JAMAL MOHAMED COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI – 20
P. G. DEPARTMENT OF ZOOLOGY

M. Phil., : ZOOLOGY (2014-15)

SEM	SUBJECT CODE	COURSE	SUBJECT TITLE	HRS/ WEEK	CREDIT	MARK
I	14MPZO 01	CORE COURSE I	RESEARCH METHODOLOGY	4*	4	100
	14MPZO 02	CORE COURSE II	ADVANCES IN ZOOLOGY	4*	4	100
	14MPZO 03	CORE COURSE III	RESEARCH TRENDS IN ZOOLOGY	4*	4	100
	14MPZO 04	CORE COURSE IV	COMPUTER SKILLS, COMMUNICATION SKILLS AND TEACHING TECHNOLOGY	4*	4	100
			TOTAL	**16**	**16**	**400**
*** One Library hour for each course**						
II	14MPZO 05	DISSERTATION		-	8	200
			GRAND TOTAL	--	**24**	**600**

M. Phil., (Zoology)
SEMESTER I: CORE I

PART-I PAPER – I - RESEARCH METHODOLOGY

Sub Code: **14 MPZO 01** Max Marks: 100
Hours/Week: 4 Internal Marks: 40
Credits: 4 External Marks: 60

UNIT – 1:

Selection and Designing of Research Problem, Research Documentation – Methods of Literature collection, Bibliography, Thesis writing, Preparation of research papers for Journals, Preparation and Presentation of research papers in Symposia and Conferences.

UNIT – 2:

Principles of Micro technique – Types of microtome – Fixatives, Fixation tissue processing and staining
Histochemistry – Fixatives, Histochemical stains – Principles involved in identification of Carbohydrates, Proteins, Lipids, DNA, Acid and alkaline phosphatases.
Electron Microscopy – SEM, TEM, STEM – Principles and applications.

UNIT -3:

Chromatography – Principles, Types and Applications - HPLC, TLC, GLC.
Electrophoresis - Principles, Types and Applications – SDS-PAGE and Immuno electrophoresis.
Immunological Techniques - Immunodiffusion, ELISA; Blotting Techniques – Southern and Western blotting techniques.
Spectrophotometry – Principle and applications –Visual, UV – atomic absorption spectrophotometer.

UNIT 4:

Tracer Techniques – Autoradiography and its applications – Radiation measuring devices – Geiger Muller counter, Scintillation counter – Principle and their applications.
Remote sensing and radiotelemetry – Principle and applications.
pH meter – Principle and applications.
Centrifuge – Principles, Types and applications.

UNIT – 5:

Statistical methods and applications – Experimental designs – Sampling distribution – Probability. Analysis of variance – two way classification – Correlation coefficient – multiple correlations – multiple regression – Vital statistics – Life table.

REFERENCE BOOKS:

1. Anderson, Durston, Polle (1970) Thesis and Assignment Writing, Wiley Eastern Ltd.
2. Gurumani, N. (2006) Research Methodology for Biological Science, MJP Publishers, Chennai, India.
3. Bailey, N.T.J. 1997. Statistical Methods in Biology III edn. Cambridge University Press, New York
4. Arora, P.N. 1998. Biostatistics, Himalaya Publishing House.
5. Glamet, A.M. (1974) Practical Methods in Electron Microscopy, Vol.3., North Holland Publishing Co.,
6. Pearse, A.G.E, (1968) Histochemistry – Theoretical and Applied – Vols. I and IIChurchill Livingstone, London.
7. Larson, M.A. Ray, B. (1999) Laboratory Techniques in Zoology, Butterworthand Co., London.

M. Phil., (Zoology)
SEMESTER I: CORE II

PART-I PAPER – II: ADVANCES IN ZOOLOGY (ELECTIVE)

Sub Code: **14 MPZO 02** Max Marks: 100
Hours/Week: 4 Internal Marks: 40
Credits: 4 External Marks: 60

UNIT I

Genomics – Scope and importance – Genomics in India – Cloning and Expression vectors: BACs and PACs as vectors for cloning – Construction and Cloning techniques and its applications in biology – Ethical issues. Proteomics – Methods of proteomics – Resolution and identification of proteins – Protein-Protein interaction.

