



TAMIL NADU OPEN UNIVERSITY

School of Education

CERTIFICATE PROGRAMME ON ADVANCED TECHNOLOGICAL APPLICATIONS IN TEACHING MATHEMATICS

This certificate programme aims to prepare teachers and other professionals equipped with the knowledge and skills for organising teaching and training with the help of appropriate technologies.

Programme Objectives

While studying the Certificate Programme, the student shall be able to:

- develop an understanding of the nature of educational technology and its impact on teaching and learning of Mathematics;
- imbibe an awareness about the various educational technologies and their pedagogic uniqueness;
- extend the skills needed for making optimum use of the technologies enabling collaborative practices and sharing of educational resources;
- promote selection of technology and integrate it successfully in the instructional system; and
- enhance Digital Literacy for teacher empowerment.

Programme Outcomes

After completion of the Certificate Programme, the student will be able to:

- practice appropriate techno-pedagogical competencies in the teaching – learning process of Mathematics;
- handle the curriculum with ease using technology enabled teaching;
- equip themselves to various instructional technology for classroom teaching;
- educate children with diverse needs and abilities effectively by using adaptive techniques and technologies;
- inculcate the usage of digital mode to enhance teaching.

- Eligibility** : 12th pass and above
- Medium of Instruction** : English.
- Duration** : Minimum 6 months and Maximum 1 year
- Fee Structure** : Rs. 1500 /-

Programme Details

COURSE CODE	COURSE TITLE	CREDITS
CATM - 01	ICT in Teaching Mathematics	3
CATM - 02	Teaching of Mathematics	3
CATM- 03	Modern Techniques in Teaching - Learning Process	3
Total Credits		9

Examination System: Theory Examinations will be conducted by the University in the Identified Centres. The assignment for each course should be submitted to the respective Learning Support Centres, which will be evaluated by the evaluators appointed by the University.

Assignment for each Course

Assignment 1:

Answer any one of the questions not exceeding 1000 words	Max – 15 Marks
Question 1	
Question 2	
Question 3	

Assignment 2:

Answer any one of the questions not exceeding 1000 words	Max – 15 Marks
Question 1	
Question 2	
Question 3	

Theory Examination: Students shall normally be allowed to appear for theory examination by completing Assignment. The Term-End Examination shall carry Sections: A, B and C.

Section-A	Very Short-Answer Questions [Each 3- Marks] Three out of Five Questions	3 x 3 = 9 Marks
Section-B	Short-Answer Questions [Each 7 - Marks] Three out of Five Questions	3 x 7 = 21 Marks
Section-C	Long-Answer Questions [Each 10- Marks] Four out of Seven Questions	4 x 7 = 40 Marks
Total		70 Marks

Awarding Continuous Internal Assessment (Maximum 30 marks):

Submission and Evaluation of Assignments	15 Marks (Compulsory)
Attending in Academic Counselling Classes at LSCs/SCs (50% of Attendance may be considered for maximum marks)	15 Marks
Total	30 Marks

Scheme of Evaluation

Continuous Internal Assessment	30 Marks
Theory Examinations	70 Marks
Total	100 Marks

Passing Minimum: The passing minimum is 25marks out off 70 marks in the external (Theory) Examination and minimum 10 marks out off 30 marks in the Continuous Internal Assessment (CIA), overall 40 percent for successful completion of each course.

Classification of Successful Candidate: Candidates who pass all the Courses and who secure 60 percent and above in the aggregate of marks will be placed in the first class. Those securing 50 percent and above but below 60 percent in the aggregate will be placed in the second class. Those securing 40 percent and above but below 50 percent in the aggregate will be placed in the third class.



Tamil Nadu Open University
School of Education
Chennai – 15

COURSE TITLE	: INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) FOR TEACHING MATHEMATICS
COURSE CODE	: CATM - 01
COURSE CREDIT	: 3

COURSE OBJECTIVES

While studying Information and Communication Technology (ICT) in Mathematics, the students shall be able to:

- develop the scope of ICT and its applications in teaching learning;
 - imbibe the means of ICT integration in teaching learning;
 - categorise the computer components and software and hardware approach in education;
 - describe the instructional applications of Internet and web resources; and
 - construct the process of using the application software for creating documents, database, presentation and other media applications.
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COURSE OUTCOMES

After completion of Information and Communication Technology (ICT) in Mathematics, the student will be able to:

