KL UNIVERISTY
FIRST SEMESTER 2010-11
Course Handout
Academic Division

Dated: 07-07-2010

Course No. : BT C203
Course Title : Cell Biology
Course Structure : 3-0-0
Course coordinator : S Prasanthi

1. Course Description:
The main objective of this paper is to strengthen the fundamentals of living organisms ranging from simple to complex organisms. It will help the students to analyze and apply the basic principles for development / production of useful products from biological organisms. This paper deals with basics of cell biology , structure and plasticity, cell types, cell division, tissue formation, cell boundary components and characteristics of membranes, ways to move molecules across membranes.

2. Scope and Objective of the Course:
This course is concerned primarily with eukaryotic cells structural details and the molecular functions of the different parts of the cell Cell biology is defined as the basic unit of Life. All the basic molecules responsible for living and sustaining normal life are biomolecules, like carbohydrates, lipids, proteins, nucleic acids were incorporated with in the cell. The basic understanding of Cell biology is a pre-requisite for any student trying to establish a research or academic career in the field of Biotechnology. Most of the research in Biotechnology hovers around nuclear components of cell especially DNA. Thus, it is essential to know the morphology and various functions of sub cellular components. .

3. Books:

(i) Textbook:

1. Cell Biology, Genetic, Molecular Biology, Evolution and Ecology by P.S. Verma and V. K. Agarwal, S. Chand and Company Ltd.
2. Cell Biology: S.C.Rastogi- New age international publishers

(ii) Reference Book:

1. Cell Biology & Molecular Biology
   - EDP Roberties & EMF Roberties, Sauder College.
2. The Cell-By Geoffrey's. Cooper, ASM press Washington, D.C.

4. Syllabus:

UNIT – 1: Introductory Cell Biology
What are microorganisms? Differences between Eukaryotic and prokaryotic organisms. Structure and function of Prokaryotic and Eukaryotic cell – bacterial cell, plant cell, animal cell, Cyanobacterial cell. Cell organelles – plasma membrane, mitochondira, Golgi complex, E.R. Lysosomes, Ribosomes. -9hrs.

UNIT – II: Nuclear Organization
Nuclear ingredients – Nuclear membrane, Nature of the genetic material, Nucleoproteins. Packaging of genetic material, Nucleosome model, Organization of Chromatin, Chromosome. Cytoskeleton – Microtubules, microfilaments. -9 hrs.

UNIT – III: Cell division and cell cycle.

Cell Reproduction and Division: Mitosis and Meiosis. Cell cycle and Regulation - Steps in cell cycle, Go-GI transition, cell cycle check points, Chromosome movements, regulation of cell division. Cell differentiation: cortical differentiation, nucleardifferentiation and cell death -9 hrs

UNIT IV: Tissues, Receptors and Signaling

Plant – Meristems, Simple, complex and special tissues. Growth patterns, Cell growth and mechanisms. Embryonic development, Organogenisis, metamorphosis, Cell signaling- Membrane receptors, Cell-Cell interactions

-9 hrs

UNIT – V: Membrane Structure and Transport

The structural and functional organization of cell membrane. Cell surface – the extra cellular matrix of eukaryote's cell wall. Transport across cell membrane – passive and active transport, Na- pump, Ca^{2+} ATPase pumps, Lysosomal and Vacuolar membrane ATP dependent proton pumps, Co-transport into prokaryotic cells, endocytosis, exocytosis, pinocytosis and phagocytes.

