

**GONDWANA UNIVERSITY,
GADCHIROLI.**

**STUDY COMMITTEE IN MATHEMATICS
B.SC. I (MATHEMATICS)
SEMESTER WISE SYLLABUS**

**WITH EFFECT FROM
2012-13**

SYLLABUS
B.SC. PART I SEMESTER I
PAPER I
MAT 101: ALGEBRA AND TRIGONOMETRY

TOTAL MARKS: 75 (60+15)

Unit I

De-Moivre's theorem and its applications, Square root of complex number. Inverse circular and hyperbolic functions. Logarithm of complex quantity. Summation of series. C+iS methods based on binomial, Geometric, Exponential, Sin x and Cos x.

Unit II

Definition of rank of a matrix. Theorems on consistency of a system of linear equations Application of matrices to a system of linear (homogeneous and non-homogeneous equations) Eigen values, Eigen vectors and characteristic equation of a matrix.
Caley Hamilton's theorem

Unit III

Relation between roots and coefficients of a general polynomial equation in one variable
Transformation of equations. Descarte's rule of signs. Solution of cubic equations
(cardon method)

Unit IV

Divisibility, Definition and elementary properties. Division Algorithm, G.C.D. and L.C.M. of two integers, Basic properties of G.C.D. , Euclidean Algorithm. Primes. Euclid's Theorem, Unique Factorization Theorem.

References

1. K.B. Datta, Matrix and Linear Algebra - Prentice Hall of India PVT ltd. New Delhi 2000
2. Chandrika Prasad, Text book on Algebra and theory of equations- Pothishala private ltd. Allahabad.
3. H.S. Hall and S.R. Knight, Higher Algebra- H.M. Publications 1994
4. S.L. Loney, plane trigonometry part- II Macmillan and company, London
5. Elementary number theory, David Burton- Tata Mc Graw Hill (Walter Rudin Series) Indian Edition
6. Prof. T.M. Karade and M.S. Bendre, Algebra and Trignometry Sonu Nilu.

SYLLABUS
B.SC. PART I SEMESTER I
PAPER II

MAT 102: DIFFERENTIAL AND INTEGRAL CALCULUS

TOTAL MARKS: 75 (60+15)

Unit I

Limit and continuity of a function $\epsilon - \delta$ definition of limit and continuity two sided continuity. Theorem on differentiation, Mean value theorem, Rolles theorem, Legranges mean value theorem Cauchy's generalised Mean value theorem. Marlaurin Series and Toylor's series expansion, curvature.

Unit II

Higher orders derivative calculation of n^{th} derivative some standard result. Determination of n^{th} Derivative of rational function, n^{th} Derivative of product of the power of Sines and Cosine. Leibnitz's theorem n^{th} Derivative of product of the two function. Indeterminant form.

Unit III

Integral of irrational and transcendental function. Integral based on

$$\sqrt{x^2 + a^2}, \quad \sqrt{x^2 - a^2}, \quad \sqrt{a^2 - x^2}$$

Reduction formula for $\int \sin^n x dx$ and $\int \cos^n x dx$

Reduction formula for $\int \sin^p x \cos^q x dx$

Reduction formula for $\int \tan^n x dx$ and $\int \cot^n x dx$

Reduction formula for $\int \sec^n x dx$ and $\int \operatorname{cosec}^n x dx$

Reduction formula for

$$\int \frac{1}{(X^2 + a^2)^n} dx$$

Reduction formula for $\int x^m (ax^2 + b)^p dx$

Unit IV

Improper integral, Gamma function, Properties of Gamma function, Beta function, Properties of Beta function.

References

- 1) Gabriel klambaue, Mathematical Analysis, Marcel Dekkar, Inc, New York, 1975
- 2) N. Piskunovv, Distterntial and integral calculate peace publisher, Moscro.
- 3) Murray R. Spiegel, Theory, and problems of Advanced calculus, Schaum's outline series schaum publishing co New York.
- 4) Gorakh Prasad, Ditteroential calculus Pothishala private ltd. Allahabad.
- 5) Gorakh Prasad, Integral Calculus Pothishala Private Ltd. Allahabad.
- 6) P. K. Jain and S. K. Kaushik, An Introduction to Real Analysis S. Chand and Co. New Delhi 2002
- 7) Prof. T.M. Karade and M.S. Bendre, Calculas and Differential Equations Sonu, Nilu, Nagpur

SYLLABUS
B.SC. PART I SEMESTER – II
MTH:103 PAPER – III VECTOR CALCULUS, GEOMETRY & DIFFERENCE EQUATION
TOTAL MARKS: 75(60+15)

Unit I

Vector triple product. Product of Four Vectors. Vector differentiation. Gradient, divergence and curl. Solenoidal and irrotational vector field.

