



ADIKAVI NANNAYA UNIVERSITY: RAJMAHENDRAVARAM

**B.Sc Cyber Forensic
Single Major
From 2023-24 (Syllabus-Curriculum)
Course Structure**

Year	Semester	Course	Title of the Course	No. of Hrs /Week	No. of Credits
I	I	1	Introduction to Classical Biology	3+2	4
	I	2	Introduction to Applied Biology	3+2	4



SEMESTER-I

COURSE 1: INTRODUCTION TO CLASSICAL BIOLOGY

Theory

Credits: 4

5 hrs/week

Learning objectives

The student will be able to learn the diversity and classification of living organisms and understand their chemical, cytological, evolutionary and genetic principles.

Learning Outcomes

1. Learn the principles of classification and preservation of biodiversity
2. Understand the plant anatomical, physiological and reproductive processes.
3. Knowledge on animal classification, physiology, embryonic development and their economic importance.
4. Outline the cell components, cell processes like cell division, heredity and molecular processes.
5. Comprehend the chemical principles in shaping and driving the macromolecules and life processes.

Unit 1: Introduction to systematics, taxonomy and ecology.

- 1.1. Systematics – Definition and concept, Taxonomy – Definition and hierarchy.
- 1.2. Nomenclature – ICBN and ICZN, Binomial and trinomial nomenclature.
- 1.3. Ecology – Concept of ecosystem, Biodiversity and conservation.
- 1.4. Pollution and climate change.

Unit 2: Essentials of Botany.

- 2.1. The classification of plant kingdom.
- 2.2. Plant physiological processes (Photosynthesis, Respiration, Transpiration, phytohormones).
- 2.3. Structure of flower – Micro and macro sporogenesis, pollination, fertilization and structure of mono and dicot embryos.
- 2.4 Mushroom cultivation, floriculture and landscaping.

Unit 3: Essentials of Zoology

- 3.1. The classification of Kingdom Animalia and Chordata.
- 3.2 Animal Physiology – Basics of Organ Systems & their functions, Hormones and Disorders
- 3.3 Developmental Biology – Basic process of development (Gametogenesis, Fertilization, Cleavage and Organogenesis)
- 34 Economic Zoology – Sericulture, Apiculture, Aquaculture



Unit 4: Cell biology, Genetics and Evolution

- 4.1. Cell theory, Ultrastructure of prokaryotic and eukaryotic cell, cell cycle.
- 4.2. Chromosomes and heredity – Structure of chromosomes, concept of gene.
- 4.3. Central Dogma of Molecular Biology.
- 4.4. Origin of life

Unit 5: Essentials of chemistry

- 5.1. Definition and scope of chemistry, applications of chemistry in daily life.
- 5.2. Branches of chemistry
- 5.3. Chemical bonds – ionic, covalent, noncovalent – Vander Waals, hydrophobic, hydrogen bonds.
- 5.4. Green chemistry

References

1. Sharma O.P., 1993. Plant taxonomy. 2nd Edition. McGraw Hill publishers.
2. Pandey B.P., 2001. The textbook of botany Angiosperms. 4th edition. S. Chand publishers, New Delhi, India.
3. Jordan E.L., Verma P.S., 2018. Chordate Zoology. S. Chand publishers, New Delhi, India.
4. Rastogi, S.C., 2019. Essentials of animal physiology. 4th Edition. New Age International Publishers.
5. Verma P.S., Agarwal V.K., 2006. Cell biology, genetics, Molecular Biology, Evolution and Ecology. S. Chand publishers, New Delhi, India.
6. Sathyanarayana U., Chakrapani, U., 2013. Biochemistry. 4th Edition. Elsevier publishers.
7. Jain J.L., Sunjay Jain, Nitin Jain, 2000. Fundamentals of Biochemistry. S. Chand publishers, New Delhi, India.
8. Karen Timberlake, William Timberlake, 2019. Basic chemistry. 5th Edition. Pearson publishers.
9. Subrata Sen Gupta, 2014. Organic chemistry. 1st Edition. Oxford publishers.



ACTIVITIES:

1. Make a display chart of life cycle of nonflowering plants.
2. Make a display chart of life cycle of flowering plants.
3. Study of stomata
4. Activity to prove that chlorophyll is essential for photosynthesis
5. Study of pollen grains.
6. Observation of pollen germination.
7. Ikebana.
8. Differentiate between edible and poisonous mushrooms.
9. Visit a nearby mushroom cultivation unit and know the economics of mushroom cultivation.
10. Draw the Ultrastructure of Prokaryotic and Eukaryotic Cell
11. Visit to Zoology Lab and observe different types of preservation of specimens
12. Hands-on experience of various equipment – Microscopes, Centrifuge, pH Meter, Electronic Weighing Balance, Laminar Air Flow
13. Visit to Zoo / Sericulture / Apiculture / Aquaculture unit
14. List out different hormonal, genetic and physiological disorders from the society



SEMESTER-I

COURSE 2: INTRODUCTION TO APPLIED BIOLOGY

Theory

Credits: 4

5 hrs/week

Learning objectives

The student will be able to learn the foundations and principles of microbiology, immunology, biochemistry, biotechnology, analytical tools, quantitative methods, and bioinformatics.