- enrich his/her knowledge on role of ICT and its applications in teaching learning;
 - practice the ways and means of integrating ICT in teaching learning;
 - comprehend the use of computer components and software and hardware approach in education;
 - educate the children with learning applications of Internet and web resources; and
 - promote the process of using the application software for creating documents, database, presentation and other media applications.
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BLOCK 1 ICT FOR TEACHING MATHEMATICS

UNIT-1 – ICT – An Introduction

UNIT-2 – Communication Technology

UNIT-3 – Classroom Communication

BLOCK 2 COMPUTER FUNDAMENTALS

UNIT– 4 – Introduction to Computers

UNIT – 5 – Hardware

UNIT – 6 – Software

BLOCK 3 INSTRUCTIONAL TECHNOLOGIES

UNIT– 7 – Teaching Aids

UNIT – 8 – Multimedia

UNIT – 9 –Educational Implications

BLOCK 4 MODERN TECHNOLOGY FOR TEACHING MATHEMATICS

UNIT – 10 – Internet

UNIT – 11 – Web Based Teaching-Learning Process

UNIT – 12 – Social Media for Education

BLOCK 5 ICT IN EDUCATION

UNIT – 13 – ICT in Classroom Management

UNIT – 14 – ICT for Evaluation

SUGGESTED READING

- **Alexey Semenov (2005)** Information and Communication Technologies in Schools: A Handbook for Teachers, Paris, UNESCO, Division of Higher Education.
- **Conrad, Kerri (2001)** Instructional Design for Web – Based Training, New Delhi, Human Resource Development.
- **Horton, W (2001)** Designing Web-Based Training, New York, John Wiley & Sons.
- **Lee, William W; Diana L Owens (2004)** Multimedia – Based Instructional Design: Computer – Based Training, San Francisco, CA: Jossey-Bass.
- **Mallik, Utpal et al. (2001):** Learning with Computers Level – III. NCERT New Delhi.
- **Morey, D; Maybury M & Bhavani, Th. (2001)** Knowledge Management, Hyderabad, University Press (India) Ltd:.
- **Rosenberg, M.J. (2001)** e-learning, New York: McGraw Hill.
- **Sallis, E & Jones, G (2002)** Knowledge Management in Education: Enhancing Learning & Education. London: Kogan Page.



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COURSE TITLE : **TEACHING OF MATHEMATICS**
COURSE CODE : **CATM - 02**
COURSE CREDIT : **3**

COURSE OBJECTIVES

While studying Teaching of Mathematics, the student shall be able to:

- describe the nature and scope of Mathematics;
- categorise the educational objectives based on Bloom's taxonomy;
- develop various micro-teaching skills for enhancing teaching competencies;
- prepare various instructional plans for teaching Mathematics; and
- construct various appropriate evaluation tools for assessing performance of students in Mathematics.

COURSE OUTCOMES

After completion of Teaching of Mathematics, the student will be able to:

- enrich his/her knowledge on role and significance of Mathematics;
 - use measurable verbs for writing educational objectives in Mathematics;
 - apply skills of micro-teaching in regular classroom teaching;
 - teach effectively as per the instructional plans; and
 - evaluate the students' performance adopting the tools of evaluation.
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BLOCK 1 **OBJECTIVE AND PLANNING OF TECHING MATHEMATICS**

