

PPD

P. PRIYADARSHINI
ASSISTANT PROFESSOR
DEPT OF BIOTECHNOLOGY
J.J. COLLEGE OF ARTS AND
SCIENCE [AUTONOMOUS]

ANIMAL BIOTECHNOLOGY

III B.S.C, BIOTECHNOLOGY

Dec-2021

PPD

	1	2	3	4	5	6
D1		<u>III</u> UG _A VAC	<u>III</u> UG MB			
D2	<u>III</u> UG _A ABT	<u>III</u> UG MB			<u>III</u> UG _A ABT	
D3		<u>III</u> UG MB		<u>III</u> UG MB		
D4		← Major Lab →			<u>III</u> UG _A VAC	
D5	<u>III</u> UG _A ABT		<u>III</u> UG _A			
D6		<u>III</u> UG _A VAC	<u>III</u> UG MB			

Animal Biotechnology

UBRIBTCC12

Unit - I

Embryology:

Gametogenesis and fertilization in animals, molecular events during fertilization, genetic regulations in embryonic development - Artificial fertilization methods [IVF, IUF, ICSI] and embryo transfer, superovulation, polycystic ovarian syndrome [PVS], collection and preservation of embryos, culture of embryonic stem cells and its applications.

Unit - II

Animal cell culture

Fundamentals :- Facilities and applications.

Media preparation for Animal cell culture.

Types of cell culture: Primary and secondary

cell culture, cell transformation, cell lines, Insect cell lines, stem cell cultures, Tests;

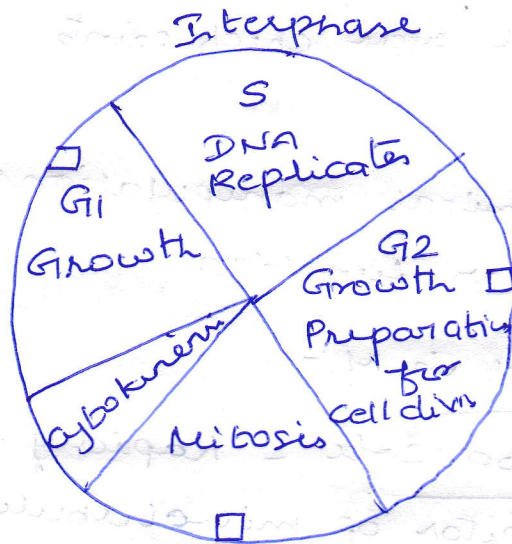
cell viability and cytotoxicity. Biology of

cultured cells, measurement of growth, cell

synchronization, senescence and apoptosis.

organ culture and transplantation,

Cryopreservation.



→ Biochemical changes leads to characteristic cell changes and death

changes:

- cell blebbing
- cell shrinkage
- Nuclear fragmentation
- Chromatin condensation
- DNA fragmentation
- mRNA delay.

→ Each 50 to 70 billion cells dies due to apoptosis.

G.P.
 Dr. G. MANIGANDAN, Ph.D., SET, NET
 Head, Department of Biotechnology
 J.J. College of Arts and Science (Autonomous)
 Pudukkottai - 622 422

P. Par
 Dr. J. PARASURAMAN, M.A., M.B.A., M.C.A.,
 M.Phil., B.Ed., Ph.D.

PRINCIPAL
 J.J. College of Arts and Science
 (Autonomous)
 J.J. Nagar, Sivagangam Post,
 PUDUKKOTAI - 622 422



Dr. V. SUBRAMANIAN.

Assistant professor.

Department of Biotechnology,

J.I. College of Arts & Science

Pudukkottai

Dec-2021

Timetable.

	1	2	3	4	5
D1	III UUT NBT			I UUT (MB)	II PUJ (MB)
D2		III UUT VAC		IV UUT (MB)	
D3	II PUJ VAC		III UUT VAC		
D4			IV UUT (MB)		II PUJ (MB)
D5	← Lab →		II UUT VAC		III UUT NBT
D6		IV UUT (MB)		IV UUT (MB)	
	III UUT - "A"	II UUT - "B"			

SEMESTER -VI - MBE - III
NANOBIOTECHNOLOGY

Course Code: U6R1BTMBE3

Hours/Week: 4

Credit: 4

Max Marks: 100

Internal Marks: 25

External Marks: 75

COURSE OBJECTIVES

- The aim of this course is to provide basic knowledge in the interface between chemistry, physics and biology on the nano structural level with a focus on biotechnological usage.
- To get knowledge about characterization of the Bioproducts
- To aware the basic principles about protein nanostructures
- To get basic principles about spectroscopy
- The students get knowledge about applications of nanotechnology

Total Instructional Hours: 46

UNIT I: Nano Biology

Hours: 09

Concepts, definitions, prospects; nanoparticles – size, shape, properties. Bio nanoparticles – nanostarch, nano composites – dendrimers, Hot-Dot nanoparticles. Types of biomaterials. Biodegradable polymers.

