ADIKAVI NANNAYA UNIVERSITY, RAJAHMUNDRY

SCHOOL OF LIFE AND HEALTH SCIENCES

Pre Ph.D Examination Syllabus- 2024

Paper - I: Recent Advances in Life Science & Research Methodology

Research Guide: Prof.K.Ramaneswari, Dept. of Zoology, Adikavi Nannaya University

(**Research Scholar**: Ankam SS Rajendra babu : Regd No 21104001)

UNIT-I:

Basic and applied research, Literature survey and collection, Identification of the problem, Setting up of objectives, Experimental design, standardization of protocols, Annual report preparation, Thesis writing, Research paper and Review article writing, Project writing. Research ethics, Plagiarism.

UNIT-II:

Biochemical techniques: Extraction, isolation, purification, Identification and characterization of Proteins, Quantification of carbohydrates, Extraction of lipids, Enzyme kinetics – Enzymes assay, activity, turn over, yield. Measurement of pH: Use of indicators, Sterilization techniques, Media Preparation. Centrifugation techniques - Principle and applications of Centrifugation.

UNIT-III:

Microscopy – Principle, types, and applications of Microscopy,

Chromatography - Principle, types, and applications of Chromatography

Electrophoresis – Principle, types and applications of electrophoretic techniques

Isotopes – Scintillation counter, Gamma ray counter, Radioactive decay, Measurement and Units of radioactivity, safety measurements, Disposal of radioactive wastes.

UNIT-IV:

Spectrophotometry – Principles and applications of Visible, UV spectrophotometry, IR, NMR, AAS

Biostatistics – Sampling methods, Sample collection, Mean, Median, Mode, Tabulation of data, Graphical representation of data, correlation, regression, Chi-square test, Student t-test, Test of significance, ANOVA Software used in Biostatics.

UNIT-V:

Computational Biology-Microsoft office-word, excel and power point presentation, Graphical representation of data using EXCEL and sigma plot.

Bioinformatics –BLAST, Protein data base.

Intellectual property rights (IPR), property rights (IPP) and Patenting.

Texts and References:

1. Research methodology of biological science – by N. Gurumani
2. Fundamentals of Biostatistics – by Khan & Khanum
3. Biophysical chemistry: principles and techniques– by Upadhyay
4. An Introduction to Practical Biochemistry by Keith Wilson and John Walker
5. Molecular Cloning: A laboratory Manual by Joseph Sambrook and David W. Russell Published by Cold Spring Harbor Laboratories Press

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SCHOOL OF LIFE AND HEALTH SCIENCES

Pre Ph.D Examination Syllabus- 2024

Paper - II: Oral Microbiome & Inflammatory markers in Oral Cancers, Pre–Malignancy and Healthy Individuals –A Comparative Study

Research Guide: Prof.K.Ramaneswari, Dept. of Zoology, Adikavi Nannaya University

(Research Scholar: Ankam SS Rajendra babu : Regd No 21104001)

UNIT-I

Microbiome – Introduction, classification and Types. Bacteria (Gram Negative and Gram Positive and Other Intracellular Pathogenic Bacteria) Fungal C – Types and Oral fungal infections in oral Cancers . Viruses- Oncogenic Viruses their role in oral cancers, Laboratory Identification Methods.

UNIT-II

Oral Microbial Ecology, oral Microbial Physiology – eubiosis and dysbiosis,

Bacterial Pathogenesis – Entry ,attachments Mechanisms of Bacterial colonization, invasion, Immune response inhibitors ,Toxins

Immune Response- classification ,Types Innate and Acquired and Inflammatory Biomarkers.

UNIT-III

Tumor Immunology – Cells involved in Tumor suppression ,Anti tumor immunity ,Immune evasion by Tumors .Tumor Immunology Pathway .

Role of Cytokines in inflammation Classification .Types

Oncogenic cytokines - IL 6 , IL8, TNF Alpha , and their role in Oral Cancers

UNIT-IV

Sample- Types of Sample for Oral cancer Detection – Saliva ,Buccal Scraping, Tissue .

Method of Sample collection from Pre-Malignancy and Malignancy and Normal Individuals. – Scarping , Biopsy .ets

UNIT-V

Molecular techniques: Next generation sequencing, RT-PCR, Data analysis and use of statistics in Biomedical research Sequencing – Introduction and Classification

NGS – Introduction ,Types – Metagenomics , whole Genome Sequencing role of NGS in Cancer Diagnosis . advantages and Disadvantages .

Identification of Cytokines: Use of HPLC, ELISA – Types –Direct , Indirect, Sand Witch Elisa.

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Pre Ph.D Examination Syllabus-2024

Paper - III: Presentation on the Research topic:

Course structure:				
S.No	**Paper title**	**Test Mode**	**Marks**	**Credits**
1	Paper I: Recent Advances in Life Science & Research Methodology	Written	100	4
2	Paper II: : Oral Microbiome & Inflammatory markers in Oral Cancers, Pre–Malignancy and Healthy Individuals –A Comparative Study.	Written	100	4
3	Paper III: Oral Microbiome & Inflammatory markers in Oral Cancers, Pre–Malignancy and Healthy Individuals –A Comparative Study.	Presentation	50	2

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Model papers:

ADIKAVI NANNAYA UNIVERSITY, RAJAHMUNDRY
School of Life and Health Sciences
Pre-PhD Examinations w.e.f. 2024
Model paper for Paper- I: Recent Advances in Life Science & Research Methodology

Duration: 3 hours **Max Marks: 100M**

ALL Questions carry equal marks

5X20=100M **Answer all the questions**

UNIT-I

1) Write about experimental design and standardization of protocols for research work. Add a note on identification of research problem?

(or)

2) Write briefly about the thesis writing and Project writing?

UNIT-II

3) Differentiate disinfection and sterilization. Write about the role of various instruments used to create sterile condition for cell and tissue culture. Add a note on Media preparation?

(or)

4) Write in detailed about Enzyme assay, activity, turnover yield. Add a note on Enzyme kinetics?

UNIT-III

5) Write in detail about radioactive decay. Measurement of radioactivity, safety measurements and disposal of radioactive wastes?

(or)

6) Define Chromatography? Write about Principle, types, and applications of Chromatography?

UNIT-IV

7) Write about graphical representation of data. Add a note correlation and regression?

(or)

8) Describe about tabulation and graphical representation of data. Add a note on ANOVA?

UNIT-V

9) Write about the various applications of Bioinformatics in Biology?

(or)

10) Write in detail about IPR & IPP?

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Model papers:

ADIKAVI NANNAYA UNIVERSITY, RAJAHMUNDRY

School of Life and Health Sciences

Pre-PhD Examinations w.e.f. 2024

Model paper for Paper- II: Oral Microbiome & Inflammatory markers in Oral Cancers, Pre–Malignancy and Healthy Individuals –A Comparative Study

Duration: 3 hours **Max Marks: 100M**

ALL Questions carry equal marks

Answer all the questions **5X20=100M**

UNIT-I

1) Write about Introduction of Microbiome their role in oral Cancers?

(or)

2) Write briefly about the Classification and Types of Bacteria, Fungus and Viruses?

UNIT-II

3) Write about the Oral Microbial Ecology and Physiology?

(or)

4) Write in detailed about Immune Response and Mechanisms of Colonization?

UNIT-III

5) Write in detail about Tumor immunology in Cancers ?

(or)

6) Write about Inflammatory Biomarkers in oral Cancers (Oncogenic cytokines their role in oral Cancers ?

UNIT-IV

7) Write about Saliva and Buccal Sample collection storage from Pre Malignancy and Malignancy and Normal Individuals.

(or)

8) Describe about Sample Preparation For NGS and Cytokines Estimation ?

UNIT-V

9) Write about the Introduction of the NGS Types and MNGS and WGS and Elisa ?

(or)

10) Write in detail about the Role of NGS in Cancer Diagnosis as Compared Sanger's Sequencing?

***

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ADIKAVI NANNAYA UNIVERSITY, RAJAHMUNDRY
SCHOOL OF LIFE AND HEALTH SCIENCES
Pre Ph.D Examination Syllabus- 2024

BUDDHA SAI KEERTHANA . Reg. No:- 21104003

Paper - I: Recent Advances in Life Science & Research Methodology

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Chromatography - Principle, types, and applications of Chromatography
Electrophoresis – Principle, types and applications of electrophoretic techniques
Isotopes – Scintillation counter, Gamma ray counter, Radioactive decay, Measurement and Units of radioactivity, safety measurements, Disposal of radioactive wastes.

UNIT-IV:

Spectrophotometry – Principles and applications of Visible, UV spectrophotometry, IR, NMR, AAS
Biostatistics – Sampling methods, Sample collection, Mean, Median, Mode, Tabulation of data, Graphical representation of data, correlation, regression, Chi-square test, Student t-test, Test of significance, ANOVA Software used in Biostatics.

