC-715	Mycoplasmology	T	1	II
VMC-716	Mycoplasmology	P	1	II
VMC-717	Enterobacteriaceae	T	1	I
VMC-718	Enterobacteriaceae	P	1	I
VMC-719	Bacterial Infections of Reproductive System	T	1	I
VMC-720	Bacterial Infections of Reproductive System	p	1	I
VMC-721	Molecular Determinants of Bacterial Pathogenesis	T	1	II
VMC-722	Molecular Determinants of Bacterial Pathogenesis	P	1	II
VMC-723	Molecular and Genetic Aspect of Viral Pathogenesis	T	2	I/ II
VMC-724	Molecular and Genetic Aspect of Viral Pathogenesis	P	1	I/ II
VMC-725	Structure Function and Relationships of DNA and RNA Viruses	T	2	I/ II
VMC-727	Viral Genetics	T	2	II
VMC-729	Advances in Clinical Immunology	T	1	I
VMC-730	Advances in Clinical Immunology	P	1	I
VMC-731	Advances in Immunoregulation	T	1	I
VMC-733	Cytokine and Chemokines	T	1	I
VMC-799	Research (Ph.D)	-	-	I / II

Core courses for M.V.Sc: VMC-501; VMC-502; VMC-503; VMC-504; VMC-505; VMC-506; VMC-508; VMC-600

Core Courses for Ph.D: VMC-704; VMC-705; VMC-706; VMC-707; VMC-708; VMC-709; VMC-710; VMC-700

Syllabus Veterinary Microbiology (VMC)

Minor fields permissible: (For both MVSc and PhD)

1 Veterinary Pathology
2 Veterinary Public Health & Epidemiology
3 Animal Biochemistry
4 Animal Biotechnology

VMC- 501 General Bacteriology and Mycology T-2-I

Scope and historical development of Bacteriology, Classification and Taxonomy of bacteria. Microscopy, stains and staining of bacteria. Morphology and nature of bacteria. Growth, Nutrition and Physiology of bacteria. Resistance of bacteria to physical and chemical agents. Antibiotic agents and their actions. Bacterial variation. Bacterial Ecology. Pathogenicity of bacteria. Bacterial Toxins. Antigens, Antibodies and antigen-antibody reactions. Immunity. Preservation of bacteria. Bacteriophage. Scope and historical development of mycology. Morphology of fungi: structure and ultrastructure. Fungal growth and reproduction. Differentiation, nutrition, metabolism and genetics of fungi. Fungal spores. Classification of fungi. Fungi as animal parasite. Prevention and control of fungal growth. Fungal immunity. Glossary.

VMC- 502 General Bacteriology and Mycology P-1-I

Principles of microscopy, types of microscope and their use, care of the microscope and micrometry. Stains and staining techniques. Sterilization and its methods, sterilization of glasswares, surgical instruments, media etc. Preparation of different culture media, media for biochemical tests. Isolation, purification and identification of bacteria. Bacterial count, measurement of bacterial growth: (a) optical density method & (b) spectrophotometer. Disinfection and phenol co-efficient. Antibiotic sensitivity of bacteria. Measurement of virulence of bacteria. Serological techniques: plate agglutination test, tube agglutination test, gel diffusion test, counter-immunoelectrophoresis, immunoelectrophoresis and ELISA. Safety measures in mycology laboratory. Media preparation. Stains and staining. Fungal growth patterns. Morphology of genetic and reproductive structures. Culture, isolation and identification of fungal agents from clinical specimens. Maintenance and preservation of fungal cultures.

VMC-503 General Virology T-2-I/II

History of virology; origin and nature of viruses; structure of viruses; taxonomy and classification of viruses, virus replication, viral genetics and evolution, genetic and non-genetic interactions between viruses, virus-cell interactions, viral pathogenesis, viral persistence, oncogenic viruses, epidemiology of viral infections, Immune response to viruses, viral vaccines and chemotherapy, subviral agents.

VMC-504 General Virology P-1-I/II

Sterilization of equipment, glassware, plasticware, chemicals and biologicals; collection, preservation, transportation of clinical samples and their processing; preparation of media and reagents for cell culture; subculturing and maintenance of cell lines; isolation of virus in cell cultures, titration of viruses; detection of viral antibodies, detection of viral antigen, Detection of viral nucleic acids.

VMC-505 Principles of Immunology and Clinical application T-2-I

Unit-I: **Introduction to vertebrate immunsesystem** : Origin of immune system of vertebrates, Constitutive and adaptive immunity, Physiological barrier; Self and non-self-discrimination,

Unit-II: Constitute & adaptive immunesystem: Pathogen recognition receptors (PRR/TLR). Cells and organs involved in immune system; Ontogeny of immune system. Primary lymphoid organ; Thymus/bursa/bursa equivalent; Secondary lymphoid organs; Lymph node / spleen; Mucosal associated lymphoid organ; Cutaneous associated lymphoid organ; Phagocytosis and pathogen removal.

Unit-III: **Antigen and its character**: Characteristic of ideal antigen. Classification of antigen; Concept of hapten, Antigenic determinant /epitope; Antigen and immunogenicity,

Unit-IV: **Antigen recognition by B cell:** B cell receptor /immunoglobulin; Basic structure of immunoglobulin; various class and subclass of immunoglobulin; Immunoglobulin variability, Synthesis of immunoglobulin; Immunoglobulin gene and rearrangement; Function of immunoglobulin; Membrane and secreted immunoglobulin.

Unit-V: **Antigen recognition by T cell:** T cell receptor and its structure; TCR1 & TCR-2. T-cell receptor diversity; Gene regulating TCR; Associated molecule of T cell CD3 / CD4 /CD8 in antigen recognition.

Unit-VI: **MajorHistocompatibility Complex Molecule:** General feature of MHC and nomenclature. Structure of MHC; Classification of MHC; Cellular distribution; MHC gene and expression of MHC protein; MHC polymorphism; MHC and immune response.

Unit_VII: **Immuneregulation with B & T cells:** Antigen recognition; Antigen presentation and processing; T & B cell cooperation; Role of accessory molecule, Idiotypic network; and its outcome, Antigen recognition by TCR; MHC restriction; Role of integrin and selectin. Cytokine and their role; Cytotoxic effect and its mechanism.

Unit-VIII: Natural killer cell and cytotoxicity: Mechanism of NK cell killing, Role of NK cell in tumor regression.

Unit-IX: Complement System: basic concept of complement; Classification of complement, Complement structure, Complement activation pathways, Mechanism of complement activation, Complement receptors, Removal of complement, Complement deficiencies.

Unit-X: Cytokine and chemokines; cytokine and Structure, Cytokine producing cells, Role of cytokine in immune regulation, Chemokines and virokines. Immunological tolerance. Autoimmunity and autoimmune diseases, types of hyper sensitivity reactions.

Unit-XI: Principles for detection of antigens, antibodies and cellular immune functions: principles and applications in quantitation and characterization of immunoglobulins.

Unit-XII:Theoretical background for separation and purification of lymphocytes and mononuclear phagocytes and other effector cells from blood, lymphnodes, spleen, bone marrow.

Unit:-XIII:Techniques involved for detection of Cytokines, detection of functional tests for mononuclear phagocytes.

Unit XIV: Common immunological tests used in diagnosis of microbial and parasitic diseases: haemagglutination inhibition, radio-immunoassay, immune enzyme assay, fluorescent- labeled immunological tests, agglutination and protection tests.

Unit:XV: Detection of immunecomplexes, Test involved for detection of immunodeficiency diseases and autoimmunity. Principle behind hypersensitivity reactions

VMC-506 -Principles of Immunology and Clinical application P-1-I

Unit-I Humoral: Separation of Immunoglobulilin from serum by salt precipitation, caprylic acid precipitation, purification of immunoglobulin by ionexchange chromatography and affinity chromatography, Raising of antibodies against serum immunoglobulin in laboratory animals, detection of antibody by gel diffusion, radial immunodiffusion,

immunoelectrophoresis technique, Haemagglutination and haemagglutination inhibition test. Raising of anti SRBC antibody in mice and birds.

Unit-II- Cellular: Separation of mononuclear cells from blood by density gradient centrifugation, viable count of lymphocyte by dye exclusion method. Isolation of polymorphonuclearleucocytes, monocytes/ macrophages by plastic surface adherence method. Test for phagocytosis of opsonized sheep red blood cells. Lymphocyte culture with mitogen to detect the cell proliferation.

VMC-508 Techniques in Microbiology P-1-I/II

Preparation of different media and stains used in bacteriology and mycology; different sterilization and disinfection techniques, Techniques for isolation and identification of bacteria and fungi; ABST, Techniques for maintenance and preservation of bacteria and fungi. Isolation of bacterial and fungal genomic DNA, plasmid DNA, Polymerase chain reaction, Agarose gel electrophoresis.

Preparation of water in oil antigen emulsion using oil as adjuvant, Immunization of animal with emulsified antigenic preparation for production of antibody and collection of antiserum from immunized animals. Preservation of antiserum for long term storage. Separation of immunoglobulin fraction from serum by salt precipitation technique. Serological technique like, agglutination, immunodiffusion, immunoelectrophoresis for detection of antigen antibody reaction, Quantification of antibody by single radial immunidiffusion technique. Dissection of laboratory animals and birds for detection of lymphoid organ, Demonstration of SDS PAGE, ELISA and western blot. Demonstration for isolation of mononuclear cells from peripheral blood of domestic animals using density gradient centrifugation technique.

Virus isolation using cell culture and embryonated chicken eggs; titration of animal viruses; haemagglutination and haemagglutination inhibition assays, virus purification techniques.

VMC-509 Systemic Bacteriology T-2-I

Systematic studies on the classification, morphology, biochemical reactions, antigenic characters and pathogenicity of Brucella, Camphylobacter, Vibrio, Listeria, Erysipelothrix, Mycobacterium, Pasteurella, Bacillus, Clostridium, Streptococcus, Staphylococcus, Salmonella, Escherichia, Shigella, Corynebacterium, Yersinia, .Leptospira, Mycoplasma, Chlamydia, Rickettsia, Actinobacillus and Dichelobacter. Conventional and molecular diagnostic techniques for diseases produced by these bacteria, Control methods including vaccines.

VMC-510 Systemic Bacteriology P-1- I

Isolation, identification and characterization of Brucella, Camphylobacter, Vibrio, Listeria, Erysipelothrix, Mycobacterium, Pasteurella, Bacillus, Clostridium, Streptococcus, Staphylococcus, Salmonella, Escherichia, Shigella, Corynebacterium, Yersinia, .Leptospira, Mycoplasma, Chlamydia, Rickettsia, Actinobacillus and Dichelobacter

VMC-511 Mycoses T-2-II

Systematic studies: ecology, geographic distribution, etiology, pathogenicity, symptoms, diagnosis, treatment and control of Dermatophytoses, Tinea Versicoler, Piedra, Rhinosporidiosis, Epizootic Lymphangitis, Sporotrichosis, Mycotic mastitis, Aspergillosis, Candidiasis, Cryptococcosis, Histoplasmosis, Blastomycosis, Coccidioidomycosis, Mycotoxicoses and Mycotic abortion

VMC-512 Mycoses P-1-II

Isolation and characterization of fungi viz: -Candida albicans, C.tropicalis, C.krusii, Cryptococcus neoformans, Histoplasma capsulatum, Mucor sp. Aspergillus flavus, A.fumigatus, Microsporum sp., Trichophyton sp., Pityrosporum orbiculare, Rhinosporidium seeberi, Histoplasma farciminosum, Sporothrix schenckii, Blastomyces dermatitidis, Fusarium sp. and Penicillium sp. Detection of mycotoxins in feed ingredients and other samples.

VMC-513 Systematic Animal Virology T-2-II

Studies on animal viruses belonging to various order/families/viruses/subviral agents given below with reference to etiology, epidemiology, disease status in India, pathogenesis and pathology, immunity, diagnosis, prevention and control: Poxviridae, Asfarviridae and Iridoviridae, Herpesvirales, Adenoviridae, Papillomaviridae and Polyomaviridae, Parvoviridae, Circoviridae and Anelloviridae, Retroviridae, Reoviridae, Birnaviridae, Paramyxoviridae, Rhabdoviridae, Filoviridae, Bornaviridae , Orthomyoxviridae, Bunyaviridae, Arenaviridae, Coronaviridae, Arteriviridae and Roniviridae, Picornaviridae, Caliciviridae and Astroviridae, Togaviridae, Flaviviridae, Hepeviridae, Hepadnaviridae, Deltaviruses, Unclassified Viruses, Prions.

