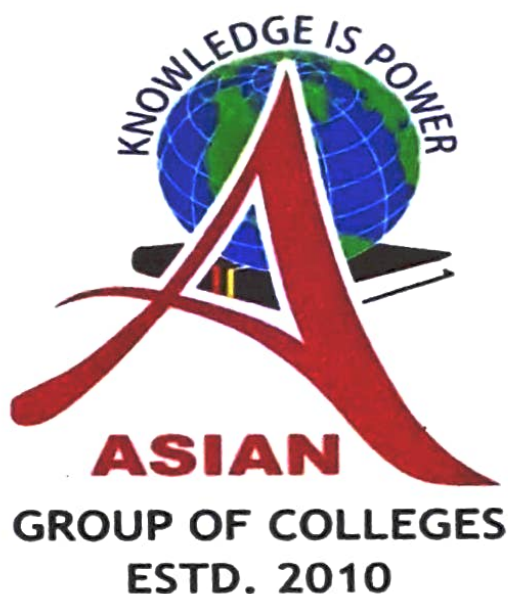


Asian Educational Institute, Patiala (PB)

(An Autonomous College)

School of Science and Mathematics



SYLLABUS

B.Sc/B.Sc(Hons.) & B.A./B.A.(Hons.)

Mathematics – (Major, Minor, IDC/MDC and SEC)

(Semester – V, VI)



Session: 2026-2027

Signature

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Session: 2026-2027

ASIAN EDUCATIONAL INSTITUTE, PATIALA (PB)
UG PROGRAMME (Bachelor of Science) B.Sc./B.Sc.(Honours),
B.A/B.A.(Honours)
SESSION: 2026-2027

Code	Title of paper	Hours (Per Week)	Max. Marks			Credits	Examination Time ours
			Total	Ext.	Int.		
SEMESTER-V							
BMATH301T	MAJ/MIN: Analysis	04	100	70	30	04	03
SEMESTER-V							
BMATH302T	MAJ/MIN: Fundamentals of Geometry	04	100	70	30	04	03
BMATH303T	MAJ/MIN: Optimization Techniques	04	100	70	30	04	03

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Semester-V
Analysis
Paper Code - BMATH301T
(Major/Minor Theory)

Max. Marks: 100
External Marks: 70
Internal Marks: 30
Pass Marks: 35%

Credits: 04
Total Teaching hours: 55

Course Outcomes: The students will be able to:

CO1: To study the concept of sequence and series.

CO2: To understand the concept of convergence and divergence.

CO3: To learn about integration and integrability.

CO4: To learn about relation between integration and differentiation.

CO5: To study the application of integration.

CO6: To understand the concept of infinite series and positive term series.

INSTRUCTIONS FOR THE PAPER SETTER

The Question paper will consist of three sections A, B and C. Sections A and B will have four questions each from the respective sections of the syllabus and Section C will consist of one compulsory question having ten short answer type questions covering the entire syllabus uniformly. Each question in sections A and B will be of 10 marks and section C will be of 30 marks.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions in all selecting two questions from each of the section A and B and compulsory question of Section C.

Section-A

Sequences; Definition of sequence, Limit of sequence, limit inferior and limit superior, convergence and divergence of sequence, Cauchy's criterion of convergence, monotonic sequences.

Infinite series; Definition of series, positive term series, comparison tests, Cauchy's root test, D'Alembert's ratio test, Raabe's test, logarithmic, Gauss and integral test., Leibnitz test, Alternating series.

Section-B

Reimann integrals: Definition and existence of integrals, Darboux theorem, Conditions of integrability, integration and differentiation, first and second mean value theorem, fundamental theorem of calculus.

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Improper integrals: Integration of unbounded functions, comparison test, infinite range of integration, integrand as product function, Beta, Gamma function.

References

1. CALCULUS AND ANALYTIC GEOMETRY, Ninth Edition, George B. Thomas and Ross L. Finney.
2. S.C. Malik and Savita Arora; Mathematical Analysis, New Age international publishers, INDIA.
3. Differential and Integral Calculus, Shanti Narayan.
4. Walter Rudin: Principles of Mathematical Analysis.

Exam

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Semester-VI
Fundamentals of Geometry
Paper Code - BMATH302T
(Major/Minor Theory)

Max. Marks: 100
External Marks: 70
Internal Assessment: 30
Pass Marks: 35%

Credits: 04
Total Teaching hours: 55

Course Outcomes: The students will be able to:

CO1: To understand the geometric structure.

CO2: To understand the behaviors of conics.

