

DEPARTMENT OF ZOOLOGY

Curricula for

M. Phil & Ph.D Course Work

(CHOICE BASED CREDIT SYSTEM)

With effect from 1st semester, 2021 under Session 2020-21



Prepared & compiled
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Scrutinised and approved by
DBS, Zoology

RAJIV GANDHI UNIVERSITY
RONOHILLS: DOIMUKH

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M. Phil COURSE WORK
Rajiv Gandhi Central University, Itanagar
Arunachal Pradesh

COURSE STRUCTURE

Semester	Paper code	Title of the Paper	Credit	Internal	End Sem	Total
I	ZCWC-601	Research Methodology	3:1:0	20	80	100
	ZCWC-602	Research and Publication Ethics	1:0:1	25	25	50
	ZCWO-603.....6Y3	Open Elective Paper (any one)	2:0:0	10	40	50
	ZCWE-604...6Y4	Departmental Elective Paper (any one)	3:1:0	20	80	100
	Sub total			12	75	225
II	ZCWP-605	Review, synopsis preparation & Presentation	0:0:1	10	-	10
	Sub total					10
III	ZCWP-606	Presentations of Progress	0:0:1	15		15
Sub total						15
IV	ZCWP-607	Dissertation	8:0:0		50	50
	ZCWP-608	Viva (open)	2:0:0		25	25
Sub total			12	25	75	100
Total			12	100	300	400



1st Semester
CURRICULAR DETAILS
Course Work & M. Phil Dissertation
Duration: Four Semester Courses
First Semester: Core Course-I
04 credits = 40 Lect., Hrs (@10Lect/Hr)
RESEARCH METHODOLOGY
Paper Code: ZCWC- 601

Total marks: 100
Pass Mark: 50%

End Semester (ES): 80
Internal Assessment (IA): 20

1. **Basics of research:** Meaning, objectives and nature of scientific research; Approaches to pursue research, Review and identifying researchable issues; Significance of building information and data. 8 lectures
2. **Planning of Research and design:** Defining the research questions, formulation of research hypothesis; Adoption of methodologies to answer the problem, layout and design for research, examining technical feasibility. 8 lectures
3. **Types of research, data collection analysis & presentation:** Basic research and applied research, Sampling – theory, types, steps and sample size, Advantage and limitation of sampling methods and standardization; computer application: Tabulation, graphs & figures, MSword, MS PowerPoint; Relevant Bio-informatics tool. 12 lectures
4. **Statistical concept:** Mean, Standard deviation, Standard error of mean, Co-efficient of variation, parametric and non parametric tests, Correlation and Regression, Testing of hypothesis –Chi square test, t test, analysis of variance (ANOVA) and F test; Software application : MS Excel, SPSS, Sigmaplot and relevant other packages of for statistical analysis. 12 lectures
5. **Internal Assessment:** The scholar will be assessed by an Internal Board constituted by DBS based on the ‘assignment’ given either by his/her supervisor within the jurisdiction of the contents of the paper or as decided by the Internal Board.



1st Semester

CURRICULAR DETAILS

Course Work & M. Phil Dissertation

Duration: Four Semester Courses

First Semester: Core Course-II

02 credits = 20 Lect., Hrs (@10Lect/cr)

RESEARCH AND PUBLICATION ETHICS

Paper Code: ZCWC- 602

Total marks: 50

Pass Mark: 50%

ES: 25

IA: 25

1. Theory:

1.1 Philosophy and ethics: Introduction to philosophy, definition; ethics: definition, judgements and reactions. 3 lectures

1.2 Scientific conduct: Intellectual honesty and research integrity, scientific misconduct, falsification, fabrication and plagiarism 4lectures

1.3 Publication ethics: Definition, best practices, conflicts of interests, concept, problems that lead to unethical behaviour and vice versa, types, authorships 3 lectures

