GONDWANA UNIVERSITY
GADCHIROLI

Proposed Syllabus For

M.Sc. Mathematics

Semester-I and Semester-II

Under Choice Based Credit System

(C.B.C.S.)

With effect from

Academic Year: 2016-17

(Considered and approved in B.O.S.)
M.Sc. Mathematics

Semester wise Syllabus

M.Sc. Semester- I

PSCMTHT01 : Algebra-I
PSCMTHT02 : Real Analysis-I
PSCMTHT03 : Topology-I
PSCMTHT04 : Linear Algebra and Differential Equations
PSCMTHT05 : Numerical Analysis

M.Sc. Semester- II

PSCMTHT06 : Algebra-II
PSCMTHT07 : Real Analysis-II
PSCMTHT08 : Topology-II
PSCMTHT09 : Classical Mechanics
PSCMTHT10 : Differential Geometry
### Semester I for M.Sc. Program in Mathematics

<table>
<thead>
<tr>
<th>Core</th>
<th>Theory / Practical</th>
<th>Teaching scheme (Hours/Week)</th>
<th>Credits</th>
<th>Examination Scheme</th>
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<tbody>
<tr>
<td></td>
<td>Th</td>
<td>Total</td>
<td>Theory</td>
<td>Seminar</td>
</tr>
<tr>
<td>PSCMTHT01</td>
<td>Paper 1</td>
<td>5</td>
<td>5</td>
<td>4</td>
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<td>PSCMTHT02</td>
<td>Paper 2</td>
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<td>5</td>
<td>4</td>
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<td>PSCMTHT03</td>
<td>Paper 3</td>
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<tr>
<td>PSCMTHT04</td>
<td>Paper 4</td>
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<td>4</td>
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<td>PSCMTHT05</td>
<td>Paper 5</td>
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<td>4</td>
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### Semester II for M.Sc. Program in Mathematics

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<th>Core</th>
<th>Theory / Practical</th>
<th>Teaching scheme (Hours/Week)</th>
<th>Credits</th>
<th>Examination Scheme</th>
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<td>Total</td>
<td>Theory</td>
<td>Seminar</td>
</tr>
<tr>
<td>PSCMTHT06</td>
<td>Paper 6</td>
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<td>5</td>
<td>4</td>
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<td>PSCMTHT07</td>
<td>Paper 7</td>
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<td>4</td>
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<td>PSCMTHT08</td>
<td>Paper 8</td>
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<td>5</td>
<td>4</td>
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<tr>
<td>PSCMTHT09</td>
<td>Paper 9</td>
<td>5</td>
<td>5</td>
<td>4</td>
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<tr>
<td>PSCMTHT10</td>
<td>Paper 10</td>
<td>5</td>
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<td>4</td>
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<tr>
<td>TOTAL</td>
<td></td>
<td>25</td>
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<td>20</td>
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DISTRIBUTION OF MARKS FOR INTERNAL ASSESSMENT

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Activities</th>
<th>Max. Marks</th>
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<tbody>
<tr>
<td>1</td>
<td>Attendance</td>
<td>05(Compulsory)</td>
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<tr>
<td></td>
<td>Any Two of the Following Activities</td>
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<tr>
<td>1</td>
<td>Seminar</td>
<td>10</td>
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<tr>
<td>2</td>
<td>Unit Tests</td>
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</tr>
<tr>
<td>3</td>
<td>Home Assignments</td>
<td>10</td>
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Total Marks -25
Minimum Passing Marks -07

University Question Paper Pattern

A student of M. Sc. Sem I and Sem II in Mathematics has to attempt all five questions in each paper.
Q1 to Q4 are long answer questions with internal choice within unit whereas Q5 is compulsory question of short answers on all four units.
Setting of the question paper as under.

