Courses based on Under Graduate Curriculum Framework (UGCF) -2022

DEPARTMENT OF MATHEMATICS

B.Sc. (Hons.) Mathematics

(Discipline Specific Core (DSC) and Discipline Specific Elective (DSE) Courses)

Sem.	DSC (1-20) (3L + 1T/1P = 4 credits)	DSE (1-6) (3L + 1T/1P = 4 credits)
I	**DSC-1**: Algebra (3L + 1T) **DSC-2**: Elementary Real Analysis (3L + 1T) **DSC-3**: Probability and Statistics (3L + 1P)	
II	**DSC-4:** Linear Algebra (3L + 1T) **DSC-5**: Calculus (3L + 1T) **DSC-6:** Ordinary Differential Equations (3L + 1P)	
III	**DSC-7:** Group Theory (3L + 1T) **DSC-8:** Riemann Integration (3L + 1T) **DSC-9:** Discrete Mathematics (3L + 1P)	**DSE-1:** Choose any *one* (i) Graph Theory (3L + 1T) (ii) Mathematical Python (3L + 1P) (iii) Number Theory (3L + 1T)
IV	**DSC-10:** Sequences and Series of Functions (3L + 1T) **DSC-11:** Multivariate Calculus (3L + 1T) **DSC-12:** Numerical Analysis (3L + 1P)	**DSE-2:** Choose any *one* (i) Biomathematics (3L + 1T) (ii) Mathematical Modeling (3L + 1P) (iii) Mechanics (3L + 1T)
V	**DSC-13:** Metric Spaces (3L + 1T) **DSC-14:** Ring Theory (3L + 1T) **DSC-15:** Partial Differential Equations (3L + 1P)	**DSE-3:** Choose any *one* (i) Mathematical Data Science (3L + 1P) (ii) Linear Programming and Applications (3L + 1T) (iii) Mathematical Statistics (3L + 1T)
VI	**DSC-16:** Advanced Group Theory (3L + 1T) **DSC-17:** Advanced Linear Algebra (3L + 1T) **DSC-18:** Complex Analysis (3L + 1P)	**DSE-4:** Choose any *one* (i) Mathematical Finance (3L + 1P) (ii) Integral Transforms (3L + 1T) (iii) Research Methodology (3L + 1P)
VII	**DSC-19:** Linear Analysis (3L + 1T)	**DSE-5:** Choose at least *one* and at most *three* (i) Advanced Differential Equations (3L + 1T) (ii) Dynamical Systems (3L + 1T) (iii) Fundamentals of Topology (3L + 1T) (iv) Information Theory and Coding (3L + 1T) (v) Optimization (3L + 1T) (vi) Research Methodology (3L + 1P)
VIII	**DSC-20:** Field Theory and Galois Extension (3L + 1T)	**DSE-6:** Choose at least *one* and at most *three* (i) Advanced Mechanics (3L + 1T) (ii) Cryptography (3L + 1T) (iii) Industrial Mathematics (3L + 1P) (iv) Geometry of Curves and Surfaces (3L + 1T) (v) Integral Equations and Calculus of Variations (3L+1T) (vi) Machine Learning: A Mathematical Approach (3L + 1P)

3L = 3 Hours Lecture; 1T = 1 Hour Tutorial; 1P = 2 Hours Practical.

Courses based on Under Graduate Curriculum Framework (UGCF) -2022

DEPARTMENT OF MATHEMATICS

B.A. (Prog.) with Mathematics as Major/Non-Major

(Discipline, Discipline Specific Core (DSC), and Discipline Specific Elective (DSE) Mathematics Courses)

Semester	DSC (1-8) and Discipline (A-1 to A-6) (3L + 1T/1P = 4 credits)	DSE (1-4) (3L + 1T/1P = 4 credits)
I	**DSC-1:** Elements of Discrete Mathematics (3L + 1T) **Discipline A-1:** Topics in Calculus (3L + 1T)	
II	**DSC-2:** Analytic Geometry (3L + 1T) **Discipline A-2:** Elementary Linear Algebra (3L + 1T)	
III	**DSC-3:** Theory of Equations and Symmetries (3L + 1T) **Discipline A-3:** Differential Equations (3L + 1T)	
IV	**DSC-4:** Introduction to Graph Theory (3L + 1T) **Discipline A-4:** Abstract Algebra (3L + 1T)	
V	**DSC-5:** Linear Programming (3L + 1T) **Discipline A-5:** Elements of Real Analysis (3L + 1T)	**DSE-1:** Choose any *one* (i) Combinatorics (3L + 1T) (ii) Elements of Number Theory (3L+1T) (iii) Mathematical Python (3L + 1P)
VI	**DSC-6:** Elementary Mathematical Analysis (3L + 1T) **Discipline A-6:** Probability and Statistics (3L + 1P)	**DSE-2:** Choose any *one* (i) Discrete Dynamical Systems (3L+1P) (ii) Introduction to Mathematical Modeling (3L + 1P) (iii) Research Methodology (3L+1P)
VII	**DSC-7:** Numerical Methods (3L + 1P)	**DSE-3:** Choose at least *one* and at most *three* (i) Advanced Linear Algebra (3L + 1T) (ii) Elements of Metric Spaces (3L + 1T) (iii) Mathematical Data Science (3L + 1P) (iv) Integral Transforms (3L + 1T) (v) Research Methodology (3L + 1P)
VIII	**DSC-8:** Topics in Multivariate Calculus (3L + 1T)	**DSE-4:** Choose at least *one* and at most *three* (i) Applied Algebra (3L + 1T) (ii) Elements of Partial Differential Equations (3L + 1T) (iii) Mathematical Statistics (3L + 1T) (iv) Optimization Techniques (3L + 1T) (v) Rings and Fields (3L+1T)

3L = 3 Hours Lecture; 1T = 1 Hour Tutorial; 1P = 2 Hours Practical.

