Chaudhary Ranbir Singh University, Jind

(Established by the State Legislature Act 28 of 2014)

Scheme
for

Post Graduate Programme

M.Sc. Mathematics

as per NEP-2020
Curriculum and Credit Framework for Postgraduate Programme

With Multiple Entry-Exit, Internship and CBCS-LOCF
With effect from the session 2024-25 (in phased manner)

DEPARTMENT OF MATHEMATICS
FACULTY OF PHYSICAL SCIENCES

CHAUDHARY RANBIR SINGH UNIVERSITY JIND
HARYANA, INDIA

Abbreviations used

Sr. No.	Full form	Abbreviation	Description
1	Core Course	CC	Compulsory core courses for the programme. CC will be a theory course of 4 credits.
2	Discipline Elective Course	DEC	Elective Courses offered by the DCI. A student can opt one course out of 4 given options for that DEC course. One course can be opted in a semester through MOOCs from SWAYAM or other portals. DEC will be a theory course of 4 credits.
3	Practicum	PC	Practical course of 4 credits which will be compulsory in all semesters for all students except in the 4th Semester when a student opts Dissertation work.
4	Seminar	S	Seminar is a Skill Enhancement Course (SEC) aiming to impart skills of self-learning, comprehension, communication and presentation.
5	Constitutional, Human, Moral Values and IPR	CHM	CHM is a compulsory Value Added theory Course of 2 credits.
6	Open Elective Course	OEC	OEC is a Multidisciplinary course of 2 credits. Every student will opt a course from the pool of OEC courses other than Mathematics.
7	Employability and Entrepreneurship Skills Course	EEC	EEC is Vocational or SEC course aiming to increase the employment and entrepreneurship potential of students of programme.
8	Theory	Th	
9	Practical	P	
9	Lecture	L	
10	Tutorial	T	
11	Dissertation	D	A research course of 12 credits, where a student will undertake research work and submit a dissertation as per rules prescribed by the university.
12	Programme Learning Outcomes	PLOs	
13	Course Learning Outcomes	CLOs	

Programme Learning Outcomes (PLOs): As per NEP-2020, PLOs include outcomes specific to disciplinary areas of learning associated with the chosen field (s) of learning as well as generic learning outcomes. These also include transferable skills and competencies that post graduates of all programmes of study should acquire and be able to demonstrate for the award of the Degree. The programme learning outcomes would also focus on knowledge and skills that prepare students for further study, employment, research and responsible citizenship.

The PLOs of **M.Sc. Mathematics** programme are stated as per following domains:

PLOs	After the completion of Master degree in Mathematics, a student will be able to:
PLO-1: Knowledge and Understanding	Demonstrate the deep understanding and advanced knowledge in the core areas of Mathematics subject and understanding of recent developments and issues, including concepts, theories, principles, methods and techniques in different areas of pure and applied Mathematics.
PLO-2: General Skills	Acquire the general skills required for performing and accomplishing the tasks as expected to be done by a skilled professional in the fields of Mathematics.
PLO-3: Technical/ Professional Skills	Demonstrate the learning of advanced cognitive computing, programming, formulating models, using mathematical softwares and other teaching and professional skills required for completing the specialized tasks related to the profession and for conducting and analyzing the relevant research tasks in different domains of the Mathematics.
PLO-4: Communication Skills	Effectively communicate the attained skills in different areas of the Mathematics in a precise, well-structured and unambiguous mathematical language through effective oral and/or written expressions to the society at large.
PLO-5: Application of Knowledge and Skills	Apply the acquired knowledge and skills to the problems in the subject area, and to identify and analyze the issues where the attained knowledge and skills can be applied by carrying out research investigations to formulate evidence-based solutions to complex and unpredictable problems associated with the field of Mathematics or otherwise.
PLO-6: Critical thinking and Research Aptitude	Attain the capabilities of critical thinking, logical reasoning, investigating problems, analysis, problem solving, application of mathematical methods/techniques, in intra/inter-disciplinary areas of the **Mathematics** enabling to develop skills to solve mathematical problems having applications in other disciplines and/or in the real world and to formulate, synthesize, and articulate issues for designing of research proposals, testing hypotheses, and drawing inferences based on the analysis.
PLO-7: Constitutional, Humanistic, Moral	Know constitutional, humanistic, moral and ethical values, and intellectual property rights to become a scholar/professional with

Values and Ethics	ingrained values in expanding knowledge for the society, and to avoid unethical practices such as fabrication, falsification or misrepresentation of data or committing plagiarism.
PLO-8: Capabilities/ qualities and mindset	To exercise personal responsibility for the outputs of own work as well as of group/team and for managing complex and challenging work(s) that requires new/strategic approaches.
PLO-9: Employability and job-ready skills	Attain the knowledge and skills required for increasing employment potential, adapting to the future work and responding to the rapidly changing demands of the employers/industry/society with time, and to have strong foundation in basic and applied aspects of Mathematics so as to venture into research in different areas of mathematical sciences, jobs in scientific and various industrial sectors and/or teaching career in Mathematics.

