NEP-2020 based Curricula and Examination Scheme,
University of Kota, Kota 2024

B.Sc. Biotechnology programme

CBCS pattern (with effect from 2024-2025)

DEPARTMENT OF BIOTECHNOLOGY

UNIVERSITY OF KOTA

MBS Marg, KOTA (Rajasthan)-324005

B.Sc. Biotechnology Semester-III, IV

Semester-wise Details

SECOND Year

Year / Semester	Serial Number, Code & Nomenclature of Paper				Duration of Exam	Teaching Hrs/Week & Credit			Distribution of Marks			Min. Pass Marks	
	Number	Code		Nomenclature		L	P	C	Inter-nal Assess.	Sem. Assess.	Total Marks	Internal Assess.	Sem. Assess.
II Year **III Semester**	3.1	BBT09		Fundamentals of Molecular Biology	3 Hrs	4	--	4	30	70	100	12	28
	3.2	BBT 10		Biophysics & Instrumentation	3 Hrs	4	--	4	30	70	100	12	28
	3.3	BBT 11		Basics of Plant Physiology	3 Hrs	4	--	4	30	70	100	12	28
	3.4	BBT 12		Practical-III	6 Hrs	--	12	6	--	150	150	--	75
	3.7	GEC		Computer Application	1.5 Hrs	2	---	2	---	50	50	--	20
	Semester Total					**14**	**12**	**20**	**90**	**410**	**500**	**--**	
II Year **IV Semester**	4.1	BBT 13		Plant Cell,Tissue and Organ Culture	3 Hrs	4	--	4	30	70	100	12	28
	4.2	BBT 14		Basics of Animal Physiology	3 Hrs	4	--	4	30	70	100	12	28
	4.3	BBT 15		Fundamentals of Immunology & Animal Cell Culture	3 Hrs	4	--	4	30	70	100	12	28
	4.4	BBT 16		Practical-IV	6 Hrs	--	12	6	--	150	150	--	75
	4.7	GEC		Environment Science	1.5 Hrs	2	---	2	---	50	50	--	20
	Semester Total					**14**	**12**	**20**	**90**	**410**	**500**	**--**	
	Second Year Total					**28**	**24**	**40**	**180**	**820**	**1000**	**--**	
	Option for exit with Diploma in Biotechnology (80 credits score)												

Assessment Pattern:

The assessment of the students shall be divided into two parts in which first part is continuous assessment or internal assessment or mid-term assessment (30% weightage of the maximum marks) and second part is semester assessment or external assessment or end-term assessment (70% weightage of the maximum marks). Assessment pattern and distribution of maximum marks is summarized as given below:

(i) Continuous or Internal or Mid Term Assessment:

(a) The continuous or internal or mid-term assessment (30% weightage of the maximum marks) for each theory paper shall be taken by the faculty members of the respective Departments during each semester. There will be three internal assessment tests (*i.e.*first internal assessment test or first mid-term test and second internal assessment test or second mid-term test and third internal assessment test) each of 10% weightage of maximum marks of each theory paper. Each internal assessment shall be of one hour duration for theory paper

and shall be taken according to academic calendar which will be notified by the Department / University.

(b) For practical papers, there will be no continuous or internal or mid-term assessment. There will be only one external or semester or end-term assessment (100% weightage of maximum marks).

(ii) Semester or External or End Term Assessment:

(a) The semester or external or end-term assessment (70% weightage of the maximum marks) shall be three hours duration to each theory paper and twelve hours duration (spread over two days with 6 hours per day) for each practical paper and shall be taken by the University at the end of each semester.

(b) The syllabus for each theory paper is divided into five independent units and question paper for each theory will be divided into three sections as mentioned below:

Section-A *will carry 20 marks with one compulsory question comprising ten short answer type questions taking two questions from each unit. Each question shall be of two marks.*

Section-B *will carry 50 marks with equally divided into five long answer type questions . Paper setter shall be advised to set two questions from each unit and students are instructed to attempt five questions by selecting one question from each unit.*

(c) The syllabus of practical paper is divided according to main streams of Biotechnology. Marks shall be awarded on the basis of major & minor experiments, spotting, viva-voce, practical record, regularity factor, lab skills, maintain cleanness of workplace, *etc*.

