

B.R.A.BIHAR UNIVERSITY, MUZAFFARPUR



COURSE OF STUDY
M.A/M.Sc, MATHEMATICS
SEMESTER- I, II, III & IV
CHOICE BASED CREDIT SYSTEM (CBCS)
(To be effective from 2018-2019)

Asigh
26/3/19

Asigh
26.3.19

Banshi
26/3/19
University Professor &
Head of the Dept. of Mathematics
B.R.A.U., Muzaffarpur

M.A/M.Sc (Mathematics)

SCHEME OF EXAMINATION

Passing of Examination and Promotion Rule

The Post Graduate Course in Mathematics shall be of two academic sessions comprising of FOUR SEMESTERS. Each academic session shall consist of two Semesters - I & III from July to December and Semester II & IV from January to June.

Each theory paper irrespective of their nature and credits shall be of 100 marks out of which the performance of a student in each paper will be assessed on the basis of Continuous Internal Assessment (CIA) of 30 marks and the End Semester Examination (ESE) consisting of 70 marks.

The components of CIA shall be

(a) Two Mid Semester Written Tests of one hour duration each	15 Marks
(b) Seminar/quiz	5 Marks
(c) Assignment	5 Marks
(d) Punctuality & Conduct	5 Marks
Total	30 Marks

1. There shall be no supplementary examination in any of the Semester Course (I, II, III & IV).

2. A student who has appeared at the CIA and attended the required minimum percentage (75%) of the attendance in theory shall be permitted to appear in the End Semester Examination (ESE).

3. To be declared passed in ESE in any subject, a student must secure at least 45% marks in each paper separately.

A student has to secure minimum 45% marks in CIA of any paper. In case, a student fails to secure minimum 50% marks in CIA of any paper, he/she will be declared fail in that paper. Students shall have to reappear in that paper and in CIA examination also in the same semester of next academic session.

Prakash
26/5/19

Prakash
26-5-19

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University Professor &
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If students fail to secure minimum 50% marks in CIA of any paper his result will be declared as fail in that paper. Students shall have to reappear in that paper in the same semester of next academic session.

A promoted candidate, if he has passed in CIA but fails in theory paper/papers, he/she shall retain his/her CIA award and will reappear in the theory paper only of the semester whenever available. However, if a candidate is declared fail in any End Semester Examination, shall retain nothing and will have to redo the course work of failed semester again and he has to appear again in CIA as-well-as in theory paper.

4. If a candidate passes in at least two paper in his/her First, Second and third End Semester Examination, he/she shall be promoted to next higher semester. But he/she will have to clear their backlog papers in the next end semester examination of that semester whenever it is available. Even if a student is promoted to fourth semester his final result will only be declared when he/she has cleared all their backlog papers.

5. Final result of M.Sc. will be published only after he/she has cleared all the 16 paper securing minimum qualifying marks.

6. Student shall be awarded Grade Point (GP) at the end of each semester examination and Cumulative Grade Point (CGP) at the end of final End Semester Examination in 10 point scoring system.

Declaration of Result

The following grading system shall be used by teacher/Examination department

Letter Grade	Percentage Range	Number of Letter Grade	Description of Grade
O	90-100	10	Outstanding
A++	80-89	9	Excellent
A+	70-79	8	Very Good
A	60-69	7	Good
B+	50-59	6	Average
B	45-49	5	Pass
F	Less than 45	Less than 5	Fail

A student shall be declared to have passed and promoted to the next semester when he/she earns B or above grade in the semester examination covering continuous evaluation, mid-terms and end term examination.

D.K. Singh
26/10/19

Asst. Prof.
26/10/19

Prof.
26/10/19
University Professor &
Head of the Dept. of Mathematics
S. V. S. Murallipeta

Syllabus of M.A/M.Sc (Mathematics) Semester I

PAPER I (MAT CC 01)

Abstract Algebra

Abstract Algebra

Prerequisites: Introduction to Group, Elementary Properties of Group, Finite Group, and subgroup, Cyclic Group, Permutation Group, Properties of Permutations, rings, integral Domains, Characteristics of rings.

