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THIRUVALLUVAR UNIVERSITY

SERKKADU, VELLORE–632115

B.Sc. BIO CHEMISTRY

SEMESTER - II

SYLLABUS

FROM THE ACADEMIC YEAR

2023 – 2024

FIRST YEAR: SEMESTER II

S.No.	Part	Study Components Course Title		Ins. Hrs /week	Credit	Title of the Paper	Maximum Marks		
SEMESTER II							**CIA**	**Uni.Exam**	**Total**
1.	I	Language	Paper-2	6	3	Tamil/Other Languages	25	75	100
2.	II	English	Paper-2	4	3	English	25	75	100
3.	II	NMSDC: Language Proficiency for Employability	Paper-1	2	2	Overview of English Communication	25	75	100
4.	III	Core Course –CC III	Paper-2	5	5	Cell Biology	25	75	100
5.	III	Core Course –CC IV	Paper -3	5	5	Core Practical II -Cell Biology	25	75	100
6.	III	Elective II Generic/ Discipline Specific	Elective II	6	3	Chemistry- II	25	75	100
7.	IV	Skill Enhancement Course SEC-2	Paper2	2	2	Medicinal Diet	25	75	100
8.	IV	Skill Enhancement Course SEC-3 (Discipline Specific)	Paper 1	2	2	First Aid	25	75	100
		Sem. Total		**32**	**25**		**200**	**600**	**800**

FIRST YEAR: SEMESTER II
CELL BIOLOGY

Course Code	Course Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
	Core paper 3: Cell Biology	Core	2	1	-	-	3	4	25	75	100

Learning Objectives

The main objectives of this course are to

- Provide basic understanding of architecture of cells and its organelles.
- Understand the organization of prokaryotic and eukaryotic genome.
- Educate on the structural organization of bio membrane and transportmechanism
- Impart knowledge on cellcycle, cell division and basics of cells
- Familiarize the concept of mechanism of cell-cell interactions.

Module I:	Architecture of cells- Structural organization of prokaryotic and eukaryotic cells microbial, plant and animal cells. The ultrastructure of nucleus, mitochondria, RER, SER, Golgi apparatus, lysosome, peroxisome and their functions	**12Hrs.**
Module II:	Cytoskeleton- microfilament, microtubules and intermediary filament- structure, composition and functions. Organization of Genome -prokaryotic, and eukaryotic genome. Organization of chromatin – histones, nucleosome concept, formation of chromatin structure.	**12Hrs.**
Module III:	Biomembranes- Structuralorganizationofbilipidlayermodelandbasicfunctions- transport across cell membranes- Uniport, Symport and Antiport. Passive and active transport.	**12Hrs.**
Module IV:	Cell cycle-DefinitionandPhasesofCellcycle-Celldivision-MitosisandMeiosis and its significance, Cancer cells- definition, types andcharacteristics of cancer cells.	**12Hrs.**
Module V:	Extracellular matrix – Collagen, Laminin, Fibronectin and Proteoglycans- structure and biological role. Structure and role of cadherin, selectins, Integrin, Cell -cell interactions- Types-gap junctions, tight junctions and Desmosomes	**12Hrs.**

Course Outcomes

CO	On completion of this course, students will be able to	Program outcomes
CO1	Explain the structure and functions of basic components of Prokaryotic and Eukaryotic cells, especially the organelles.	PO1
CO2	Familiarize the Cytoskeleton and Chromatin	PO1,PO2
CO3	Illustrate the structure, composition and functions of cell membrane related to membrane transport	PO1,PO2
CO4	Elaborate the phases of Cell cycle and Cell division-Mitosis and Meiosis and characteristics of cancer cells.	PO1, PO2
CO5	Relate the structure and biological role of extracellular matrix in cellular interactions	PO1,PO2

Text books

1. Arumugam. N, Cell biology. Sara's publication(10ed, paperback), 2019

2. Devasena.T. Cell Biology. Oxford University Press India-ISBN: 9780198075516, 0198075510, 2012

3. Bruce Albert's and Dennis Bray. 2013, Essential Cell Biology. (4^{th}Ed). Garland Science.

Reference books

1. S.C, R. Cell Biology. New age Publishers -ISBN-10: 8122416888/ISBN-13: 978-8122416886, 2008

2.Cooper,G.A.TheCell:AMolecularApproach.SinauerAssociates,Inc-ISBN10: 0878931066 / ISBN 13: 9780878931064, 2013

3. E.M.F., D.R,CellandMolecularBiology.LippincottWilliams&WilkinsPhiladelphia - ISBN: 0781734932 9780781734936, 2006

4. Lodish H.A, Berk C.A, Kaiser M, Krieger M.P, Scott A, Bretscher H, Plough and Matsudaira. 2007. Molecular Cell Biology, 6th Edition, WH. Freeman Publishers, New York, USA.