Question Paper Pattern:

(A) Continuous or Internal or Mid Term Assessment:

30% weightage of Maximum Marks (30 Marks out of 100 Maximum Marks).

(i) Continuous or Internal or Mid Term Assessment:

Format
Department of .....
College / University .....
Address.....

First Internal Assessment Test 20… - 20….

Class	**:**	**Max. Marks**	**: 10 Marks**
Semester	**:**	**Duration of Exam.**	**:**
Subject	**:**	**Date of Examination**	**:**
Paper	**:**	**Name of Teacher**	**:**

Note: All questions are compulsory and marks are given at the end of the each question. Two or three sub-divisions may be given in the question.

Q. No. 1. ……..

or…….4 Marks

Q. No. 2. ……..

or…….3 Marks

Q. No. 3. ……..

or…….3 Marks

(B) Semester or External or End Term Assessment:

70% weightage of Max Marks (*i.e.*70 Marks out of 100 Max Marks).

Duration of Examination: 3 Hours **Max. Marks: 70**

Note*: The syllabus is divided into five independent units and question paper will be divided into three sections.*

- ***Section-A*** *will carry 20 marks with one compulsory question comprising ten short answer type questions taking two questions from each unit. Each question shall be of one mark.*
- ***Section-B*** *will carry 50 marks with equally divided into five long answer type questions . Paper setter shall be advised to set two questions from each unit and students are instructed to attempt five questions by selecting one question from each unit.*

SECTION-A

Q. 1.

Unit-I

(i) …… **2 Mark**

(ii) …… **2 Mark**

Unit-II

(iii) …… **2 Mark**

(iv) …… **2 Mark**

Unit-II

(v) …… **2 Mark**

(vi) …… **2 Mark**

Unit-IV

(vii) …… **2 Mark**

(viii) ..... **2 Mark**

Unit-V

(ix) ..... **2 Mark**

(x) ..... **2 Mark**

SECTION-B

Unit-I

Q. 2. ..... **10 Marks**

or **10Marks**

Unit-II

Q. 3. ..... **10 Marks**

or ..... **10 Marks**

Unit-III

Q. 4. ..... **10 Marks**

or ..... **10 Marks**

Unit-IV

Q. 5. ..... **10 Marks**

or **10Marks**

Unit-V

Q. 6. ..... **10Marks**

or ..... **10 Marks**

Practical Examinations:

Continuous or Internal or Mid Term Assessment: *Not applicable in practical.*

External or Semester or End Term Assessment:

Duration of Exam : 6 Hours

Maximum Marks : 150 Marks*

Distribution of Maximum Marks:

S. No.	Name of Exercise	Marks
1.	Exercise No. 1 : Major Experiment	12

2.	Exercise No. 2 : Major Experiment	12
3.	Exercise No. 3 : Major Experiment	12
4.	Exercise No. 4 : Minor Experiment	10
5.	Exercise No. 5 : Minor Experiment	10
6.	Exercise No. 6 : Minor Experiment	10
7.	Exercise No. 7: Preparation	8
8.	Exercise No. 8: Preparation	8
9.	Exercise No. 9: Preparation	8
10.	Exercise No. 10 : Spotting Experiment(5 x 3= 15spots)	30
11.	Record (5x3)	15
12.	Viva-voce	15
Total Marks		**150**

SEMESTER THIRD

Paper 3.1 BBT-09 Fundamentals of Molecular Biology

Course Type : Core **Credits:4**

Duration :3 hrs

Continuous/Internal/Assessment : 30 Marks

Semester Assessment : 70 Marks

***Note**: The syllabus is divided into five independent units and question paper will be divided into two sections.*

- ***Section-A** will carry 20 marks with one compulsory question comprising ten short answer type questions taking two questions from each unit. Each question shall be of two marks.*
- ***Section-B** will carry 50 marks with equally divided into five long answer type questions. Paper setter shall be advised to set two questions from each unit and students are instructed to attempt five questions by selecting one question from each unit.*

UNIT -I

Introduction to molecular biology – historical background, nature of genetic material, experimental proof for DNA as genetic material, types of nucleic acids (DNA and RNA). Watson Crick model of DNA, other forms of DNA (A-form, Bform and Z-form), properties of DNA, DNA denaturation and renaturation, concept of central dogma, satellite DNA and tandem repeats.