Chaudhary Ranbir Singh University, Jind

Scheme of Examination for Postgraduate Programme M.Sc. Mathematics
as per NEP-2020 Curriculum and Credit Framework for Postgraduate Programmes
(CBCS LOCF) with effect from the session 2024-25 (in phased manner)
Framework-2
Scheme-Q

Semester	Course Type	Course Code	Nomenclature of course	Theory (Th)/ Practical (P)/ Seminar/ CHM/OEC/ EEC/ Dissertation/ Project Work	Credits		Contact hours per week L: Lecture P: Practical T: Tutorial				Internal Assessment Marks	End Term Examination Marks	Total Marks	Examination hours
					Course	Sem. Total	L	T	P	Total				
1	CC-1	M24-MAT-101	REAL ANALYSIS	Th	4	26	3	1	0	4	30	70	100	3
	CC-2	M24-MAT-102	COMPLEX ANALYSIS	Th	4		3	1	0	4	30	70	100	3
	CC-3	M24-MAT-103	ORDINARY DIFFERENTIAL EQUATIONS-I	Th	4		3	1	0	4	30	70	100	3
	CC-4	M24-MAT-104	NUMBER THEORY	Th	4		3	1	0	4	30	70	100	3
	CC-5	M24-MAT-105	ABSTRACT ALGEBRA	Th	4		3	1	0	4	30	70	100	3

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	PC-1	M24-MAT-106	PRACTICAL -1	P	4		0	0	8	8	30	70	100	4
	SEMINAR	M24-MAT-107	SEMINAR	S	2		0	0	0	2	0	50	50	1
2	CC-6	M24-MAT-201	FIELD THEORY	Th	4		4	0	0	4	30	70	100	3
	CC-7	M24-MAT-202	MEASURE AND INTEGRATION	Th	4		4	0	0	4	30	70	100	3
	CC-8	M24-MAT-203	TOPOLOGY	Th	4		4	0	0	4	30	70	100	3
	CC-9	M24-MAT-204	ORDINARY DIFFERENTIAL EQUATIONS-II	Th	4	26	4	0	0	4	30	70	100	3
	CC-10	M24-MAT-205	COMPUTER PROGRAMMING WITH MATLAB	Th	4		4	0	0	4	30	70	100	3
	PC-2	M24-MAT-206	PRACTICAL-2	P	4		0	0	0	8	30	70	100	4
	CHM	M24-CHM-201	CONSTITUTIONAL, HUMAN AND MORAL VALUES, AND IPR	Th	2		2	0	0	2	15	35	50	3
	Internship	M24-INT-200	An internship course of 4 Credits of 4-6 weeks duration during summer vacation after 2nd semester is to be completed by every student. Internship can be either for enhancing the employability or for developing the research aptitude.								50	50	100	

CC-11	M24-MAT-301	INTEGRAL EQUATIONS AND CALCULUSOF VARIATIONS	Th	4	26	4	0	0	4	30	70	100	3
CC-12	M24-MAT-302	FUNCTIONAL ANALYSIS	Th	4		4	0	0	4	30	70	100	3
DEC-1 (One course is to be opted out of M24-MAT-303 to M24-MAT-306)	M24-MAT-303	FUZZY SET THEORY	Th	4		4	0	0	4	30	70	100	3
	M24-MAT-304	COMMUTATIVE ALGEBRA	Th	4		4	0	0	4	30	70	100	3
	M24-MAT-305	DIFFERENTIAL GEOMETRY	Th	4		4	0	0	4	30	70	100	3
	M24-MAT-306	ELASTICITY	Th	4		4	0	0	4	30	70	100	3
DEC-2 (One course is to be opted out of M24-MAT-307 to M24-MAT-310)	M24-MAT-307	ADVANCED NUMERICAL ANALYSIS	Th	4		4	0	0	4	30	70	100	3
	M24-MAT-308	ARTIFICIAL INTELLIGENCE	Th	4		4	0	0	4	30	70	100	3
	M24-MAT-309	MATHEMATICAL STATISTICS	Th	4		4	0	0	4	30	70	100	3
	M24-MAT-310	FLUID MECHANICS	Th	4		4	0	0	4	30	70	100	3