VMC-514 Systematic Animal Virology P-1-II

Study of the symptoms, course of the disease, gross lesions, histopathological lesions in animals/poultry infected with major viruses; collection, preservation and processing of clinical specimens; Isolation of viruses in embryonated eggs and cell cultures; cytopathogenicity induced by representative viruses; diagnostic assays employed for various diseases described by OIE.

VMC-516 Animal Cell culture P-1-I/II

Source of cells and cell lines; designing of cell culture laboratory; preparation of glasswares, cell culture media and reagents; preparation of primary and explant cultures; subculturing of semi continuous and continuous cell cultures; counting of cells; scaling up of cell culture; cryopreservation and revival of cells; transportation of cells; cytopathic effect of different viruses in cell culture; virus titration.

VMC-602 Clinical Bacteriology P-2-I

Collection and dispatch of material for bacteriological and serological diagnosis. Processing of various materials like blood, urine, fecal material, brain, lung, and milk for isolation of various bacterial agents from the above materials employing different culture media. Identification of the isolate on the basis of morphology and various biological, biochemical and serological tests. Application of various serological tests like slide agglutination, CIE, IHA, CFT etc. Pathogenicity of the isolate in laboratory animals.

VMC-603 Antibacterial agents and their action T-1-II

Antibiotic sensitivity and drug resistance. Mechanism of drug resistance. MIC value of certain drugs against pathogenic bacteria responsible for infections in livestock and poultry and their mode of action in relation to recovery from diseases

VMC-604 Antibacterial agents and their action P-1-II

Determination of bacteriostatic and bacterial levels of antibiotics by various methods. In vitro transfer of drug resistance

VMC-606 Biosafety & Biosecurity in Veterinary Microbiology T-1-I/II

Safety considerations and guidelines for Veterinary Microbiology Laboratories, Biohazards associated with microbial pathogens; criteria for risk assessment of microbial pathogens. Classification of pathogens in various groups and its implications microbial containments. Containment levels required for work with various infectious agents and biosafety guidelines for microbiology laboratories. Essential features required for establishing the four types of biosafety laboratories. Various classes of biological safety cabinets and their features and functions. Concept of GMP and GLP with special reference to schedule M of Drugs and Cosmetic Act of India. Roles of Regional and Reference Laboratories; role of OIE.

VMC 607 Viral Vaccines T-1-I/II

Historical developments in vaccinology; principles of vaccination, types of vaccines and their merits and demerits; immunology of vaccination; principles of attenuation, inactivating agents, adjuvants, carriers and delivery vehicles, vaccine delivery systems, new generation vaccines: subunit vaccine, gene-deleted vaccine, vectored vaccine, chimeric viruses; virus-like particles (VLPs), DNA vaccine, synthetic peptide vaccine, edible vaccines; molecular defined attenuation, disabled infectious single cycle (DISC) vaccine, epitope mapping, marker vaccine and DIVA strategy, licensed/commercialized conventional and new generation vaccines, immunotherapy for virus infections, vaccination policy, vaccination schedules for animals and poultry, strains used in different viral vaccines, herd immunity; vaccine failure.

VMC 608 Viral Vaccines P-1-I/II

Selection of candidate vaccine strains; production of live and inactivated vaccines; quality control: sterility, purity, safety and potency; stability test; lyophilization of viral vaccines.

VMC 609 Viral Pathogenesis and Immunity T-2-I/II

Brief history of viral pathogenesis, Koch's postulates, the sequential steps in viral infection, cellular receptors and viral tropism, virus–cell interactions, viral virulence, viral persistence, patterns of infection: incubation periods, mathematics of growth correlate with patterns of infection, acute infections, persistent infections, latent infections, "slow" infections, abortive infections, transforming infections, innate immunity, immune responses to viral infection, virus-induced immunopathology, virus-induced immunosuppression.

VMC 611 Antiviral agents T-1-II

Historical perspective, screening for antiviral compounds, computational approaches for drug discovery, properties of ideal antiviral agent, limitations of antivirals; classification of anti-viral agents in relation to viral replication cycle, drugs inhibiting specific stages of virus infection – virus attachment and entry, uncoating, viral gene expression, viral genome replication, viral assembly and maturation, viral release, antiviral therapies that target immune processes, resistance to antiviral agents, promising antiviral agents against important animal viruses, plant-based antiviral drugs.

VMC 613 Avian viruses T-2-I/II

Different aspects of major viral disease of poultry including economic and Public Health Significance, History, Etiology: Classification, Morphology, Chemical Composition, Biologic Properties, Virus Replication, Susceptibility to Physical and Chemical Agents, Laboratory Host Systems, Pathogenicity; Pathobiology and Epidemiology: Incidence and Distribution, Natural and Experimental Hosts, Transmission, Spread, Incubation Period, Clinical Signs, Pathology, Immunity; Diagnosis: Isolation and Identification, molecular

Diagnosis, differential Diagnosis,; Intervention Strategies: Management Procedures, Vaccination.

VMC 615 Viral Zoonoses T-1-II

Classification of Zoonoses, Factors influencing the prevalence of zoonoses, Safety precautions, Etiology, epidemiology, transmission, pathogenesis and pathology, clinical features, diagnosis, prevention and control of emerging and reemerging viral zoonoses.

VMC 618 Viral Bioinformatics P-1-II

Biological databases, Primer designing, methods for sequence analysis – convention and new generation sequencing, phylogenetic analysis, ORF prediction, protein structure prediction, RNA secondary structure prediction, sequence submission.

VMC-619 Molecular Immunology T-1-I

Molecular structure, function and ligands of Toll Like receptors, ligands, signal transduction through TLR, Lymphocyte markers and CD nomenclature. Recognition of antigens by BCR, molecularstructure of antibodies, synthesis assembly and expression of immunoglobulin, Immunoglobulin gene and rearrangement its organization and expression of lymphocyte receptor gene, immunoglobulin gene diversity and mechanism of recombination of B cell gene,; Function of immunoglobulin; Membrane and secreted immunoglobulin; B lymphocyte subsets. Conventional T cell and T reg cell; T cell receptor; T cell gene diversity, Associated molecule of TCR. MHC structure, Genomic organization of the MHC, haplotype, Concept of congenic syngeneic, concept of polymorphisim of MHC gene, expression of MHC molecules and inheritance pattern, exogenous and endogenous antigen processing and presentation by MHC. B cell and T cell activation:- BCR and TCR complex in cell activation, Pathway of signal transduction, role co-stimulators in B cell and T cell activation, Recruitment of adaptor proteins, Role of Kinase and phosphatase in signal transduction pathway. Methods in studying T cell activation, Assays for B cell lymphocyte activation.

VMC-620 Molecular Immunology P-1-I

Isolation and purification of immunoglobulin classes. Techniques of immunoelectrophoresis, polyacrylamide gel electrophoresis, western blot experiment, single radial immunodiffusion as quantitative test, counter current immunoelectrophoresis, rocket immunoelectrophoresis, cross immunoelectrophoresis.

VMC-621 Cellular Immunology T–1-I

Cells and tissues of immune system. Structure and function of primary and secondary lymphoid organs. Lymphoid trafficking. Chemotaxis and effector functions of macrophages and granulocytes. Ontogeny of immune system. T and B cells differentiation and maturation in primary lymphoid organs. Activation of T and B cells and clonal expantion. Apoptosis. Antigen presenting cells and their functions. Cellular immune response effector mechanisms. Cytokine and chemokines and their roles in the immune system. Regulation of immune response. MHC restriction. Immunological tolerance, graft rejection.

VMC-622 Cellular Immunology P-1-I

Isolation of mononuclear cells from blood of domestic animals and birds, proliferation of B cell and T cell using specific mitogen under culture condition, Detection of proliferation of lymphocyte by MTT assay, Separation of polymorphonuclear leucocytes and detection of phagocytic assay, generation of monocyte derived macrophage under in vitro culture

condition. Isolation of lymphocytes from spleen of mice and day old chicken and its culture, Isolation of bone marrow derived macrophage from mice and its culture for maturation.

VMC-623 Immunomodulation T-1-II

Immunomodulators and their mechanism of action. Immunosuppression induction by antigen. Neuroendocrine control of immunoregulation .Immunosuppressive agents and drugs, corticosteroids cyclosporins cyclophposphamide and other agents like irradiation and the mode of action. Adjuvants: classification, mode of action, adjuvants combination and safety. cytokine as adjuvant, PLG and microparticle as adjuvant, TLR agonist as adjuvant Antigen delivery system and mode of action. Immunostimulants: bacterial product and synthetic compound, complex carbohydrates, immune enhancing drugs, vitamins and cytokines.

VMC-624 Immunomodulation P-1-II

Preparation of water in oil and oil in water adjuvant, Inoculation of experimental animals/birds with different commercial adjuvant and TLR agonist and safety study, Immunisation of animals/birds with immunopotentiators /immunosupressants along with adjuvants. Quantification of immune response at various time intervals.

VMC-625 Mucosal Immunology T-1/II

Mucosal barrier: Development and physiology of mucosal defense. Cells and lymphoid tissues of mucosal immune system: MALT, GALT, NALT, BALT. Mucosal inductive and effector sites. Mucosal Immunoglobulin, IgA synthesis and transport to intestinal lumen , Intestinal macrophage, Antigen uptake and presentation at mucosal sites, transepithelial transport of antigen.. Description and role of Paneth cell and cryptopatches . M-cells and their functions. Intestinal Dendritic cell, Mucosal immune effector mechanisms including secretary IgA response. Extrathymic T cell development in mucosal tissues and their phenotypes and functions. Importance and limitations of mucosal immunization. Mucosal adjuvants and delivery systems. Oral tolerance mechanistic approach. Assessment of mucosal immune response and potency testing.

VMC-626 Mucosal Immunology P -1-II

Experimental; Isolation of lymphoid cells from mucosal surfaces (intestine and bronchial lavage) and viable count, culture of these cells under in vitro condition with mitogen, for lymphoprolifaration assay. Characterization. Immunization through mucosal routes. With NDV and assessment of humoral antibody by HA and HI test. Assessment of secretary IgA levels in serum, intestinal, tracheal and lungs lavage. Demonstration of Payer`s patches of domestic animal by histological section staining pre and post immunization using oral route to confirm activation of cells in intestinal lymphoid tissue.

VMC-627 Avian Immunnology T-1-II

Structure and function of avian immune system an overview: Cells and organs of avian immune system, Avian Innate Immune Responses, Complement system in avian species. Avian Cytokines and Chemokines. Ontogeny and development of the Avian Immune System, Bursa of Fabricius and Avian B Cells, Avian immunoglobulin: structure and function, mechanism of immunoglobulin diversity in avian species. Generation of Antibody Repertoires, Evolution of Avian Immunoglobulins, Avian T cell receptors, T cell diversity: Antigen Recognition and Lineages, The Avian MHC and Antigen Presenting Cells and antigen processing and presentation, The Avian mucosal Immune System (Enteric , Respiratory and , Reproductive Immune System),Avian Immunosuppressive Diseases and Immune Evasion, Practical Aspects of Poultry Vaccination for immuneresponse

VMC-628 Avian Immunnology P- 1-II

Separation of avian immunoglobulin from blood and egg yolk, In-ovo immunization technique with suitable antigen/ vaccine. Separation of chicken thymocytes and bursal cells from young birds by dissection. Raising anti thymocyte antibody in mice. Isolation of lymphocytes from peripheral blood of birds. Isolation of intra epithelial lymphocytes from day old chicken. Separation of monocytes and phagocytosis of opsonized sheep RBC / bacteria.