Web resources

1.https://nicholls.edu/biol-ds/bio1155/Lectures/Cell%20Biology.pdf

2.https://www.medicalnewstoday.com/article/320878.php

3.https://biologydictionary.net /cell

Mapping with Program Outcome

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PSO1	PSO2	PSO3	PSO4
CO 1	3						3			3
CO 2	3	3					3			3
CO 3	3	3					3			3
CO 4	3	3					3	3		3
CO5	3	3					3			3

S-Strong (3) M-Medium (2) L-Low (1)

FIRST YEAR: SEMESTER II

PRACTICAL II CELL BIOLOGY

Course Code	Course Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
	Core paper 4 practical II: Cell Biology	Core practical	-	-	3	-	3	3	25	75	100

Learning Objectives

The main objectives of this course are to

- Learn the parts of Microscope
- Investigate the Cells under microscope.
- Image the Cells using different stains
- Identify the Cells, Organelles and stages of cell division
- Identify the spotters

IMICROSCOPYANDSTAININGTECHNIQUES

1. Study the parts of Light and Compound microscope
2. Preparation of Slides and Micrometry
3. Examination of prokaryotic and eukaryotic cell
4. Visualization of animal and plant cell by methylene blue
5. Visualization of Nuclear fraction by acetocarmine stain
6. Staining and visualization of Mitochondria by Janus Greenstein

II GROUP EXPERIMENT

7. Identification of different stages of Mitosis in onion root tip
8. Identification of different stages of Meiosis in onion bulb

III SPOTTERS

9. a) **Cells**: Nerve, Plant and Animal cell

   b) **Organelles**: Mitochondria, Chloroplast, Endoplasmic reticulum,

   c) **Mitosis stages**–Prophase, Anaphase, Metaphase, Telophase

Course Outcomes

CO	On completion of this course, students will be able to	Program outcomes
CO1	Identify the parts of Microscope.	PO1,PO2

CO2	Preparation of Slides	PO1,PO2
CO3	Identify the stages of Mitosis & Meiosis	PO1,PO2
CO4	Visualize Nucleus and Mitochondria by staining methods	PO1,PO2
CO5	Identify the spotters of cells, organelles and stages of Cell division	PO1,PO2

Textbooks

1. Rick wood. D and J.R.Harris Cell Biology: Essential Techniques John Wiley 1996.
2. Davis J.M. Basic Cell culture: A practical approach IRL 1994.
3. Ganesh M.K. and Shivashankara A.R. 2012. Laboratory Manual for Practical Biochemistry Jaypee publications 2nd Edn.

Web resources

1. https://www.microscopemaster.com/organelles.html
2. https://www.pdfdrive.com/biochemistry-books.htm
3. http://medcell.med.yale.edu/histology/cell_lab.php#:~:text=
4. The%20electron%20microscope%20is%20necessary,and%20small
5. %20granules%20and%20vesicles.
6. http://amrita.olabs.edu.in/?sub=79&brch=18&sim=237&cnt=1
7. https://www.khanacademy.org/science/ap-biology/heredity/
8. meiosis-and-genetic diversity/a/phases-of-meiosis
9. https://www.microscopemaster.com/organelles.html
10. https://www.pdfdrive.com/biochemistry-books.html

Mapping with Program Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PSO1	PSO2	PSO3	PSO 4
CO 1	2	3					3	3	3	3
CO 2	2	3					3	3	3	3
CO 3	2	3					3	3	3	3
CO 4	2	3					3	3	3	3

S-Strong (3) M-Medium (2) L-Low (1)

SKILL ENHANCEMENT COURSE –SEC II

MEDICINAL DIET

Course Code	Course Name	Category		L	T	P	S	Credits	Inst. Hours	Marks		
										CIA	External	Total
	NME: Medicinal Diet	SEC		1	1	-	-	2	2	25	75	100

Learning Objectives

The main objectives of this course are to

- Provide basic knowledge about diet
- Understand of diet modification for GI diseases
- Plan a diet for liver diseases
- Prepare diet chart for Infectious diseases
- Plan a diet for Diabetes ,Renal and Cardio-vascular diseases

Module-I	Principles of Therapeutic Diet: Definitions of Normal diet, Therapeutic diet, Soft Diet and Liquid diet. Objectives of Diet Therapy. Advantages of using normal diet as the basis for Therapeutic diet.	**6 Hrs**
Module II	Diet modification in Gastrointestinal diseases: Peptic ulcer, Diarrhoea, Lactose intolerance, Constipation and Malabsorption syndrome	**6 Hrs**
Module III	Diet Modification in liver and gall bladder in diseases: Etiology, symptoms and dietary treatment in jaundice, hepatitis, Cirrhosis of liver and hepatic coma.	**6 Hrs**
Module IV	Diet Modification in Infectious Diseases: Fevers, Typhoid, Tuberculosis and Viral Hepatitis. Dietary modifications in Tuberculosis.	**6 Hrs**
Module V	Diet Modification in Diabetes ,Renal and Cardio-vascular diseases-DiabetesAcute& Chronic glomerulo nephritis, nephrosis, renal failure, kidney stone and Hypertension.	**6 Hrs**