UNIT-V:

Computational Biology-Microsoft office-word, excel and power point presentation, Graphical representation of data using EXCEL and sigma plot.
Bioinformatics –BLAST, Protein data base.
Intellectual property rights (IPR), property rights (IPP) and Patenting.

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4. An Introduction to Practical Biochemistry by Keith Wilson and John Walker
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P Vijaya Mrunal
RESEARCH SUPERVISOR

P Vijaya Mrunal
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Pre Ph.D Examination Syllabus- 2024

Paper – II:- Cancer Genetics and Research Methodology

UNIT - 1 :-
Structure, Types and Function of DNA & RNA;
Growth factors – EGF, TNF & TGF and other growth factor receptors;
Role of Transcription factors;
Cellular proto-oncogenes – Oncogene activation.

UNIT – 2 :-
Types of cancers, causative factors and symptoms;
Carcinogenesis – Radiation and chemical carcinogenesis, Viral carcinogenesis – DNA and RNA Viruses ;
Prognosis and diagnosis of Cancer;

UNIT – 3 :-
Cancer Cell Signalling;
Molecular basis of Cancer;
Methods of treatment for Cancer – Chemotherapy, Radiationtherapy, Immunotherapy and Gene therapy.

UNIT – 4 :-
HOX genes classification, function and significant role in development of animals;
Evolutionary significance of HOX genes in animals;
Regulatory mechanisms of HOX genes in the development of Carcinogenesis;
Epigenetics Role of HOX genes in cancer;

UNIT – 5 :-
Isolation of DNA & RNA, Primer designing, PCR amplification;
Quantitative Real Time PCR;
RNA Sequencing;
Western Blotting Technique.

Texts and References:

1.) Jean S.Deutsch HOX Genes Studies from the 20th to 21st Century
2.) Spyros Papageorgiou HOX Gene Expression
3.) Weinberg R. The Biology of Cancer. Garland Science.second edition 2014
4.) Jesse Kresak. Cancer Growth and Progression Springer 2014
5.) Michael Scott. Molecular Diagnosis of Cancer_ Methods and Protocols-Humana Press 2004

P Vijaya Vimala
RESEARCH SUPERVISOR

P Vijaya Vimala
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Pre Ph.D Examination Syllabus-2024

Paper - III: Presentation on the Research topic: Evaluation of Expression of *HOX* Genes in Breast Cancer Patients at North Coastal Region of Andhra Pradesh, South India.

Course structure:				
S.No	**Paper title**	**Test Mode**	**Marks**	**Credits**
1	Paper I: Recent Advances in Life Science & Research Methodology	Written	100	4
2	Paper II: Cancer Genetics & Research Methodology	Written	100	4
3	Paper III: Evaluation of Expression Of *HOX* Genes in Breast Cancer Patients at North Coastal Region of Andhra Pradesh, South India.	Presentation	50	2

P Vijaya Nirmala
RESEARCH SUPERVISOR

P Vijaya Nirmala
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Model papers:

ADIKAVI NANNAYA UNIVERSITY, RAJAHMUNDRY
School of Life and Health Sciences
Pre-PhD Examinations w.e.f. 2024
Model paper for Paper- I: Recent Advances in Life Science & Research Methodology

Duration: 3 hour **Max Marks: 100M**

ALL Questions carry equal marks **5X20=100M**

Answer all the questions

UNIT-I

1) Write about experimental design and standardization of protocols for research work. Add a note on identification of research problem?

(or)

2) Write briefly about the thesis writing and Project writing?

UNIT-II

3) Differentiate disinfection and sterilization. Write about the role of various instruments used to create sterile condition for cell and tissue culture. Add a note on Media preparation?

(or)

4) Write in detailed about Enzyme assay, activity, turnover yield. Add a note on Enzyme kinetics?

UNIT-III

5) Write in detail about radioactive decay. Measurement of radioactivity, safety measurements and disposal of radioactive wastes?

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UNIT-IV

7) Write about graphical representation of data. Add a note correlation and regression?

(or)

8) Describe about tabulation and graphical representation of data. Add a note on ANOVA?

UNIT-V

9) Write about the various applications of Bioinformatics in Biology?

(or)

10) Write in detail about IPR & IPP?

***

P Vijaya Nirmala
RESEARCH SUPERVISOR

P Vijaya Nirmala
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Model papers:

ADIKAVI NANNAYA UNIVERSITY, RAJAHMUNDRY
School of Life and Health Sciences
Pre-PhD Examinations w.e.f. 2024
Model paper for Paper- II: Cancer Genetics and Research Methodology

Duration: 3 hour **Max Marks: 100M**

ALL Questions carry equal marks **5X20=100M**

Answer all the questions

UNIT -1

1.) Write about the Structure, Types and Function of DNA & RNA.

(or)

2.) Write briefly about Cellular proto-oncogenes – Oncogene activation.

UNIT -2

3.) Describe about Types of cancers, causative factors and symptoms.

(or)

4.) Give a detailed account on Prognosis and diagnosis of Cancer.

UNIT -3

5.) Write briefly about Cancer Cell Signalling.

(or)

6.) Write about methods of treatment for Cancer – Chemotherapy, Radiationtherapy, Immunotherapy and Gene therapy.

UNIT -4

7.) Write in detail about HOX genes classification, function and significant role in development of animals.

(or)

8.) Describe the Epigenetics Role of HOX genes in cancer.

UNIT -5

9.) Write about Isolation of DNA & RNA, Primer designing, PCR amplification.

(or)

10.) Write briefly about RNA Sequencing.

RESEARCH SUPERVISOR

Hebd. Dept. of Zoo...
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ADIKAVI NANNAYA UNIVERSITY, RAJAHMUNDRY
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Pre Ph.D Examination Syllabus- 2024

Paper - I: Recent Advances in Life Science & Research Methodology

Research guide:Prof.K.Ramaneswari,Dept of Zoology,Adikavi Nannaya University
Research scholar:D.Thirupathi:Reg. No:21104004

UNIT-I:

Basic and applied research, Literature survey and collection, Identification of the problem, Setting up of objectives, Experimental design, standardization of protocols, Annual report preparation, Thesis writing, Research paper and Review article writing, Project writing. Research ethics, Plagiarism.

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Model papers:

ADIKAVI NANNAYA UNIVERSITY, RAJAHMUNDRY
School of Life and Health Sciences
Pre-PhD Examinations w.e.f. 2024
Model paper for Paper- I: Recent Advances in Life Science & Research Methodology

Duration: 3 hour **Max Marks: 100M**

ALL Questions carry equal marks **5X20=100M**

Answer all the questions

UNIT-I

1) Write about experimental design and standardization of protocols for research work. Add a note on identification of research problem?

(or)

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UNIT-V

9) Write about the various applications of Bioinformatics in Biology?

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Pre PhD examinaion 2024

Paper 3: presentation on the Research topic

Course structure :

S.No	Paper title	Test mode	Marks	Credits
1	Paper 1 : Recent advances in life sciences and research methadology	written	100	4
2	Paper 2: Studies on the amphibian diversity , distribution and their phylogenetics	written	100	4
3	Paper 3: Studies on the amphibian diversity , distribution and their phylogenetics from the villages of Rajanagaram mandal	presentation	50	2

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ADIKAVI NANNAYA UNIVERSITY : RAJAHMUNDRY

Department of Zoology

Pre-PhD Course work syllabus

Paper-II: Studies on the Amphibian diversity, distribution &their phlogenetics

Research Guide: Professor. K. Ramaneswari, Dept. of Zoology, Adikavi Nannaya University

(Research Scholar:D.Thirupathi; Regd No.21104004)

UNIT-I : Biosystematics- Definition and basic concepts. Importance and applications of biosystematics.

Principles of Taxonomy :Binomial Nomenclature,Trinomial nomenclature,Importance of Taxonomy,Aims of Taxonomy.

Types of taxonomy- Conventional types, Cytotaxonomy. Chemotaxonomy and Molecular taxonomy.

UNIT-II: Concept of species :Static concept,Dynamic concept,Typological concept,Phenetic concept,Ernst Mayr's Biologicl concept of species,Evolutionary concept of species

Speciation: Allopatric speciation,Parapatric speciation,peripatric speciation,sympatric speciation

UNIT-III: Taxonomic characters for identification of amphibians

Classification of Amphibians up to orders.Taxonomic characters

Behavioural studies: Parental care in Amphibians and courtship behaviour in Amphibians

UNIT-IV: Evolution of amphibians .Phylogenetics: Procedure to read a phylogenetic tree .monophyletic group,parapyhletic group &polyphlyetic group.

Methods to construct phylogenetic trees,Parsimony,Procedure to pick the best phylogenetic tree by Parsimony.

UNIT-V: DNA barcoding:Importance of DNA barcoding

Steps of DNA barcoding,Role of Mitochondrial 16s rRNA in DNA barcoding.

DNA extraction and sample preparation methods.

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Pre Phd Examination-2024

Model Paper for paper-2: Studies on the Amphibian diversity ,distribution & their phylogenetics .

