DEPARTMENT OF BOTANY
UNDERGRADUATE COURSE CURRICULUM 2023-24

PART-A: Introduction				
Program: *Certificate Course*		Class: B. Sc. Semester- II	Year: 2023	Session: 2023-2024
1	Course Code	BSC–2T		
2	Course Title	Cytology, Genetics and Cytogenetics		
3	Course Type	Core Course		
4	Pre-requisite (if, any)	As per Government norms / Institutional scheme		
5	Course Learning. Outcomes (CLO)	At the end of this course, the students will be able to ➢ *Understand the cell structure as an unit of living beings* ➢ *Aware with the basic concept of Genetics and fundamentals of Cytogenetic- genetics based on chromosomes* ➢ *Become familiar with cellular mechanism of living organism, concept of nucleic acid as genetic material* ➢ *Understand the concept of Mendel's experiment, Mendelian genetics Post Mendelian – classical genetics*		
6	Credit Value	03		
7	Total Marks	Max. Marks: 100	Min Passing Marks: 40	

PART- B: Content of the Course		
Total No. of Teaching Hours – 45 Hours		
Unit	**Topics (Course contents)**	**No.of Hours**
I	**Cytology-I / Plant cell:** Concept of cytology & The Cell Theory; Prokaryotic and eukaryotic cells; Ultra structure of Plant Cell & Cell Organelles –, Mitochondria, Chloroplast, E.R, Golgi-complex, Ribosome, Lysosome and Cell Membrane and Cell Wall – Chemical composition, Latest concept of structure and function.	11 Hours
II	**Cytology-II / Nucleus & Division:** Nucleus – nuclear envelop & nuclear pore, Nuclear material – Nucleic acid – DNA & RNA, Chromatin & Chromosome (DNA packaging in eukaryotes). Nucleolus (Structure, Function and Biogenesis). Overview of Cell cycle – G1, S, G2 & M phases, Events of Mitosis and Meiosis; its significance and Molecular controls.	11 Hours
III	**Genetics (Classical):** History of Mendel' experiments, Terminologies; Laws of Inheritance; Test cross, Co- dominance, incomplete dominance; Modified Mandelian Ratios: 2:1- lethal Genes; 9:7; 9:4:3; 13:3; 12:3:1. 15:1. Cytoplasmic Inheritance & Male sterility. Linkage: concept & types, complete & incomplete linkage, bridges experiment, coupling & repulsion, Crossing over: concept and significance.	11 Hours
IV	**Cytogenetic:** Structural chromosomal changes -Deletions, Duplications, Inversions & Translocations. Numerical chromosomal changes: Aneuploidy – types, cause& consequences; Euploidy, Polyploidy – types, origin and interrelation; Mutation – concept and molecular basis. Types of mutations, types, nature and effects of physical & chemical mutagens. Role of chromosomal aberration, polyploidy & mutation in evolution & crop improvement.	12 Hours
Keywords	*Cytology, Cyplasmic organelle, Cell cycle, Mendel's, Genetics, Cytogenetics*	

Signature Members of BOS-

1 2 3 4 5 6

PART–C: (BSC–2T)

Learning Resources: Text Books, Reference Books and Others

Text Books Recommended -

1. Cell Biology; Powar C. B. and Daginawala H. I., Himalay Pub. House, Bombay.
2. Cell biology by Karp, G. 2010.
3. Cell and Molecular Biology: Concepts and Experiments. 6th Edition.John Wiley & Sons. Inc.
4. De Robertis, E.D.P. and De Robertis, E.M.F. 2006.Cell and Molecular Biology.8th edition. Lippincott Williams and Wilkins, Philadelphia.
5. Genetics by P. K. Gupta, Rastogi Publication
6. Gytogenetics, Molecular biology and Plant breeding by P. K. Gupta, Rastogi Publication
7. Becker, W.M., Kleinsmith, L.J., Hardin. J. and Bertoni, G. P. 2009.The World ofof the Cell.7th edition. Pearson Benjamin Cummings Publishing, San Francisco.

Online Resources–

- **e-Resources /e-books and e-learning portals**
- **Use of following sites**

1. *http://rastogipublications.com/index.php?route=product/product&product_id=50*
2. https://www.uou.ac.in/sites/default/files/slm/BSCBO
3. https://dspace.uzhnu.edu.ua/jspui/bitstream/lib/2985/1/Cytology&Genetics.pdf
4. *https://ysmubooks.am/uploads/MEDICAL_BIOLOGY.pdf*
5. *https://www.biologyonline.com/dictionary/chromosomal-mutation*
6. *https://www.bioexplorer.net/chromosomal-mutations.html/*
7. *http://adpcollege.ac.in/online/attendence/classnotes/files/1589181737.pdf*
8. *http://www.jnkvv.org/PDF/05052020112111155201108.pdf*
9. *http://icvcollege.edu.in/sites/default/files/mutation%2C%20types%2C%20and%20detection%20of%20mutation.pdf*
10. *https://old.amu.ac.in/emp/studym/100005252.pdf*
11. *http://eagri.org/eagri50/GBPR111/lec02.pdf*
12. *https://www.ncbi.nlm.nih.gov/books/NBK9876/*
13. *https://opentextbc.ca/biology/chapter/6-2-the-cell-cycle/*
14. *https://www.biologydiscussion.com/genetics/linkage-of-genetics-features-examples-types-and-significance/5183*

Part - D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	**100 Marks**
Continuous Comprehensive Evaluation (CCE):	**20 Marks**
Semester End Exam (SEE):	**80 Marks**

Internal Assessment: Continuous Comprehensive Evaluation (CCE)	Internal Test - 02 of 10 Marks each Assignment –01 of 10 Marks	The best obtained marks of both test exam and marks of Assignment shall be considered against 20 Marks
Semester End Exam (SEE):	Paper – **Two section – A & B** Section A: Objective and Short answer type questions – **10 + 30 = 40 Marks** **Objective-10 x 1=10; Short Answer Type Questions- 10 x 3=30** Section B: Descriptive answer type questions unit wise – **4 x 10 = 40 Marks**	

Signature Members of BOS-

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