Academic:

1. Degree Offered –UG, PG, PhD

Title of degree: MVSc & Ph.D. (Veterinary Microbiology)
Duration:2 yrs for MVSc & 3 yrs for Ph.D.(regular)
Eligibility Criteria : for MVSc : BVSc Pass & for Ph.D. : MVSc pass
Intake Capacity: MVSc – 02 & Ph.D. : 01
Opportunities:

2. Course offered:: UG, PG , PhD - Semester / Year wise

List of UG Courses (B.V.Sc & AH) As per latest MSVE Guidelines) , B.Tech. (D.T.) and B.F.Sc as per ICAR – V Deans Committee – 2016.

Sr No	Course No.	Title	Credit	Course offered in the Year
1	MSVE-2016	Veterinary Microbiology	3+2=5	II nd Yr.

List of PG Courses (MVSc) and M.Tech. (Dairy Technology) :

MVSc. Veterinary Microbiology

Sr No	Course No.	Title	Credit	Semester
Semester -I				
1	VMC-501	General Bacteriology	2+1=3	Core
2	VMC-503	General Virology	2+1=3	Core
3	VMC-508	Techniques in Microbiology	0+2=2	Optional
4	VMC-509	Techniques in Molecular Microbiology	1+2=3	Optional
		Total	**4+2=6**	
Semester -II				
1	VMC-502	Systematic Veterinary Bacteriology	2+1=3	Optional
2	VMC-504	Systematic Veterinary Virology	2+1=3	Optional

3	VMC-505	Principles of Veterinary Immunology	2+1=3	Core
4	VMC-506	Veterinary Mycology	1+1=2	Core
		Total	**3+2=5**	
Semester -III				
1	VMC-507	Vaccinology	2+0=2	Optional
2	VMC-510	Molecular Immunology	1+1=2	Optional
3	VMC-511	Mucosal Immunology	1+0=1	Optional
4	VMC-512	Introduction to Microbial Bioinformatics	1+0=1	Optional
5	VMC-591	Master's Seminar	1+0=1	Core
6	VMC-599	Master's Research	0+10=10	Core
7	PGS-601	Technical Writining and Communications Skills	0+1=1	Core
8	PGS-602	Agricultural Research, Research Ethics and Rural Development Programmes	1+0=1	Core
9	PGS-603	Basic Concepts in laboratory techniques	0+1=1	Core
10	PGS-604	Intellectual Property and its management in Agricultural	1+0=1	Core
11	PGS-605	Library and Information Service	0+1=1	Core
		Total	**4+12=16**	
Semester -IV				
1	VMC-599	Masters Research	0+20=20	Core
		Total	**0+20=20**	

Regular Candidate :PhD Programme

Sr No	Course No .	Title	Credit
Semester -I			
1	VMC-601	Advances in Veterinary Bacteriology*	2+1=3

2	VMC-602	Advances in Veterinary Mycology	2+1=3
3	VMC-604	Microbial Toxins	2+1=3
4	VMC-611	Advances in Veterinary Immunology*	2+1=3
5	VMC-615	Current topics in Infection and Immunity	2+0=2
6	VMC-616	Veterinary Microbial Biotechnology	2+1=3
Semester -II			
7	VMC-603	Bacterial Genetics	2+0=2
8	VMC-605	Bacterial Pathogenesis	2+0=2
9	VMC-606	Advances in Veterinary Virology*	2+1=3
10	VMC-607	Molecular Viral Pathogenesis	2+1=3
11	VMC-608	Structure-Function Relationship of DNA and RNA Viruses	2+0=2
12	VMC-614	Advances in Vaccinology	2+0=2
13	VMC-691	Doctoral Seminar I *	1+0=1
Semester III			
14	VMC-609	Oncogenic Viruses	2+0=2
15	VMC-610	Slow Viral Infections and Prions	1+0=1
16	VMC-612	Cytokines and Chemokines	2+0=2
17	VMC-613	Immunoregulation	1+0=1
18	VMC-690	Special Problem	0+1=1
19	VMC-692	Doctoral Seminar II*	1+0=1
20	CPE RPE/RPE-700	Research and Publication Ethics*	2+0=2/1+1=2
21	VMC-699	Doctoral Research	0+15=15
Semester IV			
22	VMC-699	Doctoral Research	0+20=20
Semester V			