	DEC-3 (One course is to be opted out of M24-MAT-311 to M24-MAT-314)	M24-MAT-311	ALGEBRAIC CODING THEORY	Th	4		4	0	0	4	30	70	100	3
		M24-MAT-312	FINANCIAL MATHEMATICS	Th	4		4	0	0	4	30	70	100	3
		M24-MAT-313	OPERATIONS RESEARCH	Th	4		4	0	0	4	30	70	100	3
		M24-MAT-314	MATHEMATICAL MODELING	Th	4		4	0	0	4	30	70	100	3
	PC-3	M24-MAT-315	PRACTICAL-3	P	4		0	0	8	8	30	70	100	4
	OEC	M24-OEC-331	MATHEMATICAL TOOLS FOR OTHER DISCIPLINES	Th	2		2	0	0	2	15	35	50	3
4	CC-13	M24-MAT-401	PARTIAL DIFFERENTIAL EQUATIONS	Th	4		4	0	0	4	30	70	100	3
	CC-14	M24-MAT-402	DISCRETE MATHEMATICS	Th	4		4	0	0	4	30	70	100	3
	DEC-4 (One course is to be opted out of M24-	M24-MAT-403	ADVANCED COMPLEX ANALYSIS	Th	4	26	4	0	0	4	30	70	100	3
		M24-MAT-404	ALGEBRAIC NUMBER THEORY	Th	4		4	0	0	4	30	70	100	3
		M24-MAT-405	GENERAL MEASURE AND INTEGRATION THEORY	Th	4		4	0	0	4	30	70	100	3

MAT-403 to M24-MAT-406)	M24-MAT-406	ADVANCED FUZZY SET THEORY	Th	4		4	0	0	4	30	70	100	3
DEC-5 (One course is to be opted out of M24-MAT-407 to M24-MAT-410)	M24-MAT-407	WAVELET ANALYSIS	Th	4		4	0	0	4	30	70	100	3
	M24-MAT-408	ADVANCED FUNCTIONAL ANALYSIS	Th	4		4	0	0	4	30	70	100	3
	M24-MAT-409	ADVANCED FLUID MECHANICS	Th	4		4	0	0	4	30	70	100	3
	M24-MAT-410	ECONOMETRICS	Th	4		4	0	0	4	30	70	100	3
DEC-6 (One course is to be opted out of M24-MAT-411 to M24-MAT-414)	M24-MAT-411	BIO-MATHEMATICS	Th	4		4	0	0	4	30	70	100	3
	M24-MAT-412	STATISTICAL METHODS	Th	4		4	0	0	4	30	70	100	3
	M24-MAT-413	LINEAR PROGRAMMING	Th	4		4	0	0	4	30	70	100	3
	M24-MAT-414	NON-COMMUTATIVE RINGS	Th	4		4	0	0	4	30	70	100	3
PC-4	M24-MAT-415	PRACTICAL-4	P	4		0	0	0	8	30	70	100	4
EEC	M24-MAT-416	EMPLOYABILITY SKILLS IN MATHEMATICS	Th	2		2	0	0	2	15	35	50	3
OR													

Dissertation	M24-MAT-417	DISSERTATION	D	12		0	0	0	12	0	300	300	-

NOTES:

1. A student may opt for Dissertation work of 12 credits in place of CC-14, DEC-6 and PC-4 courses in the 4th Semester.
2. The candidates, who are offered the Dissertation Course, will also study the CC-13, DEC-4, DEC-5 and EEC courses in the 4th Semester.
3. A student can opt one elective course in a semester, i.e. up to 40% of total elective courses mentioned in the scheme, through SWAYAM/NPTEL or other online portals recognized by the UGC and the university.

Table-1

Course composition- Theory/ Theory +Tutorial			
Course Credit	Internal Assessment marks	End term exam marks	Total marks
2	15	35	50
4	30	70	100

Table-2: Course composition- Theory + Practical

	Theory		Practical		
Course Credit					Total marks
Theory +Practical	Internal Assessment marks	End term exam marks	Internal Assessment marks	End term exam marks	
2+0	15	35	-	-	50
4+0	30	70	-	-	100
0+4	-	-	30	70	100

Table- 3: Distribution of Internal Assessment Marks (Theory)

Total Internal Assessment Marks (Theory)	Class Participation	Seminar/Presentation/Assignment/Quiz/class test, etc.	Mid-Term Exam
15	4	7	
30	5	10	15

Table -4 Distribution of Internal Assessment Marks (Practical)

Total Internal Assessment Marks (Practicum)	Class Participation	Seminar/Demonstration/Viva-Voce/Lab record, etc.	Mid-Term Exam
30	5	10	15