UNIT II: Tools in Nano Biotechnology

Hours: 10

Analysis of bimolecular nanostructures by Atomic Force Microscopy, Scanning Probe Electron Microscopy. Nanofabrication - lithography. Drug nanoparticles - structure and preparation. Liposomes, Cubosomes and hexosomes. Lipid based nanoparticles-liquid nano dispersion, solid liquid nanoparticles

UNIT III: Protein and DNA Based Nanostructures

Hours: 08

S-Layer proteins. Biotemplating -Engineered Nanopores, protein based nanostructure formation. Nanoparticle-biomaterial hybrid systems -De Novo Designed Structures, Biomolecular Motors - DNA-Protein nanostructures, Biomimetic fabrication of DNA-based metallic nanowires, conjugates and networks.

Unit IV: Spectroscopy

Hours: 09

Relationship between electromagnetic radiation range and spectroscopy. Fundamentals and working principle of UV-Visible spectroscopy, difference between absorbance and surface plasmon resonance (SPR), principle of Fourier-Transformation, fundamentals and working principle of FT-IR, application in functional group determination of organic compounds (-OH, -COOH, -NH₂, -NH-, -O-).

UNIT V: Application of Nanotechnology

Hours: 09

Nanotubes, Nanorods, Nanofibers and Fullerenes for nanoscale drug. Bionanoelectronics. Applications of nanobiotechnology in medicine, drug designing and cancer treatment. Medical, social and ethical considerations of nanobiotechnology.

UNIT VI: Latest learnings (For CIA Purpose only)

Hours: 06

Latest development related to the course during the semester concerned

REFERENCES

09/05/22
Do: S
Hr: S

Nanoseal drug

Nano drugs are a revolutionary and ubiquitous science of the 21st century

The application of nanotechnology in the medical field that has the potential to significantly change the course of diagnostic and treatment

ex: PEGylated human growth hormone receptor antagonist

10/05/22
Do: S
Hr: S

Nanotechnology in medicine.

* disruptive technology, it deals with surface size of 100 nm (or) smaller.

* It is very diverse technology.

- Drug, medicine, therapeutics.
- Surgery, medical robotics.
- Cancer.

12/05/22
Do: S
Hr: S

Cancer treatment

Cancer, also known as a malignant tumor, and malignant neoplasm,

typical cancer:

- Breast cancer
- Lung cancer
- Colon cancer
- prostate cancer

Surgery, chemotherapy, Radiation therapy,

From the  Department of Sports and Health Sciences

C. Semathi,
 Assistant Professor,
 Biotechnology, JJC.

2021- Dec

	1	2	3	4	5	6
D1					II UGB VAC.	
D2				III UGB FI	ICS-A EVS.	
D3		III UGB FI		II UGB FI		
D4			II UGB MBT	III UGB FI	I PG VAC.	I
D5			I CSA EVS.		I PG VAC.	
D6	← I PG-Major Lab →			← I UG Lab (Allied) →		I PG VAC

SEMESTER -IV - MBE - II
FOOD AND INDUSTRIAL BIOTECHNOLOGY

Course Code: U6R1BTMBE2

Hours/Week: 4

Credits: 4

Max Marks: 100

Internal Marks: 25

External Marks: 75

Total Instructional Hours: 48

UNIT I: Introduction to Food Technology

Hours: 08

Definition and Scope of Food Technology - Components of food industry; Quality factors in food- Functional groups and properties. Nutritive factors of food constituents - protein, carbohydrates, fats in nutrition. Dietary fiber (fibre), Vitamins.

UNIT II: Food Preservation and Packaging

Hours: 03

Food preservation: Principles of food preservation - methods of preservation: Physical (irradiation, drying, heat processing, smoking, chilling and freezing. Chemical (Sodium benzoate Class I & II); Biological: Probiotics and bacteriocins. Brief description of packaging of frozen products, dried products, types of packaging.

UNIT III: Introduction to Industrial Biotechnology

Hours: 10

Introduction - history - isolation and screening of industrially important microorganisms, enrichment liquid culture and enrichment cultures using solid media. Preservation and storage of microbial cultures- lyophilization, liquid nitrogen, Strains improvement.

UNIT IV: Sterilization and Growth Kinetics

Hours: 10

Microbial growth kinetics - Batch culture, fed-batch culture and continuous culture, up-stream processing - media formulation for industrial fermentation. Sterilization: Batch and continuous sterilization systems - filter sterilization. Downstream processing - removal of microbial cells and solid media, foam separation, precipitation, filtration, centrifugation, cell disruption, liquid-liquid extraction, chromatography, membrane process, drying and crystallization.