Learning Outcomes

1. Learn the history, ultrastructure, diversity and importance of microorganisms.
2. Understand the structure and functions of macromolecules.
3. Knowledge on biotechnology principles and its applications in food and medicine.
4. Outline the techniques, tools and their uses in diagnosis and therapy.
5. Demonstrate the bioinformatics and statistical tools in comprehending the complex biological data.

Unit 1: Essentials of Microbiology and Immunology

- 1.1. History and Major Milestones of Microbiology; Contributions of Edward Jenner, Louis Pasteur, Robert Koch and Joseph Lister.
- 1.2. Groups of Microorganisms – Structure and characteristics of Bacteria, Fungi, Archaea and Virus.
- 1.3. Applications of microorganisms in – Food, Agriculture, Environment, and Industry.
- 1.4. Immune system – Immunity, types of immunity, cells and organs of immune system.

Unit 2: Essentials of Biochemistry

- 2.1. Biomolecules I – Carbohydrates, Lipids.
- 2.2. Biomolecules II – Amino acids & Proteins.
- 2.3. Biomolecules III – Nucleic acids -DNA and RNA.
- 2.4. Basics of Metabolism – Anabolism and catabolism.

Unit 3: Essentials of Biotechnology

- 3.1. History, scope, and significance of biotechnology. Applications of biotechnology in Plant, Animal, Industrial and Pharmaceutical sciences.
- 3.2. Environmental Biotechnology – Bioremediation and Biofuels, Bio fertilizers and Bio pesticides.
- 3.3. Genetic engineering – Gene manipulation using restriction enzymes and cloning vectors; Physical, chemical, and biological methods of gene transfer.
- 3.4. Transgenic plants – Stress tolerant plants (biotic stress – BT cotton, abiotic stress – salt tolerance). Transgenic animals – Animal and disease models.



Unit 4: Analytical Tools and techniques in biology – Applications

- 4.1. Applications in forensics – PCR and DNA fingerprinting
- 4.2. Immunological techniques – Immunoblotting and ELISA.
- 4.3. Monoclonal antibodies – Applications in diagnosis and therapy.
- 4.4. Eugenics and Gene therapy

Unit 5: Biostatistics and Bioinformatics

- 5.1. Data collection and sampling. Measures of central tendency – Mean, Median, Mode.
- 5.2. Measures of dispersion – range, standard deviation and variance. Probability and tests of significance.
- 5.3. Introduction, Genomics, Proteomics, types of Biological data, biological databases- NCBI, EBI, Gen Bank; Protein 3D structures, Sequence alignment
- 5.4. Accessing Nucleic Acid and Protein databases, NCBI Genome Workbench

REFERENCES

1. Gerard J., Tortora, Berdell R. Funke, Christine L. Case., 2016. Microbiology: An Introduction. 11th Edition. Pearson publications, London, England.
2. Micale, J. Pelczar Jr., E.C.S. Chan., Noel R. Kraig., 2002. Pelczar Microbiology. 5th Edition. McGraw Education, New York, USA.
3. Sathyanarayana U., Chakrapani, U., 2013. Biochemistry. 4th Edition. Elsevier publishers.
4. Jain J.L., Sunjay Jain, Nitin Jain, 2000. Fundamentals of Biochemistry. S. Chand publishers, New Delhi, India.
5. R.C. Dubey, 2014. Advanced Biotechnology. S. Chand Publishers, New Delhi, India.
6. Colin Ratledge, Bjorn, Kristiansen, 2008. Basic Biotechnology. 3rd Edition. Cambridge Publishers.
7. U. Sathyanarayana, 2005. Biotechnology. 1st Edition. Books and Allied Publishers pvt. ltd., Kolkata.
8. Upadhyay, Upadhyay and Nath. 2016. Biophysical Chemistry, Principles and Techniques. Himalaya Publishing House.
9. Arthur M. Lesk. Introduction to Bioinformatics. 5th Edition. Oxford publishers.
10. AP Kulkarni, 2020. Basics of Biostatistics. 2nd Edition. CBS publishers.

ACTIVITIES

1. Identification of given organism as harmful or beneficial.
2. Observation of microorganisms from house dust under microscope.
3. Finding microorganism from pond water.