Duration:3 marks Max Marks:100

Each question carry 20marks

UNIT 1

1)Write about basic concepts of biosystematics and explain important applications of biosystematics (OR)

2)Write about principles of taxonomy and explain types of taxonomy.

UNIT 2

1)Write about concept of species.

2)what is speciation? and write about types of speciation.

UNIT 3

1) Write about taxonomic characters for identification of amphibians.(OR)

2)Explain parental care in amphibians with examples?

UNIT 4

1) Write about the evolution of amphibians? (OR)

2) write about phylogenetic trees .

UNIT 5

1) Explain the role of mitochondrial 16s rRNA in DNA barcoding. (OR)

2) Explain DNA extraction and sample preparation methods.

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SCHOOL OF LIFE AND HEALTH SCIENCES
Pre Ph.D Examination Syllabus- 2024

Paper - I: Recent Advances in Life Science & Research Methodology

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D. Kalyani (Research Supervisor)

P. Vijaya Nirmala
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Adikavi Nannaya University
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SCHOOL OF LIFE AND HEALTH SCIENCES
Pre Ph.D Examination Syllabus- 2024
Paper II: Biological applications of green carbon dot fabricated nanocomposites

UNIT-I: Nanoscience

Introduction to Nanoscience and Nanotechnology: Definition, History and classification; **Properties of Nanoparticles**: Quantum confinement, size effects; **Methods of synthesis of nanoparticles**: Top down and Bottom-Up approaches, Physical, chemical and biological methods of synthesis.

UNIT-II: Green synthesis

***Madhuca longifolia*:** Taxonomy, Characteristics, Medicinal properties; Bioactive compounds; **Green reducing agents:** Various methods for extraction of reducing agents from plants and other biomass; Advantages and Disadvantages; Effect of Nanoparticles properties on green reducing agents.

UNIT-III: Carbon dots

Carbon dots: Carbon quantum dots; physio-chemical, electrical and photoluminescence properties; Synthesis methods and sources of carbon dots; Applications of carbon dots in various scientific fields; Quantum yield;

UNIT-IV: Material characterization

Principal and applications of techniques; (A) Optical and Fluorescence properties**:** UV-Vis spectroscopy, FTIR, and Fluorescence spectroscopy; **Phase analysis:** X-ray diffraction; **Morphology:** Scanning Electron and Transmission Electron Microscopy; Elemental analysis: Energy dispersive X-ray spectroscopy

UNIT-V: Activities and Applications of the green synthesized nanoparticles

Pharmacological properties: Anti microbial, Anti oxidant, Anti inflammatory and Anti cancer properties. **Biomedical Applications:** Bio-imaging, cancer treatment, drug delivery systems. **Agricultural Applications:** plant growth and promotion; Crop enhancement; Soil remediation and environmental sustainability. **Environmental Applications:** Water purification and wastewater treatment. Remediation of contaminated soil and groundwater.

References:

1) Handbook of Green and Sustainable Nanotechnology: Fundamentals, Developments and Applications-Shanker et al.

2) An introduction to green nanotechnology-Nasrollahzadeh, Mahmoud, et al.

3) Applications of Nanotechnology for Green Synthesis.-Asiri et al.

4) Potential applications of mahua (Madhuca indica) biomass-Gupta et al.

D. Kalyani
(Research Supervisor)

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ADIKAVI NANNAYA UNIVERSITY, RAJAHMUNDRY
SCHOOL OF LIFE AND HEALTH SCIENCES
Pre Ph.D Examination Syllabus-2024

Presentation on the Research topic:

Course structure:				
S.No	**Paper title**	**Test Mode**	**Marks**	**Credits**
1	Paper I: Recent Advances in Life Science & Research Methodology	Written	100	4
2	Paper II: Biological applications of green carbon dot fabricated nanocomposites	Written	100	4
3	Paper III: Green synthesis of carbon dot fabricated nanoparticles using *Madhuca longifolia* and its biological activity	Presentation	50	2

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Head, Dept. of Zoology
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(Research Supervisor)

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Model papers:

ADIKAVI NANNAYA UNIVERSITY, RAJAHMUNDRY
School of Life and Health Sciences
Pre-PhD Examinations w.e.f. 2024
Model paper for Paper- I: Recent Advances in Life Science & Research Methodology

Duration: 3 hour **Max Marks: 100M**

ALL Questions carry equal marks **5X20=100M**

Answer all the questions

UNIT-I

1) Write about experimental design and standardization of protocols for research work. Add a note on identification of research problem?

(or)

2) Write briefly about the thesis writing and Project writing?

UNIT-II

3) Differentiate disinfection and sterilization. Write about the role of various instruments used to create sterile condition for cell and tissue culture. Add a note on Media preparation?

(or)

4) Write in detailed about Enzyme assay, activity, turnover yield. Add a note on Enzyme kinetics?

UNIT-III

5) Write in detail about radioactive decay. Measurement of radioactivity, safety measurements and disposal of radioactive wastes?

(or)

6) Define Chromatography? Write about Principle, types, and applications of Chromatography?

UNIT-IV

7) Write about graphical representation of data. Add a note correlation and regression?

(or)

8) Describe about tabulation and graphical representation of data. Add a note on ANOVA?

UNIT-V

9) Write about the various applications of Bioinformatics in Biology?

(or)

10) Write in detail about IPR & IPP?

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(Research Supervisor)

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ADIKAVI NANNAYA UNIVERSITY, RAJAHMUNDRY
School of Life and Health Sciences
Pre-PhD Examinations w.e.f. 2024
Model paper for Paper- II: Biological applications of green carbon dot fabricated nanocomposites

Duration: 3 hour **Max Marks: 100M**
ALL Questions carry equal marks **5X20=100M**

Answer all the questions

UNIT-I

1) **(a)** Define nanoscience and nanotechnology. Explain the properties and significance of nanomaterials.

or

(b) Discuss the methods for the synthesis of nanomaterials.

UNIT-II

2) **(a)** Describe carbon quantum dots and discuss various methods of their synthesis.

or

(b) Explain the concept of quantum yield and explore the applications of carbon dots in biomedical fields and

UNIT-III

3) **(a)** Give an overview of *Madhuca longifolia* and discuss its bioactive compounds.

or

(b) Explain the various methods of extracting green reducing agents from plants and other biomass.

UNIT-IV

4) **(a)** Explain the principles and applications of UV-Vis spectroscopy in material characterization.

or

(b) Describe the technique and applications of X-ray diffraction (XRD) in phase analysis of nanomaterials.

UNIT-V

5) **(a)** Discuss various applications of green synthesized nanoparticles.

or

(b) Explore the pharmacological properties of the green carbon dot nanoparticles

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ADIKAVI NANNAYA UNIVERSITY, RAJAHMUNDRY
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Pre Ph.D Examination Syllabus- 2024

Paper - I: Recent Advances in Life Science & Research Methodology

UNIT-I:

Basic and applied research, Literature survey and collection, Identification of the problem, Setting up of objectives, Experimental design, standardization of protocols, Annual report preparation, Thesis writing, Research paper and Review article writing, Project writing. Research ethics, Plagiarism.

UNIT-II:

Biochemical techniques: Extraction, isolation, purification, Identification and characterization of Proteins, Quantification of carbohydrates, Extraction of lipids, Enzyme kinetics – Enzymes assay, activity, turn over, yield. Measurement of pH: Use of indicators, Sterilization techniques, Media Preparation. Centrifugation techniques - Principle and applications of Centrifugation.

UNIT-III:

Microscopy – Principle, types, and applications of Microscopy,
Chromatography - Principle, types, and applications of Chromatography
Electrophoresis – Principle, types and applications of electrophoretic techniques
Isotopes – Scintillation counter, Gamma ray counter, Radioactive decay, Measurement and Units of radioactivity, safety measurements, Disposal of radioactive wastes.

UNIT-IV:

Spectrophotometry – Principles and applications of Visible, UV spectrophotometry, IR, NMR, AAS
Biostatistics – Sampling methods, Sample collection, Mean, Median, Mode, Tabulation of data, Graphical representation of data, correlation, regression, Chi-square test, Student t-test, Test of significance, ANOVA Software used in Biostatics.

UNIT-V:

Computational Biology-Microsoft office-word, excel and power point presentation, Graphical representation of data using EXCEL and sigma plot.
Bioinformatics –BLAST, Protein data base.
Intellectual property rights (IPR), property rights (IPP) and Patenting.

Texts and References:

1. Research methodology of biological science – by N. Gurumani
2. Fundamentals of Biostatistics – by Khan & Khanum
3. Biophysical chemistry: principles and techniques– by Upadhyay
4. An Introduction to Practical Biochemistry by Keith Wilson and John Walker
5. Molecular Cloning: A laboratory Manual by Joseph Sambrook and David W. Russell Published by Cold Spring Harbor Laboratories Press

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Pre Ph.D Examination syllabus-2024

PAPER-II- GREEN SYNTHESIS OF NANOPARTICLES AND RESEARCH METHODOLOGY

UNIT 1: INTRODUCTION TO NANOTECHNOLOGY

- Introduction to Nanoscience, Properties and Applications.
- Inter- atomic forces and bonding with solids spatial confinement.