Unit II

Double integration. Properties of double integration. Iterated integral. Change of order of Integration. Transformation of double integral in polar form.

Unit III

Spheres, Plane section of a sphere. Intersection of two sphere. Sphere through a given circle cone. Equation of cone with Vertex at origin. Right circular cone. Right circular cylinder.

Unit IV

Formation of difference equation. Order of difference equation. Linear difference equation. Homogeneous linear equation with constant coefficient. Non homogeneous linear equation Particular integrals

Reference Books.

- 1) Murray R. Spiegel, Vector Analysis, Schaum Publishing Company, New York.
- 2) Erwin Kregstrig, Advanced Engineering Mathematics John wiler and sons, 1999
- 3) N. Saran and S. N. Nigam, Introduction to Vector Analysis, Pothishala Pvt. Ltd.
- 4) Shanti Narayan, A text book of Vector Calculus S. Chand & co., New York.
- 5) S. L. Loney, The elements of coordinator Geometry, Macmillan and Company London.
- 6) R. J. T. Bell, Elementary treatise on coordinator Geometry of three dimensions Wiley Eastern Ltd. 1994
- 7) N. Sharan and R. S. Gupta, Analytical Geometry of three dimensions.
- 8) Gorakh Prasad and H. C. Gupta, Text Book on Coordinator Geometry, Pothishala Pvt. Ltd. Allahabad.
- 9) P. K. Jain and Khalil Ahmad. A text book of Analytical Geometry of three dimensions Wiles Eastern Ltd. 1994
- 10) Prof. T.M. Karade and M.S. Bendre, Vector Analysis and Geometry, Sonu Nilu, Nagpur

SYLLABUS
B.SC. I SEMESTER – II
PAPER –IV
MAT:104 DIFFERENTIAL EQUATION AND ANALYSIS
TOTAL MARKS: 75(60+15)

Unit – I

Exact Differential equations. Linear differential Equation. Equation reducible to linear form. First order and higher degree equations solvable for x,y,p. Clairaut's differential equations. Orthogonal trajectories

Unit – II

Linear differential equation with constant coefficient. Operator method to find the particular integral. Linear differential equation of second order. Wronskian. Method of Variation of parameter

Unit – III

Sequences. Theorem on limit of sequences. Bounded and Monotonic Sequences. Cauchy Sequences. Cauchy's convergence criterion

Unit – IV

Series of non-negative terms. Comparison test, Cauchy's integral test, Ratio test. Alternating Series, Leibnitz's theory, Absolute and conditional convergence. Series of arbitrary terms

Reference

- 1) D. A. Murry, Introductory Course in Differential Equations, orient Longman (India), 1967
- 2) G. F. Simmons, Differential Equations Tata Mc Graw Hill 1972
- 3) E. A. Codington, An Introduction to ordinary Differential Equations and their Application
C. B. S. Publisher and Distributors, Delhi, 1985.
- 4) O. E. Stanaitis, An introduction to sequences, Series and improper integral
Holden-Dev Inc. San Francisco, California.
- 5) Eart D. Rain ville, Intinite series The Macmillan company, New York.
- 6) Prof. T.M. Karade and M.S. Bendre, Calculas and Differential Euations,
Sonu Nilu.Nagpur

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Teaching Pattern

B.Sc. Part I

Semester I:

Paper I : MAT 101 ALGEBRA AND TRIGONOMETRY

TOTAL MARKS: 75 (60+15)

Paper II : MAT102 DIFFERENTIAL AND INTEGRAL CALCULUS

TOTAL MARKS: 75 (60+15)

Semester II :

Paper III : MAT 103 VECTOR CALCULUS, GEOMETRY & DIFFERENCE EQUATION

TOTAL MARKS: 75(60+15)

Paper IV : MAT 104 DIFFERENTIAL EQUATION AND ANALYSIS

TOTAL MARKS: 75(60+15)

Teaching Pattern:

1. Four Lectures per week per paper.
2. One tutorial per week per section per paper .

STUDY COMMITTEE IN MATHEMATICS
B.SC. (MATHEMATICS)
SEMESTERWISE DISTRIBUTION OF MARKS & CREDITS

| Sr No. | Class | Semester | Theory Paper Marks | | Internal Assessment Marks | Total Marks |
|--------|---------------|----------|--------------------|----------|---------------------------|-------------|
| | | | Paper I | Paper II | | |
| 1 | B.Sc.Part I | I | 60 | 60 | 15+15 | 150 |
| 2 | B.Sc.Part I | II | 60 | 60 | 15+15 | 150 |
| 3 | B.Sc.Part II | III | 60 | 60 | 15+15 | 150 |
| 4 | B.Sc.Part II | IV | 60 | 60 | 15+15 | 150 |
| 5 | B.Sc.Part III | V | 60 | 60 | 15+15 | 150 |
| 6 | B.Sc.Part III | VI | 60 | 60 | 15+15 | 150 |
| | | | 360 | 360 | 180 | 900 |