Course Outcomes

CO	On completion of this course, students will be able to	Program outcomes
CO1	Possess basic knowledge about diet	PO1
CO2	Sketch diet plan for GI diseases	PO1,PO4,PO5,PO6
CO3	Sketch diet plan for liver diseases	PO1,PO4,PO5,PO6
CO4	Sketch a diet plan for Infectious diseases	PO1,PO4,PO5,PO6
CO5	Prepare diet chart for Diabetes Renal and Cardio-vascular diseases	PO1,PO4,PO5,PO6

Text Books

1. M.Raheena Begum, A Text Book of Foods, Nutrition and Dietetics, Sterling Publishers Pvt.Ltd.

2. M.V.Raja Gopal, Sumati. R., Mudambi, Fundamentals of foods and Nutrition, Wiley Eastern Limited, Year-1990.

3. William S.R Nutrition and Diet Therapy, 1985, 5thedition, Mosly Co. St. Louis.

Reference books

1. Rodwell Williams Nutrition and Diet Therapy, 1985, the C.V MoslySt.Louis.

2. M.V.Krause & M.A.Mohan, Food Nutrition and Diet Therapy, 1992 by W.B Saunders Company, Philadelphia, London.

3. Davidson and Pass more, Human Methods and Diabetics, 1976 the English Language Book Society and Churchill.

Web sources

Mapping with Program Outcomes

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PSO1	PSO2	PSO3	PSO4
CO 1	2						3	3		3
CO 2	2			2	3	2	3	3		3
CO 3	2			2	3	2	3	3		3
CO 4	2			2	3	2	3	3		3
CO 5	2			2	3	2	3	3		3

S-Strong (3) M-Medium (2) L-Low (1)

FIRST AID

Course Code	Course Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
	First Aid	SEC (Discipline)	1	1	-	-	2	2	25	75	100

Learning Objectives

The main objectives of this course are to:

- Provide knowledge on the basics of first aid.
- Perform first aid during various respiratory issues.
- Demonstrate the first aid to treat injuries.
- Learn the first aid techniques to be given during emergency.
- Familiarize the first aid during poisoning.

Module I	Aims and important rules of first aid, dealing with emergency, types and content of a first aid kit. First aid technique – Dressing and Bandages, fast evacuation technique, transport techniques.	**6 Hrs**
Module II	Basics ofRespiration – CPR, first aid during difficult breathing, drowning, choking, strangulation and hanging, swelling within the throat, suffocation by smoke or gases and asthma. 6 Hrs	**6 Hrs**
Module III	Common medical aid- first aid for wounds, cuts, head, chest, abdominal injuries, shocks, burns, amputations, fractures, dislocation of bones.	**6 Hrs**
Module IV	First aid related to unconsciousness, stroke, fits, convulsions-seizures, epilepsy	**6 Hrs**
Module V	First aid in poisonous bites (Insects and snakes), honey bee stings, animal bites, disinfectant, acid and alkali poisoning	**6 Hrs**

Course Outcomes

CO	On completion of this course, students will be able to	Program outcomes
CO1	Discuss on the rules of first aid, dealing during emergency and first aid techniques	PO1.PO4,PO5

CO2	Understand the first aid techniques to be given during different types of respiratory problems	PO1.PO4,PO5
CO3	Provide first aid for injuries, shocks and bone injury	PO1.PO4,PO5
CO4	Detail on the first aid to be given for unconsciousness, stroke, fits and convulsions	PO1.PO4,PO5
CO5	Gain expertise in giving first aid for insect bites and chemical poisoning	PO1.PO4,PO5

Text books

1) First aid and health Dr. GauriGoel, Dr. Kumkum Rajput, Dr.ManjulMungali

1SBN-978-93-92208-19-5

2) Indian First Aid Mannual-https://www.indianredcross.org/publications/FA-manual.pdf

3) Red Cross First Aid/CPR/AED Instructor Manual

Reference books

Web resources

1)https://www.redcross.org/take-a-class/first-aid/first-aid-training/first-aid-online

2)https://www.firstaidforfree.com/

Mapping with Program Outcomes

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PSO1	PSO2	PSO3	PSO4
CO 1	2						3	3	3	3
CO 2	2			3	3		3	3	3	3
CO 3	2			3	3		3	3	3	3
CO 4	2			3	3		3	3	3	3
CO5	2			3	3		3	3	3	3

S-Strong (3) M-Medium (2) L-Low (1)

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