AKAL UNIVERSITY

TALWANDI SABO

(Established under Punjab State Act No. 25 of 2015)

Bachelor of Science Mathematics
Or
Bachelor of Science (Hons.) Mathematics (Major)
and Discipline-2 (Minor)
Or
Bachelor of Science (Hons.) Mathematics
with Research (Major) and Discipline-2 (Minor)

(Based on NEP – 2020)

Talwandi Sabo

DEPARTMENT OF MATHEMATICS

FACULTY OF SCIENCES

Scheme & Syllabi

(Academic Year 2024-25)

6. CURRICULUM AND CREDIT FARMWORK FOR UNDERGRADUATE PROGRAMME

Sem.	Major Courses		Minor Courses (MI) (4 credit)	Multi-disciplinary courses (MDC) (4 credit)	Ability Enhancement Courses (AEC) (2 credit)	Skill Enhancement Courses (SEC) (3 credit)	Value-Added Courses VAC (2 credit)	Total Credit
	DSC	DSE						
I	DSC-1 [3] DSC-2 [3] DSC-L-1[2]	-	MI-1	MDC-1	AEC-1	SEC-1	VAC-1	23
II	DSC-3 [3] DSC-4 [3] DSC-L-2 [2]	-	MI-2	MDC-2	AEC-2	SEC-2	VAC-2	23
Students exiting the programme after securing 46 credits will be awarded UG Certificate in Mathematics provided they secure 4 credits in work based vocational courses offered during summer term or internship/Apprenticeship in addition to 6 credits from skill-based courses earned during first and second semester.								**46**
III	DSC-5 [3] DSC-L-3 [2]	DSE-1 [3] or DSE-2 [3] or DSE-3 [3]	MI-3	MDC-3	AEC-3	SEC-3	-	21
IV	DSC-6 [4] DSC-7 [3] DSC-L-4 [2]	DSE-4 [3] or DSE-5 [3] or DSE-6 [3]	MI-4	-	AEC-4		VAC-3	20
Students exiting the programme after securing 87 credits will be awarded UG Diploma in Mathematics provided they secure additional 4 credit in skill based vocational courses offered during first year or second year summer term.								**87**
V	DSC-8 [4] DSC-9 [4] DSC-10 [3] DSC-L-5 [2]	DSE-7 [3] or DSE-8 [3] or DSE-9 [3]	MI-5	-				20
VI	DSC-11 [4] DSC-12 [3] DSC-L-6 [2] Internship[4]	DSE-10 [3] or DSE-11[3] or DSE-12[3]	MI-6	-				20
Students who want to undertake 3-year UG programme will be awarded UG Degree in Mathematics upon securing 127 credits								**127**
VII	DSC-13 [4] DSC-14 [4] DSC-15 [3] DSC-L-7 [2]	DSE-13 [3] or DSE-14[3] or DSE-15[3]	MI-7	-				20
VIII	DSC-16 [4] DSC-17 [4] DSC-18 [3] DSC-L-8 [2]	DSE-16 [3] or DSE-17[3] or DSE-18[3]	MI-8	-				20
Students will be awarded Bachelor of Science (Hons.) Mathematics (Major) and Discipline-2 (Minor) provided they secure 167 credits								**167**
VII	DSC-13 [4] DSC-14 [4] DSC-D [4]	DSE-13 [4] or DSE-14[4] or DSE-15[4]	MI-7	-				20
VIII	DSC-16 [4] DSC-D [8]	DSE-16 [4] or DSE-17[4] or DSE-18[4]	MI-8	-				20
Students will be awarded Bachelor of Science (Hons.) Mathematics with Research (Major) and Discipline-2 (Minor) provided they successfully completed the dissertation work and secure 167 credits								**167**

University may change or add any course in AEC, SEC, MDC, VAC, Core, DSEas per semester or suggestion from BOS in subsequent years.