23	VMC-699	Doctoral Research	0+20=20
Semester VI			
24	VMC-699	Doctoral Research	0+20=20

- Core Courses

For In -Service Candidates : Ph.D. Programme

Course Title with Credit Load

Sr No	Course No.	Title	Credit	Semester
Semester -I				
1	VMC-601	Advances in Veterinary Bacteriology*	2+1=3	I
2	VMC-602	Advances in Veterinary Mycology	2+1=3	I
	VMC-603	Bacterial Genetics	2+0=2	II
3	VMC-604	Microbial Toxins	2+1=3	I
	VMC-605	Bacterial Pathogenesis	2+0=2	II
	VMC-606	Advances in Veterinary Virology*	2+1=3	II
	VMC-607	Molecular Viral Pathogenesis	2+1=3	II
	VMC-608	Structure Function Relationship of DNA and RNA Viruses	2+0=2	II
	VMC-609	Oncogenic Viruses	2+0=2	III
	VMC-610	Slow Viral Infections and Prions	1+0-1	III
4	VMC-611	Advances in Veterinary Immunology*	2+1=3	I
	VMC-612	Cytokines and Chemokines	2+0=2	III
	VMC-613	Immunoregulation	1+0=1	III
	VMC-614	Advances in Vaccinology	2+0=2	II
5	VMC-615	Current topics in Infection and Immunity	2+0=2	I

6	VMC-616	Veterinary Microbial Biotechnology	2+1=3	I
Semester -II				
18	VMC-690	Special Problem	0+1=1	III
		Doctoral Seminar I*	1+0=1	III
19	VMC-692	Doctoral Seminar II*	1+0=1	III
20	CPE RPE/RPE-700	Research and Publication Ethics*	2+0=2/1+1=2	III
21	VMC-699	Doctoral Research	0+75=75	IV-VIII

3. Lecture Schedule – UG, PG , PhD - Theory / Practical Schedule – Approved by BoS – Subject-wise

UG: Veterinary Microbiology
B.V.Sc. & A. H. Lecture Schedule as per MSVE-16
II year

Week	Unit	Lecture No.	Topic (General and Systematic Veterinary Bacteriology)
1	I	1	Introduction and history of Microbiology, Highlights of developmental history of Veterinary Microbiology, Scope of Veterinary Microbiology
			Classification and nomenclature of bacteria, Unicellular organisms- Prokaryotes and Eukaryotes Kingdom Prokaryote and its four division (Bergey's Manual of Systematic Bacteriology) Basis of classification and nomenclature of microorganisms
		2	Microscopy and Micrometry: Lenses and the Bending of Light The Light Microscope. Newer Techniques in Microscopy
	IV	3	Historical development of immunology
			Bacterial stains and techniques: Preparation and Staining of Specimens, Dyes and Simple Staining, Differential Staining, Special staining

2	I	4	Structure and morphology of bacteria: Morphology: Shape, size, arrangement and morphological variations Structure: Structure of bacterial cell, cell wall, cytoplasmic membrane, cytoplasm, ribosome, mesosomes, chromatin material, Capsule, flagella, fimbriae, endospore, plasmids, inclusions (volutin / metachromatic granules etc)
		5	Growth and nutritional requirement of aerobic and anaerobic bacteria Growth requirements: Temperature, pH, gases (oxygen, carbon dioxide etc), moisture etc. Nutrition: Nutritional types (Autotrophs, heterotrophs, phototrophs, lithotrophs etc), Nutrient requirements (Macro and micronutrients)
			Normal, opportunistic and saprophytic bacterial flora: Types and sources of infection, method of transmission of infection Transmission of infection- Modes of transmission, direct & indirect contact etc. Sources of infection-animal, human, insects, inanimate objects
	IV	6	Lymphoid organs: Central and peripheral lymphoid organs Cells involved in immunity: Lymphocytes: T and B lymphocytes, macrophages, neutrophils, NK Cells, Dendritic cells etc.
3	I	4	Pathogenicity, virulence, determinants of virulence, Factors determining the ability of organism to produce disease, pathogenicity, virulence, invasiveness, toxigenicity, Resistance and susceptibility of host Host factors- breed, species, individual factors- age, physiological & nutritional status, use of antibiotics or corticosteroids etc., Epizootic and enzootic diseases
			Bacteremia, septicaemia and toxaemia, endotoxins, exotoxins, antitoxins, toxoids
		5	Bacterial genetics (Mutation, Transformation, Transduction and Conjugation), plasmids and antibiotic resistance. Phenotypic and Genotypic variations Chromosomal DNA, plasmids, F factor, Col factor, R Factor Methods of transmission of genetic material in microorganisms: Transformation, Transduction, Conjugation etc
			Antibiotic resistance: Genetic mechanisms, mutational, plasmid-mediated
	IV	6	Types of Immunity Immunity: Definition, types of immunity- innate immunity, mechanisms of innate immunity (non-