UNIT V: Fermented Products

Hours: 10

Industrial production using microorganisms: Enzymes - Amylase, Acid - Citric acid, Alcohol - Ethanol, Beverages - wine, Bakery products - Bread, antibiotics - penicillin, vaccine - polio, SCP - Spirulina, Vitamins - Vitamin B₁₂.

UNIT VI: Latest Developments (For CIA Purpose only)

Hours: 02

Latest developments related to the course during the semester concerned

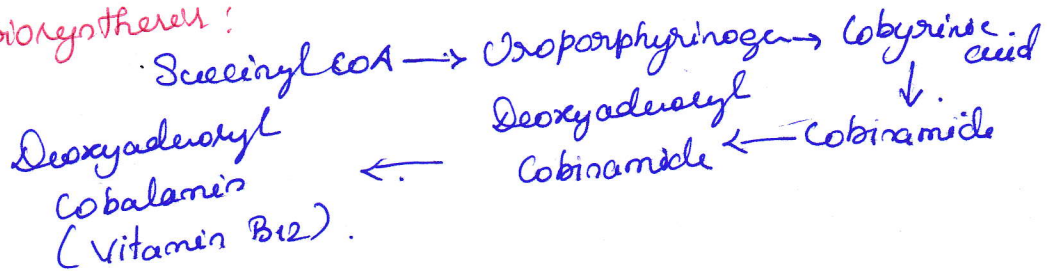
11/5/22
D.O. III
Hour - 2.

Vitamin B₁₂

Introduction:

It is an organic compound.
Fat soluble. Water soluble vitamins.

Biosynthesis:



Procedure:

- Formulation of the medium
- Sterilization of the medium
- Making starter culture
- Anaerobic fermentation
- Aerobic fermentation
- Recovery.

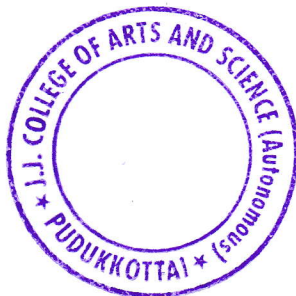
12/05/22
D.O. IV
Hour - 4.

G. Manigandan
12/05/22

Dr. G. MANIGANDAN, Ph.D., SET, NET
Head, Department of Biotechnology
J.J. College of Arts and Science (Autonomous)
Pudukkottai - 622 422

G. Parasuraman

Dr. J. PARASURAMAN, M.A., M.B.A., M.C.A.
M.Phil., B.Ed., Ph.D.
PRINCIPAL
J.J. College of Arts and Science
(Autonomous)
J.J. Nagar, Sivapuram Post,
PUDUKKOTTAI - 622 422



Dr. L. Vivekanandan
Asst. Professor,
P.G. & Research Dept.
of Biotechnology
JJC.

Dec-2021

D.O	1	2	3	4	5
1				II B.Sc. A	
2	II B.Sc. A (Major Practical)				
3		II B.Sc. A			II B.Sc. A
4					
5	II B.Sc. A				II B.Sc. A
6			II B.Sc. A		

SEMESTER - IV - CORE COURSE - VII
PLANT BIOTECHNOLOGY

Course Code: U4R1BTCC7

Hours/Week: 5

Credit : 5

Max Marks: 100

Internal Marks: 25

External Marks: 75

COURSE OBJECTIVES

- To introduce the various transformation techniques employed in plant systems.
- To get knowledge about application of genetically modified plants in the various fields of science.
- To understand the basic principles and methodologies of plant tissue culture
- To understand the different standard protocol for the production of viable clones
- To learn the knowledge on various methods of TC and secondary metabolites production.

Total Instructional Hours: 60

UNIT I: Plant Tissue Culture

Hours: 11

History and Scope of plant tissue culture- Media composition and types, hormones and growth regulators, explants for organogenesis, somoclonal variation, production of haploid plants. Micro propagation, somatic embryogenesis, protoplast culture and somatic hybridization. Cryopreservation, germplasm collection and conservation.

Unit II: Plant transformation techniques

Hours: 14

Mechanism of DNA transfer-*Agro bacterium* mediated gene transfer, Ti and Ri plasmids as vectors, direct gene transfer methods-particle bombardment, electroporation and microinjection.

Unit III: Bioproducts

Hours: 12

Production of Industrial enzymes, biodegradable plastics, therapeutic proteins, edible vaccines and antibiotics using transgenic technology. Production of useful chemicals and secondary metabolites.

Unit IV: Genetic modification in Agriculture:

Hours: 12

Transgenic plants- Herbicide resistance, viral resistance, bacterial resistance, fungal resistance crops, Delayed fruit ripening, stress tolerance. Genetically modified food, future perspectives & ecological impact of transgenic plants.

