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UNIVERSITY OF CALCUTTA · CCF (NEP 2020) UG SYLLABUS

Mathematics in Daily Life

Interdisciplinary Course (IDC) · MTHD-IDC

What this file contains

- MTHD-IDC: Mathematics in Daily Life (2 Theory + 1 Tutorial = 3 credits)
- Offered in Semester 1, 2 or 3
- Question pattern

Source and note

The pages that follow are taken unchanged from the official University of Calcutta syllabus for Mathematics under the Curriculum and Credit Framework for Undergraduate Programmes (CCF, NEP 2020). PALMATHS has only selected the pages for this programme and semester and added this cover so students can find them quickly. Always check the University of Calcutta website (caluniv.ac.in) for later notifications, corrections or changes in paper options. PALMATHS is an independent coaching centre and is not part of, or endorsed by, the University of Calcutta.

B.Sc Mathematics classes at PALMATHS, online or offline

B.Sc Maths (Calcutta University): 9088261414 · School Maths, Class 8 to 12 and IIT-JEE: 9007293439

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More semester-wise syllabus files and question papers: palmaths.com/cu-pyqs/

University of Calcutta



Syllabus for four-year (Eight Semester) B. Sc. Honours and Honours with Research Course with Mathematics Major

&

Mathematics as a Minor subject

and

Syllabus for three-year (Six Semester) Multidisciplinary Course with Mathematics

Under

Curriculum and Credit Framework (CCF)

Odd Semester : July to December

Even Semester : January to June

The syllabus for the 4 Year B.A./B.Sc. Honours and Honours with Research Course with Mathematics Major is effective from the academic year **2023-24**.

The syllabus for the 3 Year Multidisciplinary Course with Mathematics is effective from the academic year **2023-24**.

Mathematics in Daily Life - I

Semester : I / II / III	Paper Code : MTHD-IDC-TH
Credit : 3	Full Marks : 75 (Theory : 50 & Tutorial : 25)
Minimum number of classes required : 45	

4-yr Credit Distribution | MDC Credit Distribution | Course Overview
Major | Minor | MDC | Question Pattern

Course Outcome

CO1 : To learn basic ideas of set theory.

CO2 : To learn mathematics of integers behind ISBN, UPC, VISA, MASTER card nos.

CO3 : To get an idea of propositional logic, logical connectives.

CO4 : To learn basics of linear programming problems.

CO5 : To learn financial mathematics at elementary level.

Group A : Basics of Set Theory [Marks : 4] [4 classes]

- Concept and definition of sets, subsets and set operations (Union, Intersection, Complementation, Subtraction); Statements of basic laws of set algebra.
- Venn diagrams. Statement of the formula $n(A \cup B) = n(A) + n(B) - n(A \cap B)$ and its application in daily life.

Group B : Understanding Integers [Marks : 20] [18 classes]

- Statement and simple problems on First Principle of Mathematical Induction.
- Statement of Division algorithm; G.C.D. of two positive integers, Expression of G. C. D. of two integers x, y in the form $px + qy$ (p, q are integers) (Euclidean Algorithm without proof).
- Representation of a positive integer in Binary and decimal mode.
- Linear Diophantine equation in two variables: Statement of condition on the existence of integral solution, General / particular solution, Simple real life applications;
- Prime Integers. Some elementary properties of prime integers (only statement), Fundamental theorem of Arithmetic (only statement), Algorithm for Primality test.
- Congruence of Integers: Meaning of $a \equiv b \ (mod\ m)$, Statements of elementary properties of congruence; If $a \equiv b \ (mod\ m)$ then for any integer c, $(a+c) \equiv (b+c) \ (mod\ m)$, $(a–c) \equiv (b–c) \ (mod\ m)$, $ac \equiv bc \ (mod\ m)$, $a^n \equiv b^n \ (mod\ m)$ for natural numbers n.
- Application of congruence of integers: Divisibility tests by 2, 3, 4, 5, 7, 9, 11, 13 (Statements of relevant results and problems only), Check Digits in International Standard Book Number (ISBN), Universal Product Code (UPC), VISA and MASTER card (Statements of relevant results and Problems only), Formation of Round Robin Tournament Table using congruence of integers (Technique and Problems only).