VMC-629 Bacterial Genetics T-1-I

Bacterial genetic material. Bacterial variation: phenotypic and genotypic. Mutation and mutagenesis: types of bacterial mutants, detection of mutants. Nature of DNA alterations. Properties of some common mutagenic agents. Plasmid: conjugative and non-conjugative plasmid, fertility plasmid, antimicrobial resistant plasmid, and colicin. plasmid. Transposing elements: insertion sequences, transposons, and bacteriophage, cosmids. Gene transfer: (a) Conjugation: mechanism, transfer of DNA plasmid and chromosome, repression of transfer genes, incompatibity. (b) Transformation: mechanism, physiological and artificial transformation. (c) Transduction: Mechanism-generalized and specialized transduction. Recombination: mechanism, reciprocal, non-reciprocal and illegitimate recombination.

VMC-630 Bacterial Genetics P- 1-I

Detection of mutants: rough mutants, auxotroph mutants, and drug resistant mutants. Transfer of drug resistance by conjugation: direct transfer, indirect transfer (triparental cross). Propagation and titration of phage (Lambda or any other phage). Transduction.

VMC-631 Oncogenic Viruses T-2-I

General features of cell transformation and characterization of transformed cells, oncogenic RNA and DNA viruses, expression of viral and cellular oncogenes, mechanisms of viral oncogenesis, diagnosis of viral oncogenesis, oncolytic viruses, and virotherapy.

VMC-633 Slow Viral Infections and Prions T-2-II

Epidemiology, pathogenesis, diagnosis and control of slow viral infections, properties, replication and epidemiology of prions, pathogenesis, immunity, diagnosis and control of various diseases caused by prions, recent trends in prion research.

VMC-700 Seminar 1-I/II

VMC-701 Special problem 1-I/II

VMC 704 Advanced Techniques in Microbiology P-1-I/II

Cultural characterization of important bacterial and fungal pathogens, Biochemical tests for various pathogens, molecular techniques for identification and characterization of bacteria and fungi including PCR, real time PCR, southern blotting, western blotting, plasmid profiling, restriction enzyme analysis, Purification of DNA by elution, DNA transformation studies by electroporation and heat shock method.

One-step growth curve; determination of virus size and nucleic acid types; electron microscopy, hybridoma technique, modern techniques for virus diagnosis.

Isolation and characterization of immunoglobulin classes, subclasses, Fragmentation of antibody by enzyme digestion to F(ab)2 and Fc fragments, separation of fragments by Gel chromatography, affinity chromatography techniques employing Protein A Sepaharose, Antigen –antibody interaction, affinity kinetics. Separation of protein by SDS PAGE under Native and reducing condition. Western blot experiment to detect the immunogenic protein,

Solid phase ELISA, Separation of peripheral blood mononuclear cells from different vertebrate species, lymphocyte stimulation test, cytotoxic T cell assay, morphological and functional assays of blood monocytes.

VMC-705 Advanced Bacteriology and Mycology T-2-I/II

Introduction, Structure and function of cell wall of Gram-positive bacteria: capsule, peptidoglycan and teichoic acid; bacterial structure and function of cell wall of gram negative bacteria: LPS, outer membrane protein & ECA. Biosynthesis of cell walls. Surface appendages-flagella and fimbrae and associated structure e.g. spore etc., their synthesis and functions. Cell surface associated virulence mechanism viz. role in antiphagocytosis, adherence to mucosal surfaces etc. Bacterial antigens and immunogens: Surface structures as antigen, surface protective antigens. Types and functions of bacterial components as adjuvants, their chemical structure, mechanism of action and uses. Structure and function of cell wall of fungi,: structure ultrastructure of fungi. Fungal growth mechanism. Differentiation, nutrition, metabolism and genetics of fungi.

VMC-706 Advanced Bacteriology and Mycology P-1–I/II

Cell wall preparation of bacteria. Extraction of lipopolysaccharide from E. coli and characterization. Extraction of teichoic acid and its characterization. Extraction of surface antigen using Triton X-100, SDS etc. and their characterization. Demonstration of fimbriae and flagella, preparation of capsular extract and its characterization. Application of standard serological methods for disease diagnosis. Cell wall preparation of fungi, extraction of the cell wall demonstration of different spores and its implications, application of standard methods for fungal disease diagnosis

VMC -707 Advances in Virology `T-2-I/II

Biology of RNA and DNA virus replication, recent concepts in animal virus research with respect to viral structure and architecture, viral virulence, viral pathogenesis, persistence and oncogenesis, latest trends in the development of antivirals, cloning, and expression in viral vectors.

VMC-708 Advances in Virology P-1-I/II

Separation and characterization of viral proteins and nucleic acids, chromatography, blotting techniques, problem-oriented practical assignments aimed at the development of bioreagents and relevant diagnostic tests, screening and evaluation of antiviral agents for efficacy and toxicity.

VMC-709 Advances in Cellular and Molecular Immunology T-2-I/II

Cells and tissues of immune system:-.Significance of hematopoietic stem cell, Origin of myeloid cells; Lymphoid cells (T & B cells); NK cells, NKT cell, Apoptosis and its role in homeostatic mechanism. Ontogeny of the lymphoid tissue in mammal and birds. Structure and function of primary and secondary lymphoid organs. Cell adhesion molecules, recirculation and trafficking, cell homing receptor, Cytokine families:- cytokine receptors; cytokine properties, cytokine antagonist; Cellular basis of cytokine signaling, cytokine in hematopoiesis and cytokine based therapy. Chemokine; chemokine subgroups, chemokine receptors; Chemotaxis and effector functions of macrophages and granulocytes. Early development of T and B cells and its differentiation, maturation in primary lymphoid organ. Organization of expression of lymphocyte receptors gene, multigenic organization of immunoglobulin gene, Mechanism of recombination of immunoglobulin gene, T cell receptor gene expression. Thymic selection of T cell repertoire concept of Extrathymic origin of T cells; Effector and memory T and B cells, Activation of T and B cells and clonal expansion. Role of T cell help in

B cell response, affinity maturation of B cells and class switching. Antigen processing and presentation. B cell development and T cell development. Lineage commitment, Memory generation. Antibody mediated and cell mediated effector function. Antigen presenting cells, and their functions at cellular level. Cellular immune response effector mechanisms by CTL, NK cells and NK T cell, Experimental assessment of Cell mediated cytotoxicity assay. Regulation of immune response. Role of T reg cell and Immunological tolerance, graft rejection.

VMC-710 Advances in Cellular and Molecular Immunolog P-1-I/II

Raising antibody against purified protein, Isolation and characterization of immunoglobulin classes, subclasses, , Fragmentation of antibody by enzyme digestion to F (ab)2 and Fc fragments, separation of fragments by Gel chromatography, affinity chromatography techniques employing Protein A sepaharose, Antigen–antibody interaction , affinity kinetics. Separation of protein by SDS PAGE under Native and reducing condition. Western blot experiment to detect the immunogenic protein, Solid phase ELISA technique, Separation of peripheral blood mononuclear cells from different vertebrate species, lymphocyte stimulation test, cytotoxic T cell assay, morphological and functional assays of blood monocytes.

VMC-711 Bacterial toxins T-1-II

Nomenclature, definition and general characterization. Intracellular and extracellular toxins. Complex lipopolysaccharide protein toxin of cell walls. True protein exotoxins and their mechanism of action. Toxins of Corynebacterium diphtheria, Clostridium novyi, C.septicum, C .tetani, C.botulinum and toxins of other Gram-positive bacteria. True protein exotoxin of Gram-negative organisms. Role of exotoxins in animal diseases. Enterotoxins: general characterization, methods of purification, mechanism of action and role in diseases of animals. E.coli and V.cholera enterotoxins. Relation of lysogeny and bacterial toxins. Immunology of bacterial toxins. Assay system for toxins, titration in mice and tissue culture.

VMC-712 Bacterial toxins P-1-II

General behaviour of toxins. Preparation of various exotoxins. Effect of various exotoxins in vivo in animals. Effect of exotoxins in tissue culture (in vitro). Purification of exotoxins. Preparation and purification of enterotoxins. Rabbit ileal-loop techniques for enterotoxins. Toxin and antitoxin neutralization test.

VMC-713 Anaerobic infections T-1-I

Classification of anaerobic bacteria. Isolation procedure of anaerobic bacteria: selection of media and anaerobic system. Identification of pure culture isolates. Comparison of methods of isolation. Selection and preservation of specimens suspected for anaerobic diseases. Examination of specimens. General characterization of anaerobic bacteria: Criterions for diagnosing clostridial infections. Morphological, cultural, biochemical, and antigenic (including toxins) characterization of anaerobic bacteria. Experimental infection in lab animals. Epidemiology, pathogenesis, diagnosis and control of diseases caused by Clostridium perfringens type A, B, C, D, and E, C. chauvoei, C. septicum, C. histolyticum, C. bifermentans, C. sordellii, C. botulinum, Dichelobacter nodosus and Fusobacterium necrophorum

VMC-714 Anaerobic infections P-1-I

Isolation procedures and anaerobic system. Identification of pure culture of anaerobic bacteria. Selection and preservation of specimens. Morphology, cultural examination, biochemical reactions and antibiotic sensitivity test of anaerobic bacteria. Toxin-antitoxin neutralization, counter immunoelectrophoresis of Cl.perfringens toxins. Morphology, colony

characters, biochemical reactions, experimental infections in lab animals for Cl. chauvoei, Cl. septicum, Cl. novyi, Cl. tetani and B. nodosus

VMC-715 Mycoplasmology T-1-II

Historical development and classification of Tenericutes. Morphology of Mollicutes. Antigens of mycoplasmas. Role of humoral and cell mediated immunity in mycoplasma infections. Viruses of mycoplasma. Mycoplasma in tissue cultures, Pathogenicity, molecular biology and genetics of mycoplasmas. Diagnosis and control of Contagious Bovine Pleuropneumonia, Contagious Caprine Pleuropneumonia, Contagious agalactiae, Enzootic pneumonia and Atrophic rhinitis of pigs, Avian mycoplasmosis, Reproductive disorders in animals, Mastitis, Keratoconjunctivitis, Calf pneumonia, Sheep and goat pneumonia, arthritis and bovine mycoplasmosis. Ureaplasma and its association in various disease conditions.

VMC-716 Mycoplasmology P-1-II

Preparation and sterilization of various media for Mycoplasma work. Isolation of Mycoplasma on various mycoplasma media, colony characteristics and morphology, Differentiation of mycoplasma from L-forms and other bacteria. Biochemical characterization of mycoplasmas. Differentiation of mycoplasma and acholeplasma. Serological characterization of mycoplasmas. Pathogenicity of some mycoplasmas in laboratory animals. Serodiagnosis of mycoplasmosis using slide agglutination test, indirect haemagglutination test, complement fixation test, double immunodiffusion test, counter immunoelectrophoresis and ELISA test.

VMC-717 Enterobacteriaceae T-1-I

General characteristics and classification of family Enterobacteriaceae, Differentiation of genera, species of family Enterobacteriaceae by biochemical reaction, motility and other characteristics. Antigens of family Enterobacteriaceae viz. enterobacterial common antigen, O antigen, H antigen, K antigen and other antigens.

VMC-718 Enterobacteriaceae P-1-I

Isolation and preliminary identification of Salmonella, E.coli and other enterobacteria. Agglutination test and agglutination adsorption test. Preparation and standardization of Salmonella antisera. Colicin typing in E.coli. Methods of Salmonella serotyping.

VMC-719 Bacterial Infections of Reproductive System T-1 -I

Bacterial flora of semen. Diseases responsible for reproductive disorders in male and female animals with particular reference to Brucellosis, Campylobacteriosis, Leptospirosis, Mycoplasmosis, Listeriosis, Chlamydiosis, Rickettsiosis, Salmonellosis, and Contagious equine metritis. Reproductive infections due to other bacterial agents like E.coli and Klebsiella.

VMC-720 Bacterial Infections of Reproductive System P-1-I

Preparation of different media for isolation of specific organisms responsible for reproductive infections. Biochemical and sugar fermentation tests for identification of causative agent. Serological tests like plate and tube agglutination tests, gel diffusion test, Rose Bengal plate test (RBPT), milk ring test Microscopic agglutination test and enzyme linked immunosorbant assay (ELISA). Microbial load in semen.