Unit V: Bioethics

Hours: 08

Current status of transgenic plants in India and other countries, Ethical issues associated with GM crops and GM food; labelling of GM plants and products.

UNIT VI: Latest learnings (For CIA Purpose only)

Hours: 03

Latest development related to the course during the semester concerned

20/2/22
PLANT

tissues

in a st

in vitro

Impact

• Plant

modif

• Rejuven

• Produ

as c

• A tec

witho

• Help

• Advant

• The p

short

tissu

• New

• The p

inexp

• A pla

plant

* B-1, 4 glucosidase or cellobiase

◆ Applications of cellulases:

- Fruit juice & olive production & processing
- Wine & beer production & processing
- Malting - speedy modification of grains
- Textile processing - bio polishing of cellulose fibres.
- Wood pulp processing

12/05/22

◆ Glucose isomerase ⇒

↳ Causes isomerization of glucose to fructose.

↳ Produces glucose & fructose.

↳ Produces glucose from starch, & can be used for commercial production of sweetnes instead

Next Cp
Good.

G. Manigandan

DR. G. MANIGANDAN, Ph.D., SET, NET
Department of Biotechnology
and, Department of Biotechnology
Arts and Science (Autonomous)
J.J. College of Arts and Science (Autonomous)
Pudukkottai - 622 422

Dr. J. PARASURAMAN, M.A., M.B.A., M.C.A.
M.Phil., B.Ed., Ph.D.

PRINCIPAL
J.J. College of Arts and Science
(Autonomous)
J.J. Nagar, Sivapuram Post,
PUDUKKOTTAI - 622 422



M. Sakthipriya.

Asst. prof.

Dept. of Biotechnology

TIMETABLE

DO	1	2	3	4	5
I	MA	EBT	ABT	EBT	ABT
II	EBT	MT	NBT	FI	MT
III	ABT	FI	NBT	FI	ND
IV	MT	EBT	ABT	FI	NBT
V	← Major Lab. →				
VI	ABT	GIS	NBT	ND	EBT

Course Code: UGR11
Hours/Week: 6
Credit: 5

Unit I: Embryology

Gametogenesis and Fertilization
Development - Artificially
ovarian syndrome (POCSF)
cells and its application

Unit II: Animal cell

Fundamentals, Tissue Culture
Primary and secondary
viability and Clonal
apoptosis, Organ culture

Unit III: Genetic Engineering

GM (Genetically Modified)
precipitation, Hybridoma

Unit IV: Gene therapy

Mapping of human genome
DNA fingerprinting

Unit V: Transgenic

Transgenic animals
activators, hybridoma
in animal biotechnology

UNIT VI: Latest in

Latest developments

TEXT BOOKS

UNIT VII: Latest in

Latest developments

UNIT VIII: Latest in

Latest developments

UNIT IX: Latest in

Latest developments

SEMESTER – VI - CORE COURSE- XII
ANIMAL BIOTECHNOLOGY

Course Code: U6R1BTCC12
Hours/Week: 6
Credit: 5

Max Marks: 100
Internal Marks: 25
External Marks: 75

Unit I: Embryology

Hours: 15

Gametogenesis and fertilization in animals. Molecular events during fertilization, genetic regulations in embryonic development – Artificial Fertilization methods (IVF, IUF, ICSD) and embryo transfer, Superovulation, Polycystic ovarian syndrome (PVS). Collection and preservation of embryo, culture of embryos, culture of embryonic stem cells and its applications.

Unit II: Animal cell culture

Hours: 15

Fundamentals, Facilities and Applications. Media preparation for Animal cells culture. Types of cell culture: Primary and secondary cell culture, cell transformation, cell lines, insect cell lines, stem cell cultures. Tests: cell viability and Cytotoxicity. Biology of cultured cells, measurement of growth, cell synchronization, senescence and apoptosis. Organ culture and transplantation, Cryopreservation.

Unit III: Genetic engineering in animals

Hours: 12

GMO (Genetically modified organism), methods of DNA transfer into animal cells - calcium phosphate precipitation, micro-injection, electroporation, Liposome encapsulation, Biological vectors - Bacteria, Virus, Hybridoma technology, DQLLY, Vaccine production.

Unit IV: Gene therapy

Hours: 15

Mapping of human genome, Human Genome Project (HGP), RFLP, RAPD and its applications. Gene banking, DNA fingerprinting and Forensic Science. Molecular diagnosis of Genetic disorders.

Unit V: Transgenic animals

Hours: 11

Transgenic animals, production and recovery of products from animal tissue cultures: cytokines, Platelet derived growth factors, Blood clotting factors, Growth hormones, insulin transgenic animals– Merits and demerits -Ethical issue in animal biotechnology.

