Syllabus for the Batch from year 2025 to 2026

For

Certificate Course in Mathematics

(Credit Based Evaluation and Grading System)

Examinations: 2025-26

The Certificate Program Offered:

- **Certificate course in Mathematics (06 Month Duration)**

Program Outcomes:

- Fundamental Knowledge of Mathematics: Students will gain an understanding the basic concepts of Mathematics, enabling them to understand the real world Mathematics problems and solve them.
- Enhanced Technical Skills: The program focuses on learning and improving technical, reasoning, and analytical skills along with critical thinking, techniques for writing mathematical/research oriented documents using LaTex and then Numerical computations arise in all type of scientific and computational techniques and their implementation in SCILAB (open source), which are helpful in numerically solving problems commonly arising in all Science.
- Practical Experience: Through hands-on assignment, students will understand and develop problem solving skills by working on real world problems.
- Career Readiness & Employability: Program will help students to prepare about the logical thinking, reasoning, analytical ability, computational and mental skills needed for various competitive examinations.

Name of the Department: Mathematics
In Collaboration with
Directorate of Open & Distance Learning and Online Studies

GURU NANAK DEV UNIVERSITY
AMRITSAR

Eligibility:

- +2 in any stream or Equivalent Examinations
- Any student pursuing Bachelor Degree, Master Degree, M. Phil, Ph.D. from GNDU campus, affiliated college.

Scheme of Certificate Course in Mathematics

Paper Code	Subject	Marks			Credits
		Internal Assessment	End Term	Total	
ODCM101T	LaTEX	30	70	100	4-0-0
ODCM102T	Scilab Programming	30	70	100	4-0-0
ODCM103T	Mathematics for Critical Thinking	30	70	100	4-0-0
ODCM104T	Arithmetic Ability And Data Interpretation	30	70	100	4-0-0
	Total Marks & Credits	**120**	**280**	**400**	**16-0-0**

Subject Name: LATEX
Subject Code: ODCM101T
Semester-I

Time: 03 Hours **Max. Marks: 100 Marks**

Internal Assessment: 30 Marks

End Term: 70 Marks

Instructions for the Paper-Setter/examiner:

1. Question paper shall consist of **Four sections**.
2. Paper setter shall set **Eight questions** in all by selecting **Two questions** of equal marks from each section. However, a question may have sub-parts (not exceeding four sub-parts) and appropriate allocation of marks should be done for each sub-part.
3. Candidates shall attempt **Five questions** in all, by at least selecting **One question** from each section and the **5th question** may be attempted from any of the **Four sections**.
4. The question paper should be strictly according to the instructions mentioned above. In no case a question should be asked outside the syllabus.

Learning Objective: To create attractive documents with consistent Layouts. To publish research papers, Project reports and books. To enter mathematical equations, table of contents and more through LaTex.

Learning Outcomes: After completing this course, students will be able to create a LaTex document, Typeset a mathematical formulas and symbols like articles and reports.

SECTION–A

Installation of the software LaTex, Introduction to LaTex, Text formatting, font sizes, Font effects.

SECTION–B

Creating a title, Title pages, special characters, comments and spacing, table of contents.

SECTION–C

Header and Footer, Line breaking and page breaking, inserting tables and figures.

SECTION–D

Mathematical symbols, commands for writing mathematical symbols, Inserting equations, citing references.

TEXT BOOK RECOMMENDED:-

1. H. Kopka, P. W. Daly. Guide to LaTex, Addison-Wesley Professional, 4th Edition, 2003.

Subject Name: SCILAB PROGRAMMING
Subject Code: ODCM102T
Semester-I

Time: 03 Hours **Max. Marks: 100 Marks**

Internal Assessment: 30 Marks

End Term: 70 Marks

Instructions for the Paper-Setter/examiner:

1. Question paper shall consist of **Four sections**.
2. Paper setter shall set **Eight questions** in all by selecting **Two questions** of equal marks from each section. However, a question may have sub-parts (not exceeding four sub-parts) and appropriate allocation of marks should be done for each sub-part.
3. Candidates shall attempt **Five questions** in all, by at least selecting **One question** from each section and the **5th question** may be attempted from any of the **Four sections**.
4. The question paper should be strictly according to the instructions mentioned above. In no case a question should be asked outside the syllabus.

Learning Objective: To provide a programming language and numerical algorithms to solve scientific computing problems. In this multidisciplinary course, we will focus on learning several computational techniques and their implementation in SCILAB (open source), which are helpful in numerically solving problems commonly arising in all Science.
Learning Outcomes: After completing this course, students will be able to understand and apply SCILAB as computational tool, perform basic mathematical operations, analyzing data through plotting function and interpreting results through graphical outputs.

SECTION-A

Scilab console and Editor windows, arithmetical operations **(+, -, *, /,** ^), the commands such as **;** , // ./, clear, clc, sqrt, %e, %pi, %i, disp, factorial, exp, log, log10, sin, cos, sec, cosec, tan, cot, etc.

SECTION-B

Scilab files (.sce, .scf), matrices and matrix operations, solving linear equations using SCILAB, array operations (**. + , . - , .*, ./ , .^**) , relational operators (**==, <>, <, >, <=, >=, %T, %F, &, | ,** ~) , strings **“ ”**.

