John Wilson Education Society's

Wilson College (Autonomous)

Chowpatty, Mumbai-400007
RE-ACCREDITED 'A' grade by NAAC

Affiliated to the

UNIVERSITY OF MUMBAI

Syllabus for F.Y

(under NEP)

Programme: B.Sc.

Programme Code: WSMATMJ (Mathematics)

Choice Based Credit System (CBCS) with effect from Academic year 2023–2024

PROGRAMME OUTLINE 2023-2024

YEAR	SEM	COURSE CODE	UNIT	NAME OF THE UNIT/UNIT TITLE	CREDITS
FY	I	WSMATMJ111		Calculus I	2
			I	Real Number System and Sequences of real Numbers	
			II	Limits and Continuity	
		WSMATMJ112		Algebra	2
			I	Integers and Divisibility	
			II	Functions, Relations and Binary Operations	
		WSMATMJ113		Practical based on WSMATMJ111 and WSMATMJ112	2
	II	WSMATMJ121		Calculus II	2
			I	Differentiability of Functions	
			II	Infinite Series	
		WSMATMJ122		Linear Algebra	2
			I	System of Equations and Matrices	
			II	Determinants and Linear Equations	
		WSMATMJ123		Practical based on WSMATMJ121 and WSMATMJ122	2

PROGRAMME SPECIFIC OUTCOME (PSOs)

At the end of the course the learner will be able to:

PSO 1: Utilize the skills of logical thinking in problem solving and inculcate the habit of self-learning.

PSO 2: Formulate and use quantitative models arising in social science,business and other contexts.

PSO 3: Analyze the mathematical results and apply them in various problems appearing in different branches of mathematics and related fields.

PSO 4: Recognize patterns and to distinguish between essential and irrelevant aspects of the problems.

PSO 5: Employ technically oriented skills to solve specific theoretical and applied problems in mathematics and other domains.

PSO 6: Translate information presented verbally into mathematical form, select and use appropriate mathematical formulae or techniques in order to process the information and draw the relevant conclusion.

PSO 7: Solve mathematical problems using analytical methods.

PSO 8: Recognize the relationships between different areas of mathematics and the connections between mathematics and other disciplines.

PREAMBLE:

Keeping in view the new National Education Policy, Wilson College Mumbai under autonomy revised the syllabi as per the Choice Based Credit System (CBCS) for the First year B.Sc. Programme in Mathematics from the academic year 2023-2024.

Mathematics has been fundamental to the development of science and technology. In recent decades, the extent of application of Mathematics to real world problems has increased by leaps and bounds. Taking into consideration the rapid changes in science and technology and new approaches in different areas of mathematics and related subjects like Physics, Statistics and Computer Sciences, the Board of Studies in Mathematics of Wilson College Mumbai has prepared the syllabus of F.Y.B.Sc. Mathematics.

The syllabi of F.Y.B.Sc. Mathematics for Semester I and Semester II has been designed so that the students learn basic concepts of Mathematics and are exposed to rigorous methods gently and slowly. The syllabi of F.Y.B.Sc. Mathematics. would consist of two semesters and each semester would comprise two courses. Course I is 'Calculus I and Calculus II'. Calculus is applied and needed in every conceivable branch of science. Course II is 'Algebra and Linear Algebra' which develops mathematical reasoning and logical thinking and has applications in science and technology.

PROGRAMME: B.Sc. (Major)		SEMESTER I	
COURSE: Calculus I		COURSE CODE: WSMATMJ111	
Teaching Scheme		Evaluation Scheme	
Lectures (hours/week)	Credits	CIA	Semester End Examination
2 lectures (2 hours)	2	40 marks	60 marks

Course Objectives:

1. To enable the learner to understand the real number system and the properties of real numbers.
2. To enable the learner to apply Archimedean property to check the limit and continuity of a function.
3. To enable the learner to study convergent and divergent sequences and check the convergence of a sequence.
4. To enable the learner to understand the applications of Intermediate value theorem.