UNIT 2: METAL NANOPARTICLES:

- Introduction to Nanoparticles.
- Types of metal Nanoparticles, Properties, Super conductivity, Biological Applications of metal Nanoparticles
- Mechanism of action of AgNP'S

UNIT 3: SYNTHESIS OF METAL NANOPARTICLES:

- Physical and Chemical synthesis process of synthesis of metal nanoparticles
- Top-down and Bottom-up processes, sol-gel method or wet chemical method
- Colloidal method, and green route for the synthesis of Metal Nanoparticles

UNIT 4: GREEN SYNTHESIS:

- Secondary metabolities of plants and their biological activities, preparation and decoction soxhlet extraction
- Biology of Ipomoea obscure

UNIT 5: CHARACTERIZATION TECHNIQUES:

- Surface Plasmon resonance, electron microscopy (SEM&TEM), X-ray diffraction, Dynamic light scattering
- FTIR -principle of FTIR, applications for characterizing metal nanoparticles.

REFERENE BOOKS

- Nanoparticle, springer- ISBN 978-3-662-44823.6
- solid state physics -S.B. pillai

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Pre Ph.D Examination Syllabus-2024

Course structure:				
S.No	**Paper title**	**Test Mode**	**Marks**	**Credits**
1	Paper I: Recent Advances in Life Science & Research Methodology	Written	100	4
2	Paper II: PAPER-2- Green Synthesis of Nanoparticles and Research Methodology	Written	100	4
3	Paper III: Green synthesis and characterization of Silver Nanoparticles from Ipomoea obscure and its pharmacological activity	Presentation	50	2

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Model papers:

ADIKAVI NANNAYA UNIVERSITY, RAJAHMUNDRY
School of Life and Health Sciences
Pre-PhD Examinations w.e.f. 2024
Model paper for Paper- I: Recent Advances in Life Science & Research Methodology

Duration: 3 hours **Max Marks: 100M**

ALL Questions carry equal marks **5X20=100M**

Answer all the questions

UNIT-I

1) Write about experimental design and standardization of protocols for research work. Add a note on identification of research problem?

(or)

2) Write briefly about the thesis writing and Project writing?

UNIT-II

3) Differentiate disinfection and sterilization. Write about the role of various instruments used to create sterile condition for cell and tissue culture. Add a note on Media preparation?

(or)

4) Write in detailed about Enzyme assay, activity, turnover yield. Add a note on Enzyme kinetics?

UNIT-III

5) Write in detail about radioactive decay. Measurement of radioactivity, safety measurements and disposal of radioactive wastes?

(or)

6) Define Chromatography? Write about Principle, types, and applications of Chromatography?

UNIT-IV

7) Write about graphical representation of data. Add a note correlation and regression?

(or)

8) Describe about tabulation and graphical representation of data. Add a note on ANOVA?

UNIT-V

9) Write about the various applications of Bioinformatics in Biology?

(or)

10) Write in detail about IPR & IPP?

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Pre Ph.D Examination syllabus-2024

PAPER-2- GREEN SYNTHESIS OF NANOPARTICLES AND RESEARCH METHODOLOGY

Time:3Hours **Max. Marks:100**

All Questions carry equal marks

Answer any Five of the following Questions: **5×20=100M**

Unit-I

1. What is Nanoscience, write the properties and applications of Nanoscience

Or

2. Write about the Inter atomic forces and their bonding with solids and spatial confinement

Unit-2

3. What are Nanoparticles, Explain the Properties and applications of metal Nanoparticles

Or

4. Explain the Types of Nano particles and the mechanism of Action of AgNP'S

Unit-3

5. Explain the Physical and Chemical process for the synthesis of Metal Nanoparticles

Or

6. Explain the Colloidal and green synthesis of Nanoparticles

Unit-4

7. Explain the process of preparation of Decoction by soxhlet extraction

Or

8. Explain in detail the Biology of Ipomoea obscure

Unit-5

9. Explain in detail about Plasmon resonance and Electron microscopy

Or

10. Explain the Principle of FTIR and its applications in characterizing metal Nanoparticles

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Paper - III: Presentation on the Research topic

S.No	Paper title	Test Mode	Marks	Credits
1	Paper III: Green synthesis and characterization of Silver Nanoparticles from Ipomoea obscure and its pharmacological activity	Presentation	50	2

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Pre Ph.D Examination Syllabus- 2024

LAKSHMI PRADEEPTHI PEMMARAJU · Reg.No:- 2110400 7

Paper - I: Recent Advances in Life Science & Research Methodology

UNIT-I:

Basic and applied research, Literature survey and collection, Identification of the problem, Setting up of objectives, Experimental design, standardization of protocols, Annual report preparation, Thesis writing, Research paper and Review article writing, Project writing. Research ethics, Plagiarism.

UNIT-II:

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UNIT-III:

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Chromatography - Principle, types, and applications of Chromatography
Electrophoresis – Principle, types and applications of electrophoretic techniques
Isotopes – Scintillation counter, Gamma ray counter, Radioactive decay, Measurement and Units of radioactivity, safety measurements, Disposal of radioactive wastes.

UNIT-IV:

Spectrophotometry – Principles and applications of Visible, UV spectrophotometry, IR, NMR, AAS
Biostatistics – Sampling methods, Sample collection, Mean, Median, Mode, Tabulation of data, Graphical representation of data, correlation, regression, Chi-square test, Student t-test, Test of significance, ANOVA Software used in Biostatics.

UNIT-V:

Computational Biology-Microsoft office-word, excel and power point presentation, Graphical representation of data using EXCEL and sigma plot.
Bioinformatics –BLAST, Protein data base.
Intellectual property rights (IPR), property rights (IPP) and Patenting.

Texts and References:

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4. An Introduction to Practical Biochemistry by Keith Wilson and John Walker
5. Molecular Cloning: A laboratory Manual by Joseph Sambrook and David W. Russell Published by Cold Spring Harbor Laboratories Press

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Pre Ph.D Examination Syllabus- 2024
Paper –II Drug Designing for Advanced Cancer Therapies and Research Methodology

Unit 1:

Introduction: Cancer, Types of Cancer, Oncogenes, Tumor Suppressor genes, Interaction of cancer cells with normal cells.

Colon cancer: Symptoms, causes, prevention and treatment methods, Therapies – Chemotherapy, Radiotherapy.

Unit 2:

Introduction to Bioinformatics - Genomics and Proteomics, online and offline tools, Biological Databases, and types of databases. Database search using BLAST and BLOSUM

Unit 3:

Sequence alignment- Pairwise sequence alignment and Multiple Sequence alignment (T-COFFEE and CLUSTAL OMEGA). Molecular Phylogeny and methods to construct a tree (PHYLIP, MEGA, and BEAST). Protein Structure Prediction Methods.

Unit 4:

Introduction to homology modeling, Computer-aided drug designing - Bioinformatics approach for drug development - Identification of potential molecules, chemical compound library preparation, and identification of target in the pathogen, ligand, and protein preparation.

Unit 5:

Quantitative structure-activity relationship. 3D-QSAR. Techniques of developing a pharmacophore map covering both ligand- and receptor-based approaches. Applications of Computer-Aided Drug Design (CADD) in Drug Discovery

Texts and References:

1. Bioinformatics – D Mount
2. Introduction to Bioinformatics by Arthur M. Lesk (Oxford)
3. Practical Application of Computer-Aided Drug Design, Ed. Charifson P., Marcel Dekker Inc.
4. Pharmaceutical Profiling in Drug Discovery for Lead Selection Borchardt RT, Kerns EH, Lipinski CA, Thakker Dr.
5. 3D QSAR in Drug Design: Theory, Methods and Applications, Ed. Kubinyi H., Ledien ESCOM.

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Paper - III: Presentation on the Research topic:

Course structure:				
S.No	**Paper title**	**Test Mode**	**Marks**	**Credits**
1	Paper I: Recent Advances in Life Science & Research Methodology	Written	100	4
2	Paper II: Drug Designing for Advanced Cancer Therapies & Research Methodology	Written	100	4
3	Paper III: Study on Molecular Modelling and docking, Predictions and evaluation of targeted drug against Colorectal Cancer	Presentation	50	2

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Model papers:

ADIKAVI NANNAYA UNIVERSITY, RAJAHMUNDRY
School of Life and Health Sciences
Pre-PhD Examinations w.e.f. 2024
Model paper for Paper- I: Recent Advances in Life Science & Research Methodology

Duration: 3 hour **Max Marks: 100M**

ALL Questions carry equal marks **5X20=100M**

Answer all the questions

UNIT-I

1) Write about experimental design and standardization of protocols for research work. Add a note on identification of research problem?

(or)

2) Write briefly about the thesis writing and Project writing?

UNIT-II

3) Differentiate disinfection and sterilization. Write about the role of various instruments used to create sterile condition for cell and tissue culture. Add a note on Media preparation?