UNIT -II

DNA replication : mechanisms of prokaryotic DNA replication, semi-conservative model of replication, mechanism of DNA replication – discontinuous synthesis of DNA, RNA primer of DNA synthesis, DNA polymerases I, II, III and their role in DNA replication; eukaryotic DNA replication, DNA damage and repair.

UNIT -III

Regulation of gene expression in prokaryotes : Transcriptional control; enzyme induction and repression, constitutive. Synthesis of enzymes, the operon hypothesis : genes involved in regulation – regulatory genes, promoter gene, operator gene, and structural gene.Lac operon, Arg operon. Brief account of eukaryotic gene regulation.

UNIT – IV

Transcription control by termination and anti-termination, mRNA splicing, genetic code, types of RNA, wobble hypothesis, translation initiation and termination in prokaryotes.

UNIT – V

Post translational modification in prokaryotes and eukaryotes, protein sorting/ trafficking and protein localization and translocation: and signal transduction: channels and ion uptake.

References:

1. Molecular Cell Biology, 7th Edition. Lodish, et. al.
2. Biochemistry, 4th edition. Donald Voet and Voet J
3. Harpers review of Biochemistry, 25th Edition. Murray RK, Rodwell VW.
4. Lehninger's Principles of Biochemistry, 5th Edition. Nelson DL and Cox MM
5. Biochemistry, 5th Edition. Garrett and Grisham
6. Molecular Biology of the Cell, 5th Edition, Bruce Alberts et. al.
7. Cytology, P.S. Verma, V.K. Agarval, S. Chand Publications

SEMESTER THIRD
Paper 3.2 BBT- 11Biophysics and Instrumentation

Course Type : Core **Credits:4**

Duration :3 hrs
Continuous/Internal/Assessment : 30 Marks
Semester Assessment : 70 Marks

***Note**: The syllabus is divided into five independent units and question paper will be divided into two sections.*

- ***Section-A** will carry 20 marks with one compulsory question comprising ten short answer type questions taking two questions from each unit. Each question shall be of two marks.*
- ***Section-B** will carry 50 marks with equally divided into five long answer type questions. Paper setter shall be advised to set two questions from each unit and students are instructed to attempt five questions by selecting one question from each unit.*

UNIT -1

Bioenergetics: Energy and its various forms, principle of Thermodynamics, energy exchange, conservation of energy.

Photobiology: Nature of light, Primary photochemical reactions, Photosynthesis, flowering, Solarization, Photo dynamism, Strategies in light reception, Photoreceptor in microbes, Plants and animals.

UNIT -II

Biophysics of vision, vision fault and correlations, Bio luminance.Biophysics of sound vibration, Phono-receptor, Auditory function, Location and origin of sound, Hearing aids.

Membrane conductivity, Diffusion, Active transport, Osmosis, Diffusion pressure, deficit, Biosorption, Electrical properties of biological compartments, Electrochemical gradients, membrane potentials.

UNIT-III

Molecular interaction: Intra- molecular and Inter- molecular interaction, Attractive and repulsive forces operating within molecules and their overall effects on molecular interactions.

Radiations and their interaction with matter, Electromagnetic radiation, Ultraviolet and

visible spectroscopy, Raman spectra, Nuclear magnetic Resonance, Electrophoresis, Radioactive tracer techniques, Autoradiography.

UNIT-IV

Instruments, basic principle and usage: colorimeter, spectrophotometry, Centrifuges, Analytical and differential pH meters, GM counter.

Microscopy: Compound microscope, Phase contrast, Dark field, Fluorescent and Electron microscopy

UNIT-V

Elucidation of intact biological structures in living organisms: Ultrasound. Optical filters, X-ray, X-ray diffraction, Computerized Axial Tomography, Electrocardiography, Electro-encephalography.

References:

1)Upadhyay, A., Upadhyay, K. and Nath N. (2005) Biophysical chemistry: Principles and Techniques. Himalaya Publishing House, India.
2) Wilson K. and Walker J. (Eds.) (1995). Practical Biochemistry: Principles and Techniques, Cambridge University Press, U.K.
3) Sheehan, D. (2000). Physical Biochemistry: Principles and Applications, John Wiley and Sons Ltd. , Chichester, England.
4) Freifelder, D. (1982). Physical Biochemistry. Applications to Biochemistry & Molecular Biology, W.H. Freeman & Co.