7. SEMESTER-WISE DISTRIBUTION OF MOR COURSES

A student will have study compulsory Discipline Specific Core Courses in each Semesters. The semester wise distribution and credit details of DSC courses over eight semesters is listed below:

7.1 Discipline Specific Core (DSC)

Semester	Course Code	Title of the Course	Schedule of Teaching (Credits-wise)			Total Credits
			Theory	Tutorial	Practical	
I	MTMS05C101	Calculus	3	1	0	4
	MTMS05C102	Theory of Equations	3	1	0	4
II	MTMS05C201	Analysis	3	1	0	4
	MTMS05C202	Ordinary Differential Equations	3	1	0	4
III	MTMS05C301	Group Theory	3	1	0	4
IV	MTMS05C401	Real Functions and Laplace Transformation	3	1	0	4
	MTMS05C402	Mutivariate Calculus	3	1	0	4
V	MTMS05C501	Rieman Integration and Series of Functions	3	1	0	4
	MTMS05C502	Partial Differential Equations	3	1	0	4
	MTMS05C503	Linear Algebra	3	1	0	4
VI	MTMS05C601	Number Theory	3	1	0	4
	MTMS05C602	Ring Theory	3	1	0	4
VII	MTMS05C701	Advanced Group Theory	3	1	0	4
	MTMS05C702	Complex Analysis	3	1	0	4
	MTMS05C703	Advanced Real Analysis	3	1	0	4
VIII	MTMS05C801	Measure Theory	3	1	0	4
	MTMS05C802	Optimization Techniques	3	1	0	4
	MTMS05C803	Module Theory	3	1	0	4
B.Sc. (Hons.) Mathematics with Research						
VII	MTMS05C701	Advanced Group Theory	3	1	0	4
	MTMS05C702	Complex Analysis	3	1	0	4
	MTMS05C703	Advanced Real Analysis	3	1	0	4
	-	Dissertation (Synopsis)	3	1	0	4
VIII	MTMS05C803	Measure Theory	3	1	0	4
	MTMS05C804	Optimization Techniques	3	1	0	4
	-	Dissertation (Submission)	0	0	0	8

7.2 Discipline Specific Elective (DSE)

The Discipline Specific Electives (DSEs) are a pool of credit courses of Mathematics from which a student will choose to study based on his/ her interest. A student of Bachelor of Science (Hons.) Mathematics will have to study one DSE each III to VI. The semester wise distribution of DSE courses over six semesters.

Semester	Course Code	Title of the Course	Schedule of Teaching (Credits-wise)			Total Credits
			Theory	Tutorial	Practical	
III	MTMS05E301	Graph Theory	3	1	0	4
	MTMS05E302	Fourier Analysis	3	1	0	4
	MTMS05E303	Boolean Algebra and Automata Theory	3	1	0	4
IV	MTMS05E401	Analytical Geometry	3	1	0	4
	MTMS05E402	Combinatorial Mathematics	3	1	0	4
	MTMS05E403	Fuzzy Sets and Applications	3	1	0	4
V	MTMS05E501	Probability and Statistics	3	1	0	4
	MTMS05E502	Mathematical Modeling	3	1	0	4
	MTMS05E503	Differential Geometry	3	1	0	4
VI	MTMS05E601	Numerical Methods	3	1	0	4
	MTMS05E602	Operating System: Linux	3	1	0	4
	MTMS05E603	Applications of Algebra	3	1	0	4
VII	MTMS05E701	Statics	3	1	0	4
	MTMS05E702	Category Theory	3	1	0	4
	MTMS05E703	Numerical Method for ODE	3	1	0	4
VIII	MTMS05E801	Dynamics	3	1	0	4
	MTMS05E802	Analytical Number Theory	3	1	0	4
	MTMS05E803	Numerical Method for PDE	3	1	0	4

7.3 List of Courses offered as Minors or Generic Elective

All UG students are required to undergo eight minor courses of 04 credit each from the minor discipline which helps them to gain a broader understanding beyond the major discipline. These courses will be offered as generic elective for Multi-disciplinary programme.

