GONDWANA UNIVERSITY, GADCHIROLI.

B.SC. II (MATHEMATICS)
SEMESTER WISE SYLLABUS
WITH EFFECT FROM
2013-14
Teaching Pattern

B.Sc. Part II

Semester III:

Paper I : **MAT 201 : Advanced Calculus and Group Theory**

Paper II : **MAT 202 : Differential Equations**

Semester IV :

Paper III : **MAT 203 : Abstract Algebra & Differential Equation**

Paper IV : **MAT 204 : Classical Mechanics & Statics**

Teaching Pattern:

1. Four Lectures per week per paper.

2 One tutorial per week per batch per paper. (The batches of tutorials to be formed as prescribed by the University).

SYLLABUS
B. Sc. II (Semester - IV)
Paper – III
MAT 203 : Abstract Algebra & Differential Equation
Total Marks : 75 (60+15)

UNIT – I

Group automorphism, Inner Automorphism, Automorphism Group & their computations. Cayley's theorem, Counting principle.

UNIT – II

Ring theory, Subrings, Integral domain ,Characteristic of rings, Ideals.

UNIT – III

Introduction of power series, Legendre's Equations, Legendre's polynomial, generating function of $P_n(x)$. Recurrence formula for $P_n(x)$, Orthogonality of Legendre's polynomials, Bessel's equation, Recurrence formula for $J_n(x)$.

UNIT – IV

Fourier series, Even and odd periodic function, orthogonal function, Dirichlet Condition, Half range Fourier sine & cosine series.

Reference Books :-

1. Prof. T. M. Karade, J. N. Salunke, K. S. Adhav and M. S. Bendre, Abstract Algebra, Sonu Nilu, Bandu Soni Layout, Gayatri road, Parsodi, Nagpur.

2. I. N. Herstein. Topics in Algebra, Wiley eastern, Ltd. New Delhi, 1975.

3. N. Jacobson, Basic Algebra, Vols. I & II. W. H. Freeman, 1980 (Also published by Hindustan company).

4. Shanti Narayan, A Text Book of Modern Abstract Algebra, S. Chand & Co., New Delhi

5. K. B. Datta, Matrix and Linear Algebra, Prentice Hall of India Pvt. New Delhi, 2000.

6. P. B. Battacharya, S. K. Jain and S. R. Nagpal, Basic Abstract Algebra (2nd Edition) Cambridge University Press. Indian Edition. 1997.

7. K. Hoffman and R. Kunze. Linear Algebra, 2nd Editions, Prentice-Hill. Englewood Cliffs (New Jersey), 1971.

8. S. K. Jain, A. Gunawardena and P. B. Battacharya, Basic Linear Algebra with MATLAB, Key College Publishing (Springer-Verlag) 2001.

9. S. Kumaresan, Linear Algebra, A Geometrical Approach. Prentice Hall of India. 2000.

10. Vivek Sahani and Vikas Bist. Albebra, Narosa Publishing House. New Delhi, 1997.

11. I. S. Luther and I. B. S. Passi, Algebra, Vol. I-Groups. Vol. II-Rings. Narosa Publishing House (Vol. 1-1996, Vol. II-1999), New Delhi.

12. D. S. Malik, J. N. Mordeson and M. K. Sen. Fundamentals of Abstract Algebra. McGraw-Hell International Edition, 1997.

SYLLABUS
B. Sc. II (Semester - IV)
Paper IV
MAT 204 : Classical Mechanics & Statics

Total Marks : 75 (60+15)

UNIT – I

Analytical condition of equilibrium of coplanar forces, Virtual work, Uniform catenary.

UNIT – II

Generalized co-ordinates, Constraints, D' Alembert's Principle & Lagrange's equations.

UNIT – III

Reduction to the equivalent one body problem, Central force field, Classification of central orbit, Differential equation of central orbit, Kepler's laws of motion, Virial theorem.

UNIT – IV

Hamilton's Principle, Extension of Hamilton's principle to non conservative holonomic system, Hamilton's equation. Principle of least action, Routhian, Routh's Procedure.

Reference Books :-

1. Prof. T. M. Karade, Classical Mechanics, Sonu Nilu, Bandu Soni Layout, Gayatri road. Parsodi, Nagpur.

2. Prof. T. M. Karade and M. S. Bendre, Mechanics, Sonu Nilu, Bandu Soni Layout, Gayatri road, Parsodi, Nagpur.

3. H. Goldstein, Classical Mechanics. (2nd Edition) Narosa Publishing House, New Delhi.

4. S. L. Loney, Statics, Macmillian and Company, London.

5. R. S. Verma, A Text Book on Statics, Pothishala Pvt. Ltd., Allahabad

6. S. L. Loney, An Elementary Treatise on the Dynamics of a Particle and of Rigid bodies, Cambridge University Press, 1956.