Course Outcome:

The learner will be able to:

1. Recall the definitions of absolute value, neighborhoods, bounded sets, supremum, infimum, sequences of real numbers, subsequences, monotone sequences, convergent sequences, divergent sequences.
2. State the AM-GM inequality, Cauchy-Schwarz inequality and Hausdorff property, Archimedean property, Density of rationals
3. Discuss the algebra of convergent sequences, monotone convergence theorem and sandwich theorem.
4. Identify convergent and divergent sequences.
5. Define limit of a function, continuous, discontinuous functions.
6. Examine limits, continuity and discontinuity of a function.
7. Discuss the algebra of limits and continuous functions.
8. Apply Intermediate value theorem to find roots.
9. Apply Sandwich theorem to find limits

DETAILED SYLLABUS

Course Code	Unit	Sub-Unit	Course/ Unit Title	Credits/ Lectures: 2 Credits/ 30 Lectures
WSMATMJ111	**I**		**Real Number System and Sequences of Real Numbers**	**15 Lectures**
		1.1	Real number system and its order properties, Absolute value and its properties, AM-GM inequality, Cauchy-Schwarz inequality, Intervals and neighborhoods, Hausdorff property, Bounded sets, Supremum and infimum, maximum and minimum, Statement of l.u.b. axiom and its consequences, Archimedean property (only statement) and its applications, Density of rationals (only statement).	
		1.2	Definition of a sequence and examples, Convergence of sequences, every convergent sequence is bounded. Limit of a convergent sequence and uniqueness of limit, Algebra of convergent sequences, sandwich theorem, monotone sequence	
		1.3	Divergent sequences, Convergence of some standard sequences, Definition of subsequence, Subsequence of a convergent sequence is convergent and converges to the same limit, Definition of a Cauchy sequence, every convergent sequence is a Cauchy sequence and converse.	
	II		**Limits and Continuity**	**15 Lectures**
		2.1	Epsilon-delta definition of limits, Left hand and right-hand limit, Non-existence of limit, Algebra of limits, sandwich theorem, uniqueness of limit.	
		2.2	Continuity and continuous functions, Epsilon-delta definition of continuity, Sequential continuity, Algebra of continuous functions, discontinuous functions,	
		2.3	Examples of removable and essential discontinuity. Intermediate Value theorem and its applications, Bolzano-Weierstrass theorem.	

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References:

1. Apostol, Tom M. Calculus Volume I, Wiley & Sons (Asia) Pvt. Ltd, 1991.
2. Bartle, Robert G., and Donald R. Sherbert. Introduction to Real Analysis, 3rd Edition. Wiley, 1999.
3. Binmore, K. G. Mathematical Analysis : A Straightforward Approach. Cambridge University Press, 2001.
4. Courant, Richard. Introduction to Calculus and Analysis: Volume One. Interscience Publishers, 1965.
5. Ghorpade, Sudhir R. and Limaye, Balmohan V. A Course in Calculus and Real Analysis, Springer International Ltd, 2006.
6. Goldberg, Richard R. Methods of Real Analysis. Blaisdell Pub. Co.; Oxford And IBH, 1964.
7. Kumar, Ajit, and S. Kumaresan. A Basic Course in Real Analysis. Chapman and Hall/CRC, 2014, https://doi.org/10.1201/b16440.
8. Stewart, J. Calculus, Third Edition, Brooks/Cole Publishing Company, 1994.

PROGRAMME: B.Sc. (Major)		SEMESTER I	
COURSE: Algebra		COURSE CODE: WSMATMJ112	
Teaching Scheme		Evaluation Scheme	
Lectures (hours/week)	Credits	CIA	Semester End Examination
2 lectures (2 hours)	2	40 marks	60 marks

Course Objectives:

1. To enable the learner to understand the divisibility in integers.
2. To enable the learner to apply division algorithm.
3. To enable the learner to find the gcd and lcm and study their properties.
4. To enable the learner to understand functions, relations, equivalence classes and partitions.

Course Outcome:

The learner will be able to:

1. Evaluate the divisibility of integers, gcd and lcm.
2. Apply division algorithm and Euclidean algorithm.
3. Define prime numbers, coprime numbers and composite numbers.
4. Apply Euclid's Lemma and Fundamental Theorem of Arithmetic.
5. Define relations and functions, domain, codomain and range of a function.
6. Evaluate the direct image, inverse image and composite functions.
7. Identify types of functions and their properties.