UNIT – 1 – Mathematics Teaching

UNIT – 2 – Mathematics Curriculum

UNIT – 3 – Planning of Instructional Process

BLOCK 2 **STRATEGIES AND METHODS OF TEACHING MATHEMATICS**

UNIT – 4 – Micro Teaching

UNIT – 5 – Methods of Teaching

UNIT – 6 – Analytical and Systematic Methods

UNIT – 7 – Problem Solving Approaches

BLOCK 3 INSTRUCTIONAL MEDIA AND RESOURCES

UNIT – 8 – Media and Resources

UNIT – 9 – Use of Projected and Non-Projected Resources

BLOCK 4 TEACHING MATHEMATICS TO RURAL AND SPECIAL CHILDREN

UNIT – 10 – Teaching Mathematics to Rural Children

UNIT – 11 – Teaching Mathematics to Special Children

BLOCK 5 EVALUATION IN MATHEMATICS

UNIT – 12 – Evaluation

UNIT – 13 – Tools and Techniques

UNIT – 14 – Diagnostic Tests

SUGGESTED READING

- **Agarwal, S.M. (2001).** A course in teaching of modern mathematics. New Delhi: DhanapatRai Publishing.
- **Bagyanathan, D. (2007).** Teaching of mathematics. Chennai: Tamil Nadu Textbook Society.
- **James, Anice. (2010).** Teaching of mathematics. Hyderabad: Neelkamal Publications.
- **NCERT. (2015).** Content-Cum-Methodology of Teaching Mathematics. New Delhi: NCERT.
- **NCERT. (2015).** Mathematics Text book for class X. New Delhi: NCERT Publication.
- **Sidhu, Kulbir Singh. (2010).** Teaching of mathematics. New Delhi: Sterling Publishers.
- Mathematics Books for Standard VI – XII. Tamil Nadu TextBook Corporation, Government of Tamil Nadu.
- **Wadhwa, S. (2008).** Modern methods of teaching mathematics. New Delhi: Karan.
- <http://tcthankseducation.blogspot.in/2010/04/micro-teaching-and-teachingskills.html>
- http://shodhganga.inflinnet.ac.in/bitstream/10603/418/8/08_chapter3.pdf
- <http://www.mathematics.com>



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COURSE TITLE : **MODERN TECHNIQUES IN TEACHING - LEARNING PROCESS**
COURSE CODE : **CATM - 03**
COURSE CREDIT : **3**

COURSE OBJECTIVES

While studying Modern Techniques in Teaching – Learning Process, the student shall be able to:

- develop the techniques in teaching mathematics;
 - imbibe the technology in teaching mathematics;
 - develop an understanding on the recent resources in mathematics teaching;
 - extends the skill of using mobile device in mathematics teaching; and
 - construct various evaluation techniques for assessing the performance of students.
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COURSE OUTCOMES

After completion of Modern Techniques in Teaching – Learning Process, the student will be able to:

- enrich his/her knowledge on the techniques in teaching mathematics;
 - use technology in classroom teaching;
 - enhance the utilisation of latest resources in mathematics teaching;
 - put into practice the use of mobile device in teaching mathematics; and
 - evaluate the students' performance adopting the recent techniques of evaluation.
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BLOCK 1 TECHNIQUES IN TEACHING MATHEMATICS

UNIT – 1 – Mathematics Lab and Maths as Fun

UNIT – 2 – Play Way Techniques

UNIT – 3 – Drill, Review and Oral Work

UNIT – 4 – Written Work and Assignment

BLOCK 2 TECHNOLOGY IN TEACHING MATHEMATICS

UNIT – 5 – Audio Based Technology

UNIT – 6 – Video Based Technology

UNIT – 7 – Computer Based Technology

BLOCK 3 RECENT VIRTUAL RESOURCES IN MATHEMATICS

UNIT – 8 – Virtual Reality in Education: Google Glasses

UNIT – 9 – Augmented Reality in Education

BLOCK 4 MOBILE DEVICES IN MATHEMATICS TEACHING

UNIT – 10 – Mobile Learning

UNIT – 11 – Game based learning through Mobile Apps

BLOCK 5 RECENT EVALUATION TECHNIQUES IN MATHEMATICS

UNIT – 12 – Online Examination and Evaluation

UNIT – 13 – E-Portfolio

UNIT – 14 – Data Mining Techniques

SUGGESTED READING

- **Agarwal, S.M. (2001).** A course in teaching of modern mathematics. New Delhi: Dhanapat Rai Publishing.
- **Bagyanathan, D. (2007).** Teaching of mathematics. Chennai: Tamil Nadu Textbook Society.
- http://shodhganga.inflinnet.ac.in/bitstream/10603/418/8/08_chapter3.pdf
- <http://tcthankseducation.blogspot.in/2010/04/micro-teaching-and-teachingskills.html>
- <http://www.mathematics.com>
- **James, Anice. (2010).** Teaching of mathematics. Hyderabad: Neelkamal Publications.
- Mathematics Books for Standard VI – XII. Tamil Nadu TextBook Corporation, Government of Tamil Nadu.
- **NCERT. (2015).** Mathematics Text book for class X. New Delhi: NCERT Publication.
- **NCERT. (2015).** Content-Cum-Methodology of Teaching Mathematics. New Delhi: NCERT.
- **Sidhu, Kulbir Singh. (2010).** Teaching of mathematics. New Delhi: Sterling Publishers.
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