Department of Zoology
Baba Ghulam Shah Badshah University
Rajouri-185 234, Jammu & Kashmir

Ref. No: BGSBU/SBB/18/359
Dated:- 27/8/18

The Deputy Registrar (Academics)
Baba Ghulam Shah Badshah University,
Rajouri

Sir,

Please find attached herewith the syllabi of M.Phil. and Pre Ph.D. programmers of Zoology for the approval of the competent authority of the university.

Thanking you.

Yours faithfully,

27/08/2018

(Dr. A. A. Shah)
Co-ordinator,
Department of Zoology,
Baba Ghulam Shah Badshah University,
Rajouri

Coordinator
ZOOLOGY
SBB; BGSBU, Rajouri-185234

Common to all Candidates

Syllabus for Pre-Ph.D Examination-2018
Paper I (Zoology & Biotechnology)

Title of the Paper : Research methodology

Credits: 04
Maximum Marks: 100
Duration: 3 hrs

Unit I : Literature survey and scientific writing

1.1 Library and Research Documentation – Methods of literature collection, online Internet and Website.
1.2 Technical papers, Reviews, Monographs and Abstract services, Information storage and retrieval, Plagiarism-concept and its consequences.
1.3 Preparation and presentation of research papers for Journals, Symposia and Conferences-Impact factor-citation index- refereed journals.
1.4 Experimental approach – Designing of Methodology – Planning and Execution of Investigations – Methods of Editing and Abstracting, Preparation of Manuscript and Proof Reading – Thesis Writing.

Unit II : Microscopy

2.1 Microscopy: Light Microscopy, Bright field, Phase contrast, DIC, Fluorescence Microscopy.
2.2 Confocal Microscopy, SEM & TEM, Histology, and Histochemistry.
2.3 Different fixation and staining techniques for EM, freeze-etch and freeze fracture methods for EM.
2.4 Live cell imaging and its applications.

Unit III : Centrifugation and Electrophoresis

3.1 Centrifuges: Types of centrifuge - Differential & density gradient centrifugation.
3.2 Chromatography: TLC and Paper chromatography; Reverse-phase and Affinity chromatography and HPLC.
3.3 Electrophoresis: Agarose gel electrophoresis; isoelectric focusing, Pulsed field gel electrophoresis, SDS PAGE and their Applications.
3.4 ELISA and Radioimmunoassay, FISH and GISH.

Unit IV : Radiation Biology and Spectroscopy

4.1 Isotopes half life, GM counter, autoradiography.
4.2 Principles and Applications of Tracer Techniques in Biology, Brief idea of radiation dosimetry.
4.3 Spectroscopy: Basic principles, instrumentation and use of UV and IR.
4.4 Mass spectroscopy: LC-MS, GC-MS and MALDI-TOF.

Unit V : Nucleic acid isolation and Biostatistics

5.1 Genomic and plasmid DNA isolation. PCR: basic principle, types and applications.
5.2 Blotting techniques: Northern blot, Southern blot and Western blot. Flow cytometry, X-ray diffraction by crystals.
5.3 Test of Hypothesis and two types of error's. Tests of means and proportions-students t test, Chi square test and their applications.
5.4 Analysis of Variance (one way and two way). Correlation, simple partial and multiple correlations. Simple and multiple regressions and their use in biology.

Syllabus for Pre-Ph.D Examination-2018
Paper II (Biotechnology)

Title of the Paper: Basics of Nanobiotechnology and Molecular Nematology

Duration: 3 hrs
Credits: 04
Maximum Marks: 100

Name of the Candidate: Kaisar Ahmad Bhat

Unit 1. Nematodes characteristics and morphology

1.1 Definition of nematodes. Body size, color and shape and body wall.
1.2 Labial region of nematodes. En face view and sensory structures. Feeding apparatus.
1.3 Pharynx, pharyngo-intestinal junction, intestine rectum, anus and tail.
1.4 Excretory system, nervous system and reproductive system.

Unit II. Techniques for studying nematodes

2.1 Principles of sampling for nematodes. Collection, storage and care of soil samples, Sampling tools and methods, principle and procedure of nematode extraction from samples.
2.2 Principles of killing , fixing, dehydration and mounting of nematodes. Staining of nematodes for microscopic studies. Chemical composition and properties of fixatives.
2.3 Preserving and staining nematodes in plant tissues.
2.4 Preparation of nematodes for light microscopy and electron microscopy.