Courses based on Under Graduate Curriculum Framework (UGCF) -2022

DEPARTMENT OF MATHEMATICS

B.Sc. (Physical Sciences/Mathematical Sciences

(Discipline, Discipline Specific Core (DSC), and Discipline Specific Elective (DSE) Mathematics Courses)

Semester	Discipline (1-6) and DSC (7-8) (3L + 1T/1P = 4 credits)	DSE (1-6) (3L + 1T/1P = 4 credits)
I	(**Discipline A-1**) Topics in Calculus (3L + 1T)	
II	(**Discipline A-2**) Elementary Linear Algebra (3L + 1T)	
III	(**Discipline A-3**) Differential Equations (3L + 1T)	**DSE-1:** Choose any *one* (i) Combinatorics (3L + 1T) (ii) Elements of Number Theory (3L+1T) (iii) Theory of Equations and Symmetries (3L+1T)
IV	(**Discipline A-4**) Abstract Algebra (3L + 1T)	**DSE-2:** Choose any *one* (i) Elements of Discrete Mathematics (ii) Introduction to Graph Theory (iii) Linear Programming (3L + 1T)
V	(**Discipline A-5**) Elements of Real Analysis (3L + 1T)	**DSE-3:** Choose any *one* (i) Biomathematics (3L + 1T) (ii) Mathematical Python (3L + 1P) (iii) Mechanics (3L + 1T)
VI	(**Discipline A-6**) Probability and Statistics (3L + 1P)	**DSE-4:** Choose any *one* (i) Elementary Mathematical Analysis (3L+ 1T) (ii) Introduction to Mathematical Modeling (3L + 1P) (iii) Research Methodology (3L + 1P)
VII	**DSC-7:** Numerical Methods (3L + 1P)	**DSE-5:** Choose at least *one* and at most *three* (i) Advanced Linear Algebra (3L+1T) (ii) Elements of Metric Spaces (3L + 1T) (iii) Mathematical Data Science (3L + 1P) (iv) Integral Transforms (3L + 1T) (v) Research Methodology (3L + 1P)
VIII	**DSC-8:** Topics in Multivariate Calculus (3L + 1T)	**DSE-6:** Choose at least *one* and at most *three* (i) Applied Algebra (3L + 1T) (ii) Elements of Partial Differential Equations (3L + 1T) (iii) Mathematical Statistics (3L + 1T) (iv) Optimization Techniques (3L + 1T) (v) Rings and Fields (3L+ 1T)

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Courses based on Under Graduate Curriculum Framework (UGCF) -2022
DEPARTMENT OF MATHEMATICS
COMMON POOL OF GENERIC ELECTIVES (GE) COURSES OFFERED
(For all courses (other than B.Sc. (Hons.) Mathematics) under UGCF 2022)

Level/Category	Semester	GE (Generic Electives) COURSES
100 (First Category)	I	**GE-1(i): Fundamentals of Calculus*** (3L + 1T) or GE-1(ii): Theory of Equations and Symmetries (3L + 1T)
	II	GE-2(i): Analytic Geometry (3L + 1T) or **GE-2(ii): Introduction to Linear Algebra*** (3L + 1T)
200 (Second Category)	III	**GE-3(i): Differential Equations*** (3L + 1T) or GE-3(ii): Lattices and Number Theory (3L + 1T)
	IV	**GE-4(i): Elements of Real Analysis*** (3L + 1T) or GE-4(ii): Linear Programming (3L + 1T)
	V	GE-5(i): Numerical Methods (3L + 1P) or GE-5(ii): Mathematical Python (3L + 1P) or **GE-5(iii): Elementary Mathematical Analysis*** (3L + 1T)
	VI	GE-6(i): Introduction to Mathematical Modeling (3L + 1P) or GE-6(ii): Discrete Dynamical Systems (3L + 1P) or **GE-6(iii): Abstract Algebra*** (3L + 1T)
300 (Third Category)	VII	Choose maximum *two* GE-7(i): Applied Algebra (3L + 1T) GE-7(ii): Elements of Metric Spaces (3L + 1T) GE-7(iii): Introduction to Graph Theory (3L + 1T) GE-7(iv): Topics in Multivariate Calculus (3L + 1T)
	VIII	Choose maximum *two* GE-8(i): Rings and Fields (3L + 1T) GE-8(ii): Elements of Partial Differential Equations (3L + 1T) GE-8(iii): Elements of Complex Analysis (3L + 1T) GE-8(iv): Optimization Techniques (3L + 1T)

3L = 3 Hours Lecture; 1T = 1 Hour Tutorial; 1P = 2 Hours Practical.

***Mandatory Generic Electives (GE) courses,** out of which a student may choose at-least 3 GEs to add up to 28 credits to make such discipline a **minor** for the purpose of seeking admission in the Postgraduate Programme in that discipline in the University. The rest of the 16 credits can be earned from any of the above GEs including the mandatory ones.

Courses based on Under Graduate Curriculum Framework (UGCF) -2022
DEPARTMENT OF MATHEMATICS
COMMON POOL OF SKILL ENHANCEMENT COURSES (SEC) OFFERED
(For all courses under UGCF 2022)

1. **LaTeX Typesetting for Beginners**
2. **Mathematical Modeling with Excel**
3. **Financial Modeling with Excel**
4. **Network Flows**
5. **R-Shiny: Powerful Web Apps for Everyone**

Note. All SEC papers are of two credits with 4 hours practical per week each, and carry 80 marks of continuous assessment.