SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Department of Biotechnology	LP: BT22044 Rev. No: 00 Date: 20.01.2025
~~B.E~~/B.Tech/~~M.E/M.Tech~~ : Biotechnology Regulation:2022 PG Specialisation : Not Applicable Sub. Code / Sub. Name : BT22044 / Cancer Biology Unit : I - Cell Cycle and Cancer	

Unit Syllabus: Regulation of cell cycle, Cell proliferation and apoptosis; signal transduction pathways of apoptosis and signaling molecules; defective apoptotic pathways leading to cancer; mutations that cause changes in signal molecules, effects on receptor, modulation of cell cycle in cancer; Mechanism of spread; Different forms of cancers.

Objective: To understand the basic biology of cancer formation

Session No *	Topics to be covered	Ref	Teaching Aids
1.	Introduction to the Cell Cycle	TB1: Pg(18-27)	GCR/LCD
2.	Cell proliferation and Apoptosis	TB1: Pg(36-47)	GCR/LCD
3.	Apoptosis Pathways	TB1: Pg(52-57)	GCR/LCD
4.	Signal Transduction Pathways in Apoptosis	TB1: Pg(61-87)	BB/LCD
5.	Defective Apoptotic Pathways	TB1: Pg(87-89)	BB/LCD
6.	Mutations in Signal Molecules and Receptors	TB2: Pg(9-36)	BB/LCD
7.	Modulation of the Cell Cycle in Cancer	TB2: Pg(47-62)	BB/LCD
8.	Mechanism of Cancer Spread (Metastasis)	TB1: Pg(106-127)	BB/LCD
9.	Different Forms of Cancer	TB1: Pg(148-217)	BB/LCD
Content beyond syllabus covered (if any):			

* Session duration: 50 minutes

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Sub. Code / Sub. Name: BT22044 / Cancer Biology

Unit : II - Principles of Carcinogenesis

Unit Syllabus : Cancer causes Theory of carcinogenesis, metabolism of carcinogenesis, Types of carcinogens, Mechanisms of Physical, Chemical and Biological carcinogenesis.

Objective: To study the various causative agents of cancer

Session No *	Topics to be covered	Ref	Teaching Aids
10.	Introduction to Cancer	TB2: Pg(15-21)	GCR/LCD
11.	Theory of Carcinogenesis	TB2: Pg(216-237)	GCR/LCD
12.	Metabolism of Carcinogenesis	TB2: Pg(82-87)	GCR/LCD
13.	Types of Carcinogens	TB2: Pg(68-71)	BB/LCD
14.	Mechanisms of Chemical Carcinogenesis – I	TB2: Pg(74-98)	BB/LCD
15.	Mechanisms of Chemical Carcinogenesis – II	TB2: Pg(74-98)	BB/LCD
16.	Mechanisms of Physical Carcinogenesis	TB2: Pg(117-142)	BB/LCD
17.	Mechanisms of Biological Carcinogenesis – I	TB2: Pg(146-167)	BB/LCD
18.	Mechanisms of Biological Carcinogenesis – II	TB2: Pg(146-167)	BB/LCD

Content beyond syllabus covered (if any):

* Session duration: 50 mins

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Sub. Code / Sub. Name: BT22044 / Cancer Biology

Unit : III - Molecular Cell Biology of Cancer

Unit Syllabus : Signal targets and cancer, activation of kinases; Oncogenes, identification of oncogenes, mechanism of oncogene activation, retroviruses and oncogenes, detection of oncogenes. Oncogenes/proto oncogene activity; tumor suppressor genes - Rb, p53, APC, BRCA paradigms; Telomerases.

Objective: To give the overview about structure and functions of various genes involved in cancer formation

Session No *	Topics to be covered	Ref	Teaching Aids
19.	Introduction to Signal Transduction in Cancer	R1 Pg(25-36)	GCR/LCD
20.	Activation of Kinases	R1 Pg(36-38)	GCR/LCD
21.	Oncogenes	R1 Pg(48-51)	GCR/LCD
22.	Mechanism of Oncogene Activation	R1 Pg(112-123)	BB/LCD
23.	Retroviruses and Oncogenes	R1 Pg(127-132)	BB/LCD
24.	Detection of Oncogenes	R1 Pg(135-137)	BB/LCD
25.	Proto-Oncogene and Oncogene Activity	R1 Pg(139-141)	BB/LCD
26.	Tumor Suppressor Genes	R1 Pg(142-151)	BB/LCD
27.	Telomerases and Cancer	R1 Pg(153-155)	BB/LCD