VMC-721 Molecular Determinants of Bacterial Pathogenesis T- 1-II

Introduction. Entry of microbes in the body: growth in the epithelium and effect of cytokines; roles of TLRs and inflammation, encounter with the phagocytic system, spread of the microbes and generation of immune response. Virulence mechanism of microbes and the

host tissue injury. Molecular basis of pathogenicity; Secretion pathways. Mechanism of fever. Recovery from infection. Elimination of the microbes. Pathogenesis of the following important bacterial diseases of livestock viz. Tuberculosis, Haemorrhagic Septicaemia, Black Quarter, Johne's Disease, Brucellosis and Mycoplasmosis.

VMC-722 Molecular Determinants of Bacterial Pathogenesis P-1-II

Isolation and purification of plasmid and genomic DNA, RNA and their restriction enzyme analysis. Agarose gel electrophoresis and staining with ethidium bromide. Purification of DNA by elution, gene elean and 7.5 M ammonium acetate, Plasmid curing by physical and chemical methods. Role of plasmid in virulence and antibiotic resistance. DNA transformation studies by bacterial conjugation, electroporation and heat shock method. DNA fingerprinting, Preparation of bacterial diagnostic probes using non-isotopic labeling. PCR methods for optimization, determination of the size of product elution and purification of PCR products. Application of blotting techniques: Southern and dot blot, Restriction Enzyme Analysis (REA).

VMC 723 Molecular and Genetic Aspects of Viral Pathogenesis T-2-I/II

Mechanisms of viral infection and spread through the body, detailed study of virus-host interactions, host immune responses to viral infections, viral strategies to evade host immune responses, Pathogenesis of viral diseases of various systems, animal models for studying viral pathogenesis, molecular and genetic determinants of viral virulence, mechanisms of viral virulence, molecular and genetic determinants of viral persistence, viral oncogenesis, viral immunosuppression and immunopathology, animal models for studying viral pathogenesis.

VMC 724 Molecular and Genetic Aspects of Viral Pathogenesis P-1-I/II

Pathotyping of animal viruses, determination of the immunosuppressive potential of animal viruses, characterization of molecular determinants of viral virulence, recombinants and reassortants, isolation and molecular characterization of viruses with varying virulence.

VMC 725 Structure-Function Relationships of DNA and RNA Viruses T-2-I/II

Methods of studying virus structure and architecture, methods of amplification of viral nucleic acids, molecular characterization of viral protein and nucleic acid, nucleotide sequencing, and its analysis, virus replication, structure and function of animal DNA and RNA viruses, development of modern vaccines and antiviral using the relationship between structure and function of animal DNA and RNA viruses.

VMC 727 Viral Genetics T-2-II

Structure and complexity of virus genome, coding strategies, the replication cycle of viruses, basic concepts of molecular genetics, virus mutants, genetic interaction between viruses, nongenetic interaction between viruses, reverse transcription and transposition, random mutation, recombination, reassortment, gene amplification/reduction, quasispecies, defective interfering genomes, the evolution and genetics of virus-host shifts, the interplay between viruses and their host cells, viral epigenetics, reverse Genetics, viral metagenomics, Viral ecology.

VMC-729 Advances in Clinical Immunology T-1-I

Clinical laboratory methods for detection of antigens and antibodies :

Unit-I: Theory and mechanism of antigen antibody binding, thermodynmanmaics of antibody antigen interaction, Methods for detection affinity of antigen-antibody interaction, concept of equilibrium of interaction and binding constant and technique for equilibrium dialysis Surface plasmon reaction for measurement of antibody affinity, Specificity and cross reactivity, Recognition of T cell and conformational and linear epitope concept and its experimental

proof. **Unit-II:** Concept of catalytic antibody, engineered antibody, chimeric antibody, generation of monoclonal antibody and its characterization technique.
Unit-III: Principle of Immunoglobulin purification from serum by different technique and purification of monoclonal antibody,. Purification of antigens and antibodies by affinity chromatography and gel chromatography and laboratory applications with its limitations, Conjugation technique of antigens with hapten and immunization methods in lab animals.
Unit-IV: Detection of antigens in cells and tissue by immunological techniques. Detection of antibody in clinical samples using immnoprecipitation technique and its interpretation.
Unit-V: Immunoelectrophoresis, native and reduced condition. Western blot technique to detect immunogenic protein and its application in clinical cases.
Unit-VI: Different type of enzyme immunoassays such as solid phase and liquid phase , Direct indirect, competitive, sandwitch, principle of these tests and limitations.
Unit-VII: Detection of complement and acutephase protein in clinical cases. Methods for detection of immune complexes, and principle of these test and limitations. Use of radiolabelled antigen and antibodies in clinical sample such as RIA and its mechanism and interpretation of results in clinical cases.
Unit-VII: Detection of virus neutralizing antibody in cell and live animals.
Unit-IX: Clinical laboratory methods for detection of cellular immune function: skin testing lymphocyte transformation, detection of CMI by cold and radiolabelled technique. Cytokines as indicator of intracellular pathogen infection and CMI detection. ELISPOT for cell secreting cytokine molecules. Neutrophil function test, such as intracellular enzyme activity for respiratory burst using NBT reduction and DHR reduction. chemotaxis, Lymphocyte subset enumeration, flow cytometry, Magnetic activated cell sorting, Confocal fluorescence microscopy, Tunnel assay for detection of apoptosis.
Unit-X: Autoimmunity and autoimmune diseases: immunological tolerance and autoimmunity, molecular genetics of autoimmune diseases , mechanism involved in the induction of autoimmunity. Autoimmune disease: lymphoproliferative disorders, endocrinology and diabetes. **Unit-XI**: Immunodeficiency diseases: humoral, cellular and combined immunodeficiencies., Anaphylaxis and allergy, Radioallergosorbent (RAST) technique for specific IgE antibody detection, basophil activation test, serum tryptase, Test for complement deficiencies. Concept of transgenic and knockout mice in immunological test.

VMC-730 Advances in Clinical Immunolgy P-1-I

Raising of antibody against defined purified antigen (such as HEL/BSA/ cytochrome oxidase/ transferrin, or available protein in lab) as well as bacterial sonicated antigen in experimental animal and periodical bleeding to check the antibody level at early and late phase. Purification of Immunoglobulin by gel chromatography and affinity chromatography, and confirmation by western blot, Solid phase ELISA test for detection of antibody against purified antigen, Confirmation by western blot for immunogenic protein. Immunisation of birds with ND Virus and detection of HI antibody and virus neutralization test in embryyonated egg to detect the neutralizing titre using Reed and Muench method. Single radial immunidiffusion test as quantitative test for detection of level of antibody developed in immunized animal after post immunization, Crossed immunoelectrophoresis to detect the antigenic components of bacterial antigen used for immunization. Isolation of lymphocyte from birds and domestic animals using different density gradient solution and optimization of g values with time to record the difference in isolation protocol. Culture of PBMC with mitogen and antigen for lymphocyte transformation test with MTT reduction.

VMC-731 Advances in Immunoregulation T-1-I

Molecular mediators of immune response - lymphokines and monokines. Idiotypic network, Epitope specific regulation. Th, Tc and Treg cells. MHC in immunoregulation,

immune response genes. Antigen specific suppressor molecules produced by T cells. Immunosuppressive agents and immunostimulation.

VMC-733 Cytokines and Chemokines T-1-I

Properties of cytokines .General structure and function of cytokines.cytokine secretion by Th1 and Th2 subsets. Cytokines cross regulation. Cytokine receptors –general structure of cytokine receptors: immunoglobulin superfamily receptors, class 1 and class 2 cytokine receptor families. TNF receptor families, cytokine antagonists. Cytokine related diseases. Therapeutic uses of cytokines and their receptors.Chemokines: subgroups of chemokines and their structures and functions. Chemokine receptor families.

VMC 600 Seminar (1)
VMC 601 Special Problem (1)
VMC 699 Research (Total 30; 15 per Semester)
VMC 700 Seminar (1)
VMC 701 Special Problem (1)
VMC 799 Research (Total 45; 15 per Semester)

This has been implemented from Academic Session 2017-18 i.e. 1.8.2017 onwards.

Registrar &
Member Secy. (AC)

Distribution:

1. All the Chairman, BOS, IVRI, Izatnagar/Mukteswar. It is requested that the contents of the above notifications may please be brought to the notice of all the faculty members as well as the P.G. students including faculty members & P.G. Students located at other Division/Section/Campuses/Stations.
2. All the Joint Directors and Station Incharge, Bangalore/Kolkata/Palampur. It is requested that the contents of the above notifications may please be brought to the notice of all the faculty members as well as the P.G. students including faculty members & P.G. Students located at other Division/Section/Campuses/Stations.
3. The Controller of Examination Deemed University, IVRI, Izatnagar for information and necessary action.
4. The Academic Coordinator Deemed University, IVRI, Izatnagar.
5. The Incharge, ARIS Cell, IVRI, Izatnagar, with the request to upload the above notification on the Institute Website.
6. The PS to the Director, IVRI, Izatnagar.
7. PS to the Joint Director (Acad.), IVRI, Izatnagar
8. The AAO (Acad.), IVRI, Izatnagar.

ICAR-INDIAN VETERINARY RESEARCH INSTITUTE
(Deemed University)
IZATNAGAR–243 122 (UP) INDIA

No.F.2-1/2017-B&C/AC Dated : 6.6.2017

NOTIFICATION

The Academic Council, in its 60th meeting held on 5th May, 2017, approved the merger of Veterinary Public Health and Epidemiology degree for nomenclature of both the discipline and eligibility qualifications, credit hours, number of seats and course syllabus of Veterinary Public Health & Epidemiology (VPE) is hereby conveyed as per the following details :-

VETERINARY PUBLIC HEALTH AND EPIDEMIOLOGY (VPE)
PG SYLLABUS

Name of the Degree	Number of Seats Proposed
1. M.V.Sc. VPE	**7**
2. Ph.D. VPE	**6**

Core Courses for M.V.Sc.: 10 Credit hours + Seminar
Core Courses for Ph.D.: 10 Credit hours + Seminar

Eligibility for M.V.Sc Admission.:

The candidates for admission to Master's programme must have Bachelor's Degree in Veterinary Science in the concerned discipline as specified by the Veterinary Council of India (VCI).

Eligibility for Ph.D. Admission:

BVSc & AH with Master's degree in Veterinary Public Health and Epidemiology/ Veterinary Public Health/Veterinary Epidemiology/Epidemiology/Public Health/Pathobiology.

a) Master's Programme : Total credit hours - 60

i. **Major discipline**
16 Credit Hours (including a minimum of 10 Credit Hours of core courses and one Credit Hour of seminar)

ii. **Minor discipline-One**
7 Credit Hours including one Credit Hour of seminar

iii. **Supporting disciplines**
7 Credit Hours.

iv. **Research for thesis**
30 Credit Hours

b) Ph.D. Programme : Total credit hours - 75

i. **Major discipline**
16 Credit Hours including a minimum of 10 Credit Hours of core courses and one Credit Hour of Seminar

ii. **Minor disciplines (Two)**
14 Credit Hours (a minimum of 7 credit hours from each minor subject)

iii. **Research for thesis**
45 Credit Hours,

1. For other disciplines minor will be read as VPE (Veterinary Public Health & Epidemiology)
2. HD/VPH will act as Chairman of BOS and HD/Epidemiology will be permanent member of BOS of VPE discipline.
3. Approved faculty of VPH and Epidemiology may be now read as approved faculty of VPE.