Total Marks: 100
Time 3 hours

Q1 (A) Unit I (10 marks)
(B) Unit I (10 marks)

OR

Q1 (C) Unit I (10 marks)
(D) Unit I (10 marks)

Q2 (A) Unit II (10 marks)
(B) Unit II (10 marks)

OR

Q2 (C) Unit II (10 marks)
(D) Unit II (10 marks)

Q3 (A) Unit III (10 marks)
(B) Unit III (10 marks)

OR

Q3 (C) Unit III (10 marks)
(D) Unit III (10 marks)

Q4 (A) Unit IV (10 marks)
(B) Unit IV (10 marks)

OR

Q4 (C) Unit IV (10 marks)
(D) Unit IV (10 marks)
Q5 Attempt All. (20 marks)

(a) Unit I
(b) Unit II
(c) Unit III
(d) Unit IV
SEMESTER-I
Core Code :-  PSCMTHT01  Credit - 05

Algebra-I

UNIT-I


UNIT-II


UNIT-III

Direct product, semi-direct product of groups. Sylows theorems. Groups of order $2^p$ and $pq$.

UNIT-IV


Text Book:

Reference Books :
Core Code :-  PSCMTHT02  Credit - 05

Real Analysis-I

UNIT-I


UNIT-II


UNIT-III

The space of tangent vectors at a point of R^n. Another definition of Ta( R^n). Vector fields on open subsets of R^n. Topological manifolds. Differentiable manifolds. Real Projective space. Grassman manifolds. Differentiable functions and mappings

UNIT-IV

Rank of a mapping. Immersion. Sub manifolds. Lie groups. Examples of Lie groups.

Text Books :
Mc GRAW – HILL Book Company.

Reference Books :
1. Methods of Real Analysis: R.R. Goldberg , John Wiley..
Topology-I

UNIT-I


UNIT-II


UNIT-III


UNIT-IV


Text Book:

Reference Books:
Linear Algebra and Differential Equations

UNIT-I


UNIT-II


UNIT-III


UNIT-IV


Text Book :

Differential equations, dynamical systems and linear algebra: M.W. Hirsch and S. Smale, Academic press 1975

Reference Book :

Numerical Analysis

UNIT-I


UNIT-II


UNIT-III

The Weierstrass theorem and Taylor’s theorem. The minimax approximation problem, the least square approximation problem, orthogonal polynomial, economisation of Taylor series, minimax approximation.

UNIT-IV

The trapezoidal rule and Simpson’s rule, Newton- Cotes integration formulas.

Text book:

An Introduction to Numerical Analysis : Kendal E. Atkinson, Johan Wiley and sons, Inc.
Semester-II
Core Code - PSCMTHT06 Credit - 05
Algebra-II

UNIT-I


UNIT-II


UNIT-III


UNIT-IV


Text Book:

Reference Books:

Real Analysis-II

UNIT-I


UNIT-II


UNIT-III


UNIT-IV


Text Book:

Reference Books:
Topology-II

UNIT-I


UNIT-II

Quotient topology. Nets and filters.

UNIT-III

Product topology: Finite products, product invariant properties, metric products, Tichonov topology, Tichonov theorem.

UNIT-IV

Locally finite topological spaces. Paracompact spaces, Urysohn’s metrization theorem.

Text books:

Reference books:
Core Code -PSCMTHT09                          Credit - 05

Classical Mechanics

UNIT-I


UNIT-II


UNIT-III

The equations of canonical transformation. Examples of canonical transformation. The symplectic approach to canonical transformations. Poisson brackets and other canonical invariants.

UNIT-IV

Equations of motion. Infinitesimal canonical transformations and conservation theorems in the Poisson bracket formulation, the angular momentum, Poisson bracket relations, symmetry groups of mechanical systems. Liouville’s theorem.

Text Book :

Reference Books:

Core Code - PSCMTHT10  Credit - 05
Differential Geometry

UNIT-I


UNIT-II


UNIT-III


UNIT-IV


Text Book:
An introduction to Differential Geometry: T.J. Wilmore; Oxford University Press

Reference Book:
Scheme of teaching and examination under semester pattern Choice Based Credit System (CBCS) for M.Sc. Program in Mathematics.