UNIT II

DNA sequencing and Human Genome Project (HGP), DNA amplification and PCR, Gene and cDNA Library. Detection of genetic diseases using DNA recombinant technology, screening and counseling – Human gene therapy.

UNIT III

Antisense RNA - Transposons, signaling by receptors. DNA finger printing and its applications. Human *in vitro* fertilization techniques. Somatic mutation and oncogenes – Induction of mutation by mutagens, teratogens and carcinogens

UNIT IV

Methods involved in the production of Transgenic animals and their uses. Production of recombinant insulin and growth hormone.
Protein engineering – Enzyme technology.

UNIT V

Organization and expression of immunoglobulin gene.
Vaccines – Live, killed, attenuated, subunit vaccines, recombinant vaccines, DNA vaccines, synthetic peptide vaccine, multivalent subunit vaccine – Hybridoma technology – Monoclonal antibodies in diagnosis of various diseases.

REFERENCE BOOKS:

1. Abbas.,A.K., Lichtman, A.K., Pober, J.S (1998) Cellular and Molecular Immunology. III Edition W.B. Saunders Company, U.S.A.

2. Benjamin Lewin (1999) Genes VII, Oxford University Press, New York.

3. Benjamin Lewin (2008) Genes IX, Oxford University Press, New York.

4. Branden, C., Tooze, J. (1999) Introduction to Protein Structure. II Edition, Garland Publishing Inc., New York.

5. Desmond, S.T., Nicholl. (1994) An Introduction to Genetic Engineering, Cambridge University Press, New York.

6. Jonathan Graves, Dungan Reavey (1996) Global Environmental Changes plants, Animals and Communities. Longman.

7. Hawkins, J.D.(1996) Gene structure and expression. III Edition. Cambridge University Press , New York.

8. King, B. (1986) Cell Biology. London Allen and Unwin Boston, London.

9. Kumar, H.D. (1998) Modern concepts of Biotechnology, Vikas Publishing House Pvt. Ltd., New Delhi.

10. Kumar, D., Kumar, S.(1998) Modern concepts in Microbiology, Vikas Publishing House Pvt. Ltd., New Delhi.

M. Phil., (Zoology)
SEMESTER I: CORE III

PART-I PAPER-III: RESEARCH TRENDS IN ZOOLOGY

Sub Code: **14 MPZO 03** Max Marks: 100
Hours/Week: 4 Internal Marks: 40
Credits: 4 External Marks: 60

Unit I

Aquaculture – Need for Aquaculture – culture systems – Characteristics of cultivable species - freshwater, Brackish water and marine aquaculture – site selection – water management – soil management – disease management – safe waste disposal – eco friendly practice – Nursery and grow out farms – harvesting and processing – live feed culture – supplementary feeds - Androgenesis – Gynogenesis.

Unit II

Environmental toxicology: basic concepts – toxic substances – toxicity – dose response relationship –Acute and chronic exposures - biotransformation – mode of action of xenobiotics – toxicological methods – fish toxicology – effects of toxicants on fish physiology and biochemistry.

Unit III

Environmental Biotechnology: Bioremediation – bioremediation using naturally occurring micro-organisms – reducing environmental impact of agricultural practices – weed control and herbicides – pest control and biopesticides – Eco-friendly strategy to check soil borne diseases – biofertilizers – biosensors to detect environmental pollutants.

