21st Dec 2019

Board of studies meeting in the subject of Biotechnology, faculty of Science.

A meeting of the members of BOS in Biotechnology was held on 21ST Dec. 2019 at 9.30 am in the Department of Biotech of R.J. College of Arts, Commerce & Science.

Following Members were present :

Head of the Department (Chairman)
Dr. Sucheta Golwalkar — sgolwalkar

Faculty Members :
Dr. Smruti Thombare — SThombare
Dr. Tania Karipel. — Tania
Dr. Rachana Acharya — RAchanya.
Ms. Saleha Khan — SKhan.
Ms. Smita Jadhav. — —
Dr. Namrata Parab. — Nparab
Ms. Jasvinder Kaur. — Jkaur

University Representative. :
Dr. Deepali Karkhanis. — DKarkhanis

Experts from outside the parent university :
Dr. Arpita Gupte — Arpita
Asst. Prof. D.Y. Patil University.

Dr. Purvi Bhatt.
Asst. Prof. NMIMS. — 21/12/19.

Industry Representative :

Dr. Vishal Narang

Director, Clinical & Medical op. Cipla ltd.

Post Graduate Alumnus :

Ms. Nachiket Sawant

Manager, Production, Yash Raj Biotech Ltd.

SEMESTER III		
Course code	Title	Credits
RJUSBT304	Cell biology and cytogenetics	2

Course objectives: The objective of this course is to have a firm foundation in the fundamentals of Cell Biology and Cytogenetics.

Learning outcomes: By the end of the course the student will be able to:

- Develop an understanding of the Cytoskeletal network and functions.
- Understand the organization of Cell Membrane with the functions of various components.
- Discuss the principles underlying Sex Determination, Linkage and Mapping.

Unit	Topics	Lectures
UNIT I Cytoskeleton	Functions of Cytoskeleton. Microtubules: Structure and Composition. MAPs: Functions, Motor Proteins: Kinesins, Dynein; MTOCs. Dynamic Properties of Microtubules. Microtubules in Cilia and Flagella. Microfilaments: Structure, Composition, Assembly and Disassembly. Motor Protein: Myosin, Muscle Contractility: Sliding Filament Model. Actin Binding Proteins: Examples of Non-Muscle Motility. Intermediate Filaments: Composition, Structure, Types, Functions, Assembly and Disassembly;.	15
UNIT II Cell Membrane	Uptake of Nutrients by Prokaryotic Cells; Cell Permeability. Principles of Membrane Transport- Transporters and Channels; Active Transport, Passive Transport; Types of Transporters; Types of ATP Driven Pumps - Na+ K+ Pump. Cell Junctions; Cell Adhesion and Extracellular Material	15
UNIT III Cytogenetics	Sex Determination and Sex Linkage: Mechanisms of Sex Determination (XX-XY, ZZ-ZW, XX-XO) Dosage Compensation and Barr Body. Genetic Linkage, Crossing Over and Chromosomal Mapping: Tetrad Analysis; Two-point Cross; Three point Cross; Pedigree Analysis.	15

22/2/2020

SEMESTER III		
Course code	Title	Credits
RJUSBT304	Cell biology and cytogenetics	2

Course objectives: The objective of this course is to have a firm foundation in the fundamentals of Cell Biology and Cytogenetics.

Learning outcomes: By the end of the course the student will be able to:

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- Understand the organization of Cell Membrane with the functions of various components.
- Discuss the principles underlying Sex Determination, Linkage and Mapping.

Unit	Topics	Lectures
UNIT I Cytoskeleton	Functions of Cytoskeleton. Microtubules: Structure and Composition. MAPs: Functions, Motor Proteins: Kinesins, Dynein; MTOCs. Dynamic Properties of Microtubules. Microtubules in Cilia and Flagella. Microfilaments: Structure, Composition, Assembly and Disassembly. Motor Protein: Myosin, Muscle Contractility: Sliding Filament Model. Actin Binding Proteins: Examples of Non-Muscle Motility. Intermediate Filaments: Composition, Structure, Types, Functions, Assembly and Disassembly;.	15
UNIT II Cell Membrane	Uptake of Nutrients by Prokaryotic Cells; Cell Permeability. Principles of Membrane Transport- Transporters and Channels; Active Transport, Passive Transport; Types of Transporters; Types of ATP Driven Pumps - Na+ K+ Pump. Cell Junctions; Cell Adhesion and Extracellular Material	15
UNIT III Cytogenetics	Sex Determination and Sex Linkage: Mechanisms of Sex Determination (XX-XY, ZZ-ZW, XX-XO) Dosage Compensation and Barr Body. Genetic Linkage, Crossing Over and Chromosomal Mapping: Tetrad Analysis; Two-point Cross; Three point Cross; Pedigree Analysis, Karyotyping and Banding pattern.	15

22/2/2021

SEMESTER IV		
Course code	Title	Credits
RJUSBT404	Biotechnology and healthcare	2

Course objectives: The objective of this course is to gain insight into Disease diagnosis, treatment and prevention.

Learning outcomes: By the end of the course the student will be able to:

- Understand the various conventional and modern recombinant methods for disease prevention using vaccines.
- Understand modern techniques used for disease diagnosis.
- Gain knowledge regarding treatment using products from non-recombinant, recombinant organisms and gene therapy.