Unit III. DNA barcoding and phylogentic analysis

3.1 DNA barcoding: concept of MOTU (molecular operational taxonomic units) and their application in nematode taxonomy.
3.2 Molecular markers: general characteristics of DNA based molecular markers; comparative account of different DNA based markers.
3.3 Markers used in DNA barcoding: Internal transcribed Spacer sequences (ITS) and mitochondrial cytochrome oxidase C subunit 1.
3.4 Molecular phylogenetics: concept of phylogenetic tree, analysis of phylogenetic trees and tree building methods and software's used for constructing phylogenetic trees.

Unit IV. Introduction to nanotechnology

4.1 Introduction to nanotechnology and nanobiotechnology.
4.2 Nanoparticles- Definition,overview of nanomaterial properties and types.
4.3 Preparation of nanoparticles- Top down, bottom up, biological and chemical synthesis of nanoparticles.
4.4 Classifications of nanomaterials - Zero dimensional, one-dimensional and two dimensional nanostructures.

Unit V. Characterization and applications of nanoparticles

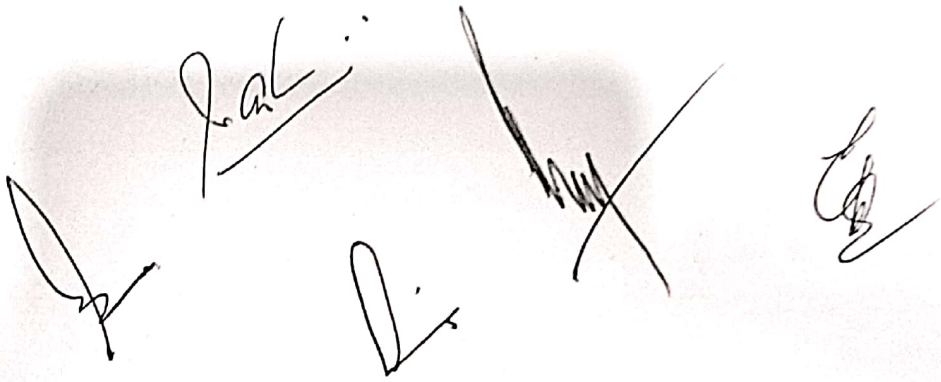
5.1 Characterization of nanoparticles by different spectroscopic and microscopic techniques.
5.2 Fundamental techniques for characterization- Flourescence, DLS and zeta potential (ζ) studies, TEM, SEM, and AFM.
5.3 Applications of nanoparticles- Agriculture and nanomedicine.
5.4 Supramolecular nanoparticles for molecular diagnostics and therapeutics.

Note for Paper Setter:

The question paper will have 10 questions, two from each Unit. The candidate will be requires to attempt five questions in all, selecting one from each Unit. All questions carry equal marks

Books Recommended:

1. A taxonomic review of the suborder (Nematode: Secernentia), Istvan Andrassy, Ostrom Paris (1983).
2. Laboratory methods for work with plant and soil nematodes, J.F. Southey, London.
3. Nematode structure, M. ShamimJairajpuri, Impressions quality printers, Hyderabad (2002).
4. D. A. Skoog, F. J. Holler and S. R. Crouch *Principles of Instrumental Analysis*, 6th Edn., Brooks Cole (2006).
5. M. L. Srivastava *Bioanalytical Techniques*, Alpha Science International Ltd (2007).
6. Introduction to Nanotechnology (2002)- Michael Krause
7. Bioinspired Nanotechnology- from surface analysis to application, Mark R, Taffny Walsh (2006)
8. Nanosystems: Molecular Machinery, Manufacturing, and Computation. K. Eric Drexler (1992).



Syllabus for Pre-Ph.D Examination-2017
Paper II (Zoology)

Title of the Paper: Introduction to general nematology
Name of Candidates: Shaheen Majeed Wani

Credits: 04
Maximum Marks: 100
Duration: 3 hrs

UNIT 1: Nematodes characteristics and morphology

1.1 Definition of nematodes. Body size, color and shape and body wall.
1.2 Labial region of nematodes. En face view and sensory structures. Feeding apparatus.
1.3 Pharynx, pharyngo-intestinal junction, intestine rectum, anus and tail.
1.4 Excretory system, nervous system and reproductive system.