			specific defense, Acquired immunity – active and passive immunity (Immune response: Humoral and cellular immune response; Primary and secondary immune response)
4	I	7	*Staphylococcus aureus* Short description of *Staphylococcus hyicus*, *Staphylococcus intermedius*, *Staphylococcus epidermidis*
		8	Streptococcus: *Streptococcus pyogenes, Streptococcus equi, Streptococcus agalactiae, Streptococcus dysgalactiae, Streptococcus uberis*
	IV	9	Antigen: Definition, properties and types of antigen (T dependent and T independent Antigens, heterophile Antigens, cross reacting Antigens), specificity of antigens, blood group antigens, Antigenic determinant / epitope. Mitogens and factors affecting immunogenicity, Adjuvants
5	I	10	Genus: *Corynebacterium: Corynebacterium pseudotuberculosis* *Corynebacterium bovis and Rhodococcus equi*
		11	Genus-Trueperella : *Trueperella pyogens, Trueperella spp.*
	IV	12	Antibody: Structure, properties and functions of different classes of immunoglobulins. Theories of antibody production; Hybridoma technique and monoclonal antibodies
6	I	13	*Listeria monocytogens, Listeria ivanovii* and *L. inocua*
		14	*Erysepelothrix rhusiopathiae*
	IV	15	Serological reactions: Antigen-antibody reactions: General features of antigen-antibody reactions, antibody affinity, avidity, specificity; forces binding antigen and antibody Principle and applications of : Precipitation, agglutination reactions; complement fixation, neutralization, cytolysis, toxin-antitoxin neutralization, immunofluorescence, enzyme immunoassays, phagocytosis, opsonic index
7	I	16	Genus: *Bacillus: Bacillus anthracis* Short description of anthrociodes -*Bacillus subtis* and *Bacillus cereus*
		17	Genus: *Mycobacterium: Mycobacterium tuberculosis, Mycobacterium bovis* *Mycobacterium avium*
	IV	18	Antigen processing and presentation: Major histocompatibility complex (MHC) structure, function and gene organization; Structure of BCR and TCR
8	I	16	*Mycobacterium avium* subsp. *Paratuberculosis*
		17	Genus: *Clostridum:* Types of Clostridia - Histotoxic, Neurotoxic, Hepatotoxix, Enteropathogenic etc.

			Clostridium chauvoei, Clostridium perfringens
	IV	18	Complement system: Activation pathways and biological consequences
9	IV	19	Cytokines: general properties, major types and function
		20	Hypersensitivity: Definition, types of hypersensitivity- immediate and delayed hypersensitivity, mechanisms of different types of hypersensitivity reactions
Total number of topics covered: 30			
INTERNAL ASSESSMENT I			
10	I	21	*Clostridium tetani: Clostridium botulinum,* Short description of other Clostridia
		22	Genus: *Actinomyces: Actinomyces bovis, Actinomyces viscosus, Actinomyces hordeovulneris Actinobaculum suis, Arcanobacterium pyogens* Genus:Nocardia, *Nocardia farcinica, Nocardia asteroides,* Streptomyces and *Dermatophilus congolensis*
	IV	23	Autoimmunity: Definition, mechanisms, classification of autoimmune disorders. Immunological tolerance
11	I	24	Enterobacteriaceae family (*E.coli, Klebsiella pneumoniae, Salmonella, Yersinia pestis, Proteus mirabillis, Proteus vulgaris)*
		25	*Pseudomonas aeuriginosa* and *Burkholderia mallei, B. pseudomallei*
	IV	26	Concept of Immunity to Microbes, Vaccines and other biological. Biologicals: Vaccines – inactivated, live and modern vaccines their advantages and disadvantages, adjuvants, quality control of vaccines
12	I	27	*Pasteurella multocida, Mannheimia hemolytica*
		28	*Actinobacillus lignieresii*
	V	29	Introduction and History : Highlights of developmental history of veterinary virology. General properties of virus, comparison of viruses & other microorganisms, definition of different terms
13	I	30	*Histophillus somni, Haemophilus parasuis, Avibacterium paragallinarum, Taylorella equigenitalis,*
	I	31	*Brucella abortus, B. melitensis* and other brucella spp. short description
	V	32	Structure of Viruses: Morphology & Structure of viruses - shape, size, symmetry, capsid, envelope, pepleomers etc., Chemical composition of viruses – nucleic acid, proteins, lipids, carbohydrates Resistance of virus to physical and chemical agents
14	I	33	*Vibrio cholera*
		34	*Campylobacter fetus* sub spp. *fetus, Campylobacter fetus* sub spp. *veneralis, C. jejuni*