(or)

4) Write in detailed about Enzyme assay, activity, turnover yield. Add a note on Enzyme kinetics?

UNIT-III

5) Write in detail about radioactive decay. Measurement of radioactivity, safety measurements and disposal of radioactive wastes?

(or)

6) Define Chromatography? Write about Principle, types, and applications of Chromatography?

UNIT-IV

7) Write about graphical representation of data. Add a note correlation and regression?

(or)

8) Describe about tabulation and graphical representation of data. Add a note on ANOVA?

UNIT-V

9) Write about the various applications of Bioinformatics in Biology?

(or)

10) Write in detail about IPR & IPP?

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School of Life and Health Sciences

Pre-PhD Examinations w.e.f. 2024

Model paper for Paper- II: Drug Designing for Advanced Cancer Therapies and Research Methodology

Duration: 3 hours **Max Marks: 100M**

ALL Questions carry equal marks **5X20=100M**

Answer all the questions

UNIT-I

1. Define Cancer and explain about different types of cancer.

(or)

2. Explain colon cancer and its screening and treatment methods.

UNIT-II

3. What is a biological database and explain different types of databases.

(or)

4. Explain about Blast and BLOSSUM

UNIT-III

5. What is multiple sequence alignment? Explain?

(or)

6. Write about different protein prediction methods.

UNIT-IV

7. Explain in brief about homology modelling.

(or)

8. What are the different bioinformatics approaches for drug designing?

UNIT-V

9. Explain about QSAR

(or)

10. Write about the applications of computer aided drug designing in drug discovery.

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SCHOOL OF LIFE AND HEALTH SCIENCES

Pre Ph.D Examination Syllabus- 2024

Paper - I: Recent Advances in Life Science & Research Methodology

Research Guide: Prof.K.Ramaneswari, Dept. of Zoology, Adikavi Nannaya University

(Research Scholar: P.Revathi devi: Regd No. 21104008)

UNIT-I:

Basic and applied research, Literature survey and collection, Identification of the problem, Setting up of objectives, Experimental design, standardization of protocols, Annual report preparation, Thesis writing, Research paper and Review article writing, Project writing. Research ethics, Plagiarism.

UNIT-II:

Biochemical techniques: Extraction, isolation, purification, Identification and characterization of Proteins, Quantification of carbohydrates, Extraction of lipids, Enzyme kinetics – Enzymes assay, activity, turn over, yield. Measurement of pH: Use of indicators, Sterilization techniques, Media Preparation. Centrifugation techniques - Principle and applications of Centrifugation.

UNIT-III:

Microscopy – Principle, types, and applications of Microscopy,

Chromatography - Principle, types, and applications of Chromatography

Electrophoresis – Principle, types and applications of electrophoretic techniques

Isotopes – Scintillation counter, Gamma ray counter, Radioactive decay, Measurement and Units of radioactivity, safety measurements, Disposal of radioactive wastes.

UNIT-IV:

Spectrophotometry – Principles and applications of Visible, UV spectrophotometry, IR, NMR, AAS

Biostatistics – Sampling methods, Sample collection, Mean, Median, Mode, Tabulation of data, Graphical representation of data, correlation, regression, Chi-square test, Student t-test, Test of significance, ANOVA Software used in Biostatics.

UNIT-V:

Computational Biology-Microsoft office-word, excel and power point presentation, Graphical representation of data using EXCEL and sigma plot.

Bioinformatics –BLAST, Protein data base.

Intellectual property rights (IPR), property rights (IPP) and Patenting.

Texts and References:

1. Research methodology of biological science – by N. Gurumani
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4. An Introduction to Practical Biochemistry by Keith Wilson and John Walker
5. Molecular Cloning: A laboratory Manual by Joseph Sambrook and David W. Russell Published by Cold Spring Harbor Laboratories Press

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Pre Ph.D Examination Syllabus- 2024

Paper - II: Microplastic Analysis and Risk Assessment

Research Guide: Prof.K.Ramaneswari, Dept. of Zoology, Adikavi Nannaya University

(**Research Scholar:** P.Revathi devi: Regd No. 21104008)

UNIT-I

Plastics- Types, Plastic production, Use of plastics in fisheries and aquaculture, Plastic waste and management, marine litter problem, contribution of fisheries and aquaculture to marine litter.

UNIT-II

Microplastics- Definition, Primary microplastics and secondary microplastics, Fisheries and aquaculture as a source of microplastics, Distribution of microplastics in aquatic environment, Chemical and biological interactions of microplastics in the environment.

UNIT-III

Microplastics in Food- Fish as food, Benefits of seafood consumption, Balancing risks and benefits, Analytical methods for microplastics in foods, Microplastics in fishes, Contaminants and additives associated with microplastics, Persistent, bioaccumulative and toxic compounds (PBTs).

UNIT-IV

Risk profiling of microplastics in aquaculture and fishery products- Introduction , Identification of human hazards from micro and nanoplastic ingestion, translocation, absorption and excretion of microplastics, toxicity of micro and nanoplastic particles, Seafood safety.

UNIT-V

Sampling of microplastics in aquatic environments and organisms- sampling considerations for abiotic environments, Basic sampling considerations for biota.

Aquatic environment-water column, Beach sediments, Bottom sediments.

Aquatic organisms- Microplastic extraction and Microplastic identification.

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Model papers:

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School of Life and Health Sciences
Pre-PhD Examinations w.e.f. 2024
Model paper for Paper- I: Recent Advances in Life Science & Research Methodology

Duration: 3 hours **Max Marks: 100M**

ALL Questions carry equal marks **5X20=100M**

Answer all the questions

UNIT-I

1) Write about experimental design and standardization of protocols for research work. Add a note on identification of research problem?

(or)

2) Write briefly about the thesis writing and Project writing?

UNIT-II

3) Differentiate disinfection and sterilization. Write about the role of various instruments used to create sterile condition for cell and tissue culture. Add a note on Media preparation?

(or)

4) Write in detailed about Enzyme assay, activity, turnover yield. Add a note on Enzyme kinetics?

UNIT-III

5) Write in detail about radioactive decay. Measurement of radioactivity, safety measurements and disposal of radioactive wastes?

(or)

6) Define Chromatography? Write about Principle, types, and applications of Chromatography?

UNIT-IV

7) Write about graphical representation of data. Add a note correlation and regression?

(or)

8) Describe about tabulation and graphical representation of data. Add a note on ANOVA?

UNIT-V

9) Write about the various applications of Bioinformatics in Biology?

(or)

10) Write in detail about IPR & IPP?

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Model papers:

ADIKAVI NANNAYA UNIVERSITY, RAJAHMUNDRY
School of Life and Health Sciences
Pre-PhD Examinations w.e.f. 2024
Model paper for Paper- II: Microplastic analysis and Risk assessment

Duration: 3 hours **Max Marks: 100M**

ALL Questions carry equal marks **5X20=100M**

Answer all the questions

UNIT-I

1) Write a brief note on Plastic types, production and its usage in Aquaculture.

(or)

2) Write an account marine litter problem?

UNIT-II

3) Differentiate between primary microplastics and secondary microplastics?

(or)

4) Write in detailed about distribution of microplastics in aquatic environment?

UNIT-III

5) Write in detail about benefits of seafood consumption?

(or)

6) Write a detailed account on contaminants and additives associated with microplastics?

UNIT-IV

7) Write about human hazards from microplastics?

(or)

8) Describe about toxicity of micro and nanoplastic particles

UNIT-V

9) Write about the Sampling techniques of microplastics in aquatic environment?

(or)

10) What are the sampling considerations for abiotic environment?

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Paper - III: Presentation on the Research topic:

Course structure:				
S.No	**Paper title**	**Test Mode**	**Marks**	**Credits**
1	Paper I: Recent Advances in Life Science & Research Methodology	Written	100	4
2	Paper II: Microplastics Analysis and Risk assessment	Written	100	4
3	Paper III: Studies for the occurrence of microplastics in water, soil and fish in Aquatic ecosystems in and around Godavari districts, Andhra Pradesh, India	Presentation	50	2

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ADI KAVI NANNAYA UNIVERSITY, RAJAHMUNDRY
SCHOOL OF LIFE AND HEALTH SCIENCES
Pre Ph.D Examination Syllabus- 2024

SHAIK FARHANA REGD.NO: 21104009

Paper - I: Recent Advances in Life Science & Research Methodology

UNIT-I:

Basic and applied research, Literature survey and collection, Identification of the problem, Setting up of objectives, Experimental design, standardization of protocols, Annual report preparation, Thesis writing, Research paper and Review article writing, Project writing. Research ethics, Plagiarism.

UNIT-II:

Biochemical techniques: Extraction, isolation, purification, Identification and characterization of Proteins, Quantification of carbohydrates, Extraction of lipids, Enzyme kinetics – Enzymes assay, activity, turn over, yield. Measurement of pH: Use of indicators, Sterilization techniques, Media Preparation. Centrifugation techniques - Principle and applications of Centrifugation.