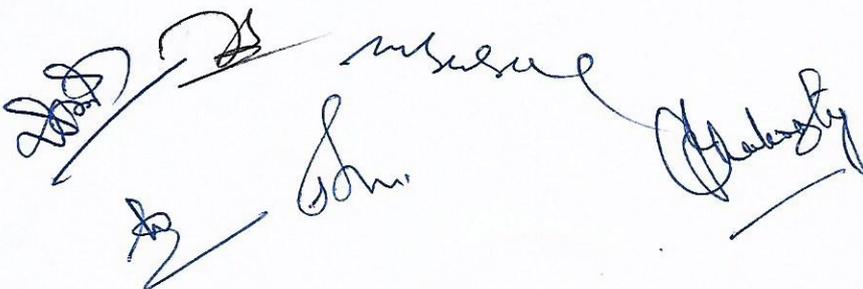
2. Practice:

2.1 Open access publishing: Open access publications and initiatives, journal finder/journal suggestion tools viz. Elsevier journal finder, Springer journal suggestions 3lectures

2.2 Publication misconduct: Use of plagiarism software like urkund, conflict of interest, authorships 3 lectures

2.3 Databases and research metrics: Indexing databases, citation databases, web of science, scopus, impact factor, h- index and i10 index 4lectures

3. Internal Assessment: The scholar will be assessed by an Internal Board constituted by DBS based on the 'assignment' given either by his/her supervisor within the jurisdiction of the contents of the paper or as decided by the Internal Board.

The bottom of the page features several handwritten signatures and initials in blue ink. There are approximately five distinct marks, including a large signature on the left, a smaller one in the middle, and a signature on the right that appears to be 'Prabir'. The marks are somewhat overlapping and written in a cursive style.

1st Semester

CURRICULAR DETAILS

Course Work & M. Phil Dissertation

Duration: Four Semester Courses

First Semester: Open Elective Course-I

02 credits = 20 Lect., Hrs (@10Lect/cr)

ROUTINE ZOO-TECHNIQUES & TOOLS

Paper Code: ZCWO- 603

Total marks: 50

Pass Mark: 50%

ES: 40

IA: 10

1. **Assessment of water quality parameters:** Physical; Chemical (BOD, COD, Hardness & Alkalinity) and Biological (Micro-invertebrates, Plankton & Bacteria); Ecological Census Techniques; Sampling of Insects and Plankton: Procedure & equipments. **5 lectures**
2. **Basics of Light microscopy:** Bright & darkfield, micro-photography, measurements and use of cameralucida. Morpho-taxonomic tools, techniques of taxon discrimination and identification. **5 lectures**
3. **Microtomy and tissue/specimen preparation for LM & EM;** Histological Techniques for microanatomy; Histo-chemical methods for Cellular components; Centrifugation: Principles and uses, ultra centrifuge; Electrophoretic Units: components, functions and applications. **5 lectures**
4. **Principles, procedure & Uses of TLC, CC & HPLC;** Working principle and components of UV-VIS Spectrophotometer; PCR technique: Quantitative and Qualitative gene expression, Hybridization techniques, DNA finger printing, Biomarker: Immuno-diffusion technique. **5 lectures**
5. **Internal Assessment:** The scholar will be assessed by an Internal Board constituted by DBS based on the evaluated 'assignment' or MCQ set either by his/her supervisor within the jurisdiction of the contents of the paper or otherwise as decided by the Internal Board.



1st Semester

CURRICULAR DETAILS

Course Work & M. Phil Dissertation

Duration: Four Semester Courses

First Semester: Open Elective Course-II

02 credits = 20 Lect., Hrs (@10Lect/cr)

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Paper Code: ZCWO- 613

Total marks: 50
Pass Mark: 50%

ES: 40
IA: 10

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1st Semester

CURRICULAR DETAILS

Course Work & M. Phil Dissertation

Duration: Four Semester Courses

First Semester: Departmental Elective Course-I

04 credits = 40 Lect., Hrs (@10Lect/cr)