Unit IV

Scope of radiation biology – sources of radiation: Natural and Artificial – Types of radiation (Alpha, Beta & Gamma) – Properties of radiation (External emitters and internal emitters) – Radiation quantities and units – radiation detectors and monitoring devices – biological effect of Ionizing radiation – application of radio Isotopes in Agriculture and Health care – Radioactive waste : source and management - Nuclear Energy programme in India

Unit V

Communicable diseases: Nature, mode of transmission, prevention and control of Chickenpox – tuberculosis - leprosy – typhoid– viral hepatitis A&B – swine flu (H1N1) – bird flu(H5N1) and HIV.

Non-communicable disease: Nature, prevention and control of hypertension, Diabetes, cardiovascular disease, Cancer, Asthma and allergy.

Vector-borne diseases : Nature, mode of transmission, prevention and control of malaria- dengue fever – filariasis and chikungunia.

REFERENCE BOOKS:

1. Shan, V.C. (1985) Elements of Radiation Biology, Todays & Tomorrows Printers & Publishers, New Delhi.

2. Merril Eisenbud (1997) Environmental Radioactivity, Academic Press, California.

3. Bascq, Z.M. and Alexander, P. (1961). Fundamentals of Radiobiology.

4. Kenrad E. Nelson & Carolyn Masters Williams.2006. Infectious Disease Epidemiology: *Theory and Practice.* Second Edition. Jones and Bartlett Publishers.

5. Park, 1989. Preventive and Social Medicine.

6. Subramanian, M.A. Toxicology – Principles and Methods, MJP Publication, Chennai

7. Omkar, Concept of Toxicology

8. Sharma, P.D. Environmental Biology & Toxicology. Rastogi Publication, Meerut.

9. Gupta, P.K. (2004) Biotecnology and Genomics, Rastogi Publication, Meerut, India.

M. Phil., (Zoology)
SEMESTER I: CORE IV

Part –I: Paper-IV: COMPUTER SKILLS, COMMUNICATION SKILLS AND TEACHING TECHNOLOGY

Sub Code: **14 MPZO 04** Max Marks: 100
Hours/Week: 4 Internal Marks: 40
Credits: 4 External Marks: 60

Unit I.

Fundamentals of Computer network - Network topologies – Basic network components – Types of network – Internet concept – World Wide Web – browsing technologies – Web site – Pubmed, Springer link, Science direct – email – Applications of internet.

Unit II

Operating system – MS Dos – MS Windows – Components of windows – Word basics – Power point - Applications of computer – MS Excel - Statistical packages — SPSS – Types of software – system software – Application software –utility software – computer languages - Machine language – Assembly language – high level languages.

Unit III

Communication skills: Introduction to life skills – Communication – emotional – functional – personality skills. Public speaking – Welcome speech- Introducing guests – Vote of Thanks – Speech on current topics - Personality Development Soft skills – Body language – Goal setting – positive attitude – emotional intelligence, leadership qualities – problem solving.
Conversation in selected context – Introduction, permission, request, offer, greetings, sympathy, apology, suggestion, persuasion, telephonic conversation, compliant, warning, gratitude. Communication for career – Preparation of resume- group discussion - Interview – standard, Panel, walk-in, group, stress, mock interview (practice)

Unit IV

Higher Education: Role of higher education –focus on social, curricular and administrative. Learning in higher education - learning events – learning outcomes – motivation. Teaching Technology in large group - Lecture methods – seminar – symposium, workshop, panel discussion and project approach. Teaching Technology in small group: Small group Instruction – Group discussion and assignments

Unit V

Class room management – conceptual analysis, discipline – component of classroom management – strategies for class room management – Behaviour problems of students in colleges. Instructional evaluation: self evaluation in college teaching – student evaluation of teaching – Professional Growth: Need and importance of professional growth – professional ethics.

REFERENCE BOOKS:

1. Vedanayagam E.G(1989) Teaching Technology for College Teachers.

2. Rajasekar, S. (2005) Computer Education and Educational Computing, Hyderabad, Neelkamal Publications.
3. Cheryl Hamilton Communicating for results, (Words Worth)
4. Leena Sen Verbal and non verbal communication –
5. Confident public speaking – Lerry Laskowsky (Warner)