UNIT-III:

Microscopy – Principle, types, and applications of Microscopy,
Chromatography - Principle, types, and applications of Chromatography
Electrophoresis – Principle, types and applications of electrophoretic techniques
Isotopes – Scintillation counter, Gamma ray counter, Radioactive decay, Measurement and Units of radioactivity, safety measurements, Disposal of radioactive wastes.

UNIT-IV:

Spectrophotometry – Principles and applications of Visible, UV spectrophotometry, IR, NMR, AAS
Biostatistics – Sampling methods, Sample collection, Mean, Median, Mode, Tabulation of data, Graphical representation of data, correlation, regression, Chi-square test, Student t-test, Test of significance, ANOVA Software used in Biostatics.

UNIT-V:

Computational Biology-Microsoft office-word, excel and power point presentation, Graphical representation of data using EXCEL and sigma plot.
Bioinformatics –BLAST, Protein data base.
Intellectual property rights (IPR), property rights (IPP) and Patenting.

Texts and References:

1. Research methodology of biological science – by N. Gurumani
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Pre Ph.D. Examination Syllabus- 2024

Paper - II: mcr-1 Gene Mediated Resistance to Colistin and Research Methodology

UNIT – I

Laboratory precaution and guidelines – collection – transportation – handling and examination of pathological specimens (Blood, Urine, Stool and sputum. hospital Hospital-acquired (nosocomial) infections and their intervention methods.

UNIT -2

Colistin: Definition, Uses, Interactions and mechanism of Action, *colistin* resistance bacteria and Molecular Detection methods.

Unit -3

Genetic features of the *mcr-1* gene, role of *mcr-1* on the development of High Colistin Resistance in gram negative bacteria.

Unit 4

Minimum Inhibitory Concentration of Antibiotics, Define Virulence factors, Superinfection, antibiotic resistance pattern, and molecular types of clinical isolates. various management strategies to control nosocomial infections to control the spread of antibiotic resistance.

Unit 5

Isolation of DNA, 16s RNA Sequencing Multi drug resistant and various Phenotypic and genotypic screening methods of Antibiotic resistance organisms., phylogenetic tree, PCE, RT-PCR, qRT-PCR.

REFERENCES

1.Ananthanarayanan, R. and C.K.J. Panicker, 2005. Text Book of Microbiology 7 th Edition. Orient Longman, New Delhi.

2.Microbiology in the Health Sciences and Diseases by R. Fuerst

3.David Greenwood, Richard C.B, Slack, John Forest Peuthere (1992). "Medical Microbiology". 14thEnd. ELBS with Churchill Livingstone.

4.Brook,G.F., J. S. Butel, A. Stephen and Morse, 2003. Medical Microbiology, 22nd Edition. Mc Graw Hill.

5.Chakraborty, P., 2003. A Text book of Microbiology. 2nd Edition. New Central Book Agency(P) Ltd., Calcutta.

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Presentation on the Research topic:

Course structure:				
S.No	**Paper title**	**Test Mode**	**Marks**	**Credits**
1	Paper I: Recent Advances in Life Science & Research Methodology	Written	100	4
2	Paper II: mcr-1 Gene Mediated Resistance to Colistin and Research Methodology	Written	100	4
3	Paper III: Prevalence And Relatedness Of mcr-1 Gene Mediated Resistance to Colistin Among the Human Samples	Presentation	50	2

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Model papers:

ADIKAVI NANNAYA UNIVERSITY, RAJAHMUNDRY
School of Life and Health Sciences
Pre-PhD Examinations w.e.f. 2024
Model paper for Paper- I: Recent Advances in Life Science & Research Methodology

Duration: 3 hour **Max Marks: 100M**

ALL Questions carry equal marks **5X20=100**
Answer all the questions

UNIT-I

1) Write about experimental design and standardization of protocols for research work. Add a note on identification of research problem?

(or)

2) Write briefly about the thesis writing and Project writing?

UNIT-II

3) Differentiate disinfection and sterilization. Write about the role of various instruments used to create sterile condition for cell and tissue culture. Add a note on Media preparation?

(or)

4) Write in detailed about Enzyme assay, activity, turnover yield. Add a note on Enzyme kinetics?

UNIT-III

5) Write in detail about radioactive decay. Measurement of radioactivity, safety measurements and disposal of radioactive wastes?

(or)

6) Define Chromatography? Write about Principle, types, and applications of Chromatography?

UNIT-IV

7) Write about graphical representation of data. Add a note correlation and regression?

(or)

8) Describe about tabulation and graphical representation of data. Add a note on ANOVA?

UNIT-V

9) Write about the various applications of Bioinformatics in Biology?

(or)

10) Write in detail about IPR & IPP?

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ADIKAVI NANNAYA UNIVERSITY, RAJAHMUNDRY
School of Life and Health Sciences
Pre-PhD Examinations w.e.f. 2024
Model paper for Paper- II: mcr-1 Gene Mediated Resistance to Colistin and Research Methodology

Duration: 3 hours **Max Marks: 100M**

ALL Questions carry equal marks

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1. Define Hospital-acquired (nosocomial) infections and explain the methods used for study of hospital acquired intervention methods?

(or)

2. What is multi drug resistant. Described and various Phenotypic and genotypic screening methods of Antibiotic resistance organisms?

3. Write briefly on *colistin* resistance bacteria and Molecular detection methods.

(or)

4. Explain the role of *mcr-1* on the development of High Colistin Resistance in gram negative bacteria?

5. Write the various Rapid Detection methods of Multi-Drug Resistance Strains?

(or)

6. Describe about various management strategies to control nosocomial infections used to control the spread of antibiotic resistance.

7. Describe about *Colistin* resistance mechanism in gram negative bacteria.

(or)

8. What are the genetic features of the *mcr-1* gene?

9. What is MIC Describe about the Minimum Inhibitory Concentration of Antibiotics

(or)

10. Define Virulence factors, Superinfection, antibiotic resistance pattern, and molecular types of clinical isolates?

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Pre Ph.D Examination Syllabus- 2024

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Model papers:

ADIKAVI NANNAYA UNIVERSITY, RAJAHMUNDRY
School of Life and Health Sciences
Pre-PhD Examinations w.e.f. 2024
Model paper for Paper- I: Recent Advances in Life Science & Research Methodology

Duration: 3 hour **Max Marks: 100M**

ALL Questions carry equal marks **5X20=100M**

Answer all the questions

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Pre Ph.D Examination Syllabus- 2024

Paper – II:

UNIT – I: **Shrimp culture Status in India, AP, Significance, Major shrimp cultured in Andhra Pradesh, P.Vannamei Culture system** Present scenario and problems: Trends in global and Indian aquaculture; different farming systems; intensive systems and constraints - environmental degradation and disease outbreaks , General procedures for disease diagnosis; Taxonomy and identification of shrimp parasites; Sampling, preparation of media and culture of pathogenic bacteria

UNIT – II: **Diseases of P.vannamei** viral diseases –Hepatopancreatic parvo like virus, Yellow head bacculovirus, white spot bacculovirus. Bacterial diseases of shell fish – aeromonas, pseudomonas and vibrio infections, luminous bacterial disease, and filamentous bacterial disease. Prevention and therapy, Protozoan diseases- Ichthyophthiriasis, Costiasis, whirling diseases, trypanosomiasis., Pathology treatments and control of disease caused by Acanthocephalan parasites, Crustacean parasites: Lernea, Argulus, Ergasilus. fish leeches, Shellfish parasites: Pathology, treatment and control of the disease caused by Microsporidians, Haplosporidians, Ciliates and Cephaline gregarines Prevention and therapy

UNIT – III: **Soil and Water Quality Management**: Soil and water interaction: Physical and chemical properties of soil and water, Productivity vs nutrient quality and quantity of soil and water, aquatic microorganisms and impact on aquatic habitats and species. Soil and water quality monitoring: soil and water quality standards. Fertilizers and manures: Different types of grade, source, rate and frequency of application, Bio fertilizers, Use of treated sewage for pond fertilization, Ecological changes taking place after fertilizing, Primary production, degradation of molecules in aquatic environment, Utilization of bioactive compounds by microorganisms.

Unit –IV **Microbial Infections and treatment of Shrimps Disease: Common** bacterial pathogens of fishes. Handling of diseased fish for bacteriological examination, Withdrawal of blood and materials from internal organs for bacteriological examination. Diagnosis and infection experiments, Cultural and biochemical identification procedures. Mycological techniques. Culture media for isolation of pathogens, non-selective, enriched, enrichment and selective media. Inoculation and purification techniques. Staining methods. Serology of microbial disease – agglutination precipitation and ELISA methods in disease diagnosis. Processing tissue samples for virological examination. Techniques for isolation of viruses. Serological tests for identification of viruses.