DETAILED SYLLABUS

Course Code	Unit	Sub-Unit	Course/ Unit Title	Credits/ Lectures: 2 Credits/ 30 Lectures
WSMATMJ112	**I**		**Integers and Divisibility**	**15 Lectures**
		1.1	Brief revision of: Divisibility in integers, division algorithm, gcd, lcm, basic properties of gcd such as existence and uniqueness, gcd of a and b can be expressed as $ma+nb$ for some integers m and n.	
		1.2	Euclidean algorithm, prime numbers, Euclid's lemma, fundamental theorem of arithmetic. Basic results like: (1) The set of primes is infinite, (2) there are arbitrarily large gaps between primes and (3) there exist infinitely many primes of the form $4n-1$ and $6n-1$	
		1.3	Definition of a Polynomial, algebra of polynomials, degree of polynomials and basic properties, roots of polynomials, relation between roots and coefficients, multiplicity of a root.	
	II		**Functions, Relations and Binary Operations**	**15 Lectures**
		2.1	Definition of relation and function, domain, co-domain and range of a function, composite functions, examples, direct and inverse image for a function, injective, surjective and bijective functions, invertible functions, binary operation as a function.	
		2.2	Equivalence relations, equivalence classes and their properties, partitions, every partition gives an equivalence relation and vice versa.	
		2.3	Congruence is an equivalence relation on set of integers, residue classes and partitions of integers, addition modulo, multiplication modulo n and examples	

References:

1. David M. Burton, Elementary Number Theory, Seventh Edition, McGraw Hill Pvt. Ltd.
2. Normann L. Biggs, Discrete Mathematics, revised Edition, Clarendon Press, Oxford, 1989.
3. I. Niven and S. Zuckerman, Introduction to the Theory of Numbers, Third Edition, Wiley Eastern, New Delhi, 1972.
4. G. Birkoff and S. Maclane, A Survey of Modern Algebrs, Third Edition, Mac Millan, New York, 1965.
5. N. S. Gopalkrishnan, University Algebra, New Age International Ltd. Reprint 2013.
6. I. N. Herstein, Topics in Algebra, Blaisdell Publishing Co., New York-Toronto-London, 1964.
7. P. B. Bhattacharya, S. K. Jain and R. S. Nagpal, basic Abstract Algebra, Second Edition, New Age International, 1994.
8. Kenneth Rosen, Discrete Mathematics and its Applications, Seventh Edition, McGraw Hill International, 2012.

PROGRAMME: B.Sc. (Major)		SEMESTER I	
COURSE: Practical Based on WSMATMJ111 and WSMATMJ112		COURSE CODE: WSMATMJ113	
Teaching Scheme		Evaluation Scheme	
Practicals (hours/week)	Credits	CIA	Semester End Examination
4 lectures per batch (4 hours per batch)	2	40 marks	60 marks

Course Objectives:

1. To enable the learner to apply division algorithm.
2. To enable the learner to find the gcd and lcm and apply their properties.
3. To enable the learner to identify surjective, injective and bijective functions, relations, equivalence classes and partitions.
4. To enable the learner to apply Archimedean property to check the limit and continuity of a function.
5. To enable the learner to identify convergent and divergent sequences.
6. To enable the learner to use Intermediate value theorem to solve problems

Course Outcome:

The learner will be able to:

1. Use the AM-GM inequality, Cauchy-Schwarz inequality, Hausdorff property, Archimedean property, Density of rationals in problem solving.
2. Apply algebra of convergent sequences, monotone convergence theorem and sandwich theorem.
3. Identify convergent and divergent sequences.
4. Examine limits, continuity and discontinuity of a function.
8. Apply Intermediate value theorem to find roots.
9. Evaluate the divisibility of integers, gcd and lcm.
10. Apply division algorithm and Euclidean algorithm.
11. Apply Euclid's Lemma and Fundamental Theorem of Arithmetic.
12. Evaluate the direct image, inverse image and Identify types of functions and their properties.

Practical	Credits
Based on WSMATMJ111	**2**
1.Application based examples of Archimedean property, intervals, neighborhood.	
2. Consequences of l.u.b. axiom, infimum and supremum of sets.	
3.Calculating limits of sequences.	
4.Cauchy sequences, monotone sequences.	
5.Limit of a function and Sandwich theorem.	
6.Continuous and discontinuous functions.	
Based on WSMATMJ112	
1. Division Algorithm, Euclidean algorithm in Z,	
2.Examples on expressing the gcd. of two non zero integers a&b as ma + nb for some m, n $\in$ Z,	
3.Primes and results on the existence of infinitely many primes of specific forms.	
4.Functions, Bijective and Invertible functions, Compositions of functions.	
5.Binary Operation, Equivalence Relations, Partition and Equivalence classes.	
6. Finding root, multiplicity of roots of a given polynomial	