OUTLINE OF COURSE CATALOGUE - PG SYLLABUS

Course No	Course Title	T/P	Credit Hours	Semester
VPE 501	**Elements of veterinary public health**	**T**	**1**	**I**
VPE 503	**Zoonoses and public health**	**T**	**1**	**I**
VPE 504	**Zoonoses and public health**	**P**	**1**	**I**
VPE 505	**Principles of food hygiene and safety**	**T**	**1**	**I**
VPE 507	Environmental pollution and safety	T	2	I
VPE 508	Environmental pollution and safety	P	1	I
VPE 511	**Principles of epidemiology**	**T**	**2**	**I**
VPE 513	**Epidemiological concepts of disease causation and control**	**T**	**1**	**I**
VPE 555	Special problem	-	1	I/II
VPE 600	**Seminar (M.V.Sc. and Ph.D.)**	**-**	**1**	**I/II**
VPE 601	**Meat hygiene**	**T**	**1**	**II**
VPE 602	**Meat hygiene**	**P**	**1**	**II**
VPE 603	Bacterial and rickettsial zoonoses	T	1	II
VPE 604	Bacterial and rickettsial zoonoses	P	1	II
VPE 605	Viral, fungal and parasitic zoonoses	T	1	II
VPE 606	Viral, fungal and parasitic zoonoses	P	1	II
VPE 607	Milk hygiene	T	1	II
VPE 608	Milk hygiene	P	1	II
VPE 609	Food-borne infections & intoxications	T	1	II
VPE 610	Food-borne infections & intoxications	P	1	II
VPE 611	Fish and seafood hygiene	T	1	II
VPE 612	Fish and seafood hygiene	P	1	II
VPE 613	Microbiology of packed foods & eggs	T	1	II
VPE 614	Microbiology of packed foods & eggs	P	1	II
VPE 615	Bioterrorism & disaster management	T	1	II
VPE 620	**Epidemiology methods**	**P**	**2**	**II**
VPE 622	Mathematical epidemiology	P	1	II
VPE 624	Clinical epidemiology	P	1	II
VPE 625	Ecology of diseases	T	1	II
VPE 627	Epidemiology of noninfectious and production diseases of animals	T	2	I
VPE 629	Biosecurity practices in disease prevention and control	T	1	I
VPE 631	Epidemiology of infectious diseases of laboratory and zoo animals	T	2	I
VPE 666	Special problem	-	1	I/II
VPE 699	Research	-	-	-
VPE 701	**Emerging and re-emerging zoonoses**	**T**	**1**	**I**
VPE 702	**Emerging and re-emerging zoonoses**	**P**	**1**	**I**
VPE 703	**Occupational health hazards**	**T**	**1**	**I**
VPE 704	**Occupational health hazards**	**P**	**1**	**I**
VPE 705	Current topics in Vet. Public Health	T	1	I
VPE 706	Current topics in Vet. Public Health	P	1	I
VPE 707	Disposal and recycling of waste	T	1	I

VPE 708	Disposal and recycling of waste	P	1	I
VPE 709	**Biohazards, biosecurity and disaster management**	**T**	**1**	**II**
VPE 711	Advances in environmental pollution control	T	2	II
VPE 712	Advances in environmental pollution control	P	1	II
VPE 721	**Survey, surveillance and data manageme**	**T**	**1**	**I**
VPE 722	**Survey, surveillance and data management**	**P**	**1**	**I**
VPE 723	**Molecular approaches in epidemiology**	**T**	**2**	**II**
VPE 724	**Molecular approaches in epidemiology**	**P**	**1**	**II**
VPE 725	Recent concepts in epidemiology and disease forecasting.	T	1	II
VPE 726	Recent concepts in epidemiology and disease forecasting	P	1	II
VPE 728	Biosecurity practices in disease prevention	P	1	II
VPE 729	Epidemiology of infectious diseases of ruminants-I	T	2	I
VPE 731	Epidemiology of infectious diseases of ruminants-II	T	2	II
VPE 733	Epidemiology of Infectious Diseases of Equines	T	2	II
VPE 735	Epidemiology of Infectious Diseases of Canines and Felines.	T	2	II
VPE 737	Epidemiology of Infectious Diseases of Poultry.	T	2	I
VPE 739	Epidemiology of diseases of Swine and Camel	T	2	I
VPE 741	Epidemiology of Sex Linked Diseases and Genetic Disorders	T	1	II
VPE-799	Research	-	-	-

Core Courses for MVSc. In VPE: VPE-501, VPE-503, VPE-504, VPE-505, VPE-511, VPE-513, VPE-601, VPE-602, VPE-620.

Core Courses for Ph.D. In VPE: VPE-701, VPE-7023, VPE-703, VPE-704, VPE-511, VPE-709, VPE-721, VPE-722, VPE-723, VPE-724.

Syllabus for Veterinary Public Health and Epidemiology

Minor Field permissible for M.V.Sc and Ph.D.

- Biostatistics
- Livestock Product Technology
- Veterinary Microbiology,
- Animal Biotechnology,
- Animal Biochemistry

VPE 501 Elements of Veterinary Public Health T-1-I

UNIT I

The purposes and scope of veterinary public health; veterinary interests in public health, principal functions and fields of activities of public health veterinarians

UNIT II

Definition of veterinary public health administration; organization, and implementation of veterinary public health services and programmes

UNIT III

Public health team, administration and functions; place of veterinarian in the public health team; veterinary public health agencies and institutions in India and abroad.

VPE 503 Zoonoses and Public Health T-1-I

UNIT I

Concept and classification of zoonoses; comprehensive description of etiology, host range, epidemiology, diagnosis and management of zoonotic diseases.

UNIT II

Factors influencing spread of zoonoses, Role of diseased and reservoir wild animal hosts. Role of vectors and natural habitat of agents. Animals as agents and vectors of human diseases- Animal agents of diseases (biting animals, venomous animals, poisonous food animals, dangerous marine or aquatic animals); Animals as vectors of infection.

UNIT II

Ecological aspects of zoonoses- Definition of ecology; Characteristics of diseases-sporadic, endemic (enzootic), epidemic (epizootic), pandemic (penzootic), in apparent, sub-clinical or latent; Carriers; Communicable or transmissible disease; Contagious diseases; Biome; Biotype; Niche; Biotic community; Ecosystem; Parasite host relations, Natural focality of disease.

UNIT III

Control of zoonoses- Control of vector population; Reduction of susceptible animal or bird population; Maintenance of ZFD (Zoonoses and food borne diseases) free status; Quarantine etc.

UNIT IV

History, etiology, epidemiology, symptomatology, diagnosis, prevention and control of important zoonoses of public health significance

Bacterial zoonoses -Anthrax, Brucellosis, Q-fever, Bartenellosis, Campylobacteriosis, Clostridial infections, E. coli infections, Leptospirosis, Listeriosis, Plague, Rat-bite fever, Salmonellosis, Tuberculosis, etc.

Rickettsial zoonoses- Typhus fevers-Epidemic typhus, Murine typhus, Scrub typhus

Spotted Fevers- Rocky Mountain spotted fever, Rickettsial pox, Chlamydial zoonoses- Types, symptoms, sources and control of chlamydial zoonoses

Mycotic zoonoses- Types, symptoms, sources and control of mycosessuperficial, cutaneous, sub-cutaneous and systemic; mycotoxicoses

Viral Zoonoses- Rabies, Influenza, Newcastle disease, Pox and parapox virus infections); Arboviral Zoonoses-tickborne zoonoses (ticKborne viral encephalitis /TBE- louping ill, Kyasanur Forest Disease); Mosquitoborne zoonoses (Chicken-gunya fever, Sindbis fever, West Nile fever, Japanese encephalitis, Yellow fever, and Rift valley fever), Viral Hemorrhagic Fever

Prion Diseases- Transmissible spongiform encephalopathies (Bovine spongiform encephalopathy, vCrudtzfelt Jacob Disease), Kuru, Scrapie.

Parasitic zoonoses- Cryptosporidiosis, Toxoplasmosis, Leishmaniasis, Echinococcosis /hydatidosis, Taeniasis, Trichnosis

VPE 504 Zoonoses and Public Health P-1-I

UNIT I : Collection and dispatch of material for diagnosis of important diseases

UNIT II: Isolation and identification of Zoonotic agents- Culture, animal/embryo inoculation. Diagnosis of important zoonotic diseases by serological test AGPT, HA/HI, ELISA, FAT, VNT, CFT etc

UNIT III: Molecular tests for diagnosis of important zoonotic diseases- PCR, Probes, etc. and any other tests-including histopathology etc.

VPE 505 Principles of Food Hygiene and Safety T-1-I

UNIT I

Relation between veterinary public health and food hygiene; concept of food hygiene, impact of environmental sanitation and other factors on food
quality.

UNIT II

Food spoilage, safety and preservation methods. Packaging - Principles and methods of packaging, Materials used for packaging and their properties, Product and package compatibility, Microbiological aspects of packaging materials.

UNIT III

Microbiological standards and quality control (biological and other indicators of hygienic quality and spoilage) of foods to prevent food-borne infections.

UNIT IV

General principles of prevention of food-borne illnesses, GMP, HACCP, risk analysis. Food plant design, material and sanitation for hygienic standards-Plant design and materials (Site, Floors and drains, Walls, Ceilings and overhead fittings, Equipments, Ventilation, Lighting); Hygienic standards- Water potability; Cleaning and disinfection methods-Definitions (sterilization, sterilant, disinfectant, bactericides, germicide, antiseptic, bacteriostatic, sanitizer, sanitation, soil, cleaning); Detergents and chemical disinfectants- classification and factors affecting their efficacy, use of heat, hot water and steam; Automatic cleaning systems- cleaning in place central cleaning, the self contained system and; gel-foam-and enzyme-based foam system

VPE 507 Environmental Pollution and Safety T-2-I

UNIT I: Introduction to environmental hygiene, environment and health, microbial aspects of pollution.

UNIT II: Soil pollution, air pollution, water pollution and health.

UNIT III: Genetic risk from environmental agents, health problems from nuclear
energy and radiation pollution, environmental estrogens. Rats (the Species and diseases of public health significance transmitted); Type of vectors (fleas, mosquitoes, ticks, blood sucking and biting flies, bugs, lice, mites etc.) and diseases of public health importance transmitted by them (malaria, yellow fever, dengue/hemorrhagic fever, encephalitis etc.); Control of Rodents

and ectoparasites (Environment sanitation, improving housing condition, citizen participation, methods of control (chemical, environmental, biological and others).
Water supply-contamination and bacteriological examination; Characteristics (physical, chemical and aesthetic) and quality of different types of water (ground water, surface water etc.); Micro-organisms as indicators of pollution (coliforms, faecal streptococci, E. coli, anaerobic spore forming organisms) and methods of their detection; Hygienic requirements of water (general examination for characteristics, bacteriological examination of water and water borne diseases)
UNIT IV: Dissemination of excreted pathogens, animal-waste and human risk, principles of safe disposal of waste.
UNIT V: Heavy metals, pesticides, veterinary drug residues and human health.

VPE 508 Environmental Pollution and Safety P-1-I
Determination of potability of drinking water, estimation and detection of pathogenic microbes in water, air, soil, animal products, sewage, and animal waste, inspection of sewage and waste disposal plants/sites

VPE 511 Principles of Epidemiology T-2-I
UNIT-I: Definitions, scope, concepts, types, application and common terms used in epidemiology.
UNIT-II: Host-Agent-Environmental factors in causation of diseases, disease patterns, routes and means of transmission of diseases, their interruption.
UNIT-III*:* Epidemiological data: its nature, sources, collection/sampling, designing of a questionnaire, storage, retrieval and presentation of data.
UNIT-IV: Measures of disease occurrence, their utility and application, analytical epidemiology (analysis of data)
UNIT V: Disease monitoring and surveillance, epidemiological studies: experimental and observational, international organizations and laws regulating animal diseases.
UNIT VI: Analytical methods for disease outbreaks investigation, formulation of causal hypothesis, chronic diseases, production diseases and economic (cost benefit) analysis of disease control and prevention.

VPE 513 Epidemiological Concepts of Disease Causation and Control T-1-I
UNIT I: Theories of disease causation and advancement in the concepts of disease causation, Iceberg concept.
UNIT II: Koch's postulates versus Evan's postulates of disease causation. Epidemiological triangles, disease causal wheels, webs and pies.
UNIT III: Endemic stability and Herd imm**UNIT**y, basic reproductive ratio, trends and spatial distribution of diseases, epidemic curves and their utility.

VPE 555 Special Problem 1 - I / II
Short research problem(s) involving contemporary issues and research techniques.