Unit –V **Health Management in shrimp farming and Quarantine Review** of various diseases of shrimps and its significant to aquaculture; diagnostic procedures and their application in aquaculture. Disease monitoring, surveillance, epidemiology, quarantine, certification and import risk analysis. Prophylaxis, hygiene and therapy of fish and shellfish disease. Commonly used drugs / chemicals in aquaculture, drug delivery. Vaccines and vaccination, probiotics and bioremedial measurers; immunostimulants and their role. of health.

D. Kalyani

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Model papers:

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Model paper for Paper-II: **A Study on White Feces Syndrome and its associated risk factors in P. Vannamei in East and West Godavari Districts of Andhra Pradesh"**

Duration: 3 hour Max Marks: 100M

ALL Questions carry equal marks 5X20=100M

Answer all the questions

UNIT-I

1) a.Write the significance of major shrimp culture in Andhra Pradesh

(or)

1) b.Write in detail about characteristics features ,taxonomy and classification of L.vannamei.Add a note on life cycle ?

UNIT-II

2) a.Explain the viral disease of P.vannamei and their prevention and control.

(or)

2) b.Explain the Bacterial disease of P vannamei shrimp and their prevention and control?

UNIT-III

3) a. Write a note on importance of physio chemical analysis of soil and water for vannamei culture

(Or)

3) b.write briefly about
   i) plankton and their classification
   ii) pond productivity and its estimation
   iii) collection and preservation of micro invertebrates
   iv) estimation of bio mass

UNIT-IV

4) a. Describe in detail the procedure for isolation and identification of various bacteria in P.vannamei.

(or)

4) b. Explain different techniques in isolation and identification of Viruses in P.vannamei?

UNIT-V

5) a) Write in detail about histopathological techniques employed in disease diagnosis

Or

5) b) Write about A) Disease surveillance B) Molecular diagnostic techniques

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Pre Ph.D Examination Syllabus-2024

Course structure:				
S.No	**Paper title**	Test Mode	**Marks**	**Credits**
1	Paper I: Recent Advances in Life Science & Research Methodology	Written	100	4
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3	Paper III: **A Study on White feces Syndrome and its associated risk factors in P.Vannmei in East and West Godavari Districts of Andhra Pradesh"**	Presentation	50	2

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Pre Ph.D Examination Syllabus- 2024

Paper - I: Recent Advances in Life Science & Research Methodology

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Pre PhD Examination Syllabus 2024

Paper II: Microbial Degradation of Xenobiotics and Research Methodology

UNIT-I:

Definition of Xenobiotic and Major xenobiotic compounds and their effects Xenobiotic solution and its Impact on the Environment. Impact of xenobiotics on soil.

UNIT-II:

Toxicity of pesticides, Microbial Degradation, Role of Microorganisms in Xenobiotic Degradation, Pseudomonas species and its role in xenobiotic effect. Xenobiotic Degrading Enzymes Associated with Pseudomonas species.

UNIT-III:

Extraction, isolation, purification, Screening, Identification and characterization of 'pseudomonas species

NIT-IV:

Methods for Pseudomonas species: Polymerase Chain Reaction (PCR) and 16SRNA sequencing characterization of pseudomonas species.

UNIT-V

Recent Advanced Technologies Employed in Microbial Degradation for Identification and Characterization of Microorganisms and Microbial Communities, Bioremediation methods: Biostimulation, Bioaugmentation, Bioventing and Biosparging.

Texts and References:

1. Xenobiotics in the soil Environment – by Muhammad Zaffar Hashmi
2. Microbial degradation of pesticides: microbial potential for degradation of pesticides- by Sangeeta Kumari
3. Isolation, Extraction, Purification, and Characterization of Fibrinolytic Enzyme from *Pseudomonas aeruginosa* and Estimation of the Molecular Weight of the Enzyme- by Jasim. B.H
4. A Highly Selective PCR Protocol for Detecting 16S rRNA Genes of the Genus *Pseudomonas* (Sensu Stricto) in Environmental Samples-by Franco Widmer
5. Recent Advanced Technologies for the Characterization of xenobiotic degrading Microorganisms and Microbial Communities – by Sandya Misra

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Pre PhD Examination Syllabus 2024
:Paper-III: Presentation on the Research topic

Course structure				
S.No	Paper title	Test Mode	Marks	Credits
1	Paper I: Recent Advances in Life Science & Research Methodology	Written	100	4
2	Paper II: Microbial Degradation of Xenobiotics and Research Methodology	Written	100	4
3	Paper III: Microbial Degradation of Xenobiotics in the soil of crop fields by pseudomonas sp. In Andhra Pradesh, India	Presentation	50	2

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Model papers:

ADIKAVI NANNAYA UNIVERSITY, RAJAHMUNDRY
School of Life and Health Sciences
Pre-PhD Examinations w.e.f. 2024
Model paper for Paper- I: Recent Advances in Life Science & Research Methodology

Duration: 3 hour **Max Marks: 100M**

ALL Questions carry equal marks **5X20=100M**

Answer all the questions

UNIT-I

1) Write about experimental design and standardization of protocols for research work. Add a note on identification of research problem?

(or)

2) Write briefly about the thesis writing and Project writing?

UNIT-II

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.Model paper for Paper II: Microbial Degradation of Xenobiotics and Research Methodology

Duration: 3 hour Max Marks: 100M

ALL Questions carry equal marks 5X20-100M

Answer all the questions

UNIT-I

?a) What is meant by Xenobiotic pollution and add a note on its impact on Environment and the soil .1

(or)

?b.) Name the major xenobiotic compounds. Write about their effects

UNIT-II

.a.)Explain Toxicity of pesticides in Microbial Degradation illustrate with examples .2

(or)

b) Role of Microorganisms in Xenobiotic Degradation, Pseudomonas species and its role in biodegradation toxins in .the soil

UNIT-III

a.)Write about the different methods for Extraction, isolation, purification of Pseudomonas species .3

(or)

b.)Write briefly about the Screening. Identification and characterization of Pseudomonas species

UNIT-IV

a.)Explain about the characterization of pseudomonas species using Polymerase Chain Reaction (PCR(

(or)

.h.) Explain about the characterization of pseudomonas species using 16SRNA sequencing method

UNIT-V

a.) Write about the recent advanced technologies employed in reducing the effect of Xenobiotics on soil quality (5 .and food chain

(or)

.b.) Give the various Bioremediation methods for improving soil quality

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4. An Introduction to Practical Biochemistry by Keith Wilson and John Walker
5. Molecular Cloning: A laboratory Manual by Joseph Sambrook and David W. Russell Published by Cold Spring Harbor Laboratories Press

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Model papers:

ADIKAVI NANNAYA UNIVERSITY, RAJAHMUNDRY
School of Life and Health Sciences
Pre-PhD Examinations w.e.f. 2024
Model paper for Paper- I: Recent Advances in Life Science & Research Methodology

Duration: 3 hour **Max Marks: 100M**

ALL Questions carry equal marks **5X20=100M**

Answer all the questions

UNIT-I

1) Write about experimental design and standardization of protocols for research work. Add a note on identification of research problem?

(or)

2) Write briefly about the thesis writing and Project writing?

UNIT-II

3) Differentiate disinfection and sterilization. Write about the role of various instruments used to create sterile condition for cell and tissue culture. Add a note on Media preparation?

(or)

4) Write in detailed about Enzyme assay, activity, turnover yield. Add a note on Enzyme kinetics?

UNIT-III

5) Write in detail about radioactive decay. Measurement of radioactivity, safety measurements and disposal of radioactive wastes?

(or)

6) Define Chromatography? Write about Principle, types, and applications of Chromatography?

UNIT-IV

7) Write about graphical representation of data. Add a note correlation and regression?

(or)

8) Describe about tabulation and graphical representation of data. Add a note on ANOVA?

UNIT-V

9) Write about the various applications of Bioinformatics in Biology?

(or)

10) Write in detail about IPR & IPP?

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SCHOOL OF LIFE AND HEALTH SCIENCES

Pre- Ph.D. Examination -2024

Paper II: Leukemia and Microbial infections

UNIT-I:

Cancer: Introduction, Epidemiology, Characteristics, Carcinogenesis: Carcinogens, Cancer initiation, promotion and progression and termination; Factors responsible for carcinogenesis: Physical chemical and Biological. Types of Cancer; Tumor development: Overview of invasion and metastasis, Tumor angiogenesis, Cell-cell interactions in cancer

UNIT-II:

Cancer and cell cycle: Regulation of cell cycle, Effect of Mutations; DNA damage and failure of repair mechanisms. Oncogenes - mechanism of gene activation and chromosomal translocations, tumor suppressor genes in cancer, Genetic rearrangements in progenitor cells; virus induced cancer; Apoptosis: Genetic regulation of apoptosis.

UNIT–III

Leukemia: Overview, Types–AML, CML, CLL, ALL., Symptoms, Causes and risk factors of Leukemia; Prognosis and diagnosis of Leukemia -Total blood count(CBC), Immuno-typing; Flow cytometry, Bone marrow aspiration and biopsy. CT Scan, MRI Scan or PET-CT Scan.