Modality of Assessment

Theory Examination Pattern:

A. **Internal Assessment- 40%- 40 marks per paper**

Sr. No.	Evaluation Type	Marks
1	**Written Objective Examination**	**20**
2	**Assignment/ Presentation**	**20**
TOTAL		**40**

B. **External Examination- 60%- 60 marks per paper**

Semester End Theory Examination:

1. Duration - These examinations shall be of **two hours** duration.
2. Theory question paper pattern:
   a. There shall be 3 questions each of 20 marks.
   b. All questions shall be compulsory with internal choice within the questions.

Paper Pattern:

Question	Options	Marks	Questions based on
1	**Part A:** Attempt any one of two theory questions each of **8 marks** (or attempt any two of four theory questions each of **4 marks**) **Part B:** Attempt any three of five questions each of **4 marks**	20	Unit I
2	**Part A:** Attempt any one of two theory questions each of **7 marks** **Part B:** Attempt any two of four questions each of **4 marks**	20	Unit II
3	Attempt any four of six questions each of **5 marks**	20	Unit I, & II
	TOTAL	**60**	

Practical Examination Pattern:

A. **Internal Examination: 40%- 40 Marks**

Particulars	Paper I	Paper II
Journal	05	05
Quiz	10	10
Participation	05	05
Total	**20**	**20**

B. **External Examination: 60%- 60 Marks**

Semester End Practical Examination:

Particulars	Paper I	Paper II
Laboratory work	25	25
Viva	05	05
Total	**30**	**30**

PRACTICAL BOOK/JOURNAL

The students are required to perform in class 75% of the Practical for the journal to be duly certified.

The students are required to present a duly certified journal for appearing at the practical examination, failing which they will not be allowed to appear for the examination.

Overall Examination & Marks Distribution Pattern

Semester I

Course	WSMATMJ111			WSMATMJ112			Grand Total
	Internal	External	Total	Internal	External	Total	
Theory	**40**	**60**	**100**	**40**	**60**	**100**	**200**
Practical	**20**	**30**	**50**	**20**	**30**	**50**	**100**

PROGRAMME: B.Sc. (Major)		SEMESTER II	
COURSE: Calculus II		COURSE CODE: WSMATMJ121	
Teaching Scheme		Evaluation Scheme	
Lectures (hours/week)	Credits	CIA	Semester End Examination
2 lectures (2 hours)	2	40 marks	60 marks

Course Objectives:

1. To enable the learner to understand the concept of differentiability of functions.
2. To enable the learner to check the differentiabilty of functions.
3. To enable the learner to identify increasing and decreasing functions.
4. To enable the learner to find the maxima and minima of a function.
5. To enable the learner to understand infinite series and their convergence.
6. To enable the learner to examine the convergence of a series.

Course Outcome:

The learner will be able to:

1. Define differentiable functions
2. Discuss the algebra of differentiable functions
3. Examine the differentiability of a function
4. Calculate higher order derivatives, maxima, minima of a function
5. Recall the convergence of infinite series.
6. Test the convergence of series

DETAILED SYLLABUS

Course Code	Unit	Sub-Unit	Course/ Unit Title	Credits/ Lectures: 2 Credits/ 30 Lectures
WSMATMJ121	**I**		**Differentiablity of Functions**	**15 Lectures**
		1.1	Definition and Examples of differentiability of a function, Differentiable functions are continuous but not conversely, Algebra of differentiable functions. Chain rule, Higher order derivatives, Leibniz rule,	
		1.2	Rolle's Theorem, Lagrange's and Cauchy's Mean Value Theorems, Applications, L-Hospital rule and examples of indeterminate forms, Taylor's theorem with Lagrange's form of remainder, Taylor polynomial and applications.	
		1.3	Monotone functions, Examples, Critical point, Local maximum/minimum, Necessary condition, stationary points, Second derivative test, examples, concave/convex functions, point of inflection.	
	II		**Infinite Series**	**15 Lectures**
		2.1	Infinite series of real numbers. Definition of convergence and divergence. Basic examples including Geometric series. Elementary results such that the tail of series tends to 0 but converse is not true.	
		2.2	Cauchy Criterion, Algebra of convergent series. Test for convergence: Comparison test, limit comparison test, ratio test, root test, Abel test and Dirichlet's test, examples	
		2.3	Alternating series, Leibnitz's test, examples. Absolute convergence, absolute convergence implies convergence but not conversely, conditional convergence.	