4. Visit to a microbiology industry or biotech company.
5. Visit to a waste water treatment plant.
6. Retrieving a DNA or protein sequence of a gene'
7. Performing a BLAST analysis for DNA and protein.
8. Problems on biostatistics.
9. Field trip and awareness programs on environmental pollution by different types of wastes and hazardous materials.
10. Demonstration on basic biotechnology lab equipment.
11. Preparation of 3D models of genetic engineering techniques.
12. Preparation of 3D models of transgenic plants and animals.

[**NOTE:** In the colleges where there is availability of faculty for microbiology and biotechnology, those chapters need to be handled by microbiology and biotechnology faculty. In other colleges, the above topics shall be dealt by Botany and Zoology faculty]

Course – I & II Model Paper (70 Marks)

SECTION A (Multiple Choice Questions)

30 x 1 = 30 M

30 Multiple Choice Questions (Each Unit 6 Questions)

SECTION B (Fill in the blanks)

10 x 1 = 10 M

10 Fill in the Blanks (Each Unit 2 Questions)

SECTION C (Very short answer questions)

10 x 1 = 10 M

10 Very short answer questions (Each Unit 2 Questions)

SECTION D (Matching) (From 5 Units)

2 x 5 = 10 M

1 A

B

C

D

E

2 A

B

C

D

E

SECTION E (True or False)

10 x 1 = 10 M

10 True or False (Each Unit 2 Questions)



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Single Major (w.e.f:2023-24A.B)

Programme: B.Sc. Honours in Cyber Forensics (Major)
SEMESTER – II
COURSE STRUCTURE

Year	Semester	Course	Title of the Course	No. of Hrs /Week	No. of Credits
	II	3	Fundamentals of Computer	3	3
			Fundamentals of Computer Practical Course	2	1
		4	Networking & Security	3	3
			Networking & Security Practical Course	2	1



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Single Major (w.e.f:2023-24A.B)

SEMESTER-II

COURSE 3: FUNDAMENTALS OF COMPUTER

Theory

Credits: 3

3 hrs/week

Learning Objectives: The students will be able to understand the fundamentals of computers & networks.

Learning Outcomes: On successful completion of the course the student will be able to:

1. Demonstrate computer and its components
2. Identify basic input and output devices
3. Learn types of printers and their configuration
4. Assembling and disassembling of computer
5. Identify preventive maintenance and troubleshooting process

Unit I: Computer

Basics, History, Characteristics, Applications, Types, Components; Input/ Output Devices, Storage Devices, Peripheral Devices; Central Processing Unit- Input/Output Unit, Arithmetic Logical Unit, Control Unit, Memory Unit. Operating System & Types; Desktop icons and Control panel objects; Files and Folders.

Unit II: Networks

Computer Networks- Introduction, Characteristics, Types and Topologies; Types of Network Devices; Internet, Internet Service Providers and their connection types.

Unit III: Components of Computer & Printers

Computer Hardware-Power Supplies, Motherboards, Internal PC Components, External Ports and Cables; Selection of Computer Components; Lab safety Procedures; Procedures to Protect Equipment and Data; Proper use of tools- Software Tools, Antistatic Wrist Strap. Printers- Installing and configuring printers, Configuring Options and Default Settings, Maintenance and Troubleshooting of Printers, Troubleshooting Printer Issues, Common Problems and Solution.

Unit IV: Assembling and Disassembling of Computer

Computer Assembling- Installation of Motherboard, Drives, Cables and Adapter Cards; Disassembling the Computer- Cables, RAM, Motherboard, Heatsink, Hard drives; BIOS Beep Codes and Setup, BIOS and UEFI Configuration, Upgradation and Configuration of a computer.

Unit V: Preventive Maintenance and Troubleshooting

Preventive Maintenance and the Troubleshooting Process, Benefits, Tasks; Inspection of Internal Components; Problem in the Computer: Identification, Root Cause; Plan of Action, Resolution of the problem and implementation.



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7Suggested Readings

1. Introduction to IT essentials Version 6 by CISCO
2. Fundamentals of Computers by Balagurusamy.
3. Fundamentals of computers by Rajaraman
4. Computer Fundamentals Course by Anita Goel
5. Computer Fundamentals 6th Ed by P.K. Sinha
6. Fundamentals of Computers by Rajaraman V

Suggested Co-Curricular Activities

1. Making of hardware as project.
2. Workshop on Assembly and Disassembly of Computer.



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SEMESTER-II

COURSE 3: FUNDAMENTALS OF COMPUTER

Practical

Credits: 1

2 hrs/week

List of Experiments:

1. Identification of Input Devices
2. Identification of Output Devices
3. Creation of Folders.
4. Components of Computer and Printers
5. Dissemble of computer.
6. Computer Assembly
7. Creation of a word file and name as Network Devices.
8. Creation of a table and data entry.
9. Power Point presentation with 10 slides.
10. Power Point with various smart arts in it.



