

MAHATHMA GANDHI UNIVERSITY KOTTAYAM

BOARD OF STUDIES IN MATHEMATICS (UG)

CURRICULAM FOR

B.Sc MATHEMATICS MODEL I

B.Sc MATHEMATICS MODELII

AND

MATHEMATICS COMPLEMENTARY COURSES

UNDER

CHOICE BASED CREDIT SYSTEM (UGCBCS2017)

(Effective from 2017 admission onwards)

B.Sc
MATHEMATICS
MODEL - I

CURRICULUM FOR B.Sc MATHEMATICS MODEL

I (UGCBCS 2017)

Course Structure

Total Credits:-120 (Eng:22+S.Lang:16+Complementary:28+open:4+Core:51)

Total hours:-150 (Eng:28+S.Lang:18+Complementary:36+open:4+Core:65)

Sl: No	Semester	Papers	Hours	Credits	Internal Marks	External Marks	Total Marks
1	I	English I	5	4	20	80	100
		English /Common course I	4	3	20	80	100
		Second Language I	4	4	20	80	100
		Mathematics Core Course - 1	4	3	20	80	100
		Complimentary1 Course - 1 (Statistics)	4	3	20	80	100
		Complimentary 2 Course – 1 (Physics Theory/ Computer)	2 (T) 2 (P)	2 0	10	60	70
	Total		25	19			570
2	II	English II	5	4	20	80	100
		English /Common course II	4	3	20	80	100
		Second Language II	4	4	20	80	100
		Mathematics Core Course- 2	4	3	20	80	100
		Complimentary1 Course –II (Statistics)	4	3	20	80	100
		Complimentary2 Course-II (Physics/ Computer)	2 (T) 2 (P)	2 2	10 20	60 40	70 60
	Total		25	21			630

3	III	English III	5	4	20	80	100
		Sec. Lang./Common course I	5	4	20	80	100
		Mathematics Core Course – 3	5	4	20	80	100
		Complimentary1 Course – II (Statistics)	5	4	20	80	100
		Complimentary2 Course –II (Physics Theory/ Computer)	3 (T)	3	10	60	70
	2 (P)		0				
Total		25	19			470	
4	IV	English IV	5	4	20	80	100
		Sec. Lang./Common courseII	5	4	20	80	100
		Mathematics Core Course – 4	5	4	20	80	100
		Complimentary1 Course III	5	4	20	80	100
		Complimentary2 Course III (Physics/ Computer)	3 (T)	3	10	60	70
	2 (P)		2	20	40	60	
Total		25	21			530	
5	V	Mathematics Core Course – 5	6	4	20	80	100
		Mathematics Core Course – 6	6	4	20	80	100
		Mathematics Core Course – 7	5	4	20	80	100
		Human Rights and Mathematics for Environmental studies	4	4	20	80	100
		Open Course	4	3	20	80	100
	Total		25	19			500
6	VI	Mathematics Core Course – 9	5	4	20	80	100
		Mathematics Core Course-10	6	4	20	80	100
		Mathematics Core Course-11	5	4	20	80	100
		Mathematics Core Course-12	5	4	20	80	100
		Choice Based Course	4	3	20	80	100
		Project	0	2	20	80	100
	Total		25	21			600

English:

Semester	Title of the Course	Number of hours per week	Total Credits	Total hours/ semester	University Exam Duration	Marks	
						Internal	External
1	English I	5	4	90	3 hrs	20	80
	English /Common course I	4	3	72	3 hrs	20	80
2	English II	5	4	90	3 hrs	20	80
	English /Common course II	4	3	72	3 hrs	20	80
3	English III	5	4	90	3 hrs	20	80
4	English - IV	5	4	90	3 hrs	20	80

Second Language:

Semester	Title of the Course	Number of hours per week	Total Credits	Total hours/ semester	University Exam Duration	Marks	
						Internal	External
1	Second Language I	4	4	72	3 hrs	20	80
2	Second Language II	4	4	72	3 hrs	20	80
3	Sec. Lang./ Common course I	5	4	90	3 hrs	20	80
4	Sec. Lang./ Common course II	5	4	90	3 hrs	20	80