VPE 600 Seminar (M.V.Sc. AND PhD) 1 - I / II

VPE 601 Meat Hygiene T-1-II
UNIT I: Principles of food hygiene with special reference to meat of animal origin, human health and economics, nature and problem of meat supply in India.
UNIT II
Meat hygiene and public health, abattoir hygiene

Objectives and components of meat hygiene, livestock population and status of meat industry in India; Food animals and practice of their rearing for hygienic meat production, carcass yield, estimation of weight of condemned materials; Hygienic practices in transportation of food animals and their housing; Abattoir-materials, designs and layout. Sanitation in the abattoir 'Abattoir effluent treatment,

UNIT III

Ante-mortem inspection; Humane slaughter- methods and sanitary, carcass dressing procedures for various species;- Causality and emergency slaughter;' Post-mortem inspection of carcasses-common conditions and diseases encountered, judgment; Adulteration of meat-significance and methods of detection, Aids to meat inspection- Staining, tests for use on meat; Bacterial, viral, fungal and parasitic diseases transmitted through meat and meat products, poultry and eggs; prevention of meat contamination after slaughter; treatment and disposal of by-products.

UNIT IV

Hazard analysis and critical control point (HACCP) programme-concept, components and application to ensure hygienic production of meat

VPE-602 Meat Hygiene P-1-II

Meat inspection, microbiological and quality control tests of meat, Procedures of evaluation of hygienic/microbiological quality of raw and processed foods especially of animal origin by detection of biological and other indicators

VPE 603 Bacterial and Rickettsial Zoonoses T-1-II

History, etiology (cultural, biochemical and other identification characters), epidemiology (occurrence, transmission and survivability of pathogen in nature) symptomatology, diagnosis, prevention and control measures of important bacterial zoonotic diseases of public health importance

UNIT I : *Bacillus, Listeria, Mycobacterium, Clostridium, Staphylococcus, Brucella, Leptospira, Borrelia, Bartonella, Coxiella*

UNIT II: Description of *Vibrio, Salmonella, Escherichia, Campylobacter, Yersinia, Staphylococcus, Streptococcus,*

UNIT III: *Rickettsia (Rocky mountain spotted fever, North Asian tick typhus, Boutonneuse fever, Queensland tick typhus, Rickettsial pox, Scrub typhus, Murine typhus, Epidemic typhus, Eherlichiosis, Q-fever, Brill- Zinsser disease, North Asian tickborne spotted fever) and Chlamydia (Psittacosis and Ornithosis)*

VPE 604 Bacterial and Rickettsial Zoonoses P-1-II

Isolation and identification methods for important bacterial and rickettsial agents of public health significance from host, vehicle and environment.

VPE 605 Viral, Fungal and Parasitic Zoonoses T-1-II

History, etiology (cultural, biochemical and other identification characters), epidemiology (occurrence, transmission and survivability of pathogen in nature) symptomatology, diagnosis, prevention and control measures of important viral, fungal and parasitic zoonotic diseases of public health importance

UNIT I : BSE (encephalomyelitis), rabies, Avian and Swine influenza, KFD, Rift valley fever, Japanese encephalitis, West Nile, Dengue, Yellow fever , Viral Hemorrhagic fever group, Coronaviridae (Severe acute respiratory syndrome), Herpesviridae, Poxviridae and enteroviruses

UNIT II : Cutaneous mycoses - Trychophytosis, Microsporosis, Epidermophytosis, Sub-cutaneous mycoses - Blastomycosis, Rhinosporidiosis, Systemic mycoses- Aspergillosis, Candidiasis, Coccidiodomycosis, Cryptococcosis, Histoplasmosis, Nocardiosis.
UNIT III: Description of parasites of public health importance: Taeniasis, Echinococosis, Trichinellosis, Toxoplasma, Leishmaniasis, Trypanosomiasis, Diphyllobothrium, Schistosomiasis, Fasciola, Strongyloidiasis, Thelaziasis, Cryptosporidium, Amoebiasis, Giardiasis,

VPE 606 Viral, Fungal and Parasitic Zoonoses P-1-II
Isolation and identification methods for important fungal, viral and parasitic agents of public health significance from host, vehicle and environment.

VPE 607 Milk Hygiene T-1-II
UNIT I
Principles of milk hygiene with special reference to milk of animal origin, human health and economics, nature and problem of milk supply in India.
UNIT II
Milk hygiene and public health, Importance and objectives of milk hygiene; Present status and future trends of dairying in India; Hygienic measures for safe milk production. at milk production level, during milk collection and transport; Pasteurization-process, purpose, time temperature relationship, equipments, steps, methods, evaluation of efficacy, recontamination
UNIT III
Rancidity-induced and spontaneous; Milk allergy-lactose intolerance, residues antibiotic, chemicals, radio-nucleids; Adulteration-common practices, detection and its significance; Mastitis-causes, detection, prevention and effect on milk quality; Milkborne infections and intoxications. Adulteration of milk-significance and methods of detection
UNIT IV
Dairy equipments, steps, methods, evaluation of cleaning efficacy, including in place cleaning,

VPE 608 Milk Hygiene P-1-II
Microbiological and quality control tests of milk, test for detection of mastitis, and adulteration of milk.

VPE 609 Food-Borne Infections and Intoxications T-1-II
UNIT I
Food-borne bacterial infection and intoxications due to *Salmonella, Campylobacter, Clostridium, Staphylococcus, Listeria, Vibrio, E. coli, Bacillus cereus,* Bacterial, Mycotic and Seafood toxins,
UNIT II
Food-borne viral infections: infectious hepatitis, poliomyelitis, gastroenteritis etc, natural toxic substances in foods.
UNIT III
Health problems due to food additives, biocides,
UNIT IV
Heavy metals, antibiotics, hormones etc. in food.

VPE 610 Food-Borne Infections and Intoxications P-1-II
Detection and quantitation of food-borne pathogens, toxins, antibiotics, pesticides and additives in foods

VPE 611 Fish and Seafood Hygiene T-1-II

UNIT I: Fisheries and resources in India, fish preservation, hygienic quality control

UNIT II: Hygienic disposal and utilization of byproducts of fish, hygienic handling, transportation and marketing of fish.

UNIT III: Biotoxins of shellfish and marine fish and measures for their control. Public health aspects of food borne zoonotic diseases of fish (bacterial, viral and parasitic); Safe production, handling and marketing of fish, shellfish hygiene and inspection. Public health hazards in fish trade.

VPE 612 Fish and Seafood Hygiene P-1-II

Study of physical and biological indicators of wholesome fish to determine hygienic status of raw and processed fish. Residue analysis in fish**.**

VPE 613 Microbiology of Packed Foods and Eggs T-1-II

UNIT I

History, development, processing and quality control of canned foods; Indicator organisms-their detection and significance; Physical and microbiological examination of canned foods; Pathogenic microorganisms and their toxins- public health

UNIT II

importance and detection in packed foods, eggs and egg products; HACCP; Control measures for safe and wholesome packed foods and eggs

VPE 614 Microbiology of Packed Foods and Eggs P-1-II

Microbiological analysis of packed foods, egg and egg products for hygienic quality; Detection of pathogenic organism /toxins in packed foods, egg and egg products

VPE 615 Bioterrorism and Disaster Management T-1-II

UNIT I:

Natural and man-made disaster, impact analysis and classification of disaster scale, essential preparations to manage disaster, role and sequence of emergency medical services by veterinarians.

UNIT II

Effect of natural disasters like floods, prolonged draughts, forest fires, earthquakes, sunami and tidal damages,storms etc. on animal population both domestic and wild, post-disasterdisease susceptibility, emergency control and remedial measures.

UNIT III

Biomedical hazards and biosafety, occupational health risk management. Major agents and their characteristics which have been used in the past and those which can be used in future as biological weapons.

UNIT IV

Biological weapons, hazard analysis and combating bioterrorism. Bio- ethics and social ethics, advisory role of veterinarians.

VPE 620 Epidemiology Methods P-1-II

UNIT I: Designing secondary data analysis studies, Epidemiologic study designs, Confounding, selection bias, and causal diagrams

UNIT II: Overview of the National animal health data, Understanding data, choosing a coding structure, Tabling and visualizing data.

UNIT III: Recoding variables, Work on conceptual model, generalized linear models: normal, logistic, and Poisson regression, Time-to-event data.

UNIT IV: Survival models, Time-to-event, Impact of confounders, Measurement error and misclassification.
UNIT V: Sensitivity and specificity analyses, Model and variable selection
UNIT VI: High-dimensional data, Correlation and Regression analysis, Missing data methods for handling missing data.
UNIT VII: Clinical prediction models, Discrimination and calibration, Optimism and validation.

VPE 622 Mathematical Epidemiology P-1-II
UNIT I: Data format and questionnaire designing and collection of data, calculation of disease frequencies (rates, ratios, and proportions), Adjustment of rates.
UNIT II: Cost benefit analysis and disease economics, Depiction of disease patterns and trends
UNIT III: Retrospective and prospective data collection and analysis.

VPE 624 Clinical Epidemiology P-1-II
UNIT I: Methods for collection data and samples relevant to clinical epidemiology. Observational and experimental epidemiogical methods with reference to Case control, cohort and cross sectional studies.
UNIT II: Uses of diagnostic tests, statistical evaluation of diagnostic assays, sensitivity and specificity of diagnostic tests. Evaluation of preventive methods viz., vaccine efficacy, treatment efficacy etc.
UNIT III: Diseases of multiple etiology (mastitis, diarrhea, abortions) and their diagnosis and prevention. Sampling, isolations and antibiotic/ culture sensitivity etc.

VPE 625 Ecology of Diseases T-1-II
UNIT I: Basic ecological concepts, distribution and regulation of population size, the niche with examples, ecosystems, biotope, landscape epidemiology, nidality.
UNIT II: Patterns of disease, epidemic curves (Reed-Frost-model, Kendall's waves), trends in temporal and spatial distribution of disease.
UNIT III: Global warming, its impact on animal health, pathogens/vectors and changing disease patterns.

VPE 627 Epidemiology of Noninfectious and Production Diseases of Animals T-2-II
UNIT I: Causation concepts of noninfectious and production diseases in animals.
UNIT II: Production diseases of dairy cattle, swine and other animals. Milk fever, lactation tetany, hypomagnesemia, ketosis, post pasteurient haemoglobinurea, azoturea, goiter, anaemia, rickets, osteomalacia, vitamin and mineral deficiencies.
UNIT III: Noninfectious diseases of pet animals (equines, canines and felines)
UNIT IV: Psychological disorders of animals and their prevention.
UNIT V: Work related diseases of work animals like bullocks, load animals (donkeys and ponies), race horses.
UNIT VI: Pollution and global warming associated health and production problems of animals, toxicosis, poisoning.

VPE 629 Biosecurity Practices in Disease Prevention and Control T-1-I
UNIT I: Definition and principles of biosecurity, shedding of pathogens by infected animals, their survival in the environment, routes of entry and transmission of pathogens.
UNIT II: Protection of susceptible animals, interruption of pathways of transmission, role of disinfection to break cycle of infection.

UNIT III: Chemical disinfectants, microbial resistance to disinfectants, physical methods of disinfection and sterilization.
UNIT IV: Biosecurity measures for collection of specimen from wild animals. Vaccines-success stories of disease eradication through vaccination.

VPE 631 Epidemiology of Infectious Diseases of Laboratory and Zoo Animals T-2-I
UNIT I: Specific diseases of laboratory animals caused by bacteria, viruses
UNIT II: Diseases of laboratory animals caused by fungi and parasites.
UNIT III: Specific diseases of zoo (captive) animals caused by bacteria, viruses, fungi and parasites.
UNIT IV: Ecological problems and population density measures, techniques used in wild life disease surveillance and monitoring.

VPE 666 Special Problem 1 – I / II
Short research problem(s) involving contemporary issues and research techniques.

VPE 699 Research 30 – I / II

VPH 701 Emerging and Re-Emerging Zoonoses T-1-I
UNIT I
Concept of emerging and re-emerging zoonotic infections, international interests in zoonoses, measurement and economics of zoonoses, latest diagnostic and management planning for zoonoses.
UNIT II
Current challenges and strategies, euzoonoses, xenozoonoses, nosocomial zoonoses, newer zoonotic agents viz. cat-scratch disease, rat bite fever, Creutzfeld-Jacob disease, Ebola, Marburg, Lassa, Nipah, Menangle, Herpes B, SARS, Hantan Virus.
UNIT III
Simian and human immunodeficiency, bovine spongiform encephalopathy, hepatitis A & E, H5N1 and H1N1 influenza viruses; re-emerging zoonoses with new pathology viz. neurocysticercosis, campylobacteriosis, rabies, Tuberculosis.