UNIT VI: Latest learnings (For CIA Purpose only)

Hours: 04

Latest development related to the course during the semester concerned.

TEXT BOOKS

1. Fundamentals of Animal Biotechnology, B. Singh, SK Gupta and MS Chauhan. 2013. The Energy and Environment Institute, Patna.
2. Biotechnology: V: (Including Animal Cell Biotechnology, Immunology and Plant Biotechnology) by L.K. Chugh. 2nd Edition, New Age International.

Transgenic Animals.

Transgenic mice & Swine.

Human Hb and specific circulating
Immunoglobulins.

⇒ Proteins from blood
Serum for blood
transfusion and disease diagnosis.

⇒ Genes expressed and protein released
in blood serum.

Transgenic sheep.

→ Bacterial gene cys E and M.

→ Improved wool production/quality.

Transgenic Rabbit.

Human genes - IGF2 - growth hormone,
tissue plasminogen activator.

- Mol. farming.

Transgenic ~~Am~~ fish.

Salmon - or rainbow trout.

growth hormone - antifreeze gene - Increased
body growth - 60% increased in size.

Mr. J. John Vasanth
Asst. Professor
Semester - II
Molecular Biology

Molecular Biology

J. John Vasanth

Asst. Professor

Dept of Biotechnology

Dec - 2021



Genetics and molecular Biology

Course code: U2RIBTCC3

22/02/22
 DO-II

Total Instructional Hour: 66

UNIT I: Classical Genetics Hours: 12

Dominance, Segregation, Independent Assortment, Co-dominance, Linkage, Crossing Over, Sex linkage and Sex influenced character. Concept of Gene - allele, multiple alleles, pseudo allele.

UNIT II: Prokaryotic Genetics Hours: 12

DNA and RNA as a genetic material. Types, forms, Structure and functions of DNA and RNA. - *E. coli* chromosome, Plasmid - Structure, properties, types and significance. Transposons. Genetic code, gene structure, concept of Gene-expression, Transcription, Translation Posttranslational and Transcriptional modification. Gene regulation - *Lac* operon, *Trp* operon.

UNIT III: Eukaryotic Genetics Hours: 12

Chromatin structure: Histones, Nucleosome, Repetitive DNA, Giant chromosomes: Polytene and Lampbrush chromosomes. RNA splicing and Transcription, Ribozyme, Translation, Population genetics, life cycle of *Neurospora crassa*. Breakage, Rejoining and models of recombination- The Holiday model.

UNIT IV: Replication of DNA, Mutation & DNA repair mechanism Hours: 11

Replication of DNA - Enzymes involved, models, Rolling circle model, Theta Model Replication of RNA, Mutation and its Types, DNA repair mechanism, Transposable elements.

UNIT V: Human Genetics and Microbial Genetics Hours: 10

Pedigree analysis, Lod Score for Linkage testing, Karyotypes. Methods of Gene Transfer Transformation, Conjugation, Transduction and Sexduction.

UNIT VI: Latest learnings (For CIA Purpose only) Hours: 03

Latest development related to the course during the semester concerned

Time Table.

Hrs D.O	1	2	3	4	5
I	← Major Lab. →				I UG VAC
II	III UG B' NBT	I UG MB' EVS			I UG VAC
III	I UG GMB	I PG (GE)	III UG NBT B'		I UG VAC
IV		I UG GMB		III UG B' NBT	
V	I PG (GE)	I UG MB' EVS		I UG GMB	I PG (GE)

(ii) Conjugation:

→ During conjugation, genetic material is transferred from a donor bacterium to recipient bacterium through sex pili

→ DNA - F-fertility factor

12/04/22

D.O II

(iii) Transduction:

→ Transduction occurs when foreign DNA or RNA is introduced into bacterial or eukaryotic cells via a virus or viral vector.

28/04/22

D.O I

(iv) Sexduction:

→ The process by which chromosomal fragments are transferred between bacteria by means of a specific plasmid.

M. Maleswari M.Sc., B.Sc., M.Phil.

Asst. professor
Dept of Biotechnology.

J.J. College of arts and science.

SEMESTER – III - CORE COURSE- XI
PLANT BIOTECHNOLOGY

Course Code: P3R1BTCC11

Hours/Week: 5

Credit: 5

Max Marks: 100

Internal Marks: 25

External Marks: 75

Total Instructional Hours: 60

UNIT I: Plant tissue culture

Hours: 12

Scope and Importance of plant tissue culture- Media composition and types (MS, LS, BS and NG) hormones and growth regulators, explants for organogenesis, somoclonal variation, production of haploid plants. Micropropagation, somatic embryogenesis, synthetic seed preparation, embryo rescue, protoplast culture and somatic hybridization. Cryopreservation, germplasm collection and conservation.