UNIT 2: Classification, phylogeny and major works.

2.1 Nematodes and their relationship to the allies. Broad classification of nematode upto sub-orders.
2.2 Phylogenetic relationship amongst broad categories of nematodes.
2.3 History and development of nematology in India and abroad.
2.4 Major contribution of nematologists of 19^{th} and 20^{th} century with special reference to India.

UNIT 3: Techniques for studying nematodes.

3.1 Principles of sampling for nematodes. Collection, storage and care of soil samples, sampling tools and methods, principle and procedure of nematode extraction from samples.
3.2 Principles of killing , fixing, dehydration and mounting of nematodes. Staining of nematodes for microscopic studies. Chemical composition and properties of fixatives.
3.3 Preserving and staining nematodes in plant tissues.
3.4 Preparation of nematodes for light microscopy and electron microscopy.

UNIT 4: Order Rhabditida (sub orders of Rhabditina and Diplogastrina)

4.1 Morphology and taxonomy of Rhabditina. Basic organization in characters.
4.2 Classification of sub-order Rhabditina upto sub-families and genera.
4.3 Morphology and taxonomy of Diplogastrina. Basic organization in characteristics.
4.4 Classification of sub-order Diplogastrina upto sub-families and genera.

UNIT 5: Orders Mononchida and Tylenchida

5.1 Morphology and taxonomy of Mononchida. Basic organization in characteristics.
5.2 Classification of sub-order Mononchida upto sub-families and genera.
5.3 Morphology and taxonomy of Tylenchida. Basic organization in characteristics.
5.4 Classification of sub-order Tylenchida and Aphlenchina upto sub-families and genera.

Note for Paper Setter:

The question paper will have 10 questions, two from each Unit. The candidate will be required to attempt five questions in all, selecting one from each Unit. All questions carry equal marks

References:

1. A taxonomic review of the suborder (Nematode: Secernentia), Istvan Andrassy, Ostrom Paris (1983).
2. Laboratory methods for work with plant and soil nematodes, J.F. Southey, London.
3. Nematode structure, M. Shamim Jairajpuri, Impressions quality printers, Hyderabad (2002).

Syllabus for Pre-Ph.D Examination-2017
Paper II (Zoology)

Title of the Paper: Introduction to general nematology
Name of Candidates: Yasmeen Kausar

Credits: 04
Maximum Marks: 100
Duration: 3 hrs

UNIT 1: Nematodes characteristics and morphology

1.1 Definition of nematodes. Body size, color and shape and body wall.
1.2 Labial region of nematodes. En face view and sensory structures. Feeding apparatus.
1.3 Pharynx, pharyngo-intestinal junction, intestine rectum, anus and tail.
1.4 Excretory system, nervous system and reproductive system.

UNIT 2: Classification, phylogeny and major works.

2.1 Nematodes and their relationship to the allies. Broad classification of nematode upto sub-orders.
2.2 Phylogenetic relationship amongst broad categories of nematodes.
2.3 History and development of nematology in India and abroad.
2.4 Major contribution of nematologists of 19th and 20th century with special reference to India.

UNIT 3: Techniques for studying nematodes.

3.1 Principles of sampling for nematodes. Collection, storage and care of soil samples, sampling tools and methods, principle and procedure of nematode extraction from samples.
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4.4 Classification of sub-order Diplogastrina upto sub-families and genera.

UNIT 5: Orders Mononchida and Tylenchida

5.1 Morphology and taxonomy of Mononchida. Basic organization in characteristics.
5.2 Classification of sub-order Mononchida upto sub-families and genera.
5.3 Morphology and taxonomy of Tylenchida. Basic organization in characteristics.
5.4 Classification of sub-order Tylenchida and Aphlenchina upto sub-families and genera.

Note for Paper Setter:

The question paper will have 10 questions, two from each Unit. The candidate will be required to attempt five questions in all, selecting one from each Unit. All questions carry equal marks

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2. Laboratory methods for work with plant and soil nematodes, J.F. Southey, London.
3. Nematode structure, M. Shamim Jairajpuri, Impressions quality printers, Hyderabad (2002).

