MANGALORE UNIVERSITY

M.Sc. Mathematics Choice Based Credit System (Semester Scheme)
Programme from the academic year 2022-23

Preamble:

The syllabi for the M.Sc. Mathematics Choice Based Credit System (Semester Scheme) Programme in use at present were introduced from the academic year 2016-17. To enable the programme to be on par with global standards and to provide hands on experience, Practical components have been added to this syllabi and the restructured syllabi was implemented from the academic year 2019-20. The Practical courses were of 2 credits each in the first 3 semesters.

In the current syllabi, all hard core courses have been retained with minor changes in few courses from the existing one. A new soft core course 'MTS 406: Theory of Combinatorics' is introduced in the first semester as replacement of 'MTS 405: Number Theory'. In the third semester a soft core course 'MTS 516: Advanced Number Theory' is introduced and the soft core course 'MTS 510: Theory of Partitions' is dropped. In the fourth semester a new soft core course 'MTS 563: Advanced Graph Theory' is introduced in place of 'MTS 556: Advanced Discrete Mathematics'. All the remaining soft core courses have been retained with minor changes. To meet the present requirements of the industries the Python programming language is introduced and the lists of programmes for the practical courses have been revised. The "Open Elective" courses in the second and third semesters are offered only to the students of other departments. The current syllabi take into consideration the recommendations of U.G.C. Curriculum Development Committee and it is meant to be introduced from the academic year 2022-23.

(*Revised as per the BOS meeting on 05.09.2022 to take the lead in the competitive/emulating industry/market based on the recent developments/inventions in the society.*)

Programme Outcome:

- Provide a strong foundation in different areas of Mathematics, so that the students can compete with their contemporaries and excel in the various careers in Mathematics.
- Develop abstract mathematical thinking.
- Motivate and prepare the students to pursue higher studies and research, thus contributing to the ever increasing academic demands of the country.
- Enrich the students with strong communication and interpersonal skills, broad knowledge and an understanding of multicultural and global perspectives, to work effectively in multidisciplinary teams, both as leaders and team members.
- Facilitate integral development of the personality of the student to deal with ethical and professional issues, and also to develop ability for independent and lifelong learning.

Programme Specific Outcome:

- Students will demonstrate in-depth knowledge of Mathematics, both in theory and application. They develop problem-solving skills and apply them independently to problems in pure and applied mathematics.

- Students will attain the ability to identify, formulate and solve challenging problems in Mathematics. They assimilate complex mathematical ideas and arguments.
- Students will be able to analyze complex problems in Mathematics and propose solutions using research based knowledge
- Students will be able to work individually or as a team member or leader in uniform and multidisciplinary settings.
- Students will develop confidence for self-education and ability for lifelong learning. Adjust themselves completely to the demands of the growing field of Mathematics by lifelong learning.
- Effectively communicate about their field of expertise on their activities, with their peer and society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations.
- Students will get the skills to answer competitive examinations such as JRF/NET, GATE, SET and other fellowships examinations conducted by premier institutions/agencies.

A. Consolidated List of Courses:

The following shall be the Courses of study in the four semesters M.Sc. Mathematics Programme (CBCS-PG) from the academic year 2022-2023.

Hard Core Courses:

First Semester	Second Semester
1. MTH 401 Algebra - I 2. MTH 402 Linear Algebra- I 3. MTH 403 Real Analysis - I	4. MTH 452 Algebra - II 5. MTH 453 Real Analysis - II 6. MTH 454 Topology

Third Semester	Fourth Semester
7. MTH 502 Complex Analysis - I 8. MTH 503 Measure and Integration 9. MTH 504 Multivariate Calculus and Geometry	10. MTP 551 Project Work 11. MTH 552 Complex Analysis – II 12. MTH 553 Functional Analysis

Soft Core Courses

First Semester	Second Semester
1. MTS 404 Numerical Analysis 2. MTS 407 Theory of Combinatorics 3. MTL 408 Practical -I	4. MTS 455 Linear Algebra - II 5. MTS 456 Ordinary Differential Equations 6. MTL 458 Practical - II

Third Semester	Fourth Semester
7. MTS 505 Advanced Numerical Analysis 8. MTS 506 Commutative Algebra 9. MTS 507 Graph Theory 10. MTS 508 Lattice Theory 11. MTS 509 Fluid Mechanics 12. MTS 513 Applied Algebraic Coding Theory 13. MTS 514 Operations Research 14. MTS 515 Design and Analysis of Algorithms	17. MTS 554 Partial Differential Equations 18. MTS 555 Advanced Topology 19. MTS 557 Algebraic Number Theory 20. MTS 558 Calculus of Variations and Integral Equations 21. MTS 559 Mathematical Statistics 22. MTS 560 Computational Geometry 23. MTS 561 Cryptography 24. MTS 562 Finite Element Method with Applications