SEMESTER-II

COURSE 4: NETWORKING AND SECURITY

Theory

Credits: 3

3 hrs/week

Learning Objectives: The students will be able to understand the fundamentals of computers & networks.

Learning Outcomes: On successful completion of the course the student will be able to:

1. Install various operating systems, and configuration
2. Demonstrate on various protocols
3. Troubleshoot laptops and mobile devices
4. Demonstrate network types
5. Understand OSI Model
6. Troubleshoot Computer Networks

UNIT I: Operating Systems

Operating System: Terms, Characteristics and Types; Windows Installation, Storage Device Setup Procedures, Custom Installation Options, Boot Sequence and Registry Files, Windows Configuration and Management, Administrative Tools, Secure System Configurations, Anti-virus installations and configuration.

UNIT II: Applied Computer Networking

OSI Models, Firewalls and Intrusion Detection/Prevention Systems (IDS/IPS), IP Addresses, IPv4 vs. IPv6, Static Addressing, Dynamic Addressing, Transport Layer Protocols, TCP, UDP, Port Numbers, Wireless and Wired Router Configurations, Network Sharing, Common Preventive Maintenance Techniques used for Networks, Troubleshooting process for Networks, Communication: secret and covert communication and applications of secret/covert communication.

UNIT III: Laptops and Mobile Devices

Laptop: Components, Configuration, Hardware and Component Installation, Configuration Replacing Hardware Device replacement, Preventive Maintenance, Troubleshooting Process; Mobile Device: Components and Configuration, Operating Systems, Synchronization Preventive Maintenance, Basic Troubleshooting Process, Methods for Securing, Common Problems and Solutions.

UNIT IV: Network Security

Security: Introduction, Vulnerabilities, Threats & Attacks (Denial of Service/Distributed Denial of Service, Side channel, DNS reflection & amplification); Procedures, Intrusion detection and response, Securing Web Access, Protecting Data, Protection Against Malicious Software, Security Techniques, Protecting Physical Equipment, Common Preventive Maintenance Techniques for Security, Basic Troubleshooting Process for Security.

UNIT V: Troubleshooting Computer Networks

Identification and Troubleshooting Process; Networks, Security, LAN, Cyber warfare and Network Attacks, Mitigating Cyber Attacks; Security Assessment, Testing and Evaluation, Security information and event management.



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SUGGESTED READINGS

1. Introduction to IT essentials version 6 by CISCO
2. Network Forensics: Tracking Hackers Through Cyberspace by Sherri Davidoff
3. Network Forensics by Ric Messier
4. Learning Network Forensics by Samir Datt
5. Introduction to Security and Network Forensics by Willian J. Buchanan
6. Hands-On Network Forensics by Salman Arthur

SUGGESTED CO-CURRICULAR ACTIVITIES

1. Creation of a model of various topologies.
2. Making a model of Internet.
3. Demonstration by making a model of various networking devices.



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SEMESTER-II

COURSE 4: NETWORKING AND SECURITY

Practical

Credits: 1

2 hrs/week

List of Experiments:

1. Installation of Windows
2. Comparison between various operating system.
3. Installation of Virtual Machine
4. Demonstration of components of Laptops and Mobile Devices
5. Troubleshooting Computer Network
6. Working with Nessus and NMAP tools
7. Network packet analysis through Wireshark
8. Experiments on Open Source SIEM tools
9. Experiments on assessing network vulnerabilities
10. Experiments on Detection of DoS/DDoS attacks

BLUE PRINT OF MODEL QUESTION PAPER (Sem-End. Examinations)

COURSE NAME

MODEL QUESTION PAPER - THEORY

Semester: ...

Paper:, Title of the paper

Time: 3 Hours.

Max Marks: 70

SECTION – A

Answer any 5 questions. Each question carries 4 marks (5 X 4 = 20M)
(Total 8 questions, questions 1-5 from Units 1-5 & questions 6-8 from any of the units)

1. Unit -I
2. Unit-II
3. Unit-III
4. Unit-IV
5. Unit-V
6. From any Unit
7. From any Unit
8. From any Unit

SECTION – B

Answer all the questions. Each question carries 10 marks. (5 X 10 = 50M)
(Each question (both 'A' or 'B') from each Unit.

9. from Unit I
(OR)
from Unit I

10. from Unit II
(OR)
from Unit II

11. from Unit III
(OR)
from Unit III

12. from Unit IV
(OR)
from Unit IV

13. from Unit V
(OR)
from Unit V