-9 hrs

5.Course Plan:

Lect.No	Learning Objectives	Topics to be Covered	Reference	Chapters
1.	Introduction	Cell hierarchy	T1 P124	1
2.	Prokaryotic cell	Bacteria cell structure and functions	T1 P124-126,	1
3.	Eukaryotic cell	Animal cell	T1 P:127	1
4.	Eukaryotic cell	Plant cell	T1 P:127-128	1
5.	Cell organelles	Plasma membrane	T1 P:129,130	1
6.	Cell organelles	mitochondria	T1 P:132,133	1
7.	Cell organelles	Golgi complex	T1 P:139-140	1
8	Cell organelles	Endoplasmic reticulum	T1 P:141	1
9	Cell organelles	lysosomes	T1 P:175-183	1
10	Cell organelles	ribosomes	T1 P:280-292	1
11	Nuclear ingredients	Nuclear membrane	T1p 243-256,R2 315-330	2
12	Nuclear ingredients	Genetic material	R2 p315-330	2
13.	Nuclear ingredients	nucleoproteins	R2 p315-330	2
14.	Nucleosome model	Nucleosome model	R2 p315-330	2

15.	chromatin	Organization of chromatin	R2 p315-330	2
16.	chromosomes	chromosomes	R2 p315-330	2
17.	cytoskeleton	microtubules	T1 P293-303,R1 P174-180	2
18.	cytoskeleton	microfilaments	T1 P293-303,R1 P158-163	2
19.	Cell division	mitosis	T2 P:237,238	3
20.	Cell division	meiosis	T1 p330-334	3
21.	Cell cycle	Steps in cycle	T1 p261-264	3
22.	Cell cycle	Check points	R2 p576	3
23.	Cell cycle	Chromosome movement	R2 p577	3
24.	Cell cycle	Regulation of cell division	R2 p574	3
25.	Cell differentiation	Cortical differentiation	T1 p399-405	3
26.	Cell differentiation	Nuclear differentiation	T1 p399-405	3
27	Cell death	apoptosis	T1 p459-464	3
28.	Plant tissues	Meristems	E-learning notes	4
29.	Plant tissues	Simple tissues	E-learning notes	4
30	Plant tissues	Complex tissues	E-learning notes	4
31.	Plant tissues	Special tissues	E-learning notes	4
32.	Cell growth	Growth patterns	E-learning notes	4
33	Cell growth	Cell growth mechanism	E-learning notes	4
34.	Cell growth	Organogenesis	E-learning notes	4
35	metamorphosis	Metamorphosis	E-learning notes	4
36	Cell signaling	Signaling	T1 p441-444	4
37.	receptors	Extranal,internal receptors	T1 p445-456	4
37.	Cell – cell interactions	CAM, CJM	T2 P80-86	4
38	Cell membrane-CELL MATRIX	Structure and functions,	T1 p146-153,R2 P504-509	5
39	Transport	Passive transport	T1 p126-142	5
40	Transport	Active transport	T1 p126-142	5
41	Transport	Na-K pumps,ca+ ATPase pumps	T1 p126-142	5
42	Transport	Proton pumps	T1 p126-142	5
43	Transport	Co-transport	T1 p126-142	5
44	Transport	Endocytosis-exocytosis	T1 p126-142	5
45	Transport	Pinocytosis and phagocytes-over all view	T1 p126-142	5

6.Self learning material:

S.NO	Topic	Source	Counseling classes
1	Different types of bacteria and morphology	Internet	
2	Animal cell hierarchy		
3	Animal cell classification		
4	Plant cell classification		
5	Tissue classifications in human beings		
6	DNA ,RNA		
7	What are proteins		

7.Evaluation Scheme:

Component	Duration (minutes)	% Weightage	Marks	Date & Time	Venue
Test-1	50 Min	10	10	11.08.2010 09.30 – 10.20	NSH
Test-2	50 Min	10	10	15.09.2010 09.30 – 10.20	NSH
Assignement submission		5	5	Continuous	NSH
Assignment Test	50 Min	5	5	27.10.2010 09.00 – 10.20	NSH
Quiz	30 Min	5	5	27.10.2010 09.00 – 10.20	NSH
Regular Lab Evaluation	Continuous	0	0		
Comprehensive Lab Exam	3 Hrs	0	0		
Comprehensive Exam	3 Hrs	60	60		
Attendance for Theory & Tutorial		5	5	Continuous	
Attendance for Lab		0	0	Continuous	

8. Chamber consultation hour: Informed in the class in first week.

9. Notices: All notices regarding the course will be put in E-learning website.

Course Coordinator