

Kanya Maha Vidyalaya, Jalandhar (Autonomous)

Scheme and Curriculum of Examinations of Two Year Degree Programme

(Under Credit Based Continuous Evaluation Grading System) (CBCEGS)

Master of Science (Botany)

Session: 2026-27

Master of Science (Botany) Semester-II										
Course Code	Course Title	Course Type	Hours Per week L-T-P	Credits L-T-P	Total Credits	Marks				Examination time (in Hours)
						Total	Th.	P	CA	
MBTL-2336	Mathematical Biology	C	3	3-0-0	3	100	70	-	30	3
MBTP-2078	Botany Practicals IV	C	6	0-0-3	3	100	-	70	30	6

C- Compulsory

Master of Science (Botany)
Semester-II
Session: 2026-27
Course Title: Mathematical Biology
Course Code: MBTL-2336

Course outcomes

After the successful completion of this subject, the students should be able to:

CO 1: Recognize linear function, power function, periodic function, exponential function and trigonometric relation and apply differentiation and integration in real life Scenario.

CO 2: Calculate differentiation and integration of some important functions by using different rules.

CO 3: Understand the concept of random experiment and laws of probability.

CO 4: State the null hypothesis and alternative hypothesis (both one way and two ways) for the application of t-test, Chi Square test and ANOVA.

Master of Science (Botany)
Semester-II
Session: 2026-27
Course Title: Mathematical Biology
Course Code: MBTL-2336

Examination time: 3 Hrs.

L T P
3 0 0

Max. Marks- 100

Theory - 70

CA – 30

Instructions for the Paper Setters:

Eight questions of equal marks (14 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section. The question paper must contain 30% of the article/theory from the syllabus.

The students can use only Non-Programmable & Non-Storage Type Calculator and statistical tables.

Unit I

1. Linear Function: $y=ax$ and $y=ax+b$
2. Power Function: $y=ax^n$.
3. Sine and cosine, trigonometric relations.
4. Exponential and Logarithmic Functions: Exponential function $y=aq^x$, logarithmic function.

Unit II

5. Differentiation and Integration: differentiation of some important functions (Linear function, Power function, Logarithmic, Exponential, Trigonometric functions), product rule and quotient rule of differentiation, chain rule of differentiation.
6. Integration: Rules of integration (Linear function, Power function, Logarithmic, Exponential, Trigonometric Functions), integration by substitution, integration of product of two functions.

Unit III

7. Probability: Random experiment, sample space events, mathematical definition of probability, addition and multiplication law of probability. Statistics: Mean, standard deviation, Normal Distribution, Simple linear regression and correlation.

Unit IV

8. Hypothesis testing: Sample Statistics and parameters, standard error, t-test as a test of single mean, chi square test as a goodness of fit and association of attributes (For uniformity, ratio and proportion), One way ANOVA & Two way ANOVA

Reference Books:

1. O.P Arora, V.K Bhandari, Mathematics, S.Dinesh and Co., Jalandhar city, Second edition, 2000 (Scope in Chapter-6)
2. O.P Arora, V.K Bhandair, Mathematics, S.Dinesh and Co., Jalandhar city, ninth edition, 2004 (Scope in Chapters-3,5,7,8)
3. P.N Arora, P.K Malhan, Biostatistics, Himalaya Publishing House, New Delhi, Second edition, 2013 (Scope in Chapters-5,6,8,9,10,11,12,13,14).

Master of Science (Botany)
Semester-II
Session: 2026-27
Botany Practicals IV
MBTP-2078
(Based on MBTL-2074, MBTL-2075 and MBTL-2336)

Course Outcomes:

After passing this course the student will be able to:

CO1: Understand structures of various cell organelles.

CO2: Examine cell divisions in plant cells.

CO3: Perform different experiments based on plant ecology.

CO4: Analyze nutrients and pigment contents in plants using various techniques.

CO5: Learn application of Statistics in Life Science.

CO6: Analyze and interpret the observations Statistically

Master of Science (Botany)

Semester-II

Session: 2026-27

Botany Practicals IV

MBTP-2078

(Based on MBTL-2074, MBTL-2075 and MBTL-2336)

Examination time: 6 Hrs.

Max. Marks- 100

L T P

Practical - 70

0 0 3

CA – 30

Instructions for the paper setter: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same may be submitted for the record to COE Office, Kanya Maha Vidyalaya, Jalandhar.

Suggested Practicals

Based on MBTL-2074:

1. Understanding the cytology laboratory- components of compound/electron microscope.
2. Examination of electron micrographs of eukaryotic cells with special reference to organelles.
3. Examination of various stages of mitosis and meiosis using appropriate plants material (e.g. onion root tips, onion flower buds).
4. Calculation of Mitotic and meiotic index from dividing root tip cells and pollen grains.
5. Study on cyclosis in *Tradescantia* and *Hydrilla* leaves.
6. Observations on Barr bodies in Squamous epithelium.
7. Preparation of Feulgen stained chromosomes in root tip cells.
8. Effect of colchicine on chromosome movements during mitosis.
9. Use of fluorescent dye to visualize cell components.

Based on MBTL-2075:

1. To determine minimum size and number of quadrats required for reliable estimate of biomass in grassland.
2. To find out association between grassland species using chi square test.
3. To analyse plant communities using Bray-Curtis ordination method.
4. To determine soil moisture content, porosity, bulk density of different soil samples collected from different locations.
5. To study chlorophyll content of SO₂ fumigated and unfumigated plant leaves.
6. To determine Na, K concentration of water sample using flame photometer.
7. To determine water holding capacity of different soil samples.
8. To determine percent organic Carbon and organic matter in different soil samples.
9. To estimate rate of CO₂ evolution from different soil using soda lime or alkali absorption method.
10. To determine sulphate content of water samples.
11. To determine O₂ content of water samples.

Based on MBTL-2336:

1. To Study the Exponential Growth of Microbes with the help of Graph.
2. To Find the rate of change of Bacterial Growth w.r.t time, nutrient etc.
3. To Study the Application of Probability in Life Sciences / Genetics.
4. To Analyse the Biostatistical data using mean and Standard deviation.
5. To Find Correlation and Regression between two Variables of Biostatistical data.
6. Application of t-test as a Single mean in Life Sciences.
7. Application of χ^2 -test as a Goodness of fit in Life Sciences.
8. Application of χ^2 - test in association of attributes in Life Sciences.
9. Application of Z- test as test of single Mean in Life Sciences in Botany.