Group C : Mathematical Logic [Marks : 7] [6 classes]

- Proposition, propositional variables and propositional Logic.

- Logical Connectives: NOT (Negation), OR (Disjunction), AND (Conjunction), Exclusive OR (XOR), IMPLICATION (If p then q) and BI-IMPLICATION (If and only if) and their Truth Tables; Truth value of a proposition, Truth tables of expressions involving more than one logical connective.
- Tautology, logical consequence, logical equivalence, contradiction.

Group D : Basics of Operations Research [Marks : 9] [8 classes]

- Idea of Linear Programming Problems: Objective function, decision variables, constraints.
- Formulation of daily life problems as an LPP (e.g. Carpenter problem, preparation of mixtures of chemicals, diet problems etc.).
- Solution of an LPP by graphical method (only bounded region).
- Definition of Game, Examples from daily life, Two person zero sum game, Strategy, Payoff, Saddle point, Solution of a game problem with saddle point (only elementary problems).

Group E : Financial Mathematics [Marks : 10] [9 classes]

- Time value of money - Simple interest and Compound interest (Fundamental Formulae); Interest payable monthly, quarterly, annually (only problems).
- Ordinary Simple Annuities – Accumulated value and Discounted Value of an ordinary simple annuity – Idea of repayment of loans, Simple problems. (No formula derivation).
- Problems on Dividend calculation and Calculation of income tax on taxable income (old and new regime).

References

[1] Bonnie Averbach and Orin Chein, Problem Solving Through Recreational Mathematics, Dover Publications, 1980.

[2] Richard Bronson and Govindasami Naadimuthu, Schaum's Outline of Operations Research, McGraw Hill, 1997.

[3] David M. Burton, Elementary Number Theory, Universal Book Stall, 1989.

[4] J. G. Chakraborty and P.R. Ghosh, Linear Programming and Game Theory, Moulik Library, 2009.

[5] M. Chakraborty, Lecture note: A journey through the logic wonderland, IIEST Shibpur, 2016.

[6] P. Chandra, Investment Analysis and Portfolio Management, McGraw Hill(2008).

[7] Richard Courant and Herbert Robbins, What is Mathematics? Oxford University Press, 1995.

[8] Elliott Mendelson, Introduction to Mathematical Logic, Chapman & Hall; London,1997.

[9] Kenneth H. Rosen, Elementary Number Theory and its Applications; Addison-Wesley Publishing Company, 1984.

[10] M. K. Sen and B. C. Chakraborty; Introduction to Discrete Mathematics, Books and Allied (P) Ltd, 2019.

[11] Paul R. Thie and G. E. Keough, An Introduction To Linear Programming and Game Theory, John Wiley & Sons, INC., Third Edition, 2008.

[12] Petr Zima and Robert L. Brown, Mathematics of Finance, Schaum's Outline Series, McGraw-Hill, 2nd edition, 1996.

4-yr Credit Distribution | MDC Credit Distribution | Course Overview

Major | Minor | MDC | Question Pattern

Question Pattern for
Interdisciplinary Course (IDC) in Mathematics

MTHD-IDC	Mathematics in Daily Life
Group A : **Basics of set theory** (Marks : 4)	1 question is to be attempted out of 2 questions each carrying 4 marks.
Group B : **Understanding integers** (Marks : 20)	5 questions are to be attempted out of 8 questions each carrying 4 marks.
Group C : **Mathematical Logic** (Marks : 7)	1 question is to be attempted out of 3 questions each carrying 7 marks. Each questions may have multiple parts.
Group D : Basics of Operations Research (Marks : 9)	1 question is to be attempted out of 3 questions each carrying 9 marks. Each questions may have multiple parts.
Group E : Financial Mathematics (Marks : 10)	2 questions are to be attempted out of 4 questions each carrying 5 marks.

Evaluation of Tutorial (TU : 1 credit, 25 marks)

(a) An Internal examination of 15 marks should be conducted by the Colleges.
Questions of 3 marks / 5 marks / 6 marks covering the whole syllabus should be prepared for the purpose of internal examination.

(b) 10 marks should be awarded based on Viva-Voce eamination conducted by the Colleges.

(c) For MTHM-SEC3-TH (Linear Programming & Rectangular Games) 10 marks will be awarded by evaluation of internal assignments instead of viva-voce.

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