| Semester | Papers | University Exam Marks - Credits | Internal Assessment Marks - Credits | Total Marks - Credits | Grand Total Marks - Credits 900 - 60 |
|----------|----------------------------|------------------------------------|--|--------------------------|--|
| 1 | 2 Compulsory | 2x60 - 2x4 | 2x15 - 2x1 | 150 - 10 | |
| 2 | 2 Compulsory | 2x60 - 2x4 | 2x15 - 2x1 | 150 - 10 | |
| 3 | 2 Compulsory | 2x60 - 2x4 | 2x15 - 2x1 | 150 - 10 | |
| 4 | 2 Compulsory | 2x60 - 2x4 | 2x15 - 2x1 | 150 - 10 | |
| 5 | 1 Compulsory 1 Elective | 2x60 - 2x4 | 2x15 - 2x1 | 150 - 10 | |
| 6 | 1 Compulsory 1 Elective | 2x60 - 2x4 | 2x15 - 2x1 | 150 - 10 | |

Paper Pattern and Evaluation Scheme

Theory- Two theory papers for every Semester each of 60 Marks and time duration is of three clock hours.

Internal Assessment- TOTAL Marks 30 Per Semester 15 on each paper
 Considering Students Attendance, Class Performance,
 Unit test, Home Assignments, Class seminar

Question Paper Pattern:

Time 3 Hours All questions are compulsory Total Marks: 60

Question I (12 Marks)

Unit I A) 6 Marks
B) 6 Marks

OR

Unit I C) 6 Marks
D) 6 Marks

Question II (12 Marks)

Unit II A) 6 Marks
B) 6 Marks

OR

Unit II C) 6 Marks
D) 6 Marks

Question III : (12 Marks)

Unit III A) 6 Marks
B) 6 Marks

OR

Unit III C) 6 Marks
D) 6 Marks

Question IV: (12 Marks)

Unit IV A) 6 Marks }
B) 6 Marks }

OR

Unit IV C) 6 Marks }
D) 6 Marks }

Question V : (12 Marks)

Unit V Eight Short Questions (Attempt any Six) two from each unit,
with each of two marks

Evaluation Scheme

1. Theory and Internal Assessment will be separate heads of passing.
2. To pass the internal assessment, student must secure at least 6 marks out of 15 in each paper.
In case a student fail in Internal assessment he/she will have to submit the same before the commencement of next examination.
3. In case a student fails in theory but passes in IA, the marks of these carried over in each paper.
4. Total marks must be 40 percent in aggregate for a student to be declared pass.

**Proceedings of the meeting of the Subject committee in Mathematics held on
April 24, 2012**

As per the notification of Gondwana University Subject committee in Mathematics of the Gondwana University met at **11.30** am on Dated **April. 23, 2012** at University Administrative Hall, Dr. Lalsingh Khalsa Chairman Subject committee was in chair . Dr Lalsingh Khalsa placed the agenda itemwise before the committee for the consideration and approval of Committee.

Item No.I To consider and confirm the Semester wise Syllabus for B.Sc.I and Msc I (Mathematics)

Resolution No.I Dr Ladke L.S. placed the copies of Syllabus for observation and discussed in the meeting. All the members with some suggestions accepted the semesterwise syllabus for B.Sc. I and M.Sc. I for 2012-13. and it was unanimously confirmed.

Item No.II To discuss on teaching Pattern

Resolution No.2 Dr. Lalsingh Khalsa explained the teaching pattern of both papers in each semester for B,Sc I and M.Sc. I It was discussed among members and finally with some changes teaching plan was accepted unanimously.

Item-III :- To discuss on Paper pattern and evaluation scheme.

Resolution 2- Pattern of both papers for each semester was discussed thoroughly and decided to set the questions on each unit with intra unit choice based.

While discussing on evaluation scheme it was decided that Theory and Internal Assessment will be separate heads of passing and frame some rules of evaluation. There was no other item for discussion

Dr. L.H. Khalsa Chairman Study Committee thanked all the members for their valuable participation and Co-operation.

⌘ Following members were present at the meeting. ⌘

| Sr.No. | Name | Designation | Signature |
|---------------|------------------|--------------------|------------------|
| 1. | Dr Khalsa L.H. | Chairman | |
| 2. | Dr.Thengane K.D. | Member | |
| 3. | Dr. Singaru S.S. | Member | |
| 4. | Dr Varhade D.N. | Member | |
| 5. | Dr.Ladke L.S. | Member | |