Syllabus for Pre-Ph.D Examination-2017
Paper II (Zoology)

Title of the Paper: Introduction to general nematology
Name of Candidates: Shazad Ali Bukhari

Credits: 04
Maximum Marks: 100
Duration: 3 hrs

UNIT 1: Nematodes characteristics and morphology

1.1 Definition of nematodes. Body size, color and shape and body wall.
1.2 Labial region of nematodes. En face view and sensory structures. Feeding apparatus.
1.3 Pharynx, pharyngo-intestinal junction, intestine rectum, anus and tail.
1.4 Excretory system, nervous system and reproductive system.

UNIT 2: Classification, phylogeny and major works.

2.1 Nematodes and their relationship to the allies. Broad classification of nematode upto sub-orders.
2.2 Phylogenetic relationship amongst broad categories of nematodes.
2.3 History and development of nematology in India and abroad.
2.4 Major contribution of nematologists of 19th and 20th century with special reference to India.

UNIT 3: Techniques for studying nematodes.

3.1 Principles of sampling for nematodes. Collection, storage and care of soil samples, sampling tools and methods, principle and procedure of nematode extraction from samples.
3.2 Principles of killing , fixing, dehydration and mounting of nematodes. Staining of nematodes for microscopic studies. Chemical composition and properties of fixatives.
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UNIT 4: Order Rhabditida (sub orders of Rhabditina and Diplogastrina)

4.1 Morphology and taxonomy of Rhabditina. Basic organization in characters.
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4.4 Classification of sub-order Diplogastrina upto sub-families and genera.

UNIT 5: Orders Mononchida and Tylenchida

5.1 Morphology and taxonomy of Mononchida. Basic organization in characteristics.
5.2 Classification of sub-order Mononchida upto sub-families and genera.
5.3 Morphology and taxonomy of Tylenchida. Basic organization in characteristics.
5.4 Classification of sub-order Tylenchida and Aphlenchina upto sub-families and genera.

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2. Laboratory methods for work with plant and soil nematodes, J.F. Southey, London.
3. Nematode structure, M. Shamim Jairajpuri, Impressions quality printers, Hyderabad (2002).

Syllabus for Pre-Ph.D Examination-2017
Paper II (Zoology)

Title of the Paper: Introduction to general nematology
Name of Candidates: Skyla Shafi

Credits: 04
Maximum Marks: 100
Duration: 3 hrs

UNIT 1: Nematodes characteristics and morphology

1.1 Definition of nematodes. Body size, color and shape and body wall.
1.2 Labial region of nematodes. En face view and sensory structures. Feeding apparatus.
1.3 Pharynx, pharyngo-intestinal junction, intestine rectum, anus and tail.
1.4 Excretory system, nervous system and reproductive system.

UNIT 2: Classification, phylogeny and major works.

2.1 Nematodes and their relationship to the allies. Broad classification of nematode upto sub-orders.
2.2 Phylogenetic relationship amongst broad categories of nematodes.
2.3 History and development of nematology in India and abroad.
2.4 Major contribution of nematologists of 19th and 20th century with special reference to India.

UNIT 3: Techniques for studying nematodes.

3.1 Principles of sampling for nematodes. Collection, storage and care of soil samples, sampling tools and methods, principle and procedure of nematode extraction from samples.
3.2 Principles of killing , fixing, dehydration and mounting of nematodes. Staining of nematodes for microscopic studies. Chemical composition and properties of fixatives.
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4.2 Classification of sub-order Rhabditina upto sub-families and genera.
4.3 Morphology and taxonomy of Diplogastrina. Basic organization in characteristics.
4.4 Classification of sub-order Diplogastrina upto sub-families and genera.

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5.1 Morphology and taxonomy of Mononchida. Basic organization in characteristics.
5.2 Classification of sub-order Mononchida upto sub-families and genera.
5.3 Morphology and taxonomy of Tylenchida. Basic organization in characteristics.
5.4 Classification of sub-order Tylenchida and Aphlenchina upto sub-families and genera.

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2. Laboratory methods for work with plant and soil nematodes, J.F. Southey, London.
3. Nematode structure, M. Shamim Jairajpuri, Impressions quality printers, Hyderabad (2002).