VPH 702 Emerging and Re-Emerging Zoonoses P-1-I
Special problems related to emerging/re-emerging prevalent zoonotic diseases in India.

VPH 703 Occupational Health Hazards T-1-I
UNIT I
Health/diseases associated with various occupations (Agriculture and Livestock Farmers/Abattoir workers/Hide and Skin workers/Veterinarians/Environmentalists, etc.)
UNIT II
Transportation, spread, maintenance and control of diseases affecting various occupational groups in contact with animals and their public health significance

VPH 704 Occupational Health Hazards P-1-I
Diagnosis of various occupational diseases of public health significance, identification and characterization of causative agents

VPE 705 Current Topics in Veterinary Public Health T-1-I
UNIT I
Contemporary status of Veterinary Public Health administration, organization and functions of veterinary public health agencies in India and abroad.

UNIT II

Advanced studies on principles, diagnostic methods of emerging public health problems, advances in zoonotic diseases.

UNIT III

Role of biotechnology in food hygiene, Hazard Analysis Critical Control Point System (HACCP).

VPE 706 Current Topics in Veterinary Public Health P-1-I

Special problems related to field investigations of outbreaks of food poisoning and zoonotic diseases in a community

VPE 707 Disposal and Recycling Of Waste T-1-I

UNIT I

Concept of 'reduce, reuse and recycle' in environmental management, role of holistic environmental biotechnology and microbial control of pollution.

UNIT II

Safe disposal of animal waste and food plant waste, utilization/recycling of livestock waste.

UNIT III

Pollutants due to sewage, sewage treatment systems, solid waste and its management.

VPE 708 Disposal and Recycling of Waste P-1-I

To study the role of microorganisms and chemicals in degrading waste, to study the factors influencing biodegradation.

VPH 709 Biohazards, Biosecurity and Disaster Management T-1-II

UNIT I

Biohazards and bioterrorism: case studies.

UNIT II

Innovative biosecurity approaches.

UNIT III

Regulations for safety in laboratories, hospitals, biological plants.

UNIT IV

Case studies of natural and man-made disasters. Approaches for management of disasters Formation of teams/ groups. Equipments required for managing such disasters

VPE 711 Advances in Environmental Pollution Control T-2-II

UNIT I

Advanced studies on problems pertaining to environmental hygiene, air, soil and water pollution, disinfection procedures, impact of global environmental problems on human/animal health; ecophilosophy, environmental ethics and environmental economics, environmental conflicts and cooperation.

UNIT II

Environmental risks and management, environmental risk assessment and reporting, modern global information, surveillance and monitoring systems, decision making and public awareness.

UNIT III

International environmental management efforts, participatory international organizations and their selected programmes and selected legislations.

VPE 712 Advances in Environmental Pollution Control P-1-II

Detection and estimation of air, soil and water pollution; detection of pathogens in environmental sources.

VPE 721 Survey, Surveillance and Data Management T-1-I

UNIT-I: Over-view of concepts of survey, monitoring and surveillance, purpose and method of sampling, size of sample.

UNIT-II: Goals and types of surveillance, monitoring, mechanism of surveillance and surveillance network.

UNIT-III: Disease/data recording and reporting, data recording schemes, Veterinary information systems and data bases.

VPE 722 Survey, Surveillance and Data Management P-1-I

Development of questionnaires on selective topics, survey of livestock and poultry farmers to find out usefulness/effectiveness of vaccination/ artificial insemination/ other practices, surveillance of important diseases in different parts of state, analysis and presentation of data, development of suitable software.

VPE 723 Molecular Approaches in Epidemiology T-2-I

UNIT-I: The concept of molecular basis of a disease, molecular determinants of pathogenicity of infectious agents and their transmissibility to susceptible populations of livestock and poultry.

UNIT-II: Laboratory biosafety, biosecurity, biological weapons

UNIT III: Antigenic, genetic and biological characterization of field isolates of pathogens incriminated in field outbreaks, differentiation of field and vaccine strains and correlation of pathotypes and genotypes of a pathogen.

UNIT IV: DIVA diagnostics, DIVA vaccines, concept of marker vaccines, modernization in vaccine technology and prevention strategies.

UNIT-V: Immunological tests, immunoblotting techniques, monoclonal antibodies in different ELISAs for antigenic analysis, MLEE, and proteomic tools in agent identification and differentiation.

UNIT VI: Application of nucleic acid based assays viz. polymerase chain reaction (PCR) assays, nucleotide sequencing, restriction endonuclease analysis and RFLP analysis for genomic characterization using the field material directly or after extraction of nucleic acid from small scale cultures, use of radioactively labeled or non radioactive oligo-nucleotide probes in dot-blot and Southern hybridizations.

VPE 724 Molecular Approaches in Epidemiology P-1-I

Extraction and isolation of nucleic acid from field isolates of the causative pathogens, digestion with restriction endonucleases and electrophoresis in agarose gel in order to obtain fingerprints and their comparative analysis. SDS-PAGE for protein profiling. Western blotting and ELISA for screening of field samples.

VPE 725 Recent Concepts in Epidemiology and Disease Forecasting T-1-I

UNIT-I: Review of epidemiological concepts with respect to epidemiology of economically important diseases (haemorrhagic septicemia, fowl typhoid, colibacillosis, Mastitis, Glanders, brucellosis, surra, foot and mouth disease, PPR, swine fever, IBD, avian Influenza, goat & sheep pox etc.

UNIT-II: Geographical Information System and its applications in epidemiology, various expert systems and their role in epidemiology.

UNIT-III: Modelling and application of various models in disease forecasting and use of Epidemiological software.

VPE 726 Recent Concepts in Epidemiology and Disease Forecasting P-1-I

Collection of epidemic data, Epidemiological exercises of economically important diseases in the region, use of Geographical Information System in epidemiology, various expert systems, modelling and various models used in disease forecasting, use of various epidemiological software.

VPE 727 Biosecurity Practices In Disease Prevention P-1-II

Practical use of disinfectants in destruction of microbes in laboratory and under field conditions. Determination of efficacy/phenol coefficient of commonly used disinfectants. Measurement of vaccine titres.

VPE 729 Epidemiology of Infectious Diseases of Ruminants-I T-2-I

UNIT I: Mastitis, joint ill, ulcerative lymphangitis, anthrax, colibacillosis. salmonellosis,

UNIT II: Anaerobic infections, black quarter, tetanus, bacillary haemoglobinuria, botulism, braxy, entero-toxaemia, Foot rot,

UNIT III: Pasteurellosis, listeriosis, campylobacteriosis, tuberculosis, Johne's disease, brucellosis, leptospirosis.

UNIT IV: Actinomycosis, actinobacillosis, ringworm, aspergillosis and mycotoxicosis

UNIT V: Cutaneous streptothricosis, sporotrichosis, coccidiodomycosis, rhinosporidiosis, mucormycosis, histoplasmosis, candidiasis, blastomycosis etc.

VPE 731 Epidemiology of Infectious Diseases of Ruminants-II T-2-II

UNIT I: Foot and mouth disease, vesicular stomatitis, vesicular exanthema, PPR, bovine viral diarrhea, mucosal disease, ephemeral fever, Bovine Herpes virus-1 induced syndromes, leucosis, viral pneumonia, pox diseases, infectious gastro-enteritis of viral etiology.

UNIT II: Bovine malignant head catarrh, rabies, BSE, scrapie, blue tongue, louping ill, papillomatosis.

UNIT III: Bovine tropical theileriosis, babesiosis, anaplasmosis, trypanosomiosis, toxoplasmasis, Coccidiosis, Sarcocystosis

UNIT IV: Fascioliosis, amphistomiosis, gastro-intestinal nematodiosis, schistosomiosis, verminous bronchitis, echino-coccosis, coenurosis, tape worm infestations.

VPE 733 Epidemiology of Infectious Diseases of Equines T-2-II

UNIT I: Anthrax, tetanus, botulism, strangles, glanders, malignant edema, actinomycosis, clostridial infections, *Rhodococcus equi* pneumonia (Zoonotic), tuberculosis.

UNIT II: African horse sickness, infectious equine anaemia, equine influenza, equine encephalomyelitis, rabies, equine viral rhinopneumonitis, equine viral arteritis vesicular stomatitis, ulcerative lymphangitis.

UNIT III: Trypanosomiasis/ dourine, babesiosis, parasitic pneumonia.

UNIT IV: Cutaneous eczema, cutaneous acne, cutaneous pustular dermatitis, candidiasis, histoplasmosis, coccidiodomycosis, dermatophytosis.

VPE 735 Epidemiology of Infectious Diseases of Canines and Felines T-2-II

UNIT I: Bacterial diseases: salmonellosis, campylobacteriosis, mycobacteriosis, actinomycosis, nocardiosis, streptococcosis, leptospirosis, borreliosis, tetanus, botulism.

UNIT II: Canine viral diseases: canine-distemper, infectious canine hepatitis, parvovirus infection, rabies, infectious tracheo-bronchitis, corona virus infection.

UNIT III: Feline viral diseases: feline pan-leucopaenia, feline infectious peritonitis, feline herpesvirus, feline spongiform encephalopathy, feline calci virus, feline immuno-deficiency virus (FIV).

UNIT IV: Toxoplasmosis, neosporosis, sarcoptic mange, demodectic mange, hookworm and toxocara canis infections, leishmaniasis, canine babesiosis, ehrlichiosis, hepatozoonosis.
UNIT V: Mycotic diseases and mycotoxicoses of canine and felines.
UNIT VI: Vaccination schedule for prevention and control of diseases.

VPE 737 Epidemiology of Infectious Diseases of Poultry T-2-I
UNIT I: Impact of diseases on poultry industry, mechanism of disease transmission.
UNIT II: Bacterial diseases: *Escherichia coli* and Salmonella infections, coryza, fowl cholera, gangrenous dermatitis, mycoplasmosis, CRD, Avibacterium and Gallibacterium infections.
UNIT III: Viral diseases: Newcastle disease, infectious bursal disease, Marek's disease, infectious bronchitis, inclusion body hepatitis, hydro-pericardium syndrome, avian pox, infectious laryngo-tracheitis, avian influenza, lymphoid leucosis, avian encephalomyelitis, infectious bronchitis.
UNIT IV: Fungal diseases and mycotoxicosis: aspergillosis, candidiosis, favus, mycotoxicosis.
UNIT V: Parasitic infections: coccidiosis, roundworm and tape worm infestations.
UNIT VI: Vaccination schedule for prevention and control of diseases.
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VPE 739 Epidemiology of diseases of Swine and Camel T-2-I
UNIT I: Specific diseases of camel e.g. kapali, malli, jhooling, pica, satyriasis, specific peritonitis, kumree, chronic peritonitis.
UNIT II: General infectious diseases: anthrax, actinomycosis, black quarter, bronchitis, coccidiosis, contagious echthyma, haemorrhagic septicaemia, hydatidosis, mange, mastitis, camel pox, rabies, surra, tuberculosis etc.
UNIT III: Swine diseases: Swine influenza, hog cholera, African swine fever, swine pox, vesicular exanthema, vesicular stomatitis, rabies.
UNIT IV: Porcine enteroviruses, pseudorabies, listeriosis, leptospirosis, brucellosis, anthrax, salmonellosis, swine erysipelas, pasteurellosis, tuberculosis mange etc.
UNIT V: Mycotic and parasitic infections of camels and swine.

VPE 741 Epidemiology of Sex Linked Diseases and Genetic Disorders T-1-II
UNIT I: Genetic Epidemiology and tools
UNIT II: Principles of transmission of genetic disorders.
UNIT II: Cyclopean malformation in lambs, Haemophilia in dogs, Dwarfism, Cryptorchidism, Pendulous crop of turkey, inherited diseases associated with coat colour, inherited achondroplastic dwarfism.

VPE-799: RESEARCH

This has been implemented from Academic Session 2017-18 i.e. 1.8.2017 onwards.

Registrar &
Member Secy. (AC)

Distribution:

1. All the Chairman, BOS, IVRI, Izatnagar/Mukteswar. It is requested that the contents of the above notifications may please be brought to the notice of all the faculty members as well as the P.G. students including faculty members & P.G. Students located at other Division/Section/Campuses/Stations.