Studies on Ecology and Biodiversity

Paper Code: ZCWE- 604

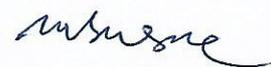
Total marks: 100

Pass Mark: 50%

ES: 80

IA: 20

1. Monitoring techniques of population: Insects, fish and birds; Curating museum specimens. Wildlife photography: Digital camera - Principle & camera trapping, equipment and accessories. Microscopy: Morpho-anatomy of insect, fish and birds.
10 lectures
2. Biodiversity measurement: Indices and species distribution patterns- Scatter plot presentation; Softwares and methods for distribution map; Linking biodiversity conservation and poverty alleviation
10 lectures
3. Monitoring DNA diversity: Techniques of DNA Extraction from samples of insect, fish and wildlife; Separation of mitochondrial DNA; Primer designing, Polymerize Chain Reaction, Alignment of DNA sequences.
10 lectures
4. Basics of migration biology: Birds and Fishes; Habitat predilection of wild insects, birds & fishes in-situ: Environmental, nutritional requirements; Rearing and propagation procedure in captivity.
10 lectures
5. **Internal Assessment:** The scholar will be assessed by an Internal Board constituted by DBS based on the evaluated 'assignment' or MCQ set either by his/her supervisor within the jurisdiction of the contents of the paper or as decided otherwise by the Internal Board.



1st Semester

CURRICULAR DETAILS

Course Work & M. Phil Dissertation

Duration: Four Semester Courses

First Semester: Departmental Elective Course-II

04 credits = 40 Lect., Hrs (@10Lect/cr)

Advanced Techniques in Zoological Research

Paper Code: ZCWE- 614

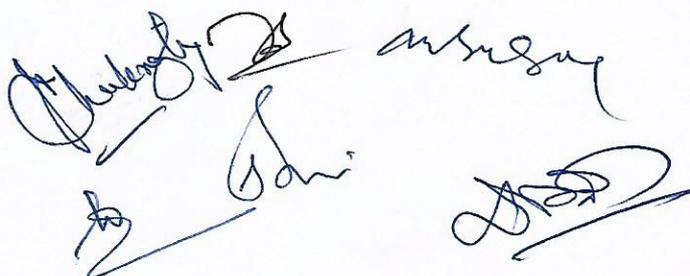
Total marks: 100

Pass Mark: 50%

ES: 80

IA: 20

1. Animal cell culture and cell line; Stem cell and applications. Gene and animal cloning; DNA Micro array technology. DNA finger printing and its applications. Use of different Chromatographic techniques in endocrinology and chronobiological research. **10 lectures**
2. Fluorescence In Situ Hybridization (FISH) and Immuno – Histo-Chemistry: Application in biological research. Genome isolation and PCR techniques : Quantitative and qualitative gene expressions in eukaryotes **10 lectures**
3. Site directed mutagenesis and Knock-out animals: Method and applications for gene expression study. Genotoxicity assessment in Zoological research: Micronuclei, chromosome aberration, Sister-chromatid Exchange assay and Comet assay. **10 lectures**
4. Balanced diet: Concept and nutritional significances; Nutritional requirement and feed formulation. Types of therapeutic diet: Composition of representative diets in various ailments viz., Diabetes mellitus, Cardio vascular disease, kidney diseases, anaemia. Methods for nutritional analysis: Amino acids, Phyto-steroids and micronutrients. **10 lectures**
5. **Internal Assessment:** The scholar will be assessed by an Internal Board constituted by DBS based on the evaluated 'assignment' or MCQ set either by his/her supervisor within the jurisdiction of the contents of the paper or as decided otherwise by the Internal Board.