SEMESTER THIRD
Paper 3.3 BBT 12: Basics of Plant Physiology

Course Type : Core **Credits:4**

Duration :3 hrs
Continuous/Internal/Assessment : 30 Marks
Semester Assessment : 70 Marks

***Note**: The syllabus is divided into five independent units and question paper will be divided into two sections.*

- ***Section-A** will carry 20 marks with one compulsory question comprising ten short answer type questions taking two questions from each unit. Each question shall be of two marks.*
- ***Section-B** will carry 50 marks with equally divided into five long answer type questions. Paper setter shall be advised to set two questions from each unit and students are instructed to attempt five questions by selecting one question from each unit.*

UNIT – 1

Plant water relations : importance of water to plant life, physical properties of water diffusion and osmosis, absorption & ascent of sap.Transport of water and transpiration. Mineral nutrition: Essential macro and micro elements and their role. Transport of organic substances.

UNIT – II

Photosynthesis Significance, historical aspects, photosynthetic pigments, action spectra and enhancement effects, concept of two photo systems (Cyclic & Non cyclic) z-scheme. Photophosphorylation, C-3, C-4 and CAM pathway, photorespiration.

UNIT – III

Respiration: ATP the biological energy currency, aerobic and anaerobic respiration,kreb's cycle, electron transport mechanism (chemi-osmotic theory), redox potential, oxidative phosphorylation, pentose phosphate pathway.

UNIT – IV

Nitrogen and lipid metabolism: Biology of nitrogen fixation, importance of nitrate reductase and its regulation, ammonium assimilation, structure and function of lipids, fatty acid 21 biosynthesis, α&β oxidation, saturated and un saturated fatty acids, storage and mobilization of fatty acids.

UNIT – V

Growth and Development : Definitions, phases of growth and development, kinetics of growth, seed dormancy Seed germination and factors of their regulation plant movements the concept of photoperiodism, plants hormones auxins, gibberellins, cytokinins, abscissic acid, ethylene, history of their discovery, biosynthesis and mechanism of actions photomorphogenesis, phytochromes and cytochromes.

References:

1.Salisbury, F.B. and C.W. Ross (1992), Plant Physiology, Wadsworth Publication Company
2. Taiz, L. and Zeiger, E. (2002), Plant Physiology. 3rd Edn., Sinauer Associates
3. Srivastava, H.N. (2005) Plant Physiology, Pardeep Publications

SEMESTER THIRD

Paper 3.4 PRACTICALS III

1. Preparation of genomic DNA from bacteria.
2. Isolation of genomic DNA from Blood.
3. Quantitation of DNA by spectrophotometry.
4. Isolation of plasmid DNA from bacteria.
5. Restriction enzyme digestion and its analysis by gel electrophoresis.
6. Absorption
7. Adsorption

8. Osmosis: Potato osmoscope
9. Transport across membrane
10. Study of DNA melting
11. Photosynthesis: Demonstration of Oxygen evolution.
12. Light/Carbon dioxide necessary for photosynthesis.
13. To study the permeability of plasma membrane using different concentration oforganic solvents.
14. To demonstrate the phenomenon of the osmosis by the use of potato osmometer.
15. To study the phenomenon of plasmolysis and deplasmolysis.
16. To demonstrate the rate of transpiration by use of potometers (Ganong's/Farmers)
17. To study the relative rate of transpiration from the leaf surfaces of the different plants using cobalt chloride paper.
18. To demonstrate that light is necessary for photosynthesis.
19. To demonstrate the effect of different wavelengths of light during the photosynthesis.
20. To demonstrate the carbon-dioxide, light, water and chlorophyll are essential for photosynthesis by moll's experiment.
21. To compare the rate of photosynthesis under different condition by using wilmott's bubbler.
22. Comparison of the rate of respiration (R.Q.) of various plant parts or substrates with the help of Ganong'srespirometer.
23. Separation of chlorophyll pigments by the paper chromatography
24. Principles and application of instruments:
    a. PH meters (digital).
    b. Light and phase contrast microscope.
    c. Colorimeter.
    d. Spectrophotometer (Visible and UV).
    e. Sound level meter.
    f. Audiometer.
    g. GM counter and Scintillation counter
    h. Incubator
    i. Shaker
    j. Laminar flow bench
    k. Hearing aids

