

Devi Ahilya Vishwavidyalaya Indore (M.P.)

Department of Higher Education, Govt. of M.P.

Post Graduate Semester wise Syllabus

As recommended and Approved by Board of Studies D.A.V.V.

उच्च शिक्षा विभाग, म.प्र. शासन

स्नातकोत्तर कक्षाओं के लिये सेमेस्टर अनुसार पाठ्यक्रम

अध्ययन मण्डल देवी अहिल्या विश्वविद्यालय द्वारा अनुशंसित तथा अनुमोदित

Session (सत्र) 2020-21

M. Sc. Botany (Semester System)



Third Semester

Course PG 304:

Genetics and Biostatistics

85+15

- UNIT I: **Mendelian genetics:** Monohybrid, dihybrid crosses, gene interaction, co-dominance and lethal allele, extra nuclear inheritance, chloroplatic DNA and mitochondrial DNA. Mechanism of genetic recombination, gene mapping in prokaryotes.
- UNIT II: **Genetics of eukaryotes:** Linkage phenomenon, detection of linkage through test cross, genetics recombination in eukaryotes. Crossing over, mechanism of genetics recombination. Hybrid DNA models, constructions of genetic maps using two point and three point test cross, tetrad analysis mitotic recombination.
- UNIT III: **Gene mutation:** Spontaneous, induced, physical, chemical mutagens and molecular basis of mutation. Importance of mutation. DNA damage and repair mechanism. Transposable genetic elements in prokaryotes and eukaryotes. Mutation by transposones.
- UNIT IV: **Nuclear DNA content:** c-Value paradox, cot curve and its significance, repetition and satellite DNA. 'in situ' hybridization of satellite DNA. Introns and their significance. Multigene family and their evolution.
- UNIT V: **Biostatistics:** Measurement of central tendencies, Standard deviation, standard error, Probability rules, t-text, X^2 (chi-square) test, correlation, regression analysis and Binomial distribution.

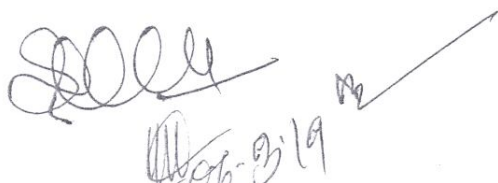

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Suggested Laboratory Exercises based on course 303-

1. Isolation of DNA and preparation of cot curve.
2. Demonstration of Mitosis/Meiosis(normal and abnormal).
3. Determination of Mitotic index in various plant materials.
4. Exercise based on probability rules.
5. Genetic exercise on Mendel's laws, Monohybrid and Dihybrid crosses.
6. Numerical exercise on gene interactions.
7. Numerical on chi square test, F-test and central tendencies.
8. Numerical exercise on genetical mapping in Eukaryotes.
9. Experiments on mutation.
10. Demonstration of aneuploidy, polyploidy etc.

Suggested Readings-

1. Atherly, A.G. Girton, J.R. and Mc Donald, J.E.1999. The Science of Genetics: SaPosts college publishing, Fort Worth, USA.
2. Burnham, C.R.1962. Discussions in Cyto genetics, Burgess publishing Co. Minnesota.
3. Busch. H. and Rothblum. L.1982. Volume X. The cell nucleus rDNA part A. Academic press.
4. Hartl, D.L. and Jones, E.W.1998. Genetics: Principles and Analysis(4th edition). Jones and Bartlett publishers, Massachusetts, USA.
5. Hattl, D.L.and Jones, E.W.2006. Genetics:Principles and Analysis(5th edition). Jones and Bartlett publishers, Massachusetts, USA.
6. Khush, G.S.1973. Cyto genetics of Aneuploids. Acedemic press, New York, London.
7. Lewis, B.2000 Gene7. Oxford University Press, New York, USA.
8. Lewis,R.1997, Human, Genetics: Concepts and Application (2nd edition). WCB McGraw, Hill, USA.
9. Russel, P.J.1998. Genetics(5th edition). The Benjamin/Cummings publishing company Inc.,USA.
10. Snusted, D.P. and Simmons, M.J. 2000. Principles of Genetics(2nd edition). Jhon Wiley and Sons Inc., USA.
11. Snusted, D.P. and Simmons, M.J.2006 Principles of Genetics(3rd edition). Jhon Wiley and Sons Inc.,USA.
12. Lewin, B.2006, Genes 7, Oxford University press, New York.

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