

**KSKV Kachchh University: BHUJ**  
**B.Sc.: Semester: II (TWO) SUBJECT: MATHEMATICS**  
**PAPER: Calculus & Differential Equations**  
**PAPER Code: MAJ MAT-201 / MIN MAT-205 / MDC MAT-207**  
**(3 Credits)**

**Unit 1**

Integrals: Reduction formula for definite integration of  $\sin^n x$ ,  $\cos^n x$ , finite integration of  $\sin^n x$ ,  $\cos^n x$ ,  $\sin^m x \cos^n x$  for non-negative integers  $m$  and  $n$ .  
Beta and Gamma functions.

**Unit 2**

Differential Equations of first order and first degree : Only Examples of Separable variables, Homogeneous Differential Equations, Exact differential Equations, Linear Differential Equations, Bernoulli's Differential Equations, orthogonal trajectories.

**Unit 3**

Linear Differential Equations of higher order and degree one with constant coefficients (Only examples), Operator  $D$ , right of side of a differential equation having  $e^{ax}$ ,  $\sin ax$ ,  $\cos ax$  and  $x^r$  for natural number  $r$  only), Method of variation of parameters.

❖ **Reference Books:**

1. Differential Calculus – Shantinakaran
2. Integral Calculus – Shanti Narayan
3. Calculus – T. M. Apostol
4. Higher Algebra – Bernard & Child.
5. Calculus – James Stewart- sixth edition

**KSKV Kachchh University: BHUJ**  
**B.Sc.: Semester: II (TWO) SUBJECT: MATHEMATICS**  
**PAPER: Calculus & Differential Equations -Practical**  
**PAPER Code: MAJ MAT-202 -P/ MIN MAT-206-P / MDC MAT-208-P**  
**(1 Credit)**

Practical No.	Description
1	Draw the graph of circle with centre origin and also with centre (h,k) and radius r in MATLAB / SCILAB.
2	Draw the graph of parabola in MATLAB / SCILAB.
3	Solve the first order ordinary differential equation in MATLAB / SCILAB.
4	Solve the first order ordinary differential equation in MATLAB / SCILAB.
5	Draw the trajectory in MATLAB / SCILAB.
6	Draw the orthogonal trajectory in MATLAB / SCILAB.
7	Evaluate the value of integration in in MATLAB / SCILAB.
8	Evaluate the value of double integration in in MATLAB / SCILAB.

Note: The preferable and recommended software for above practical is MATLAB because it offers wide applications.

❖ **Reference books:**

1. An Introduction to Scilab-Satish Annigeri, December 2009
2. Scilab for very beginners-Scilab enterprises.
3. MATLAB for Beginners A Gental Approach- Peter I. Kattan, PETRA Books.

**Note:** This list is demonstrative and institute can apply necessary changes in content and design of practical as per the availability of infrastructure and need of the students and requirement of skills in the region.

**Preferable Infrastructure Requirement:** A well-equipped computer lab with MATLAB or equivalent.

**Human resource requirement:** A lab in-charge with good computer knowledge preferably PGDCA, BCA required for computer lab.

**INTERNAL EVALUATION SCHEME:****❖ Theory MAJ MAT-201 / MIN MAT-205 / MDC MAT-207: 35 Marks**

1.	Internal Continuous and Comprehensive Evaluation (CCE) will be conducted by the department. The total internal theory marks will be 35 Marks.
2.	<p>CCE Marking Scheme for Theory:  For each paper, CCE may be further distributed as under. This list is not exhaustive and new parameters can be added :</p> <ul style="list-style-type: none"> <li>i) Unit Test / Internal Examination (MCQ or Descriptive)</li> <li>j) Seminar</li> <li>k) Assignments</li> <li>l) Attendance</li> </ul> <p>The Department Head will be final authority for finalizing the distribution of internal evaluation marks in every semester.</p>

**❖ Practical (MAJ MAT-202-P/ MIN MAT-206-P / MDC MAT-208-P): 15 Marks**

CCE Marking Scheme for Practical : Any one or more of the parameters from Lab Performance/ Lab attendance / Internal practical Test / Journal / Viva etc. can be used. The total internal practical marks will be 15 Marks.

➤ **EXTERNAL (UNIVERSITY) EVALUATION SCHEME:**

❖ **Theory (MAJ MAT-201 / MIN MAT-205 / MDC MAT-207): 40 Marks**

There will be a written test of total 40 marks, having total 4 questions.

**The Demonstrative Structure of the External Examination Question Paper**

Question No.	Question type	Marks
1 (Unit 1)	Descriptive Questions (2 out of 3)	10
2 (Unit 2)	Descriptive Questions (2 out of 3)	10
3 (Unit 3)	Descriptive Questions (2 out of 3)	10
4 (Unit 1,2,3)	Descriptive question / Short questions	10

- The above paper scheme is demonstrative but not exhaustive. An examiner may apply necessary changes if felt necessary.
- Types of questions may be varied: like: one descriptive question/one line answers / two line answers / definitions / reasoning / derivations of equations / derivations of sums / drawing small figures etc.