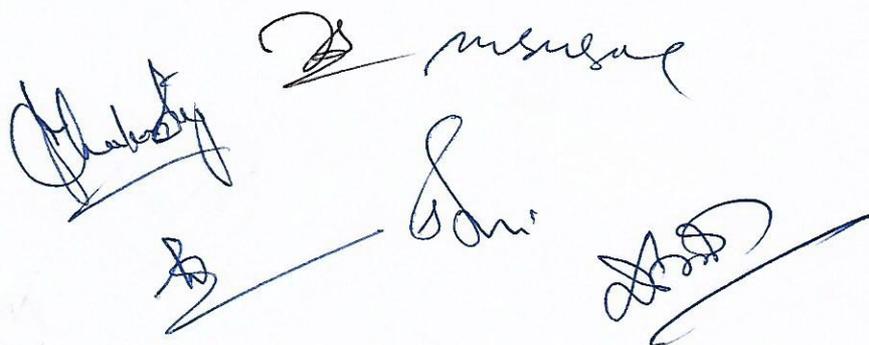


2nd semester
CURRICULAR DETAILS
Course Work & M. Phil Dissertation
Duration: Four Semester Courses
Second Semester: Practice - I
01 credits = 10 Lect., Hrs (@10Lect/cr)
REVIEW, SYNOPSIS PREPARATION & PRESENTATION
Paper Code: ZCWP- 605

Total marks: 10
Pass Mark: 50%

ES: 0
IA: 10

1. On completion of coursework finalization of the research topic will be done by the in consultation with his/her supervisor.
2. The scholar will perform the activities like literature review, identification of researchable issues and presentation of the proposed synopsis in the departmental committee.
3. After fulfilling all the required suggestion followed by committee recommendation, the proposed synopsis will be entered for further follow up by the department.
4. Mark assessed for the activities as IA only against Paper Code: ZCWP-605 shall be submitted to CoE through the HoD in time before final submission of the dissertation.
5. The supervisor shall be involved with the scholar at least 10 lectures hours for guiding and monitoring the activities of the paper.



3rd semester

CURRICULAR DETAILS

Course Work & M. Phil Dissertation

Duration: Four Semester Courses

Third Semester: Practice - II

01 credits = 10 Lect., Hrs (@10Lect/cr)

PRESENTATIONS OF PROGRESS

Paper Code: ZCWP- 606

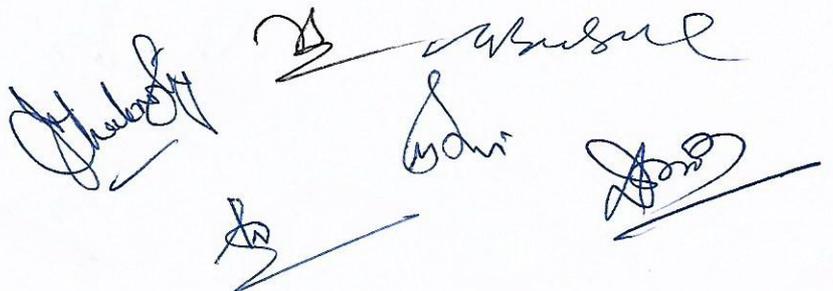
Total marks: 15

Pass Mark: 50%

ES: 0

IA: 15

The scholar has to present his/her progress of work time to time to the supervisor/HoD concerned maintaining the laboratory/ field protocol till pre-submission seminar in the DBS.



Ph.D COURSE WORK
Rajiv Gandhi Central University, Itanagar
Arunachal Pradesh

COURSE STRUCTURE

Semester	Paper code	Title of the Paper	Credit	Internal	End Sem	Total	
I ^e	ZCWC-701	Research Methodology	3:1:0	20	80	100	
	ZCWC-702	Research and Publication Ethics	1:0:1	25	25	50	
	ZCWO-703.....7Y3	Open Elective Paper (any one)	2:0:0	10	40	50	
	ZCWE-704...7Y4	Departmental Elective Paper (any one)	3:1:0	20	80	100	
	Sub total			12	75	225	300
II,III& IV	ZCW- 605	Presentations of Progress (IA), Thesis & Viva voce	2:8:2	-	-	-	
	Sub total			12	-	-	
	Total			24	75	225	300

^ePh.D course structure (Four semester: 24 credits) contains the same 1st semester curricular details of the M.Phil programme as 'Course Work' and also allows marking system (300 marks) of these 12 credits. However, in 2nd, 3rd and 4th semesters it is followed by 12 unmarked credits in total against activities like progress reports, thesis work and viva voce. **To avoid repetition, the curricular details of the course work are not presented herewith.**