	V	35	Classification of viruses: Taxonomy and nomenclature of viruses, Criteria used in classification of viruses, Classification of viruses, Subviral agents, Prion's etc
15	I	36	*Bordetella bronchiseptica* and *Moraxella bovis*
		37	Gram negative anaerobes: *Bacteriodes fragilis, Dichelobacteria nodosus* and *Fusobacterium necrophorum* ;
	V	38	Replication of viruses**:** Single step growth curve, essential steps involved in multiplication. Replication of DNA viruses. Replication of RNA viruses
16	I	39	*Leptospira borgpeterseni* serovar Hardjo, *L. inetrrogans* serovar Hardjo, and other Spirochaetes (Brachyspira, Borrelia anserina)
		40	*Mycoplasma mycoides* sub spp. *mycoides, Mycoplasma bovis, Mycoplasma capricolum* sub spp. *capripneumoniae, M. gallisepticum, and other mycoplasma spp. short description*
	V	41	Genetic and Non-genetic viral interaction: Mutation, recombination, genetic reassortment and reactivation. Transcapitation, complementation, phenotypic mixing and polyploidy
17	I	42	*Coxiella burnetti*, Neorickettsia, *Ehrlichia ruminatium*,
		43	Anaplasma, Rickettsia
	V	44	Virus – cell interactions & Viral Pathogenesis: Types of interactions, Cytocidal changes in virus infected cells, mechanisms of cell damage. Noncytocidal changes in virus infected cells, Inclusion bodies. Route of entry and its impact, Host specificity, tissue tropism, Spread, Mechanism of targeting specific tissues and organs, mechanism of virus shedding.
18	I	45	*Chlamydia trachomatis, C. suis and Chlamydophila psittaci, C. abortus C. pecorum*
		46	Emerging bacterial pathogens
			Re-emerging bacterial pathogens
	V	47	Oncogenesis: Cell transformation, Oncogenes and oncoproteins, Mechanism of activation of Cellular oncogenes by virus infection.
19	I	48	Transboundry bacterial pathogens
	V	49	Latency and Immunopathology: Viral persistence, viral strategies to evade host defense mechanisms, persistent infection and chronic damage to tissues and organs,. Immunopathology of viral infections, infection induced damage to immune system, autoimmune disease, hypersensitivity.
Total number of topics covered: 30			
INTERNAL ASSESSMENT II			
20	II	50	Introduction, History, Scope of Mycology and Classification of Mycoses

			General properties of fungi, Growth, Nutrition and Reproduction of fungi
	V	51	Birnaviridae: Infectious bursal diseases
	II	52	Candida and Cryptococcus
21	V	53	Reoviridae: Rotaviruses, Bluetongue virus, African horse sickness virus
	II	54	Aspergillus and Penicillium
	V	55	Paramyxoviridae: New castle disease virus, Canine distemper, PPR virus
22	II	56	Dermatophytes and Malassezia
	V	57	Rhabdoviridae: Rabies virus, Ephemeral fever virus
	II	58	Rhinosporidium and Sporotrichum
23	V	59	Bornaviridae: Borna virus
	II	60	Mycetoma and Zygomycetes
	V	61	Orthomyxovridae: Swine, Equine, Avian influenza viruses
24	II	62	Mycotic mastitis, Mycotic abortion and Mycotoxicoses
	V	63	Coronaviridae: Infectious Bronchitis virus, Transmissible gastroenteritis virus
	V	64	Arteriviridae: Equine viral arthritis virus
23	III	65	Basic concepts and scope of Recombinant DNA technology
	V	66	Picornaviridae: FMD virus, Duck viral hepatitis virus
		67	Caliciviridae: Feline calicivirus
24	III	68	Gene cloning, Cloning vectors and expression vectors
	V	69	Togaviridae: Equine encephalomyelitis viruses (WEE, EEE and VEE)
		70	Flaviridae: Swine fever virus, BVD virus
25	III	71	Transformation and transfection
	V	72	Retroviridae: Visina/maedi virus, Equine infectious anemia virus
		73	Retroviridae: Lymphoid leucosis virus, Bovine leukemia virus
26	III	74	Southern, Northern and Western blotting
	V	75	Poxviridae: Capripoxvirus, Avipoxvirus, Cowpoxvirus
		76	Asfarviridae: African swine fever virus
27	III	77	Bioinformatics, Gene banks
Total number of topics covered: 30			
INTERNAL ASSESSMENT III			
28	V	78	Herpesviridae: Bovine herpes viruses, Equine herpes viruses, Pseudorabies virus
		79	Herpesviridae: Infectious laryngotracheitis virus, Marek's disease virus, Malignant catarrhal fever virus, Duck plague virus
	III	80	Application of molecular and biotechnological techniques: Polymerase chain reaction, Nucleic acid hybridization
29	V	81	Adenoviridae**:** Infectious canine hepatitis virus, Egg drop syndrome virus, Fowl adenovirus