Content beyond syllabus covered (if any):

* Session duration: 50 mins

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Sub. Code / Sub. Name: BT22044 / Cancer Biology

Unit : IV - Cancer Metastasis

Unit Syllabus : Clinical significances of invasion, heterogeneity of metastatic phenotype, metastatic cascade, basement membrane disruption, three step theory of invasion, proteinases and tumour cell invasion; Angiogenesis.

Objective: To learn about the detailed concepts and methods involved in studying cancer metastasis

Session No *	Topics to be covered	Ref	Teaching Aids
28.	Introduction to Cancer Invasion and Metastasis	R2 Pg (1-10)	GCR/LCD
29.	Heterogeneity of Metastatic Phenotype	R2 Pg (11-22)	GCR/LCD
30.	The Metastatic Cascade	R2 Pg (31-41)	GCR/LCD
31.	Basement Membrane Disruption in Metastasis	R2 Pg (42-51)	BB/LCD
32.	Three-Step Theory of Invasion	R2 Pg (62-67)	BB/LCD
33.	Proteinases and Tumor Cell Invasion	R2 Pg (68-71)	BB/LCD
34.	Angiogenesis in Cancer	R2 Pg (172-208)	BB/LCD
35.	Mechanisms of Angiogenesis	R2 Pg (216-237)	BB/LCD
36.	Clinical Implications and Therapeutic Strategies	R2 Pg (239-241)	BB/LCD

Content beyond syllabus covered (if any):

* Session duration: 50 mins

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Sub. Code / Sub. Name: BT22044 / Cancer Biology

Unit : V - Cancer Therapy

Unit Syllabus : Therapy forms – surgery, chemotherapy, radiation therapy; Detection of cancers, prediction of aggressiveness of cancer, advances in cancer detection, Detection using biochemical assays and molecular; Different types of tumour markers; New approaches of cancer therapy – mAbs, vaccines, gene therapy.

Objective: To give an exposure to the students on various techniques associated with cancer treatment

Session No *	Topics to be covered	Ref	Teaching Aids
37.	Introduction to Cancer Therapy	TB3 Pg (27- 29)	GCR/LCD
38.	Surgery in Cancer Treatment	TB3 Pg (31 - 35)	GCR/LCD
39.	Chemotherapy	TB3 Pg (39- 51)	GCR/LCD
40.	Radiation Therapy	TB3 Pg (61 -69)	BB/LCD
41.	Detection of Cancers	TB4 Pg (312-329)	BB/LCD
42.	Prediction of Aggressiveness of Cancer	TB4 Pg (336-339)	BB/LCD
43.	Advances in Cancer Detection	TB4 Pg (352-359)	BB/LCD
44.	Types of Tumor Markers	TB4 Pg (361-367)	BB/LCD
45.	New Approaches in Cancer Therapy	TB4 Pg (371-375)	BB/LCD

Content beyond syllabus covered (if any):

* Session duration: 50 mins

Sub Code / Sub Name: BT22044 / Cancer Biology

REFERENCES:

TEXTBOOKS:

1. Pelengaris S and Khan M., The Molecular Biology of cancer, Blackwell Scientific Publications, Oxford, 2006.
2. Robin Hesketh, Introduction to Cancer Biology, Cambridge University Press, 2013.
3. Kufe, DW, Pollock, RE, Weichselbaum, RR, Bast R.C., Gansler TS., Holland JF Frei, E, Cancer medicine, 6th Edition, BC Deckker Inc., Toranto, Canada, 2003.
4. Julien L. Van Lancker, Apoptosis, Genomic Integrity And Cancer, Standard Edition, Jones and Bartlett Publishers, 2005

REFERENCE BOOKS:

1. Lauren Pecorino, Molecular Biology of Cancer, 5th edition, OUP Oxford, 2021
2. Kleinsmith, Principles of Cancer Biology, 1 st Edition, Pearson Education India, 2016

	Prepared by	Approved by
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Remarks *: The same lesson plan will be followed in the subsequent year

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