DEPARTMENT OF MATHEMATICS

MUHAMMED ABDURAHIMAN MEMORIAL ORPHANAGE (MAMO) COLLEGE

[Govt. Aided First Grade College & Affiliated to University of Calicut. Re-Accredited by NAAC with A Grade]

CURRICULUM FOR CERTIFICATE COURSE

CERMA004: INTRODUCTION TO CALCULUS

OFFERED DURING THE

ACADEMIC YEAR 2018-19

[APPROVED BY ACADEMIC COMMITTEE, MAMO COLLEGE]

MANASSERY, MUKKAM POST, KOZHIKODE, KERALA, INDIA, 673 602.
EMAIL: MAMOCOLLEGE@GMAIL.COM

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CURRICULUM FOR CERTIFICATE COURSE IN INTRODUCTION TO CALCULUS [CERMA004]

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INSTITUTIONAL VISION, MISSION & OBJECTIVES

01

VISION

VISION: Build Scientifically Oriented, Intellectually Accomplished, Morally Upright and Socially Committed youth who can play a constructive role in Nation Building.

MISSION

MISSION: Intellectual, social and economic empowerment of the youth in general and women, minorities, orphans and the destitute in particular by providing quality, value-based higher-education.

OBJECTIVES

OBJECTIVES: Pursuit of Excellence, Harnessing technology, Thrust on value-based education, Nurturing Excellence and Moulding the youth for Nation Building

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VISION, MISSION, OBJECTIVES & CORE VALUES OF THE DEPARTMENT 02

VISION (icon)

VISION: Educating students to excel in all their endeavours for the betterment of the society and nation

MISSION (icon)

MISSION: Empowers students to fulfil their moral, professional, social and economic financial responsibilities

OBJECTIVES: (a) Develop a positive attitude towards Mathematics and to appreciate its practical applications in life, (b) Develop problem solving skills and the ability to use mathematics in everyday life, (c) Develop problem solving skills and the ability to use mathematics in everyday life and (d) Use mathematical language effectively and accurately.

VALUES (icon)

CORE VALUES: Practical Orientation, Intellectual Enlightenment, Social Commitment, Moral Uprightness, Ethical Self-Fashioning, Cultural Enrichment, International Outlook, Aesthetic Sensibility, Vocational Excellence and Psychological Stability.

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B.Sc. MATHEMATICS: PROGRAMME EDUCATIONAL OBJECTIVES (PEOs) 03

After 4 to 5 years of graduation, the career and professional accomplishments attained by the B.Sc Mathematics Graduates would reflect that the programme really prepared the graduates to deal with the real world, where they could apply and use the skills and knowledge they have learned to good use

Specifically, the graduate would be able to:

PEO1: Have significant opportunities in various service domains at National and International levels like banking, insurance, government jobs, consultancy, teaching, defense, industry, research and entrepreneurial pursuit.

PEO2: Have leadership quality to handle all kind of circumstances in diversities by providing interdisciplinary and multidisciplinary learning environment.

PEO3: Inculcate value system while working in a team assigned with a important targets they will contribute through their critical thinking and

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mathematical competence holding the ethical values.

PEO4: Achieve peer recognition as an individual or as a team member having specialized knowledge and expertise to investigate, formulate, analyse and implement on the problems of pure, applied and computational mathematics to compete at global level.

PEO4: Have continuous learning attitude to adopt new skills and techniques to overcome the problems related with new technologies.

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B.Sc MATHEMATICS: PROGRAMME SPECIFIC OUTCOME (PSOs) 04

On the successful completion of the B.Sc. Mathematics Programme, the graduates would be able to:

PSO1: Understand the mathematical concepts and applications in the field of algebra, real and complex analysis, optimization, differential equations, Vector calculus etc.

PSO2: Adopt changing scientific environment in the process of sustainable development by using mathematical tools

PSO3: Handle the advanced techniques in algebra, analysis, optimization, differential equations, engineering, finance and actuarial science to analyse and design algorithms solving variety of problems related to real life problems.

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PSO4: Have necessary language skills and expertise in the field of research and developments through seminar and project.

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B.Sc MATHEMATICS: PROGRAMME OUTCOMES (POs)   **05**

On the successful completion of the B.Sc. Mathematics Programme, the graduates would be able to:

PO1: **KNOWLEDGE DOMAIN**: Demonstrate an understanding of the basic concepts in mathematics, statistics, operations research and their importance in the solution of some real- world problems.