		82	Papilomaviriade**:** Papillomatosis
	III	83	DNA library, DNA sequencing and DNA fingerprinting
30	V	84	Parvoviridae**:**Canine parvoviruses, Feline panleucopenia virus
	V	85	Circoviridae**:** Chicken anemia virus
	III	86	IPR, Ethics and regulatory issues in Animal Biotechnology
31	V	87	Prions: Scrapie, Bovine spongiform encephalopathy
		88	Emerging, re-emerging & transboundry viruses & viral infection: Equine morbillivirus, Porcine reproductive and respiratory syndrome virus, Nipah, Hanta virus, Ebola and Marburg viruses
Total number of topics covered: 11			
Total number of topics covered as per BoS: 101			
ANNUAL BOARD PAPER – I			
ANNUAL BOARD PAPER – II			
*** Practical Schedule will remain the same**			

4. Teaching Schedule :UG, PG , PhD - Prepared by – Course Teacher – Year wise / Course Wise

Teaching Schedule: PG

VMC-501 (2+1=3) General Bacteriology: Theory

Sr.No.	Lecture No.	Topic	Date
UNIT I			
1	1	Historical events of Microbiology	27/2/24
2	2	Contribution of eminent scientists, scope and application of microbiology	28/2/24
3	3	Taxonomy and nomenclature of bacteria	5/3/24
4	4	Basic principle of microscopy and micrometry	6/3/24
5	5	Classical and Confocal Microscopy	12/3/24
6	6	Nomaraski and Electron Microscopy	13/3/24
7	7	Staining of bacteria	19/3/24
8	8	Structure and function of bacterial cell: Morphology of bacteria	20/3/24

9	9	Structure, composition and functions of cell wall, cytoplasmic membrane	26/3/24
10	10	Structure, composition and functions of cytoplasm, ribosomes, nuclear material, bacterial inclusions	27/3/24
11	11	Structure, composition and functions of appendages like capsule, flagella, fimbriae	2/4/24
12	12	Structure, composition and functions of endospores, plasmids etc.	3/4/24
13	13	Bacterial growth: measurement of bacterial growth, bacterial growth curve	10/4/24
14	14	Bacterial Physiology and Nutrition: Nutritional types, nutritional and physiological requirements	16/4/24
15	15	Bacterial metabolism: Bioenergetics, generation of energy and transfer, oxidation-reduction system, membrane transport, electron transport system, aerobic and anaerobic respiration, carbohydrate, protein, lipid metabolism, biosynthesis of macromolecules	23/4/24
16	16	Secretion systems of bacteria	24/4/24
17	17	Excretion systems of bacteria	30/4/24
18	18	General Principles of bacterial disease diagnosis	7/5/24
19	19	Advances in bacterial disease diagnosis	8/5/24
UNIT II			
20	20	Bacterial genetics and Bacterial variation	14/5/24
21	21	Horizontal genetic transfer mechanisms- transformation, transduction and conjugation	15/5/24
22	22	Plasmids, transposons and drug resistance	21/5/24
UNIT III			
23	23	Determinants of pathogenicity and its molecular basis: Invasiveness, invasins	22/5/24
24	24	Determinants of pathogenicity and its molecular basis: toxigenesis, exotoxins and endotoxins and mechanism of their action	28/5/24

