GONDWANA UNIVERSITY

GADCHIROLI

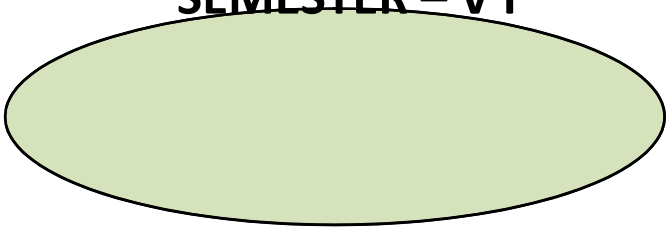
SEMESTER SYSTEM PATTERN SYLLABUS

for

B.Sc.

Mathematics

SEMESTER – V I



(With effect from : 2014-15)

a

SYLLABUS

B. Sc. III (Semester – VI)

Paper – IV (Compulsary)

MAT 304 : Analysis

Total Marks : 75 (60+15)

UNIT – I

Metric space, subspace of metric space, open set, Cauchy's sequence, complete Metric space, compactness.

UNIT – II

Riemann Integral, Integrability of continuous and monotonic function,

The Fundamental theorem of integral calculus, Mean value theorem of integral calculus.

UNIT – III

Complex integration, Cauchy's integral theorem, Cauchy integral formula, singularity, Residue theorem.

UNIT – IV

Fourier Transform:-

Dirichlet condition, The Fourier series, The Fourier integral, Finite Fourier sine & cosine transform, Infinite Fourier transform, Infinite Fourier sine & cosine transforms, some properties of Fourier transform, partial differential equations

Reference Books :-

1. Prof. T. M. Karade, J. N. Salunke, K. S. Adhav and M. S. Bendre, Analysis, Sonu Nilu, Bandu Soni Layout, Gayatri road, Parsodi, Nagpur.
2. Prof. T. M. Karade, Complex Analysis, Sonu Nilu, Bandu Soni Layout, Gayatri road, Parsodi, Nagpur.
3. I. M. Apostol, Mathematical Analysis, Narosa Publishing House. New Delhi, 1985.
4. E. C. Tichmarch, Theory of functions.

5. R. R. Goldberg, Real Analysis, Oxford & I. B. H. Publishing Co., New Delhi, 1970.
6. S. Lang. Undergraduate Analysis, Springer-Verlag, New Youk. 1970.
7. D. Somasundaram and B. Choudhary, A First Course in Mathematical Analysis, Narosa Publishing House. New Delhi, 1997.

SYLLABUS

B. Sc. III (Semester – VI)

Paper – V (Optional)

MAT 305 : Special Relativity - II

Total Marks : 75 (60+15)

UNIT – I

Tensor Analysis - Coordinate transformations, Summation Convention, The Kronecker delta, Covariant, Contravariant and mixed tensor, symmetric and skew symmetric tensors, Fundamental operations on tensors, metric tensor, conjugate metric tensor.

UNIT – II

Christoffels symbols, Transformation of christoffels symbols, covariant derivatives, Absolute derivative, Geodesics, Curvature tensor, Ricci tensor, Einstein tensor, The Bianchi identity.

UNIT – III

Relativistic Mechanics : Variation of mass with velocity Equivalence of mass and energy, Transformation Eq^{n} for mass, momentum and energy, Energy momentum four vectors, Relativistic force and transformation equation for its components, Relativistic Lagrangian and Hamiltonian Relativistic eq^{n}of motion of particle.

UNIT – IV

Electromagnetism : Maxwell's equation in vacuum, Transformation equations for density of electric charge and current, propagation of electric and magnetic field strength, Transformation equations for electromagnetic four potential vector, Lagrangian for a charged particle in an electromagnetic field. Lorentz force. The electromagnetic field tensor Maxwell's eq^{n} in tensor form, Lorentz force on a charged particle.

Reference Books :-

1. Lectures on Special Relativity

   Prof. T. M. Karade, K. S. Adhav and Maya S. Bendre, Sonu Nilu.

2. C. Moller, The Theory of Relativity, Oxford Clarendon Press, 1952.

3. P. G. Bergmann, Introduction to the theory of relativity, Prentice Hall of India, Pvt. Ltd. 1969.

4. I. I. Anderson, Principle of relativity Physics, Academic Press, 1967.

5. Murray R. Spiegel, Theory and Problems on vector Analysis SIJ Metrics and Introduction to Tensor Theory, Shaum's outline Series, Me. Gra. Hill Book Company.

SYLLABUS
B. Sc. III (Semester – VI)
Paper – VI (Optional)
MAT 306 : Number Theory and Discrete Mathematics

Total Marks : 75 (60+15)

UNIT – I

Diophantine equation ax + by = c congruence, Fermat's theorem, Wilson's theorem.

UNIT – II

Linear congruencies simultaneous linear congruence. Higher degree congruenes order of integers (mod m)

UNIT – III

Basic concept of graph theory undirected and directed graph, Simple graph, multi graph, pseudo graph Degree of vertex indegree and outdegree sub graphs and isomorphic graph, paths cycles, connectivity. Trees and their Properties spanning tree. BFS Algorithm DFS algorithm properties Binary trees.

UNIT – IV

Lattices and Boolean Algebra

Definition and Examples. Some properties of lattices, sub lattices. Direct product and homomorphism. Some Special Lattices Boolean algebra Definition and Examples sub algebra, Direct product and homomorphism.

Text Book: - For (Unit I & II)

Number Theory
S G Telang, Edited By M. G. Nadkarni & J. S. Dani
Tata McGraw-Hill Pubkishing Company Limited (New Delhi)

For (Unit III & IV)

Discrete Mathematical Structures with Applications to Computer Science
J. P. Tremblay, R. Manohar
Tata McGraw-Hill Edition

Reference Books:

1. An Introduction to the Theory of Numbers ± I. Niven and H. Zuckerman
   1980, 4th Edition, John Wiley & Sons, New York.
2. Elementary Number Theory & Its Applications ± Kenneth Rosen
   1987, 2nd Edition, Reading Mass Addison ± Wesley.
3. Discrete Mathematical structures by Bernard Kolman, Robert C. Busby, Sharon Ross, Prentice- Hall of India
4. Discrete Mathematics and its applications by Kenneth H.Rosen, Tata McGraw- Hill