UNIT II: Plant transformation techniques

Hours: 12

Mechanism of DNA transfer-*Agro bacterium* mediated gene transfer, Ti and Ri plasmids as vectors, role of virulence genes; design of expression vectors; 35S promoter, genetic markers, reporter genes; viral vectors. Direct gene transfer methods-particle bombardment, electroporation and microinjection.

UNIT III: Metabolic engineering of plants

Hours: 11

Plant cell culture for the production of useful chemicals and secondary metabolites (Hairy root culture, Biotransformation, Elicitation) - pigments, flavonoids, alkaloids; mechanism and manipulation of shikimate pathway. Production of Industrial enzymes, PHB, therapeutic proteins, edible vaccines and antibiotics using transgenic technology.

UNIT IV: GM-Technology

Hours: 11

Crop improvement, productivity, performance and fortification of agricultural products-Bt cotton, Bt brinjal. Herbicide resistance, viral resistance, bacterial resistance, fungal resistance crops. Golden rice and transgenic sweet potato. Strategies for engineering stress tolerance, Antisense Technology- Delayed fruit ripening.

UNIT V: Transgenic plants

Hours: 11

Current status of transgenic plants in India and other countries, Ethical issues associated with GM crops and GM food; labeling of GM plants and products. Importance of integrated pest management and terminator gene technology. Environmental impact of herbicide resistance crops and super weeds.

UNIT VI: Latest learnings (For CIA Purpose only)

Hours: 03

Latest development related to the course during the semester concerned.

06.09.20
D/o: [Signature]
Hr: [Signature]

Handwritten notes and signatures on the right margin, including the word "equi" and various initials.

- Proteins - for Emo.
- Infectious agents - for Rapid test
- Drug markers - Dga, Dgm, Dgn.
- Tumor markers - In new born screening.
- Serum proteins - In clinical research

G. Manigandan

Dr. G. MANIGANDAN, Ph.D., SET, NET
 Head, Department of Biotechnology
 J.J. College of Arts and Science (Autonomous)
 Pudukkottai - 622 422

V. Parasuraman

Dr. J. PARASURAMAN, M.A., M.L.A., M.P.H., B.Ed., Ph.D.
 PRINCIPAL
 J.J. College of Arts and Science
 (Autonomous)
 J.J. Nagar, Sivapuram Post,
 PUDUKKOTTAI - 622 422



Dr. V. Subramaniam.

Notes of Lesson.

~~Stress cell.~~

Subject : Bioinstrumentation.

2021- Nov Jun.

	1	2	3	4	5
D1	III MC BiB		III U4 BINS	I P4 SMB	III U4 I C
D2		II U4	Major practical		
D3	I-P4	III U4 B		III U4 C	I P4
D4			I P4 SMB	I-P4 SMB	
D5	III U4 C	III U4 B	I P4 SMB		III U4 DUP
D6	III MC		III U4 P	III U4	

**SEMESTER V - CORECOURSE-IX
BIOINSTRUMENTATION**

Course Code: U5R1BTCC9

Hours/Week: 6

Credits: 5

Max Marks: 100

Internal Marks: 25

External Marks: 75

COURSE OBJECTIVES

- To understand the principles of analytical techniques and equipment used in Biological science.
- To have a fundamental knowledge regarding the Microscopy, Spectroscopy, Centrifugation.
- To acquire knowledge on the Chromatographic method for the separation of biological products.

Total Instructional Hours: 72

UNIT I: Basic Instruments

Hours: 14

Physical balance, pH meter, Autoclave, Hot air oven, isoelectric point. Principles and application of light microscopy, phase Contrast, Bright and Dark field Microscopy fluorescence Microscopy.

UNIT II: Centrifuges and Chromatography

Hours: 16

Basic principle of centrifugation and its types - Ultra Centrifugation, Density gradient Centrifugation, Differential centrifugation, Standard Sedimentation coefficient. Chromatography - Principle, Types and application: Paper chromatography, Thin layer chromatography, Column Chromatography and HPLC and Gas chromatography.

UNIT III: Spectroscopy

Hours: 14

Principle and applications of Colorimeter, Bomb calorimeter, Fluorescence spectroscopy, UV/VIS Spectroscopy, IR Spectroscopy, Raman Spectroscopy

UNIT IV: Tracer Techniques

Hours: 16

Radioactive isotope - Half life, GM counter, Liquid scintillation counter, Autoradiography, Semi auto analyzer, ELISA Reader and Thermal cyclers.