CO3: To understand the concept of tangents and normals.

CO4: To understand the concept of conicoids.

CO5: Analyze symmetry, axes, and standard form of central conicoids

CO6: Analyze right circular cylinder and parabolic cylinder in standard form.

INSTRUCTIONS FOR THE PAPER SETTER

The Question paper will consist of three sections A, B and C. Sections A and B will have four questions each from the respective sections of the syllabus and Section C will consist of one compulsory question having ten short answer type questions covering the entire syllabus uniformly. Each question in sections A and B will be of 10 marks and section C will be of 30 marks.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions in all selecting two questions from each of the section: A and B and compulsory question of Section C.

Section-A

Conic sections: General equation of conic section, identification and tracing of various curves based on eccentricity.

Parabola: Derivation from the conic section equation, different forms of parabola, concept of tangent and normal, parametric equations of a parabola, polar of point, pole of a given line.

Ellipse: Definition and derivation, the standard equation, the basic structure related to axes, foci and the latera recta, tangent and normal, properties of the eccentric angles.



Hyperbola: Definition and derivation, transverse and conjugate axes, asymptotes of a hyperbola, pair of tangents, Equation referred to the asymptotes as axes.

Section-B

Cone- The homogeneous equation, equation with vertex at origin, cone with a given vertex and a given conic for base, tangent plane of the cone, quadric cone, reciprocal cone.

Introduction to conicoids: General concept as three-dimensional analogs of conic sections, general form the equation. Types of conicoids: Ellipsoid, Hyperboloid of one sheet, Hyperboloid of two sheets, Paraboloid of revolution (elliptic and hyperbolic), origin, symmetry, axis of intersection.

Non-central Conicoids: Cylinder, quadric cylinder, right circular cylinder, standard form, parabolic cylinder, elliptic cylinder, hyperbolic cylinder.

References

1. Coordinate Geometry by S.L. Loney. A.I.T.B.S. Publishers, India. Reprint, 2009.
2. Analytical Solid Geometry by Shanti Narayan and P.K Mittal. S. Chand Publishing, 2007.



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Semester-VI

Optimization Techniques

Paper Code: BMATH303T

Major/Minor Theory

Max. Marks: 100

External Marks: 70

Internal Marks: 30

Pass Marks: 35%

Credits: 04

Total Teaching hours: 55

Course Outcomes:

CO1: Explain the basic concepts of inventory management, inventory costs, inventory models, and Economic Order Quantity (EOQ).

CO2: Analyze and solve inventory problems involving EOQ models with and without shortages under different demand and replenishment conditions.

CO3: Apply job sequencing techniques to determine the optimal sequence of jobs on two or more machines.

CO4: Construct and analyze project networks using Critical Path Method (CPM) and Program Evaluation and Review Technique (PERT) for project planning and scheduling.

CO5: Apply optimization techniques to solve practical decision-making problems in production, inventory control, and project management

INSTRUCTIONS FOR THE PAPER-SETTER

The question paper will consist of three sections A, B and C. Sections A and B will have four questions each from the respective sections of the syllabus and Section C will consist of one compulsory question having ten short answer type questions covering the entire syllabus uniformly. Each question in Sections A and B will be of 10 marks and Section C will be of 30 marks.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions in all selecting two questions from each of the Section A and B and compulsory question of Section C.



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Section-A

Inventory, Costs involved in Inventory, Variables in Inventory Models, Characteristics of Inventory Systems and Classifications, Concept of Economic Ordering (EOQ).

EOQ models with no shortage: Economic Lot Size system with uniform demand. Economic Lot Size with different rates of demand in different cycles. Economic Lot Size with finite rate of replenishment.

EOQ models with shortages: EOQ with constant rate of demand. Scheduling time constant and scheduling time variable. Production Lot Size demand with shortages.

Section-B

Introduction to Job Sequencing :n jobs on two machines, m jobs on three machines, Two jobs on m machines, jobs on m machines.

Project Networks, Critical Path Method (CPM), Project Evaluation and Review Technique (PERT).

References

1. Churchman – Introduction to Operation Research, J. Wiley.
2. C. N. Mohan, K. Deep – Optimization Techniques, New Age International (P).
3. H. A. Taha – Operation Research, Pearson Education.
4. P. S. Sharma – Operation Research, Tata McGraw Hill.
5. S. D. Sharma – Operation Research, Kedar Nath Ram Nath (India).
6. Kanti Swarup, P. K. Gupta, M. Mohan – Operation Research, Sultan Chand & Sons, New Delhi.



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