Unit	Topics	Lectures
UNIT I Disease prevention	Ideal vaccine, conventional vaccine, purified antigen vaccine, recombinant vaccine, recombinant polypeptide vaccine, DNA vaccine	15
UNIT II Disease diagnosis	Disease diagnosis using probes, monoclonal antibodies. Detection of genetic disease in fetal cells.	15
UNIT III Disease treatment	Products from non-recombinant and recombinant organisms, interferon, growth factors, antisense nucleotides, monoclonal antibodies, drug designing, delivery and targeting, artificial tissue. Gene therapy – types, augmentation and targeted gene transfer.	15

22/2/2020

SEMESTER IV		
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RJUSBT404	Biotechnology and healthcare	2

Course objectives: The objective of this course is to gain insight into Disease diagnosis, treatment and prevention.

Learning outcomes: By the end of the course the student will be able to:

- Understand the various conventional and modern recombinant methods for disease prevention using vaccines.
- Understand modern techniques used for disease diagnosis.
- Gain knowledge regarding treatment using products from non-recombinant, recombinant organisms and gene therapy.

Unit	Topics	Lectures
UNIT I Disease prevention	Ideal vaccine, conventional vaccine, purified antigen vaccine, Subunit vaccine (recombinant vaccine) – Herpes simplex virus, foot and mouth disease, peptide vaccine, Recombinant polypeptide vaccine, DNA vaccine, Attenuated vaccine	15
UNIT II Disease diagnosis	Disease diagnosis using probes, monoclonal antibodies. Detection of genetic disease in fetal cells, DNA hybridization probe, Diagnosis of Malaria, Detection of *Trypanasoma cruzi*, non-radioactive hybridization procedures, DNA fingerprinting.	15
UNIT III Disease treatment	Products from non-recombinant and recombinant organisms, interferon, growth factors, antisense nucleotides, monoclonal antibodies, drug designing, delivery and targeting, artificial tissue. Gene therapy – types, augmentation and targeted gene transfer.	15

SEMESTER VI		
Course Code	Title	Credits
RJUSBT604	Environmental Biotechnology	2.5

Course objectives: To impart knowledge regarding management of industrial, storm and hazardous waste.

Learning outcomes: By the end of the course the student will be able to:

- Get an insight on the different traditional and new sources of renewable energy.
- Understand the principles and practices involved in treatment of industrial effluent
- Gain an insight in the management and treatment of waste water.
- Understand the disposal of waste from different industries.

Unit	Topics	Lectures
UNIT I Industrial effluent treatment	Biological processes for industrial effluent treatment, aerobic biological treatment- activated sludge process, CASP, advanced activated sludge processes (any two) Biological filters, RBC, FBR Anaerobic biological treatment- contact digesters, packed bed reactors, anaerobic baffled digesters, UASB	15
UNIT II Solid waste treatment	Solid waste treatment; pollution indicators & biosensors; biodegradation of xenobiotics- persistent compounds, chemical properties influencing biodegradability, microorganisms in biodegradation; Use of immobilized enzymes or microbial cells for treatment -	15
UNIT III Wastewater treatment	Wastewater treatment- introduction, biological treatment, impact of pollutants on biotreatment, use of packaged organisms and genetically engineered organisms in waste treatment; Heavy metal pollution – sources, microbial systems for heavy metal accumulation, techniques used for heavy metal removal	15
UNIT IV Hazardous waste management	Biodegradation of waste from industry- Dairy; Distillery; Antibiotic industry;	15

22/2/2020

SEMESTER VI		
Course Code	Title	Credits
RJUSBT604	Environmental Biotechnology	2.5

Course objectives: To impart knowledge regarding management of industrial, storm and hazardous waste.

Learning outcomes: By the end of the course the student will be able to:

- Get an insight on the different traditional and new sources of renewable energy.
- Understand the principles and practices involved in treatment of industrial effluent
- Gain an insight in the management and treatment of waste water.
- Understand the disposal of waste from different industries.

Unit	Topics	Lectures
UNIT I Industrial effluent treatment	Biological processes for industrial effluent treatment, aerobic biological treatment- activated sludge process, CASP, advanced activated sludge processes (any two) Biological filters, RBC, FBR Anaerobic biological treatment- contact digesters, packed bed reactors, anaerobic baffled digesters, UASB	15
UNIT II Solid waste treatment	Solid waste treatment; pollution indicators & biosensors; biodegradation of xenobiotics- persistent compounds, chemical properties influencing biodegradability, microorganisms in biodegradation; Use of immobilized enzymes or microbial cells for treatment -	15
UNIT III Wastewater treatment	Wastewater treatment- introduction, biological treatment, impact of pollutants on biotreatment, use of packaged organisms and genetically engineered organisms in waste treatment; Heavy metal pollution – sources, microbial systems for heavy metal accumulation, techniques used for heavy metal removal	15
UNIT IV Biofertilizer's and Biopesticides	Introduction to Biofertilizer's, Types of Biofertilizer's, Bacteria and *Mycorrhiza* as Biofertilizers. Introduction to Biopesticides, Types, Benefits and Applications.	15

Topics / Units to be changed / reframed

SYBSc

Sem III Paper 304 Unit III - Cytogenetics

Sem IV ✓ Paper 404 Unit I

Unit II

TYBSc

Sem VI Paper 604 ✓ Unit IV - Biopest & biofert

Unit II & III - reframe

22/12/2020