25	25	Determinants of pathogenicity and its molecular basis: adherence, colonization	29/5/24
26	26	Determinants of pathogenicity and its molecular basis: evasion of host defenses	4/6/24
27	27	Markers and PAMPs, exotoxin and endotoxin	5/6/24
28	28	Bacteriophages- temperate and virulent phages	11/6/24
29	29	Bacteriophages- lysogeny and lysogenic conversion	12/6/24
30	30	Antimicrobial agents: Classes of antimicrobials	18/6/24
31	31	Antimicrobial agents: Mechanism of action	19/6/24
32	32	Disinfectants -Mechanism of action	25/6/24
33	33	Disinfectants -Classification	26/6/24
34	34	Disinfectants -resistance and susceptibility testing	2/7/24
35	35	Bacterial immunity: to extracellular bacteria	3/7/24
36	36	Bacterial immunity: to intracellular bacteria	9/7/24

Teaching Schedule

VMC-501 (2+1=3) General Bacteriology (Practical)

Sr.No.	**Lecture No.**	**Topic**	**Date**
1	1	Orientation to a bacteriology laboratory	28/2/24
2	2	Different sterilization techniques: Physical methods	6/3/24
3	3	Disinfection techniques: Chemical, biological methods	13/3/24
4	4	Laboratory biosafety and biosecurity	20/3/24
5	5	Cultivation of aerobic, microaerophilic bacteria	27/3/24
6	6	Cultivation of anaerobic bacteria	3/4/24
7	7	Isolation of bacteria in pure culture: using dilution method, various inoculation techniques etc	10/4/24

8	8	Isolation of bacteria in pure culture: using different substances or indicators in media and biological methods	24/4/24
9	9	Microscopy	1/5/24
10	10	Morphological characterization of bacteria by different staining methods viz. Simple staining, differential staining	8/5/24
11	11	Morphological characterization of bacteria by different staining methods viz. Negative staining, special staining etc	15/5/24
12	12	Important biochemical tests for identification of bacteria: carbohydrate, protein and lipid metabolism tests	22/5/24
13	13	Important biochemical tests for identification of bacteria: sugar and miscellaneous tests	29/5/24
14	14	Determination of bacterial number and biomass by different methods	5/6/24
15	15	Determination of bacterial number and biomass by different methods (contd..)	12/6/24
16	16	Standard protocols for antibiotic sensitivity test: Disc diffusion method	19/6/24
17	17	Detection of MIC: Resazurin microtiter assay	20/6/24
18	18	Detection of MIC: Broth microdilution method	3/7/24

Teaching Schedule

Semester I (Practical)

VMC-508 (0+2=2) Techniques in Microbiology

Sr.No.	Lecture No.	Topic	Date
		UNIT I	

1	1	Orientation to a microbiology laboratory	29/2/24
2	2	Different sterilization and disinfection techniques	1/3/24
3	3	Different sterilization and disinfection techniques	7/3/24
4	4	Laboratory biosafety and biosecurity	14/3/24
5	5	Microscopy	15/3/24
6	6	Microscopy	21/3/24
7	7	Media preparation for aerobes	22/3/24
8	8	Media preparation for anaerobes	28/3/24
9	9	Isolation, cultivation and purification of bacteria and fungi	4/4/24
10	10	Isolation, cultivation and purification of bacteria and fungi	5/4/24
11	11	Morphological and biochemical characterization	12/4/24
12	12	Morphological and biochemical characterization	18/4/24
13	13	Morphological and biochemical characterization	19/4/24
14	14-16	Antibacterial sensitivity test by Disc diffusion, broth dilution and MIC determination technique	25/4/24 26/4/24 2/5/24
UNIT II			
15	17-18	Cultivation of viruses in embryonated eggs	3/5/34 9/5/24
16	19-21	Cultivation of viruses in cell culture	10/5/24 16/5/24 17/5/24
17	22	VNT	24/5/24

UNIT III			
18	23-24	Different immunological techniques- Agglutination	17/5/24 24/5/24
19	25-26	Precipitation	30/5/24 31/5/24
20	27-28	HA and HI	6/6/24 7/6/24
21	29-30	ELISA	13/6/24 14/6/24
22	31	FAT (Direct)	20/6/24
23	32	FAT (Indirect)	21/6/24
24	33	RIA	27/6/24
25	34-36	Other immunological assays	28//6/24 4/7/24 5/7/24