15. MTS 516 Advanced Number Theory 16. MTL 517 Practical - III	25. MTS 563 Advanced Graph Theory

Open Elective Courses

Second Semester	Third Semester
1. MTE 451 Discrete Mathematics and Applications.	2. MTE 501 Differential Equations and Applications 3. MTE 512 Mathematical Finance

Note:

- All hard core courses are of 4 credits each and all are compulsory.
- Practical courses are of 2 credits each and all are compulsory.
- Soft core courses except practical courses are of 4 credits each. The soft core courses in the first two semesters are compulsory. In the third and fourth semesters student can choose any two soft core courses (other than practical courses) from the list of soft core courses offered in that semester.
- Project work which is compulsory for every student, involves self study to be carried out by the student (on a research problem of current interest or on an advanced topic not covered in the syllabus) under the guidance of a supervisor.
- Supervisor may be from the parent institution or from any other reputed institution/industry.
- Project work shall be initiated in the third semester itself and the project report (dissertation) shall be submitted at the end of the fourth semester.
- For practical the student faculty ratio is 10:1. That is for every ten student one faculty to be allotted for effective implementation.

B. Scheme of Instruction and Examination

First Semester

Course Code	Instruction Hours per week			Credits	Duration of Examination in hours	University Examination Max. Marks	Internal Assessment Max. Marks	Total Marks
	Theory	Tutorial	Total					
MTH 401	4	2	6	4	3	70	30	100
MTH 402	4	2	6	4	3	70	30	100
MTH 403	4	2	6	4	3	70	30	100
MTS 404	4	2	6	4	3	70	30	100
MTS 407	4	2	6	4	3	70	30	100
MTL 408	4	-	4	2	3	35	15	50

Second Semester

Course Code	Instruction Hours per week			Credits	Duration of Examination in hours	University Examination Max. Marks	Internal Assessment Max. Marks	Total Marks
	Theory	Tutorial	Total					
MTE 451	3	1	4	3	3	70	30	100
MTH 452	4	2	6	4	3	70	30	100
MTH 453	4	2	6	4	3	70	30	100
MTH 454	4	2	6	4	3	70	30	100
MTS 455	4	2	6	4	3	70	30	100
MTS 456	4	2	6	4	3	70	30	100
MTL 458	4	-	4	2	3	35	15	50

Third Semester

Course Code	Instruction Hours per week			Credits	Duration of Examination in hours	University Examination Max. Marks	Internal Assessment Max. Marks	Total Marks
	Theory	Tutorial	Total					
MTE 501	3	1	4	3	3	70	30	100
MTE 512	3	1	4	3	3	70	30	100
MTH 502	4	2	6	4	3	70	30	100
MTH 503	4	2	6	4	3	70	30	100
MTH 504	4	2	6	4	3	70	30	100
MTS 505	4	2	6	4	3	70	30	100
MTS 506	4	2	6	4	3	70	30	100
MTS 507	4	2	6	4	3	70	30	100
MTS 508	4	2	6	4	3	70	30	100
MTS 509	4	2	6	4	3	70	30	100
MTS 513	4	2	6	4	3	70	30	100
MTS 514	4	2	6	4	3	70	30	100
MTS 515	4	2	6	4	3	70	30	100
MTS 516	4	2	6	4	3	70	30	100
MTL 517	4	-	4	2	3	35	15	50

Fourth Semester

Course Code	Instruction Hours per week			Credits	Duration of Examination in hours	University Examination Max. Marks	Internal Assessment Max. Marks	Total Marks
	Theory	Tutorial	Total					
MTP 551	6			4	-	70	30	100
MTH 552	4	2	6	4	3	70	30	100
MTH 553	4	2	6	4	3	70	30	100
MTS 554	4	2	6	4	3	70	30	100
MTS 555	4	2	6	4	3	70	30	100
MTS 557	4	2	6	4	3	70	30	100
MTS 558	4	2	6	4	3	70	30	100
MTS 559	4	2	6	4	3	70	30	100
MTS 560	4	2	6	4	3	70	30	100
MTS 561	4	2	6	4	3	70	30	100
MTS 562	4	2	6	4	3	70	30	100
MTS 563	4	2	6	4	3	70	30	100

Tutorials: There shall be 2 hours of tutorials per week for each course having 4 credits and 1 hour tutorial for an open elective. Tutorials are to be considered as teaching hours and in the tutorials students are required to solve the problems in presence of the course instructor.

Scheme of Evaluation for Internal Assessment Marks:

1. Theory Course:

   Each Theory Course shall carry 30 marks for internal assessment based on two tests of 90 minutes duration each.