UNIT-IV

Factors influencing Leukemia: Age, gender, Comorbidities; Infections in Leukemia patients: Microbial infections; Febrile neutropenia Bloodstream infections (BSI), Fungal infections, Gastrointestinal infections, urinary tract infections, respiratory infections and Nosocomial infections. Treatment of Leukemia –Chemotherapy, Radiation therapy, Immunotherapy, Targeted therapy, Stem cell transplant, Phases of treatment.

UNIT-V

Samples used for study of leukemia: blood, urine, throat swab, nasal swabs; Specimen collection methods; Microscopy,Culture tests: different types of media for culture tests; Identification of microbes; Biochemical tests to isolate pathogens; Antibiotic sensitivity tests; Antibiotic resistance in leukemia patients and recurrence of the disease.

Texts and References:

1.Microbiology –Michael J.Pelczar,JR,E.C.S.Chan,Noel R.Krieg.

2.Fundamentals Of Biochemistry-Dr.A.C.Deb.

3.Immunology-Kuby

4.Practical Microbiology-R.C.Dubey, D.K.Maheswari.

5.The Textbook of Cancer Biology-Dr.Pradeep Kumar.

D. Kaly

P Vijaya Kumari

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ADIKAVI NANNAYA UNIVERSITY, RAJAHMUNDRY

School of Life and Health Sciences
Pre-PhD Examinations w.e.f. 2024
Model paper for Paper- II: Leukemia and Microbial infections

Duration: 3 hour **Max Marks:100M**
100M

ALL Questions carry equal marks **5X20=100M**
Answer all the questions

UNIT-I

1a) Write a brief note on epidemiology, characteristics, carcinogenesis and carcinogens.Add a note on factors responsible for carcinogenesis.

(or)

1b) Write a briefly about types of cancer and tumor development.

UNIT-II

2a) Write in detail about oncogenes.

(or)

2b) Write briefly about regulation of cell cycle, effect of mutations; DNA damage and failure of repair mechanisms in cancer.

UNIT-III

3a) Write in detail about leukemia ,types of leukemia .Add a note on symptoms and causes.

(or)

3b) Write briefly about prognosis and diagnosis of Leukemia.

UNIT-IV

4a) Write in detail about different types of infections in leukemia patients.

(or)

4b) Write a brief note about chemotherapy, radiation therapy, immunotherapy, targeted therapy and stem cell transplant.

UNIT-V

5a) Write in detail about different culture tests, types of media used for culture tests .Add a note on biochemical tests to isolate pathogens.

(or)

5b) Write about importance of antibiotic sensitivity tests. Add a note on Antibiotic resistance in leukemia patients and recurrence of the disease.

D. Kalyani PVijaya Lakshmi

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SCHOOL OF LIFE AND HEALTH SCIENCES
Pre Ph. D Examination Syllabus-2024

Course structure:				
S.No	**Paper title**	**Test Mode**	**Marks**	**Credits**
1	Paper I: Recent Advances in Life Science & Research Methodology	Written	100	4
2	Paper II: Leukemia and Microbial infections	Written	100	4
3	PaperIII:AProspective And Comparative Study On microbial Infections In Acute Myeloid Leukemia (AML) And Chronic MyeloidLeukemia(CML)patients Undergoing Induction Therapy	Presentation	50	2

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ADIKAVI NANNAYA UNIVERSITY, RAJAHMUNDRY
SCHOOL OF LIFE AND HEALTH SCIENCES
Pre Ph.D Examination Syllabus- 2024

Paper - I: Recent Advances in Life Science & Research Methodology

UNIT-I:

Basic and applied research, Literature survey and collection, Identification of the problem, Setting up of objectives, Experimental design, standardization of protocols, Annual report preparation, Thesis writing, Research paper and Review article writing, Project writing. Research ethics, Plagiarism.

UNIT-II:

Biochemical techniques: Extraction, isolation, purification, Identification and characterization of Proteins, Quantification of carbohydrates, Extraction of lipids, Enzyme kinetics – Enzymes assay, activity, turn over, yield. Measurement of pH: Use of indicators, Sterilization techniques, Media Preparation. Centrifugation techniques - Principle and applications of Centrifugation.

UNIT-III:

Microscopy – Principle, types, and applications of Microscopy,
Chromatography - Principle, types, and applications of Chromatography
Electrophoresis – Principle, types and applications of electrophoretic techniques
Isotopes – Scintillation counter, Gamma ray counter, Radioactive decay, Measurement and Units of radioactivity, safety measurements, Disposal of radioactive wastes.

UNIT-IV:

Spectrophotometry – Principles and applications of Visible, UV spectrophotometry, IR, NMR, AAS
Biostatistics – Sampling methods, Sample collection, Mean, Median, Mode, Tabulation of data, Graphical representation of data, correlation, regression, Chi-square test, Student t-test, Test of significance, ANOVA Software used in Biostatics.

UNIT-V:

Computational Biology-Microsoft office-word, excel and power point presentation, Graphical representation of data using EXCEL and sigma plot.
Bioinformatics –BLAST, Protein data base.
Intellectual property rights (IPR), property rights (IPP) and Patenting.

Texts and References:

1. Research methodology of biological science – by N. Gurumani
2. Fundamentals of Biostatistics – by Khan & Khanum
3. Biophysical chemistry: principles and techniques– by Upadhyay
4. An Introduction to Practical Biochemistry by Keith Wilson and John Walker
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ADIKAVI NANNAYA UNIVERSITY, RAJAMAHENDRAVARAM.
SCHOOL OF LIFE AND HEALTH SCIENCES
Pre-Ph.D Examination syllabus

Paper-II Biochemical Composition of *Channa Striatus*

Unit -I Taxonomy and Physiology

General characters and classification of fish, Taxonomic identification, *Channa striatus*- digestive, respiratory, reproductive-male and female reproductive systems, endocrinology, developmental biology, and life history. Nutraceutical properties of *Channa striatus*.

Unit-II: Culture management

Channa Striatus in culture: Food and Feeding habits, weaning of larva, Artificial diets for various stages, ideal water quality parameters for culture, Disease management, Induced breeding -under culture conditions, Broodstock management, and Larval management.

Unit-III: Bio-chemical composition

Proteins, Carbohydrates, Fats, Vitamins and minerals – classification and their importance., Bioactive compounds of *channa striatus*. Medicinal and therapeutic values of *channa striatus*- Wound healing Antimicrobial, Antinociceptive properties, Osteoarthritis treatment.

Unit-IV: Methods

Collection of water to study water quality parameters- Temperature, dissolved oxygen, PH, alkalinity, turbidity, ammonia, and nitrites.

Sample collection, Sample preparation, and preservation of fish for biochemical analysis. Preparations of buffers. Various methods for Proximate composition and analysis.

Unit -V Tools for Biochemical Analysis:

Molecular separation by chromatography and electrophoresis, principles of analytical tools- UV spectroscopy, Centrifugation-Ultracentrifuge, Hot air oven, Muffle furnace, Water bath, and Sonicator.

Reference books :

1. **The Fresh Water Fishes of Indian Region KCJAYARAM**
2. Biochemistry- by Renee Mauricio Condori Apaza, Sheda Mendez Ancca, et al
3. **A textbook of Analytical chemistry** D. Christian, **Purnendu K. Dasgupta , Kevin A. Schug .**
4. **Tools and** techniques - Umaiyal Munusamy

D. Kely

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ADIKAVI NANNAYA UNIVERSITY, RAJAMAHENDRAVARAM.
SCHOOL OF LIFE AND HEALTH SCIENCES
Pre-Ph.D Examination syllabus

Paper-II Biochemical Composition of *Channa Striatus*

Time: 3 Hours **Marks: 100**

Unit-I

1. (a) Explain the taxonomic identification techniques concerning *Channa striatus*

(or)

(b) Differentiate between the male and female reproductive systems of *Channa striatus*. Discuss the endocrinological aspects related to reproduction.

Unit-II

2. (a) Outline the artificial diets suitable for various stages of *Channa striatus* in culture.

(or)

(b) Discuss the processes and challenges associated with induced breeding under culture conditions, emphasizing broodstock and larval management.

Unit-III

3. (a) Explain the role biochemical composition and nutritional aspects of *Channa striatus*.

(or)

(b) Discuss the medicinal and therapeutic values of *Channa striatus*, particularly its role in wound healing, antimicrobial properties.

Unit-IV

4. (a) Discuss the study of water quality parameters, emphasizing the importance of each parameter.

(or)

(b) Explain the preparation of various buffers used for extraction of biomolecules.

Unit-V

5. (a) Explain the any one technique involved in separation, purification and analysis of biomolecules.

(or)

(b) Discuss principle, procedure and application of UV spectroscopy.

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Course structure:				
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2	Paper II: Biochemical Composition of *Channa Striatus*	Written	100	4
3	Paper III: A comparative study of the biochemical composition of *Channa striatus (Bolch1793)*from capture and culture fisheries at different stages of its life cycle.	Presentation	50	2

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