Semester -II

Course no. VMC 505 (2+1=3) PRINCIPLES OF VETERINARY IMMUNOLOGY

Theory

Sr.NO	TOPIC NAME	DATE
1	Introduction to livestock and poultry immune system	10/09/2024
2	Ontogeny and phylogeny of vertebrate immune system	11/09/2024
3	Cells and organs of immune system	17/09/2024
4	Types of immunity- Innate and adaptive immune system	18/09/2024
5-6	Antigen and its characteristics- Characteristic of ideal antigen, classification of antigens, Factors affecting immunogenicity, Concept of hapten and carrier, Antigenic determinant/ epitope and cross reactivity, B-cell epitope and T cell epitope	24/09/2024 25/09/2024
7	Immunoglobulins- Basic structure and function of immunoglobulins	01/10/2024
8	Immunoglobulins- Basic structure and function of immunoglobulins	08/10/2024
9	B cell receptor/ immunoglobulins and T cell receptor	09/10/2024
10	Receptor diversity- B cell and T cell activation	15/10/2024
11-12	Major Histocompatibility Complex(General feature, structure, function, gene organization, MHC and immune response and Cytokines and chemokines	16/10/2024 22/10/2024
13-14	Immune response development- Phases of humoral and cell mediated immune response	23/10/2024 29/10/2024
15	Immunoregulation with B and T cells(Antigen recognition, Antigen presentation and processing, Antigen recognition by TCR and MHC restriction)	30/10/2024
16-17	Cell mediated immune response- General properties of effector T cells, cytotoxic T cells, NK-cells and ADCC, Role of integrin and selectin	05/10/2024 06/10/2024
18-19	Complement System- Basic concept of complement, Mechanism of complement activation, complement pathways and Complement deficiencies	12/11/2024 13/11/2024
20	Autoimmunity, autoimmune diseases and Immunological tolerance	19/11/2024
21-22	Hypersensitivity- Classification and mechanism of induction with examples	20/11/2024 26/11/2024
23	Immunodeficiency- Types with examples	27/11/2024
24	Immune response in foetus and new born	03/12/2024
25-26	Antigen antibody interaction- Antibody affinity, avidity, cross reactivity, precipitation and agglutination test	04/12/2024 10/12/2024
27	ELISA and Western blotting	11/12/2024
28	Immunodiagnostics and Immunotherapy	17/12/2024

29	Monoclonal antibodies and methods for production of monoclonal antibodies	18/12/2024

Practical : VMC -505 (2+1=3) PRINCIPLES OF VETERINARY IMMUNOLOGY

Sr.NO	TOPIC NAME	DATE
01	Preparation of antigens	06/09/2024
02	Raising of antisera against soluble and insoluble antigens	13/09/2024
03	Detection of antibody by gel diffusion, radial immune-diffusion and immune-electrophoresis techniques	20/09/2024 27/09/2024
04	Haemagglutination and haemagglutination inhibition test	04/10/2024 11/10/2024
05	ELISA and its modifications	18/10/2024 25/10/2024
06	Immunoblotting	08/11/2024
07	Different agglutination tests	22/11/2024 29/11/2024
08	Separation and purification of Immunoglobulin from serum	06/12/2024
09	Separation of mononuclear cells from blood by density gradient centrifugation	13/12/2024
10	Viable count of lymphocyte by dye exclusion method	20/12/2024
11	Measurement of T cell response- DTH and lymphoproliferative assay	27/12/2024 03/01/2024

6. College Classes Time Table :UG, PG , PhD - Year wise / Semester Wise

Time Table for (M.V.Sc. Ist Sem) 2023-2024

Days	10-11	11-12	12-13	13-14	14-16	16-18
Monday				B R E A K	VMC-509 (P)	VMC- 503 (P)
Tuesday		VMC-501 (T)	VMC-503(T)			VMC -509 (P)
Wednesday		VMC-501 (T)	VMC-503(T)		VMC-501(P)	
Thursday						VMC-508(P)
Friday			VMC-509 (T)		VMC-508(P)	

Admission Year 2023-24	
Particulars	**Date**
Commencement of Class	26/02/2024
Mid Term Examination	6/5/2024 to 16/5/2024
Entry of Mid Sem. Marks in SCMS	17/05/2024
Semester End Examination (T/P)	29/07/2024 to 12/08/2024
Last date of Entry of Sem. End Marks in SCMS	13/8/2024 (up to 06.15 pm)