MATHEMATICS CORE COURSES

Semester	Title of the Course	Number Of hours	Total Credits	Total hours/ semester	University Exam Duration	Marks	
						Internal	External
I	MM1CRT01: Foundation of Mathematics	4	3	72	3 hrs	20	80
II	MM2CRT01: Analytic Geometry, Trigonometry and Differential Calculus	4	3	72	3 hrs	20	80
III	MM3CRT01: Calculus	5	4	90	3 hrs	20	80
IV	MM4CRT01: Vector Calculus, Theory of Numbers and Laplace transforms	5	4	90	3 hrs	20	80
V	MM5CRT01: Mathematical Analysis	6	4	108	3 hrs	20	80
	MM5CRT02: Differential Equations	6	4	108	3 hrs	20	80
	MM5CRT03: Abstract Algebra	5	4	90	3 hrs	20	80
	Human rights and Mathematics for Environmental Studies.	4	4	72	3 hrs	20	80
	Open course	4	3	72	3 hrs	20	80
VI	MM6CRT01 : Real Analysis	5	4	90	3 hrs	20	80
	MM6CRT02: Graph Theory and metric spaces	6	4	108	3 hrs	20	80
	MM6CRT03 : Complex Analysis	5	4	90	3 hrs	20	80
	MM6CRT04 : Linear Algebra	5	4	90	3 hrs	20	80
	Choice Based Course	4	4	72	3 hrs	20	80
	MM6PRT01 : Project	-	2	-	-	20	80

OPEN COURSE DURING THE FIFTH SEMESTER

Title of the Course	No. of contact hrs/week	No. of Credit	Duration of Exam
MM5OPT01: History of Indian Mathematics	4	3	3 hrs
MM5OPT02: Applicable Mathematics	4	3	3 hrs
MM5GET03: Mathematical Economics	4	3	3 hrs

CHOICE BASED COURSE DURING THE SIXTH SEMESTER

Title of the Course	No. of contact hrs/week	No. of Credit	Duration of Exam
MM6CBT01: Operations Research	4	3	3 hrs
MM6CBT02: Basic Python Programming And Typesetting in LaTeX	4	3	3 hrs
MM6CBT03: Numerical Analysis	4	3	3 hrs

B.Sc DEGREE PROGRAMME MATHEMATICS (UGCBCS2017)

First Semester

MM1CRT01: Foundation of Mathematics

4 hours/week (Total Hours: 72)

3 credits

Brief Description of the Course

This course introduces the concepts of mathematical logic methods of proofs, sets, functions, relations and partial orderings. A brief introduction of theory of Equations is also included. These topics are foundations of most areas of modern mathematics and are applied frequently in the succeeding semesters.

Syllabus

Text Books:

1. K.H. Rosen: Discrete Mathematics and its Applications (Sixth edition), Tata McGraw Hill Publishing Company, New Delhi.
2. S. Bernard and J.M Child: Higher Algebra, AITBS Publishers, India,2009

Module 1: Basic Logic

(20 hours)

Propositional logic, Propositional equivalences, Predicates and quantifiers, Rules of inference, Introduction to proofs.

Text 1: Chapter – 1 excluding sections 1.4 & 1.7

Module 2: Set theory

(12 hours)

Sets, set operations, functions

Text 1: Chapter – 2 excluding section 2.4

Module 3: Relations

(20hours)

Relations and their properties, representing relations, equivalence relations, partial orderings.

(Text 1: Chapter 7 excluding Sections 7.2 & 7.4)

Module 4: Theory of Equations

(20 hours)

Roots of Equations, Relation Connecting the roots and coefficients of an equation, Transformation of equations, Special Cases, The Cubic equation, The Biquadratic Equation, Character and Position of the Roots of an Equation, Some General Theorems, Descartes's Rule of Signs, Corollaries, Reciprocal Equations

Text 2: Chapter VI Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, Chapter XI Section 1

References:

1. Lipschutz: Set Theory and related topics (Second Edition), Schaum Outline Series, Tata McGraw-Hill Publishing Company, New Delhi. (Reprint 2009).
2. P.R. Halmos : Naive Set Theory, Springer.
3. Ian Chiswell&Wifrid Hodges: Mathematical Logic, Oxford university press

4. Richard Johnsonbaugh; Discrete Mathematics; Pearson Education; Dorling Kindersley India Pvt. Ltd
5. Clifford Stien, Robert L Drysdale, Kenneth Bogart ; Discrete Mathematics for Computer Scientists; Pearson Education; Dorling Kindersley India Pvt. Ltd
6. Kenneth A Ross; Charles R.B. Wright ; Discrete Mathematics; Pearson Education; Dorling Kindersley India Pvt. Ltd
7. Ralph P. Grimaldi, B.V.Ramana; Discrete And Combinatorial Mathematics ; Pearson Education; Dorling Kindersley India Pvt. Ltd
8. Winfried Karl Grassman, Jean-Paul Tremblay; Logic And Discrete Mathematics A Computer Science Perspective ; Pearson Education; Dorling Kindersley India Pvt. Ltd
9. Lipschutz: Set Theory And Related Topics (2nd Edition), Schaum Outline Series, Tata McGraw-Hill Publishing Company, New Delhi
10. H.S.Hall, S.R. Knight: Higher Algebra, Surjit Publications, Delhi.

Question Paper Pattern

Module	Part A (2 marks)	Part B (5 marks)	Part C (15 marks)	Total
I	3	2 or 3	1	7 or 6
II	3	2	0.5	5.5
III	3	2	1.5	6.5
IV	3	2 or 3	1	6 or 7
Total no. of questions	12	9	4	25
No. of questions to be answered	10	6	2	18
Total marks	20	30	30	80

B.Sc. DEGREE PROGRAMME MATHEMATICS (UGCBCS2017)
SECOND SEMESTER
MM2CRT01: ANALYTIC GEOMETRY, TRIGONOMETRY AND
DIFFERENTIAL CALCULUS

4 hours/week (Total Hours : 72)

3 credits

Text books:

- 1. Manicavachagom Pillay, Natarajan : Analytic Geometry (Part I Two Dimensions)**
- 2. S.L.Loney : Plane Trigonometry Part II , S.Chand and Company Ltd**
- 3. Shanti Narayan , P.K.Mittal : Differential Calculus , S.Chand and Company**

MODULE I: Conic Sections **(22 hrs)**

Tangent and Normals of a Conic (Cartesian and Parametric form), Orthoptic Locus, Chords in terms of given points, Pole and Polar and Conjugate diameters of Ellipse.

Relevant Sections of Text 1

MODULE II: Polar Co-ordinates **(15 hrs)**

Polar Co-ordinates, Polar Equation of a line , Polar Equation of Circle, Polar Equation of Conic , Polar Equations of tangents and Normals , Chords of Conic Sections.

Relevant Sections of Text 1

MODULE III: Trigonometry **(17 hrs)**

Circular and Hyperbolic functions of complex variables, Separation of functions of complex variables into real and imaginary parts, Factorization of $x^n - 1, x^n + 1, x^{2n} - 2x^n a^n \cos n\theta + a^{2n}$ and Summation of infinite Series by $C + iS$ method

Relevant Sections of Text 2 Chapter – V, VI, VIII, IX.

Module IV: Differential Calculus **(18 hrs)**

Successive Differentiation and Indeterminate forms

Text 3: Chapter 5 and Chapter 10

References:

- 1. S. K. Stein : Calculus And Analytic Geometry, McGraw Hill**

2. P. K. Jain , Khalil Ahmad : Analytic Geometry of Two Dimensions ,(2ndEdition) New AgeInternational (P) Limited Publishers
3. Thomas and Finney : Calculus and Analytic Geometry , Addison Wesley

QUESTON PAPER PATTERN

Module	Part A 2 Marks	Part B 5 Marks	Part C 15 Marks	Total
I	4	2	1	7
II	2	1	1	4
III	3	3	1	7
IV	3	3	1	7
Total No. of Questions	12	9	4	25
No. of Questions to be answered	10	6	2	18
Total Marks	20	30	30	80