Unit 1 : Homomorphism; Group actions, Sylow theorems, Normal and subnormal series composition series of a group, Jordan-Holder Theorem, Solvable groups, commutator subgroup of a group, Nilpotent groups.

Unit 2 : Ring homomorphism, isomorphism, quotient rings, ideals, Kernel of ring homomorphism, principal ideal ring and domain, prime and maximal ideal, Euclidean domain.

Unit 3 : Extension fields, algebraic and transcendental extension, splitting field of Polynomial, separable and inseparable extension, normal extension, constructible real numbers.

Unit 4 : Cyclic Modules, simple Modules, semi-simple Modules, Schur's Lemma, Free Modules.

Unit 5 : Solution of equations by radicals, insolubility of equations of degree 5 by radicals.

References :

1. I. N. Herstein :- Topics in Algebra.
2. M. Artin :- Algebra
3. L. S. Luthar & L. S. Passi :- Algebra Vols I & II Narosa Publication House
4. D. S. Dummit and R. M. Foote :- Abstract Algebra
5. N. S. Gopalakrishnan :- University Algebra

BK Singh
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S. P. Singh
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Assignment
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Prof. S. P. Singh
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PAPER II (MAT CC- 02)

Real Analysis

Real Analysis

- Unit 1 :** Sequences and series of functions, pointwise and uniform convergence, Cauchy criterion for uniform convergence, Weierstrass-M test, Abel's and Dirichlet's test for uniform convergence.
- Unit 2 :** Uniform convergence and differentiation, Weierstrass approximation theorem. Power series, Uniqueness theorem for power series, Abel's and Tauber's theorem.
- Unit 3 :** Definition and examples of Riemann-Stieltje's integral. Property of integral, Integration and differentiation, the fundamental theorem of Calculus, Integration Of vector valued function, rectifiable curves.
- Unit 4 :** Functions of several variables, linear transformation, Derivatives in an open subset of R^n , chain rule, partial derivatives, interchange of order of differentiation, derivatives of higher orders, Taylor's theorem.
- Unit 5 :** Inverse function theorem, implicit function theorem, Jacobians, Extremum Problems with constraints, Lagrange's multiplier methods, differentiation of Integrals, partition of unity, Differential forms, Stoke's theorem.

References :

1. W. Rudin :- Principles of Mathematical Analysis
2. T. M. Apostol :- Mathematical Analysis
3. I.P. Natanson :- Theory of function of Real Variable
4. H.L. Royden :- Real Analysis

D. K. Srinivas
26/3/19

S. P. Srinivas
26/3/19

Praveen
26.3.19

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University Professor &
Head of the Dept. of Mathematics
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PAPER III (MAT CC-03)

Linear Algebra

Linear Algebra

- Unit 1 :** Finite dimensional vector spaces; Linear transformations and their matrix representations, rank; systems of linear equations, eigenvalues and eigenvectors, minimal polynomial, Cayley-Hamilton Theorem, diagonalization.
- Unit 2 :** Hermitian, Skew Hermitian and unitary matrices; Finite dimensional inner product space, Gram-Schmidt orthonormalization process, self-adjoint operators.
- Unit 3 :** Similarity of linear transformations, Invariant subspaces, reduction to triangular forms, Nilpotent transformations, Index of Nilpotency, invariants of a Nilpotent transformations, primary decomposition theorem, Jordan blocks and Jordan form rational canonical form.
- Unit 4 :** Bilinear form, algebra of bilinear form Matrix of bilinear forms, degenerate and Non-degenerate bilinear forms, Alternating Bilinear forms
- Unit 5 :** Symmetric and Skew-symmetric bilinear forms, Quadratic form, law of Inertia, Sylvester's theorem, Hermitian forms.

References :

1. K.B.Datta:- Matrix and Linear Algebra
2. S. Lipschitz:- Linear Algebra, Schaum's outline series
3. Hoffman and Kunze:- Linear Algebra

DKK
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Asugh
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