The following faculty members will teach the courses

Dr.Shubhangi Warke : VMC-501 (2+1=3) General Bacteriology
VMC-508 (0+2=2) Techniques in Microbiology

Dr.P.A.Tembhurne : VMC -503 (2+1=3) General Virology
VMC -509 (1+2=3) Techniques in Molecular Microbiology

I/c Professor & Head

Copy for information

1. Concerned course Teacher
2. The Associate Dean, Nagpur Veterinary College, Nagpur
3. Chairman, Academic Cell, Nagpur Veterinary College, Nagpur
4. Students (MVSc. I sem)
5.

Days	**10-11**	**11-12**	**12-13**	**13-14**	**14-16**	**16-18**
Monday	**VMC-607(T)**		UG(T)	B R E A K	UG(Batch A) VMC-509 (P)	UG(Batch B) VMC- 503 (P)
Tuesday		VMC-501 (T)	VMC-503(T)		UG(Batch C)	UG(BatchD) VMC -509 (P)
Wednesday		VMC-501 (T)	VMC-503(T)		UG(Batch C) VMC-501(P)	UG(Batch D)
Thursday	**VMC-691**	UG(T)	**VMC-607(T)**		UG(BatchB) **VMC-608(P)**	UG(Batch A) VMC-508(P)
Friday	UG(T)	**VMC-608(T)**	VMC-509 (T)		UG(P) VMC-508(P)	UG(P) **VMC-608(P)**

Maharashtra Animal & Fishery Sciences University, Nagpur

NAGPUR VETERINARY COLLEGE, NAGPUR

6.

DEPARTMENT OF VETERINARY MICROBIOLO

Time Table for (BVSc & M.V.Sc. I & II Sem) 2023-2024

The following faculty members will teach the courses

Dr.Shubhangi Warke : **UG (II Yr): UNIT I & II** (T) 39 & (P) 19
PG IstYr. : VMC-501 (2+1=3) General Bacteriology
: VMC-508 (0+2=2) Techniques in Microbiology
PG II nd Yr, : VMC-607 (2+0) Vaccinology
VMC-608 (1+2=3) Diagnosis of Infectious Diseases
VMC 691 (1+0 =1) Credit Seminar (One student)

Dr.P.A.Tembhurne	: **UG (II Yr): UNIT I V,V& III** (T) 59 & (P) 28
	: **PG Ist Yr.** : VMC -503 (2+1=3) General Virology
	VMC -509 (1+2=3) Techniques in Molecular Microbiology
	: **PG IInd Yr.** VMC 691 (1+0 =1) Credit Seminar (One student)
Dr Sonal Ingle	**UG (II Yr): UNIT I (T) 10 & (P) 11**

I/c Professor & Head

Days	10-11	11-12	12-13	13-14	14-16	16-18
Monday				B		VMC-506 (P)
Tuesday		VMC-505 (T)		R		
Wednesday		VMC-505 (T)	VMC-506 (T)	E		
Thursday				A		
Friday				K	VMC-505(P)	

Copy for information

1.Concerned course Teacher
2.The Associate Dean, Nagpur Veterinary College, Nagpur
3.Chairman, Academic Cell, Nagpur Veterinary College, Nagpur
4.Students (MVSc.I sem & II sem)
5 Department of Veterinary Pathology, LPT & Veterinary Biotechnology

Time Table for (M.V.Sc. IIst Sem) 2024-2025

Admission Year 2023-24	
Particulars	**Date**
Commencement of Class	5/9/2024
Mid Term Examination	14/11/2024 to 25/11/2024
Entry of Mid Sem. Marks in SCMS	26/11/2024
Semester End Examination (T/P)	6/2/2025 to 17/2/2025
Last date of Entry of Sem. End Marks in SCMS	18/2/2025 (up to 06.15 pm)

The following faculty members will teach the courses

Dr.Shubhnagi Warke : VMC-505 (2+1=3) Principles of Veterinary Immunology

Dr.P.A.Tembhurne : VMC -506 (1+1=2) Veterinary Mycology

Copy for information

1.Concerned course Teacher
2.The Associate Dean, Nagpur Veterinary College, Nagpur
3.Chairman, Academic Cell, Nagpur Veterinary College, Nagpur
4.Students (MVSc. I sem)