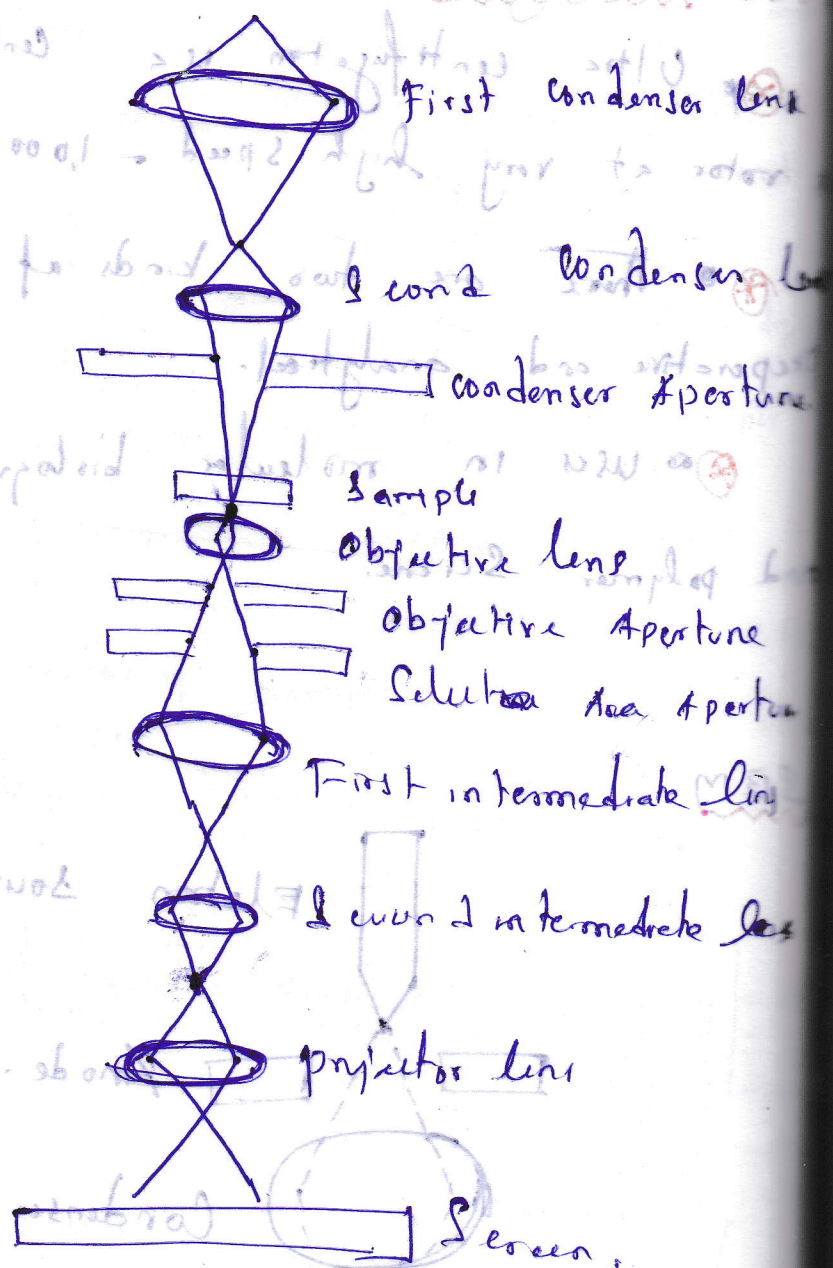
UNIT V: Electrophoretic Techniques

Hours: 10

Electrophoresis- Agarose Gel Electrophoresis, SDS-PAGE, Native Gel, 2D gel and gradient Gel Electrophoresis, Pulsed field Gel Electrophoresis (PFGE).

36.
30.12.21
Dr: X
Mr: SRB

TRM
P. R. R. R. R.



37. Hot Air oven:

* Hit air over the electrical device which are hot to sterilize.

* They can be operated from 50 to 200°C

* There is also an air filled space in between

C. Sumathi
Asst. Professor,
Dept. of Biotech,
J.J. College of Arts & Science,
Pudukkottai.

Jun-21

C. Sumathi M.Sc., M.Phil
Asst. Professor
Dept. of Biotechnology.

SEMESTER - V- MBE - I
PHARMACEUTICAL BIOTECHNOLOGY

Course code: U5R1BTMBE1

Hours/ Week: 5

Credits: 4

Max Marks: 100

Internal Marks: 25

External Marks: 75

Total Instructional Hours: 60

UNIT I: Introduction

Hours: 08

Introduction to Pharmaceutical Biotechnology, history, nature and source of drugs. Drug targets. Structure and functions; Physiochemical properties of drugs. Pharmacodynamics, pharmacokinetics and drug metabolism. Screening and isolation of bioactive compounds.