PO2: **PROBLEM ANALYSIS**: Analyse and solve the well-defined problems in mathematics statistics, and operations research. Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decision. Find, analyse, evaluate and apply information systematically and shall make defensible decisions.

PO3: **PRESENTATION AND INTERPRETATION OF DATA**: Demonstrate the ability to manipulate and visualize data and to compute standard statistical summaries.

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PO4: **ETHICS**: Analyse relevant academic, professional and research ethical problems and commit to professional ethics and responsibilities with applicable norms of the data analysis and research practices.

PO5: **MODERN TOOL USAGE**: Learn, select, and apply appropriate methods and procedures, resources and computing tools with an understanding of the limitations.

PO6: **COMMUNICATION**: Effectively communicate about their field of expertise on their activities, with their peer and society at large. Such as, being able to comprehend and write effective reports and design documentation, make effective presentations.

PO7: **PROJECT MANAGEMENT**: Apply Knowledge and understanding of principles of mathematics and statistics effectively as an individual, and as a member or leader in diverse teams to manage projects in multidisciplinary environment.

PO8: **INDIVIDUAL AND TEAM WORK**: Work effectively as an individual, as a member or leader of various teams, and in multi-disciplinary settings.

PO9: **DESIGN/DEVELOPMENT OF SOLUTIONS**: Model the real-world problems in to mathematical equations and draw the inferences by finding appropriate solutions.

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PO10: **LIFE-LONG LEARNING**: Continue to acquire mathematical knowledge and skills appropriate to professional activities and demonstrate highest standards of ethical issues in mathematics.

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CERTIFICATE COURSE

CERMA004: INTRODUCTION TO CALCULUS 06

COURSE CURRICULUM

Course Name	Introduction to Calculus
Course Code	CERMA004
Year	2018-19
Course Designer	Mr. Shibu C. G
Couse Duration	30 Hrs
Course Schedule	June to September
Maximum Students Intake	60 Students

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1. COURSE LEVEL

Under-graduation level.

2. PREREQUISITE

Basic Mathematics.

3. COURSE INTAKE & ADMISSION

Maximum 60 students will be given admission to the course based on First-Come-First-Serve basis. All the students of the MAMO College are eligible for free enrolment for the course. The enrolment notification will be issued for the course well in advance of the commencement of the course.

4. COURSE COORDINATOR

Mr. Shibuu C. G, Assistant Professor, Department of Mathematics

5. COURSE PREAMBLE

In Mathematics, Differential Calculus is a subfield of Calculus that studies the rates at which quantities change. It is one of the two traditional divisions of calculus, the other being Integral Calculus. In this course we will stdy only the foundations of Differential calculus. This course will help a student in understanding these concepts in a good manner.

6. DURATION

Total Duration: 30 Hrs. [Contact Hours 8, Corse work 14 Hrs and Assignment Works: 8 Hrs]

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7. CURRICULUM FOCUS

En To equip a student with the basic rules of the powerful tool of Mathematics, differential calculus.

8. COURSE OBJECTIVES

Learners are exposed to
(a) The concept of differentiation.

(b) To differentiate various functions.

9. SKILL EXPECTED

On the successful completion of the course, learners will be able to:

(a) Get the idea of differentiation

(b) Differentiate various type of functions in Mathematics

(c) Apply these knowledge to real life and practical problems.

10. COURSE OUTCOMES

Upon the successful completion of the course, learners will be able to:

CO No	Course Outcome(CO)	Skill/Knowledge Attainment Level Based on Revised Bloom's Taxonomy
CO1	Describe, compare, contrast, demonstrate, explain the basics of features of differentiation	Understand
CO2	Apply these knowledge to real world problems.	Apply

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CO No	Course Outcome(CO)	Skill/Knowledge Attainment Level Based on Revised Bloom's Taxonomy
CO3	Comparison of the physical meaning of differentiation with various functions.	Compare

11. MAPPING OF COs WITH PSOs AND POs

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	1	1	2	1	1	1	1	1	2	3	1	1	2	1
CO2	1	1	2	1	1	1	1	1	2	3	1	1	2	1
CO3	1	1	2	1	1	1	1	1	2	3	1	1	2	1
AVG	1	1	2	1	1	1	1	1	2	3	1	1	2	1

12. MODULE-WISE COURSE CONTENTS

MODULE 1: THE CONCEPT AND BASIC RULES OF DIFFERENTIATION.