References:

1. Apostol, Tom M. Calculus Volume I, Wiley & Sons (Asia) Pvt. Ltd, 1991.
2. Bartle, Robert G., and Donald R. Sherbert. Introduction to Real Analysis, 3rd Edition. Wiley, 1999.
3. Binmore, K. G. Mathematical Analysis : A Straightforward Approach. Cambridge University Press, 2001.
4. Courant, Richard. Introduction to Calculus and Analysis: Volume One. Interscience Publishers, 1965.
5. Ghorpade, Sudhir R. and Limaye, Balmohan V. A Course in Calculus and Real Analysis, Springer International Ltd, 2006.
6. Goldberg, Richard R. Methods of Real Analysis. Blaisdell Pub. Co.; Oxford And IBH, 1964.
7. Kumar, Ajit, and S. Kumaresan. A Basic Course in Real Analysis. Chapman and Hall/CRC, 2014, https://doi.org/10.1201/b16440.
8. Stewart, J. Calculus, Third Edition, Brooks/Cole Publishing Company, 1994.

PROGRAMME: B.Sc. (Major)		SEMESTER II	
COURSE: Linear Algebra		COURSE CODE: WSMATMJ122	
Teaching Scheme		Evaluation Scheme	
Lectures (hours/week)	Credits	CIA	Semester End Examination
2 lectures (2 hours)	2	40 marks	60 marks

Course Objectives:

1. To enable the learner to understand the system of homogeneous and non-homogeneous linear equations
2. To enable the learner to perform row and column operations.
3. To enable the learner to state and prove the existence and uniqueness of solutions of the system AX = B using determinants.
4. To enable the learner to evaluate the determinant and check the invertibility of matrices.
5. To enable the learner to apply Gauss elimination method for finding inverse of a matrix

Course Outcome:

The learner will be able to:

1. Evaluate the solutions of systems of homogeneous and non- homogeneous systems of linear equations.
2. Perform elementary row and column operations to find the solution .
3. Prove the existence and uniqueness of solutions of the system AX = B using determinants.
4. Calculate determinants of matrices.
5. Evaluate Inverse of matrices using Gauss elimination method.

DETAILED SYLLABUS

Course Code	Unit	Sub-Unit	Course/ Unit Title	Credits/ Lectures: 2 Credits/ 30 Lectures
WSMATMJ122	**I**		**System of Equations and Matrices**	**15 Lectures**
		1.1	Systems of homogeneous and non-homogeneous linear equations with Simple examples of finding solutions of such systems. Matrices (with real entries), Matrix representation of system of homogeneous and non-homogeneous linear equations.	
		1.2	Algebra of solutions of systems of homogeneous linear equations. A system of homogeneous linear equations with number of unknowns more than the number of equations has infinitely many solutions.	
		1.3	Elementary row and column operations. Row equivalent matrices. Row reduction (of a matrix to its row echelon form). Gaussian elimination. Applications to solving systems of linear equations. Examples.	
	II		**Determinants and Linear Equations**	**15 Lectures**
		2.1	Inductive definition of the determinant of a n × n matrix, Laplace expansions along an arbitrary row or column. Consequences such as (i) a square matrix is invertible if and only if its row echelon form is invertible. (ii) invertible matrices are products of elementary matrices.	
		2.2	Computation of the inverse of a matrix using Gauss elimination method. Basic properties of determinants (Statements only); (i) det A = (detA)^T (ii) A square matrix A is invertible if and only if det A ≠ 0. (iii) Minors and cofactors. (iv) det(AB) = det A det B.	
		2.3	Relation between the solutions of a system of non-homogeneous linear equations and the associated system of homogeneous linear equations. Properties such as the system Ax = b of non-homogeneous linear equations has a unique solution and the system Ax = 0 of homogeneous linear equations has no nontrivial solution if A is invertible.. Cramers Rule.	