SEMESTER FOURTH

Paper 4.1 BBT-13 Plant Cell, Tissue and Organ Culture

Course Type : Core **Credits:4**

Duration :3 hrs Continuous/Internal/Assessment : 30 Marks
Semester Assessment : 70 Marks

***Note**: The syllabus is divided into five independent units and question paper will be divided into two sections.*

- ***Section-A** will carry 20 marks with one compulsory question comprising ten short answer type questions taking two questions from each unit. Each question shall be of two marks.*
- ***Section-B** will carry 50 marks with equally divided into five long answer type questions. Paper setter shall be advised to set two questions from each unit and students are instructed to attempt five questions by selecting one question from each unit.*

UNIT -I

History, scope and applications of plant tissue culture – contribution of Indian Scientists. Concept of asepsis and methods of sterilization, Nutrient media, their composition and methods of preparation.

UNIT -II

Basic Concepts in cell culture and cellular totipotency. Callus organogenesis – dedifferentiation. Somatic embryogenesis – induction of embryogeny*in vitro*, indirect and direct somatic embryogenesis.

UNIT-III

Selection and preparation of explants for adventitious shoot bud induction and axillary bud proliferation. Steps of micropropagation-management of donor plants, culture establishment, shoot multiplication, rooting and hardening and acclimatization. Protoplast isolation, culture and differentiation.

UNIT-IV

Anther and pollen culture – production of haploids. *In vitro* fertilization, embryo, endosperm, ovary and ovule culture. Embryo rescue. Methods of cryopreservation for germplasm conservation. Somaclonal and gametoclonal variation. Meristem tip culture for elimination of viruses in plants.

Organ culture- Types, Techniques and process.

UNIT-V

Cell culture and *in vitro* production of secondary metabolites. Important alkaloids and factors affecting their production. Hairy root culture, elicitation and biotransformation.

References:

1.Bhajwani, S.S, & Razdan, M.K. (1996). Plant Tissue Culture. Theory and Practice, Elsevier.
2. Razdan, M.K. (2003) Introduction to Plant tissue culture, Science Publishers
3. Singh, B.D. (2004). Biotechnology expanding horizons, Kalyani Publishers, New Delhi.

SEMESTER FOURTH
Paper 4.2 BBT 14: Basics of Animal Physiology

Course Type : Core **Credits:4**

Duration :3 hrs
Continuous/Internal/Assessment : 30 Marks
Semester Assessment : 70 Marks

***Note**: The syllabus is divided into five independent units and question paper will be divided into two sections.*

- ***Section-A** will carry 20 marks with one compulsory question comprising ten short answer type questions taking two questions from each unit. Each question shall be of two marks.*
- ***Section-B** will carry 50 marks with equally divided into five long answer type questions. Paper setter shall be advised to set two questions from each unit and students are instructed to attempt five questions by selecting one question from each unit.*

UNIT-I

Digestion: Nutrients: Carbohydrates, lipids, proteins, vitamins, Digestive enzymes and hormones of GIT. Digestive mechanism: Mechanical and chemical digestion. Absorption and assimilation of end products of digestion.Balanced diet, malnutrition (PEM), obesity; endoscopy.

UNIT-II

Respiration: Aerobic and anaerobic respiration. Structure of respiratory organs. Mechanism and regulation of breathing. Transport of O_2 and CO_2.Respiratory disorders: Emphysema, asthma, occupational disorders,spirometry.

UNIT-III

Circulation: Circulatory fluids: Blood, lymph; blood cells; structure of haemoglobin.Blood circulation through heart, arteries, arterioles, capillaries,venules and veins. Cardiac cycle and its regulation. Blood clotting mechanism, blood pressure. Cardiac disorders, ECG, heart

transplantation (an introductory idea).

UNIT-IV

Excretion: Excretory products: NH_3, urea, uric acids, amino acids.Structure of kidney, nephron; mechanism of urine formation; micturition. Autoregulation, counter-current mechanism, renin-angiostatin system. Accessory excretory organs: Skin, liver, lungs etc. Excretory disorders, dialysis, Kidney transplant.

UNIT-V

Muscle and Neural Physiology: Structure of smooth, skeletal and cardiac muscles; myofibrils. Isotonic and isometric contraction of muscles, sliding- filament theory of musle contraction; relaxation of muscle fibres; Properties of muscles,myopathy.Kinds of neuron, structure of myelinated and nonmyelinated nerve fibres. Reflex action, types. Sensory Physiology:Tactile receptors, pain receptors, thermoreceptors, chemoreceptors.