MODULE DURATION: 15 Hrs. [Contact Hrs. 4 Hrs, Course Woks: 7 Hrs and Assessment Works: 4]

MODULE CONTENT: Limits, Definition of differentiation, Standard results, Physical meaning.

MODULE OUTCOME: On successful completion of the module, learners will familiarize with the concept of limits, differentiation and the derivatives of simple functions and its physical meaning.

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MODULE 2: DERIVATIVES

MODULE DURATION: 15 Hrs. [Contact 4 Hrs, Course Woks: 7 Hrs and Assessment Works: 4 Hrs]

MODULE CONTENT: Function of a function rule, Implicit differentiation, logarithmic differentiation, geometrical meaning

MODULE OUTCOME: On successful completion of the module, learners will be able to differentiate various functions in Mathematics and its geometrical meaning.

13. DELIVERY MODE

The course employs multi-mode delivery mechanism including, direct discussions, YouTube videos, and discussions.

14. DELIVERY SCHEDULE

June to September.

15. DETAILED COURSE DELIVERY PLAN

Hour	Delivery Mode and Activity	Topics to be Covered
1	Contact Hour - 1:	Introducing the Course and discussion on the concept limits
2	Assignment session	Simple problems on limits
3	Contact Hour -2	Definition and discussions
4	Assignment session	Problem solving using the definition
5	Contact Hour - 3	Delivering the standard results
6	Assignment session	Simple Problem solving session using the standard results

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Hour	Delivery Mode and Activity	Topics to be Covered
7	Contact Hour 4	Discussing the physical meaning of derivative
8	Assignment Session	Understanding the physical meaning with examples
9	Midcourse evaluation	Topics so far
10	Contact Hour 5	Discussion on function of a function rule
11	Assignment Session	Problem solving session on function of a function rule
12	Contact Hour 6	Discussion on implicit differentiation
13	Assignment session	Problem Solving session on implicit differentiation
14	Contact Hour 7	Discussion on logarithmic differentiation
15	Assignment session	Problem Solving session on logarithmic differentiation
16	Contact Hour 8	Discussing the geometrical meaning of derivative
17	Assignment Session	Understanding the geometrical meaning with examples
18	End course evaluation	

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16. ASSESSMENT COMPONENTS

Total Marks: 100

CLASSROOM AND GROUP PARTICIPATION: **20 Marks.** This component aims at testing the course content understanding and the reflection skills and their attainment levels.

COURSE WORK: **30 Marks.** This component aims at testing the skill attainment levels of the learners in analysing and implementing the real-world problem.

MID-COURSE ASSIGNMENT: **20 Marks.** This component aims at testing the module-wise attainment levels of the course objectives and course outcome and module outcomes.

END-COURSE ASSESSMENT: **30 Marks.** This component aims at testing overall attainment levels of the course with respect to course objectives, course outcome and module outcomes.

17. COURSE EVALUATION & GRADING

The course evaluation is done/coordinated entirely by the course coordinator. The following 10-point Indirect Grading System is used for awarding grades to students:

Percentage of Mark	Letter Grade	Interpretation	Class
95 and above	**O**	**Outstanding**	First Class with Distinction
85 to below 95	A+	Excellent	First Class with Distinction
75 to below 85	A	Very good	First Class with Distinction
65 to below 75	B+	Good	First Class
55 to below 65	B	Satisfactory	First Class

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Percentage of Mark	Letter Grade	Interpretation	Class
45 to below 55	C	Average	Second Class
35 to below 45	P	Pass	Third Class
Below 35	F	Failure	Fail
Incomplete	I	Incomplete	Fail
Absent	Ab	Absent	Fail

The grade is awarded by the course-coordinator by considering the overall performance of the learner in all the assessment component of the course.

18. GRIEVANCE REDRESSAL

The grievances, if any, can be submitted to the Head of the Department for its redressal. Those grievances that cannot be redressed by HoD can be forwarded to Academic Council of the College for final decision on the matter.

19. ISSUANCE OF CERTIFICATES

The Course Completion Certificate will be issued to all the successful candidates showing the Total Marks and Grade Obtained.

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