References:

1. S Kumaresan, Linear Algebra - A Geometric Approach, PHI Learning.
2. Serge Lang, Introduction to Linear Algebra, Springer.
3. Sheldon Axler, Linear Algebra done right, Springer.
4. Howard Anton, Chris Rorres, Elementary Linear Algebra, Wiley Student Edition).
5. Gareth Williams, Linear Algebra with Applications, Jones and Bartlett Publishers.
6. David W. Lewis, Matrix theory.

PROGRAMME: B.Sc. (Major)		SEMESTER I	
COURSE: Practical Based on WSMATMJ121 and WSMATMJ122		COURSE CODE: WSMATMJ123	
Teaching Scheme		Evaluation Scheme	
Practicals (hours/week)	Credits	CIA	Semester End Examination
4 lectures per batch (4 hours per batch)	2	40 marks	60 marks

Course Objectives:

1. To enable the learner to check the differentiabilty of functions.
2. To enable the learner to identify increasing and decreasing functions.
3. To enable the learner to find the maxima and minima of a function.
4. To enable the learner to examine the convergence of a series.
5. To enable the learner to perform row and column operations.
6. To enable the learner to evaluate the determinant and check the invertibility of matrices.
7. To enable the learner to apply Gauss elimination method for finding inverse of a matrix

Course Outcome:

The learner will be able to:

1. Examine the differentiability of a function
2. Apply the algebra of differentiable functions
3. Calculate higher order derivatives, maxima, minima of a function
4. Test the convergence of series.
5. Evaluate the solutions of systems of homogeneous and non- homogeneous systems of linear equations.
6. Perform elementary row and column operations to find the solution .
6. Calculate determinants of matrices.
7. Evaluate Inverse of matrices using Gauss elimination method.

Practical	Credits
Based on WSMATMJ121	**2**
1.Differentiability of a function	
2.Mean value theorems and its applications, L'Hospital's Rule, Increasing and Decreasing functions.	
3.Extreme values, Taylor's Theorem	
4. Higher order derivatives, Leibniz Rule	
5. Examples of convergent / divergent series and algebra of convergent series.	
6. Tests for convergence of series.	
Based on WSMATMJ122	
1. Systems of Homogeneous and Non-homogeneous linear equations.	
2. Elementary row/column operations and Elementary matrices	
3. Gauss Elimination Method	
4. Determinant and Inverse of Matrix	
5. Cramer's Rule	
6. Solution to system of linear equations	

Modality of Assessment

Theory Examination Pattern:

A. **Internal Assessment- 40%- 40 marks per paper**

Sr. No.	Evaluation Type	Marks
1	**Written Objective Examination**	**20**
2	**Assignment/ Presentation**	**20**
TOTAL		**40**

B. **External Examination- 60%- 60 marks per paper**

Semester End Theory Examination:

1. Duration - These examinations shall be of **two hours** duration.
2. Theory question paper pattern:
   c. There shall be 3 questions each of 20 marks.
   d. All questions shall be compulsory with internal choice within the questions.

Paper Pattern:

Question	Options	Marks	Questions based on
1	**Part A:** Attempt any one of two theory questions each of **8 marks** (or attempt any two of four theory questions each of **4 marks**) **Part B:** Attempt any three of five questions each of **4 marks**	20	Unit I
2	**Part A:** Attempt any one of two theory questions each of **7 marks** **Part B:** Attempt any two of four questions each of **4 marks**	20	Unit II
3	Attempt any four of six questions each of **5 marks**	20	Unit I, & II
	TOTAL	**60**	

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Practical Examination Pattern:

A. **Internal Examination: 40%- 40 Marks**

Particulars	Paper I	Paper II
Journal	05	05
Quiz	10	10
Participation	05	05
Total	**20**	**20**

B. **External Examination: 60%- 60 Marks**

Semester End Practical Examination:

Particulars	Paper I	Paper II
Laboratory work	25	25
Viva	05	05
Total	**30**	**30**

PRACTICAL BOOK/JOURNAL

The students are required to perform in class 75% of the Practical for the journal to be duly certified.

The students are required to present a duly certified journal for appearing at the practical examination, failing which they will not be allowed to appear for the examination.

Overall Examination & Marks Distribution Pattern

Semester I

Course	WSMATMJ121			WSMATMJ122			Grand Total
	Internal	External	Total	Internal	External	Total	
Theory	**40**	**60**	**100**	**40**	**60**	**100**	**200**
Practical	**20**	**30**	**50**	**20**	**30**	**50**	**100**

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