❖ **Practical (MAJ MAT-202-P/ MIN MAT-206-P / MDC MAT-208-P): 10 Marks**

There will be a practical test of total 10 marks, having total 4 exercises.

**The Demonstrative Structure of the External Examination Practical Paper**

Exercises No.	Exercises	Marks
1	Based on Mathematical Exercise in SCILAB / MATLAB	3
2	Based on Graphical Exercise in SCILAB / MATLAB	3
3	Viva Voice/MCQ Exercise	2
4	Journal	2

The above practical paper scheme is demonstrative but not exhaustive. An examiner may apply necessary changes if felt necessary.

**KSKV Kachchh University: BHUJ**  
**B.Sc.: Semester: II (TWO) SUBJECT: MATHEMATICS**  
**PAPER: Calculus & Theory of Equations**  
**PAPER Code: MAJ MAT-203**  
**(3 Credits)**

**Unit 1**

Mean value theorems: Rolle's mean value theorem, Lagrange's mean value theorem, Cauchy's mean value theorem and its examples.

**Unit 2**

Introduction of Double integrals, Evaluation of double integrals, Properties of double integrals.

Introduction of Triple integrals, Evaluation of triple integrals, Properties of triple integrals.

**Unit 3**

Theory of Equations: Relations between the roots and the coefficients of a polynomial equation in one variable.

Transformation of equations.

Solutions of cubic equation, Cardan's Method.

❖ **Reference Books:**

1. Differential Calculus – Shantinirayan
2. Integral Calculus – Shanti Narayan
3. Calculus – T. M. Apostol
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5. Calculus – James Stewart- sixth edition

**KSKV Kachchh University: BHUJ**  
**B.Sc.: Semester: II (TWO) SUBJECT: MATHEMATICS**  
**PAPER: Calculus & Theory of Equations - Practical**  
**PAPER Code: MAJ MAT-204 -P**  
**(1 Credit)**

Practical No.	Description
1	Evaluate roots from given polynomial and evaluate polynomial from given roots in MATLAB / SCILAB.
2	Evaluate the value of triple integration in in MATLAB / SCILAB.
3	Evaluate the value of triple integration in in MATLAB / SCILAB.
4	Draw the graph of Ellipse in MATLAB / SCILAB.
5	Draw the graph of Hyperbola in MATLAB / SCILAB.
6	Draw 2D graph form given function in MATLAB / SCILAB.
7	Draw 3D graph form given function in MATLAB / SCILAB.
8	Draw 3D graph form given function in MATLAB / SCILAB.

Note: The preferable and recommended software for above practical is MATLAB because it offers wide applications.

❖ **Reference books:**

1. An Introduction to Scilab-Satish Annigeri, December 2009
2. Scilab for very beginners-Scilab enterprises.
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**Preferable Infrastructure Requirement:** A well-equipped computer lab with MATLAB or equivalent.

**Human resource requirement:** A lab in-charge with good computer knowledge preferably PGDCA, BCA required for computer lab.

**INTERNAL EVALUATION SCHEME:**

❖ **Theory (MAJ MAT-203): 35 Marks**

1.	Internal Continuous and Comprehensive Evaluation (CCE) will be conducted by the department. The total internal theory marks will be 35 Marks.
2.	<p>CCE Marking Scheme for Theory:            For each paper, CCE may be further distributed as under. This list is not exhaustive and new parameters can be added :</p> <p style="padding-left: 40px;">m) Unit Test / Internal Examination (MCQ or Descriptive)            n) Seminar            o) Assignments            p) Attendance</p> <p>The Department Head will be final authority for finalizing the distribution of internal evaluation marks in every semester.</p>

❖ **Practical (MAJ MAT-204-P): 15 Marks**

CCE Marking Scheme for Practical : Any one or more of the parameters from Lab Performance/ Lab attendance / Internal practical Test / Journal / Viva etc. can be used. The total internal practical marks will be 15 Marks.

**EXTERNAL (UNIVERSITY) EVALUATION SCHEME:**

❖ **Theory (MAJ MAT-203): 40 Marks**

There will be a written test of total 40 marks, having total 4 questions.

**The Demonstrative Structure of the External Examination Question Paper**

Question No.	Question type	Marks
1 (Unit 1)	Descriptive Questions (2 out of 3)	10
2 (Unit 2)	Descriptive Questions (2 out of 3)	10
3 (Unit 3)	Descriptive Questions (2 out of 3)	10
4 (Unit 1,2,3)	Descriptive question / Short questions	10

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❖ **Practical (MAJ MAT-204-P): 10 Marks**

There will be a practical test of total 10 marks, having total 4 exercises.

**The Demonstrative Structure of the External Examination Practical Paper**

Exercises No.	Exercises	Marks
1	Based on Mathematical Exercise in SCILAB / MATLAB	3
2	Based on Graphical Exercise in SCILAB / MATLAB	3
3	Viva Voice/MCQ Exercise	2
4	Journal	2

The above practical paper scheme is demonstrative but not exhaustive. An examiner may apply necessary changes if felt necessary.


  
 (R S Thakkar)
   
 BOS - Mathematics chairman
   
 HoD - Mathematics
   
 Tolani College Of Arts & Science
   
 Adipur (Kachchh)