SECTION-C

For loop, if and elseif commands, user defined functions, executing a .sce file

SECTION-D

Graphics using Scilab (2D graphics), plotting graphs of elementary functions, plotting parametric curves and surfaces.

Books Recommended:-

1. S. L. Campbell, J.P. Chanceller, R. Nikoukhah, Modeling and Simulation in Scilab/Scios, Springer, 2006.
2. Chetana Jain, Advanced Programming in SCILAB, Alpha Science International, Oxford, UK, 2020.

CERTIFICATE COURSE IN MATHEMATICS OFFERED BY DEPARTMENT OF MATHEMATICS IN COLLABORATION WITH DIRECTORATE OF OPEN AND DISTANCE LEARNING AND ONLINE STUDIES, GURU NANAK DEV UNIVERSITY, AMRITSAR

Subject Name: MATHEMATICS FOR CRITICAL THINKING

Subject Code: ODCM103T
Semester-I

Time: 03 Hours **Max. Marks: 100 Marks**

Internal Assessment: 30 Marks

End Term: 70 Marks

Instructions for the Paper-Setter/examiner:

1. Question paper shall consist of **Four sections**.
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3. Candidates shall attempt **Five questions** in all, by at least selecting **One question** from each section and the **5th question** may be attempted from any of the **Four sections**.
4. The question paper should be strictly according to the instructions mentioned above. In no case a question should be asked outside the syllabus.

Learning Objective:

1. To introduce concepts of basic arithmetic with emphasis on analytical ability and computational and mental skills needed for various competitive examinations.
2. More emphasis will be on enhancing practical skills- To increase Students' skill to solve lengthy questions using shortcut methods and taking minimum time.

Learning Outcomes:- After completion of this course, students will be able to tackle maximum problems in minimum time involving basic arithmetic in various competitive entrance examinations (Bank P.O., UPSC and Railways recruitment exams, L.I.C., G.I.C. Tax and central excise, I.F.S., CAT, STET and other such exams).

SECTION-A

H.C.F. & L.C.M. of numbers, Time & Work, Percentage

SECTION-B

Profit and Loss, Simple Interest, Compound Interest.

SECTION-C

Simplification, Area, Volume & Surface Area

SECTION-D

Data Interpretation: Tabulation, Surds and Indices

TEXT BOOK RECOMMENDED:-

1. R.S. Aggarwal. Quantitative Aptitude, S. Chand & Company Ltd., New Delhi, 2018.

REFERENCE BOOKS RECOMMENDED:-

2. A. Guha. Quantitative Aptitude for Competitive Examinations by Abhijit Guha, Tata McGraw –Hill Pub. Co. Ltd. New Delhi.
3. E. Thorpe. Course in Mental Abilities and Quantitative Aptitude for Competitive Examinations, Tata McGraw Hill Pub. Co. Ltd. New Delhi, 2018.

Subject Name: ARITHMETIC ABILITY AND DATA INTERPRETATION

Subject Code: ODCM104T
Semester-I

Time: 03 Hours **Max. Marks: 100 Marks**

Internal Assessment: 30 Marks

End Term: 70 Marks

Instructions for the Paper-Setter/examiner:

1. Question paper shall consist of **Four sections**.
2. Paper setter shall set **Eight questions** in all by selecting **Two questions** of equal marks from each section. However a question may have sub-parts (not exceeding four sub-parts) and appropriate allocation of marks should be done for each sub-part.
3. Candidates shall attempt **Five questions** in all, by at least selecting **One question** from each section and the **5th question** may be attempted from any of the **Four sections**.
4. The question paper should be strictly according to the instructions mentioned above. In no case a question should be asked outside the syllabus.

Learning Objective:

Arithmetic ability, in essence, is the cornerstone of mathematical thinking and problem-solving like fundamental operations like addition, subtraction, multiplication, and division, understanding of numbers, their relationships, and how they are affected by operations, solve quantitative problems in everyday life and helps to understand concepts to real-world scenarios.

Learning Outcomes:- After completion of this course, students will be able to tackle maximum problems in minimum time involving arithmetic in various competitive entrance examinations (Bank P.O., UPSC and Railways recruitment exams, L.I.C., G.I.C. Tax and central excise, I.F.S., CAT, STET and other such exams).

SECTION-A

Number System, Average, Problem on Numbers

SECTION-B

Ratio Proportion, Chain Rule, Calendar, Square Roots & Cube Roots

SECTION-C

Height and Distance, Time and Distance, Problems on Trains

SECTION-D

Data Interpretation: Bar Graph, Pie-chart, Line Graph

TEXT BOOK RECOMMENDED:-

1. R.S. Aggarwal. Quantitative Aptitude, S. Chand & Company Ltd., New Delhi, 2018.

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2. A. Guha. Quantitative Aptitude for Competitive Examinations by Abhijit Guha, Tata McGraw –Hill Pub. Co. Ltd. New Delhi.
3. E. Thorpe. Course in Mental Abilities and Quantitative Aptitude for Competitive Examinations, Tata McGraw Hill Pub. Co. Ltd. New Delhi, 2018.