Semester	Code	Course Title	Schedule of Teaching (Credit-wise)			Credits
			Theory	Tutorial	Practical	
Semester-I	MTMS05MI101	Differential Calculus	3	1	0	4
Semester-II	MTMS05MI102	Differential Equations	3	1	0	4
Semester-III	MTMS05MI103	Algebra	3	1	0	4
Semester-IV	MTMS05MI104	Analysis	3	1	0	4
Semester-V	MTMS05MI105	Introduction to Linear Algebra	3	1	0	4
Semester-VI	MTMS05MI106	Multivariate Calculus	3	1	0	4
Semester-VII	MTMS05MI107	Probability and Statistics	3	1	0	4
Semester-VIII	MTMS05MI108	Numerical Techniques	3	1	0	4

7.4 List of Courses offered as Multi-disciplinary Course

All UG students are required to undergo 3 introductory-level multi-disciplinary courses relating to any of the broad disciplines other than chosen major.

Semester	Code	Course Title	Schedule of Teaching (Credit-wise)			Credits
			Theory	Tutorial	Practical	
Sem-I	MTMS05M101	Introduction to Matrix Theory	3	1	0	4
Sem-I	MTMS05M102	Fundamentals of Differential Equations	3	1	0	4
Sem-II	MTMS05M201	Sets and Functions	3	1	0	4
Sem-II	MTMS05M202	Basic Statistics	3	1	0	4
Sem-III	MTMS05M301	Numerical Methods	3	1	0	4
Sem-III	MTMS05M302	Basic Calculus	3	1	0	4

7.5 List of Courses offered as Skill Enhancement Courses

To improve the skills essential for advanced studies, research, and employability, students will be offered a variety of Skill Enhancement as listed in Table below:

Semester	Code	Course Title	Schedule of Teaching (Credit-wise)			Credits
			Theory	Tutorial	Practical	
Sem-I	MTM05S101	Logic and Sets	3	0	0	3
Sem-I	MTM05S102	Introduction to Probability	3	0	0	3
Sem-II	MTM05S201	Discrete Mathematics	3	0	0	3
Sem-II	MTM05S202	Introduction to Statistics	3	0	0	3
Sem-III	MTM05S301	Industrial Mathematics	3	0	0	3
Sem-III	MTM05S302	Statistical Methods	3	0	0	3

Note: Additionally, students can select Skill Enhancement Courses, Ability Enhancement Courses (AECs) and Value-Added Courses (VACs) from the pool of courses provided by university.

7.6 CREDIT DISTRIBUTION OF DIFFERENT TYPE OF COURSES

Subjects	**B.Sc. in Mathematics**	**B.Sc. (Hons.) Mathematics (Major) and Disipline-2 (Minor)**	**B.Sc. (Hons.) Mathematics with Research (Major) and Disipline-2 (Minor)**
Major [DSC + DSE]	64	96	84
Minor	24	32	32
Multi-disciplinary Course	12	12	12
Ability Enhancement Course	8	8	8
Skill Enhancement Course	9	9	9
Internship	4	4	4
Value Added Course	6	6	6
Dissertation in Major	-	-	12
Total Credits	127	167	167

8. TEACHING-LEARNING METHODOLOGY

The undergraduate program in Mathematics provides students with a strong theoretical background and practical exposure/hands on training in different domain of mathematics and research, helping them to appreciate and learn the importance of mathematics in different circumstances. The program includes both foundational and in-depth courses across traditional mathematics sub-disciplines, along with DSCs, DSEs, GEs, SECs, AECs, and VACs to address present needs of modern society.

Courses are delivered through traditional lectures, lab work, projects, case studies, field work, seminars, hands-on training/workshops, and various ICT-enabled tools (PowerPoint, e-resources, models, software, simulations). Students will be encouraged to undertake short-term projects, participate in industrial and institutional visits, and engage in outreach programs. They will learn scientific reasoning,