UNIT II: Drugs

Hours: 12

Adverse response to drugs, Drug tolerance, Drug intolerance, drug allergy, drug induced side effects. Tachyphylaxis, biological effects of drug abuse and drug dependence, vaccination against infection, factor that modifies the effect of drug. Assay of drug potency- bioassay and immunoassay.

UNIT III: Pharmacodynamics and toxicity

Hours: 08

Protein mode of action and pharmacodynamics- Overview of the mode of action of a biopharmaceutical Pre-clinical studies- -Toxicity (Reproductive toxicity and Teratogenicity, Mutagenicity, Carcinogenicity and Other tests); Clinical trials - Clinical trial design, Trial size design and study population.

UNIT IV: Pharmaceutical products

Hours: 14

Biopharmaceutical and biological drug development, Manufacturing of biopharmaceutical, therapeutic proteins and peptides. Recombinant growth hormones, growth factors, therapeutic monoclonal antibodies, therapeutic enzymes and their application in health care.

UNIT V: Pharmaceutical regulations

Hours: 15

Role and remit of regulatory authorities-The Food and Drug Administration (FDA), Investigational new drug application, New drug application; European regulations, National regulatory authorities, European medicines agency and the new EU drug approval system, Centralized procedure, Mutual recognition, Indian drug regulations and pharmacopeia.

UNIT VI: Latest learnings (For CIA Purpose only)

Hours: 03

Latest development related to the course during the semester concerned

23/12/21
D.O. II

Regulation of Drug Sector in India

- Definition: - To regulate means to control something to that it function properly

Regulation:
Drug regulatory Bodies.
Drug laws
Quality control
Drug Information centres.

Drug Regulatory Bodies:

- ✓ CDSCO -
- ✓ NPPA.
- ✓ Drug Controller-general of India

Drug Laws:

- ✓ Drugs & Cosmetics Act. 1940
- ✓ Pharmacy Act of 1948
- ✓ Drug & Magic remedies Act
- ✓ Drug Prices control order 1995.

Dr. G. MANIGANDAN, Ph.D., SET, NET
Head, Department of Biotechnology
J.J. College of Arts and Science (Autonomous)
Pudukkottai - 622 422

Dr. J. PARASURAMAN, M.A., M.B.A.,
M.Phil., B.Ed.

PRINCIPAL
J.J. College of Arts and Science
(Autonomous)
J.J. Nagar, Sivapuram Post.
PUDUKKOTTAI - 622



M. SAKTHIPRIYA.

ASST. PROF.

Dept. of Biotech.

J.J. college. Arts & Science.

Pudukkottai

BIOINFORMATICS.

M. SAKTHIPRIYA.
ASST. prof.

**SEMESTER --V - CORECOURSE- X
BIOINFORMATICS**

Course Code: U5R1BTCC10

Hours/Week: 7

Credits: 5

Max Marks: 100

Internal Marks: 25

External Marks: 75

Total Instructional Hours: 84

UNIT I: History, scope and importance

Hours: 15

Important contributions - aims and tasks of Bioinformatics - applications of Bioinformatics - challenges and opportunities - internet basics- HTML - introduction to NCBI data model- Various file formats for biological sequences

UNIT II: Databases - tools and their uses

Hours: 15

Importance of databases - Biological databases-primary sequence databases- Composite sequence databases- Secondary databases- nucleic acid sequence databases - Protein sequence data bases, structure databases - bibliographic databases - specialized genomic resources- analysis packages

UNIT III: Sequence alignment methods

Hours: 16

Sequence analysis of biological data-Significance of sequence alignment- pairwise sequence alignment methods- Use of scoring matrices and gap penalties in sequence alignments- multiple sequence alignment methods - Tools and applications of multiple sequence alignment.

UNIT IV: Sequence analysis

Hours: 17

Gene predictions strategies - protein prediction strategies - molecular visualization tools- phylogenetic analysis: multiple alignments and concept of trees- phylogenetic trees.

UNIT V: Drug discovery process

Hours: 17

Discovering a drug - target identification and validation - identifying the lead compound - optimization of lead compound - chemical libraries.

UNIT VI: Latest learnings (For CIA Purpose only)

Hours: 04

Latest development related to the course during the semester concerned

Match score +1
 Mismatch " +0.
 Gap penalty. -1.

```

ACGTCGTGATACGCCGTATAGTC
      ||||| | | | | |
-----GACTAAGCG-----TATCAG
  
```

Matches $18 \times +1$
 Mismatches $- 2 \times 0$. score = +11
 Gap $- 7 \times (-1)$

Amino acid substitution matrices.

PAM:-

Point accepted mutation based on global alignment - evolutionary model.

Blosum:-

Blosum substitutions based on local alignment - similarity among conserved seq.

G. R. S.

J. P.