References:

1. Berry, A.K. Animal physiology.
2. Guyton, A.C. and Hall, J.E. A Text Book of Medical Physiology (10th Edition).
3. W.B. Saunders company.
4. Ganong, H. Review of Medical physiology. McGraw Hill.

SEMESTER FOURTH
Paper 4.3BBT 15 Fundamentals of Immunology and Animal Cell Culture

Course Type : Core **Credits:4**

Duration :3 hrs

Continuous/Internal/Assessment : 30 Marks

Semester Assessment : 70 Marks

***Note**: The syllabus is divided into five independent units and question paper will be divided into two sections.*

- ***Section-A** will carry 20 marks with one compulsory question comprising ten short answer type questions taking two questions from each unit. Each question shall be of two marks.*
- ***Section-B** will carry 50 marks with equally divided into five long answer type questions. Paper setter shall be advised to set two questions from each unit and students are instructed to attempt five questions by selecting one question from each unit.*

UNIT- I

Concept of Innate and Adaptive immunity. Structure, Functions and Properties of Immune Cells and Immune Organs. Antigens, Haptens,Adjuvants. Structure, Types, Functions and Properties of antibodies.

UNIT- II

Characteristics of an antigen; Haptens; Epitopes (T & B cell epitopes); T-dependent and T-independent antigens; Adjuvants. Principles of Precipitation, Agglutination, Immunodiffusion, Immunoelectrophoresis, ELISA, ELISPOT, Western blotting, Immunofluoresence, Flow cytometry, Immunoelectronmicroscopy.Structure and Functions of MHC.

UNIT- III

Complement- Components and biological activities.
Primary and Secondary Immune Response; Generation of Humoral and Cell Mediated Immune Response.Hypersensitivity, Autoimmune diseases.

UNIT-IV

History of development of animal cell culture and methods of animal cell culture: culture media composition and preparation. Growth factors promoting proliferation of animal cell. Animal cell lines – their culture and maintenance. Stem cell cultures, embryonic stem cells and their applications.

UNIT-V

Organ culture, whole embryo culture, transfection of animal cells: selectable markers, HAT selection, antibiotic resistance etc. Somatic cell fusion, transplantation of cultured cells. Differentiation of cells, culture of animal mycoplasma. Growth kinetics of cells in culture,

References:

1. Roitt, Brostoff, Male and Mosby. Immunology.
2. Kuby et al. Immunology. W.H. Freeman and Company.
3. Rao, C.V. An Introduction to Immunology. Narosa Pub. House.
4. Coleman, R.M. Fundamental Immunology. McGraw Hill.
5. Paul, W.E. Fundamentals of Immunology. Raven Press New York
6. Masters, J. Animal Cell Culture. Panima.
7. Freshney, I. Culture of Animal Cell. John Wiley.
8. Martin, C. (Ed). Animal Cell Culture Techniques. Springer.
9. Mather and Barnes. (Ed). Methods in Cell Biology. Vol. 5-7, Animal Cell Culture Method.Academic Press.
10. Paul, J. Animal Tissue Culture. Butler, M. and Dawson, M. Lab Fax : Cell Culture. Bios Scientific Publications.

SEMESTER FOURTH

Paper 4.4 PRACTICALS IV

1. Sterilization techniques for non-living, plant material.
2. Tissue culture mediapreparation.
3. Slant preparation.
4. Excision of embryo / ovule / Anther and their inoculation.
5. Preparation of aseptic plant. Aseptic techniques.
6. Inoculation of culture. Root culture. Leaf culture. Shoot tip and meristem culture. Flower budand flower culture.
7. Isolated ovary culture.
8. Callus induction and regeneration.

1. Demonstration of catalase and ptyalin enzyme activity.
2. Haematocrit value.
3. Haemoglobin percentage.
4. RBC counting.
5. WBC counting.
6. Differential counting.
7. Blood group detection
8. Preparation of Blood film.
9. Preparation of smooth, skeletal (striated &non striated), cardiac muscle fibres.
10. Structure of Myelinated and non myelinated nerve fibre.
11. Sterilization techniques for animal material.
12. Mediapreparation.
13. Slant preparation.