2. All the Joint Directors and Station Incharge, Bangalore/Kolkata/Palampur. It is requested that the contents of the above notifications may please be brought to the notice of all the faculty members as well as the P.G. students including faculty members & P.G. Students located at other Division/Section/Campuses/Stations.
3. The Controller of Examination Deemed University, IVRI, Izatnagar for information and necessary action.
4. The Academic Coordinator Deemed University, IVRI, Izatnagar.
5. The Incharge, ARIS Cell, IVRI, Izatnagar, with the request to upload the above notification on the Institute Website.
6. The PS to the Director, IVRI, Izatnagar.
7. PS to the Joint Director (Acad.), IVRI, Izatnagar
8. The AAO (Acad.), IVRI, Izatnagar.

ICAR-INDIAN VETERINARY RESEARCH INSTITUTE
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IZATNAGAR–243 122 (UP) INDIA

No.F.2-1/2017-B&C/AC Dated : 6.6.2017

NOTIFICATION

The Academic Council, in its 60th meeting held on 5th May, 2017 approved a compulsory supporting credit course entitled "Statistical Methods for Biological Sciences (BST-503 & 504, 2T + 1P)" for all MVSc students in each discipline including students of Biostatistics to be offered from Academic Session 2017-18 i.e. 1.8.17 onwards. The said course shall be listed in the Division of Biostatistics.

Registrar &
Member Secy. (AC)

Distribution:

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ICAR-INDIAN VETERINARY RESEARCH INSTITUTE
(Deemed University)
IZATNAGAR–243 122 (UP) INDIA

No.F.2-1/2017-B&C/AC

Dated : 6.6.2017

NOTIFICATION

The Academic Council, in its 60th meeting held on 5th May, 2017 approved the introduction of a new course entitled "English Language Course" for B.V.Sc. & A.H. is hereby conveyed as per the details given hereunder :

1.	Name of the course	:	English Language Course
2.	Course Code	:	ELC-111 (non-credit)
3.	No. of theory lectures per week & duration	:	1 Lecture of 1 hour
4.	Course Instructor	:	Dr. Shashi Rani, Assoc. Professor
5.	Venue of the classes	:	Lecture Hall of P&T Division

Syllabus of English Language Course -- (ELC – 111)

Chapter – 1 Transformation of Sentences :

Types of Sentences: (a) Simple sentence
(b) Complex sentence
(c) Compound sentence

Complex sentence :- [a]Noun Clause [b]Adjective Clause [c]Adverb clause

Adverb Clause :- Adverb clause of Time, Place, Purpose, Condition, Result or Consequence, Reason, Comparison and Supposition.

Conversion of Sentences

(a) Conversion of Simple sentence to Compound sentence.
(b) Conversion of Compound sentence to simple sentence.
(c) Conversion of Simple sentence to Complex sentence.
(d) Conversion of Complex sentence to Simple sentence.
(e) Conversion of Compound sentence to Complex sentence.
(f) Conversion of Complex sentence to Compound sentence.

Chapter-- 2 Syntax : Sentence Construction and How to write correct English

(a) Order or Position of words in a sentence.
(b) The power which one word has over another. Words like Prepositions and Transitive Verbs govern other words.
(c) Agreement of words in sentences in number, person, gender and case**.**

Chapter -- 3 Comprehension of Unseen Passages

(a) How to attempt an unseen passage ?
(b) How to select a suitable Heading ?
(c) How to write the summary ?
(d) How to explain portions in Italics ?

Chapter-- 4 The Art of Translation

(a) Translation from English to Hindi
(b) Translation from Hindi to English

Some useful suggestions :

(a) Vocabulary
(b) Literal Translation
(c) Through knowledge of Tenses
(d) Construction
(e) Revision

Chapter – 5 Direct and Indirect Narration

(a) Changing Direct into Indirect Speech
(b) Interrogative Sentences
(c) Changing Indirect into Direct Speech

Chapter – 6 Active and Passive voice

Chapter – 7 Application and Letter Writing

(a) Importance and essentials of a good letter
(b) General rules of letter writing
(c) Classification of letters
(d) Letters of application (applying for a post, writing to the Head of the Institute for any problem or regarding any request from him etc.)

Spoken English

Chapter – 8 Individual Presentation by the students

(a) Some important hints on how to present your views will be given
(b) Topics will be given to students
(c) Each student will prepare the write up for 7-10 minutes presentation
(d) At last the deficiencies in each presentation will be marked out so that the student's presentation may be made more effective.

Chapter – 9 Group Discussion

(a) Groups of four students will be formed
(b) Each group will be given a topic
(c) Every group will be given 20 minutes

(d) Each member of that group will express his/her ideas in pros and cons on the given topic

(e) After four group discussions the plus and minus points of each student will be pointed out so that the shortcomings may not occur again in their presentation

Chapter – 10 How to present before an interview board/examiners board etc.

(a) With confidence

(b) Clarity in speech

(c) Speak only on desired matter

Registrar &
Member Secy. (AC)

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No.F.2-1/2017-B&C/AC Dated : 6.6.2017

NOTIFICATION

The Academic Council, in its 60th meeting held on 5th May, 2017 approved the revised list of minor disciplines for respective major disciplines is hereby conveyed as per the details given hereunder :

Sl.No.	Name of Major Disciplines	Minor Permissible
1.	Animal Biochemistry	1. Vety. Physiology 2. Animal Biotechnology 3. Vety. Microbiology 4. Animal Nutrition 5. Vety. Pharmacology
2.	Animal Biotechnology	1. Animal Biochemistry 2. Vety. Microbiology 3. Animal Genetics & Breeding
3.	Animal Genetics & Breeding	1. Animal Biochemistry 2. Biostatistics 3. Animal Biotechnology 4. Livestock Production and Management 5. Poultry Science 6. Vety. Microbiology
4.	Animal Nutrition	1. Animal Biochemistry 2. Vety. Physiology 3. Poultry Science 4. Vety. Microbiology 5. Vety. Biotechnology
5.	Bio-Statistics	1. Animal Genetics and Breeding 2. Veterinary Public Health & Epidemiology 3. Livestock Economics 4. Vety. Extension Education
6.	Livestock Economics	1. Biostatistics 2. Livestock Production and Management 3. Vety. Extension Education
7.	Livestock Production and Management	1. Animal Genetics & Breeding 2. Animal Nutrition 3. Livestock Economics 4. Poultry Science

		5. Vety. Physiology
8.	Livestock Products Technology	1. Animal Biochemistry 2. Livestock Economics 3. Livestock Production & Management 4. Poultry Science 5. Vety. Public Health & Epidemiology 6. Vety. Microbiology
9.	Poultry Science	1. Livestock Production & Management 2. Animal Genetics & Breeding 3. Animal Nutrition 4. Livestock Products Technology 5. Biostatics
10.	Veterinary Extension Education	1. Livestock Economics 2. Biostatistics 3. Livestock Production and Management 4. Poultry Science 5. Vety. Public Health & Epidemiology
11.	Veterinary Gynaecology and Obstetrics	1. Vety. Physiology 2. Animal Biochemistry 3. Vety. Surgery & Radiology 4. Veterinary Medicine 5. Animal Biotechnology 6. Vety. Microbiology
12.	Veterinary Medicine	1. Vety, Gynaecology & Obstetrics 2. Vety. Surgery & Radiology 3. Animal Biochemistry 4. Vety. Pathology 5. Vety. Microbiology 6. Vety. Pharmacology
13.	Veterinary Parasitology	1. Animal Biochemistry 2. Animal Biotechnology 3. Vety. Public Health & Epidemiology 4. Vety. Microbiology 5. Vety. Medicine
14.	Veterinary Pathology	1. Animal Biochemistry 2. Animal Biotechnology 3. Vety. Microbiology 4. Vety. Parasitology 5. Vety. Pharmacology
15.	Veterinary Pharmacology	1. Animal Biochemistry 2. Animal Biotechnology 3. Vety. Medicine 4. Vety. Pathology 5. Vety. Physiology
16.	Veterinary Physiology	1. Animal Nutrition 2. Animal Biochemistry 3. Animal Biotechnology 4. Vety. Gynecology & Obstetrics 5. Vety. Pharmacology 6. Vety. Surgery & Radiology

17.	Veterinary Public Health & Epidemiology	1. Biostatistics 2. Livestock Products Technology 3. Vety. Microbiology 4. Animal Biotechnology 5. Animal Biochemistry
18.	Veterinary Surgery and Radiology	1. Vety. Pathology 2. Vety. Medicine 3. Vety. Gyanecology & Obstetrics 4. Vety. Pharmacology 5. Animal Biotechnology 6. Vety. Microbiology 7. Vety. Physiology
19.	Veterinary Microbiology	1. Veterinary Pathology 2. Veterinary Public Health & Epidemiology 3. Animal Biochemistry 4. Animal Biotechnology

This has been implemented from Academic Session 2017-18 i.e. 1.8.2017 onwards.

Registrar &
Member Secy. (AC)

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ICAR-INDIAN VETERINARY RESEARCH INSTITUTE
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No.F.2-1/2017-B&C/AC Dated : 6.6.2017

NOTIFICATION

The Academic Council, in its 60th meeting held on 5th May, 2017, approved the Merit Scholarship to UG students (B.V.Sc. & A.H.) and guidelines for merit scholarship to UG is hereby conveyed as per the details given hereunder :

Guidelines for Merit Scholarship to UG (BVSc & AH) students

1.0 General

1.1 These rules shall be known as "Rules and Regulations governing the award of Merit Scholarships to UG (BVSc & AH) students".

1.2 These rules shall apply to UG (BVSc & AH) students of ICAR-Indian Veterinary Research Institute (Deemed University).

1.3 Institute Means "ICAR-Indian Veterinary Research Institute (Deemed University)".

1.4 Standing Committee means "Standing committee on Scholarship, Financial, Assistance and Academic Progress".

1.5 Year means "Academic Year".

2.0 Scholarship

2.1 Three Merit Scholarships shall be offered to the students of each professional year on the basis of merit. This provision shall be utilized to encourage students who have good academic record.

2.2 The Merit Scholarship shall be approved by the Academic Council on the recommendations of the Standing Committee.

2.3 Merit scholarship will commence from 2nd professional year of BVSc & AH degree programme and subsequent years on the basis of merit (OGPA) of the students. Third, Forth & Fifth professional year students will get scholarship on the basis of OGPA of preceding years on cumulative record basis.

2.4 No merit scholarship will be given during internship.

3.0 Duration

The duration of each Scholarship shall be of one year.

4.0 Amount of Scholarship:

The value of the scholarship would be an amount of Rs.5000/- for 1st position, Rs.4000/- for second position and Rs.3000/- for third position per month per student to the top three students in each academic year

In case of a tie between two students for 1st position, the amount of scholarship will be for Rs.5000/- each to both, scholarship will not be given for 2nd position and third position will get Rs.3000/-. If the tie is for 2nd position, the amount of scholarship will be distributed equally i.e. Rs.4000/- each and scholarship will not be given for 3rd position. If the tie is for 3rd position, the amount of scholarship will be distributed equally i.e. Rs.3000/- each.

5.0 Source of Scholarship

The provision of merit scholarship to UG students may be borne from the Institute funds for scholarship.

The scholarship will be under the administrative control of the Joint Director (Acad.).

6.0 Conditions of Award

The Scholarship will be admissible to the students of the Indian Nationality as defined in the Constitution of India or persons domiciled in India, irrespective of the sex, race or religion.

The scholarship during the period of study would be paid provided the student.

(i) Maintain good conduct and satisfactory academic performance (≥7.0 OGPA) throughout the period of study,

(ii) Does not fail/secured compartment in any course during the period of study.

7.0 Termination of Scholarship

The scholarship will be terminated on the date:

- Student ceases to be on the rolls of IVRI.
- Student completes his/her study.
- The sanction expires.
- The student accepts any other Scholarship or Financial Assistance.
- Under exceptional circumstances, if in the opinion of Joint Director (Acad.), the student is found to be negligent in his/her work or guilty of unbecoming conduct, with or without notice to the student.

The above guidelines will be implemented with effect from academic year 2016-17.

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