

# BHAKTA KAVI NARSINH MEHTA UNIVERSITY - JUNAGADH

Faculty: Science Subject: Mathematics Semester-II ACADEMIC YEAR-Nov.-2018

Sr. No	Level UG or PG	Sem ester	Course Group Core Elective -1 Elective -2/ Allied/SEC/DSE	Course (Paper) Title	Paper No.	Credit	Teaching Hours	Internal Marks	External Marks	Practical Internal Marks	Practical External Marks	Total Marks
1	UG	2	Core	Mathematics	Paper-2(A)	07 (4 Theory 3 Practical)	06/week	30	70	15	35	150

# BHAKT KAVI NARSINH MEHTA UNIVERSITY JUNAGADH.

## Syllabus of B.Sc. Semester-2 According to Choice Based Credit System

(Updated on Dt. 03/05/2018)

( Effective from June – 2018 )

- **Programme:** B.Sc.
- **Semester:** 2
- **Subject:** Mathematics
- **Course code:** 02 (A) – Theory
- **Title of the course** Geometry, Calculus & Matrix Algebra
  
- **Distribution of Marks for External Examination:** Total → 70 Marks
  
- **Distribution of Marks for Internal Examination:**

Assignments	→ 10 Marks
QUIZ test	→ 10 Marks
Internal exam.	→ 10 Marks
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<b>Total Marks</b>	<b>→30 Marks</b>
  
- **Credit Of The Course** 4 Credits

**B.Sc. SEMESTER -2**  
**MATHEMATICS PAPER -02(A) Theory**  
**GEOMETRY, CALCULUS AND MATRIX ALGEBRA**

**UNIT 1:**

[ 14 MARKS ]

[a]

**Coordinate Systems :**

Cartesian, Polar, Spherical and Cylindrical coordinate systems and their inter relations.

**Sphere:**

**Equation of a sphere in different forms** like Standard form, Central form, Vector form, General equation of sphere with center  $(\alpha, \beta, \gamma)$  and radius  $a$ . Plane section of a sphere, intersection of two spheres, Sphere with a given diametral extrimities , Sphere through a given circle, Intersection of a sphere and a line, Power of a point, Equation of a tangent plane & normal to a sphere, Condition for the plane  $lx + my + nz = p$  to touch the sphere  $x^2 + y^2 + z^2 + 2ux + 2vy + 2wz + d = 0$ .

[b] **Cylinder :**

Definition of a cylinder, equation of a cylinder with given generator parallel to the

$$\frac{x}{l} = \frac{y}{m} = \frac{z}{n} \text{ and guiding curve } ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0; z = 0.$$

The equation of right circular cylinder with axis  $\frac{x-\alpha}{l} = \frac{y-\beta}{m} = \frac{z-\gamma}{n}$  and radius  $r$ .

**UNIT-2:**

[ 14 MARKS ]

**Partial Differentiation: -**

Limit and continuity of functions of two variables.

Partial derivatives, Partial derivatives of higher order, Partial differentiation of composite functions , Homogeneous functions, Euler's theorem on homogeneous functions of two and three variables, Total differential and chain rule, Change of variables, Partial differentiation of implicit functions, Young's and Schwartz's theorem (without proof).

**UNIT-3:**

[ 14 MARKS ]

**Applications of Partial Derivatives:**

Errors and approximate values, Jacobians, Taylor's theorem of function of two variables, Maxima, Minima, Saddle points of function of several variables, Lagrange's method of undetermined multipliers.

**UNIT 4:****[ 14 MARKS ]****[a] Concept of a matrix:**

Some special matrices, adjoint of a matrix, inverse of a matrix and its existence & properties, Symmetric and skew symmetric matrices, Hermitian and skew Hermitian matrices.

**[b] Rank of a matrix:**

Elementary row and column operations on a matrix, row and column vectors, linear independence of row and column matrices, rank of a matrix, row and column rank of a matrix, equivalence of row and column ranks.

**UNIT-5:****[ 14 MARKS ]****Eigen values of a matrix :**

Characteristic equation of a matrix, eigen values and eigen vectors of a matrix, Cayley-Hamilton theorem and its use in finding inverse of a matrix. Application of a matrices to solve a system of linear (homogeneous and non-homogeneous both) equations. Theorems on consistency of a system of linear equations (W.P.)

**Note:**

- There shall be **SIX** periods of 55 minutes per week for Mathematics- **02(A)-Theory**.
  - There shall be one question paper of 70 marks &  $2\frac{1}{2}$  hours for Mathematics- **02(A)-Theory**

**Format of Question Paper*****(Effective from Academic Year 2018-19 onwards)***

- There shall be FIVE questions from all five units one each of 14 marks.
- Each question will be of the following form

Question no.	(A)	Answer any one out of two ( Theory Question)	07 Marks
	(B)	Answer any one out of two (Applications/Examples/Problems/Theory)	04 Marks
	(C)	Answer any one out of two ( Short Answer/One word/One line/True or False/Fill up blanks)	03 Marks
<b>TOTAL</b>			<b>14 MARKS</b>

**Reference Books :**

- (1) Differential Calculus by Shanti Narayan
- (2) Differential Calculus by Gorakh Prasad
- (3) Integral Calculus by Shanti Narayan
- (4) Differential Equations by D. A. Murray
- (5) A Text book of Calculus, S. C. Arora and Ramesh Kumar, Pitamber Publishing Company Ltd. Delhi.
- (6) Calculus: Concept and Context, Second edition, By James Stewart

Pitamber Publishing Company Ltd. Delhi.

- (7) Calculus, By G. B. Thomas and R. L. Finney, Pearson Education, 2007.
- (8) Elements of co-ordinate geometry by S. L. Loney, Mac-Millan & Co.
- (9) An elementary treatise on co-ordinate geometry of three dimensions by R. J. T. Bell, Mac-Millan & Co.
- (10) A text book of analytical geometry of three dimensions by P. K. Jain & Khalid Ahmad
- (11) A text book on matrices by Shanti Narayan
- (12) A course of Mathematical Analysis by Shanti Narayan
- (13) Analytical Solid Geometry by Shanti Narayan & P. K. Mittal, S.Chand & Co.

# BHAKT KAVI NARSINH MEHTA UNIVERSITY JUNAGADH.

**Syllabus of B.Sc. Semester-2**  
**According to Choice Based Credit System**  
*(Updated on Dt. 03/05/2018)*  
**( Effective from June – 2018 )**

- **Programme:** B.Sc.
- **Semester:** 2
- **Subject:** Mathematics
- **Course code:** 02 (B) (Practical)
- **Title of the course** Mathematics Practical
  
- **Total Marks of External Practical Examination:** 35 Marks
- **Total Marks of Internal Practical Examination:** 15 Marks  
Continuous Internal Assessment of Practical Work
- **Total Marks for Practical Examination:**  
External → 35 Marks  
Internal → 15 Marks  

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Total → 50 Marks
  
- **Credit Of The Course** 3 Credits

**BHAKT KAVI NARSINH MEHTA UNIVERSITY  
JUNAGADH**

**B.Sc. SEMESTER -2 (CBCS)  
MATHEMATICS PAPER- 02(B) (Practical)  
Mathematics Practical**

**[ 50 Marks / 3Hours]**

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Practical No. (1) (A) Draw the graph of  $y = e^x$  or  $y = 2^x$  or  $y = 3^x$ .

(B) Draw the graph of  $y = \log_e x$  or  $y = \log_{10} x$ .

Practical No. (2) Draw the graph of  $y = \sinh x$  or  $y = \cosh x$  or  $\tanh x$

Practical No. (3) Draw the graph of  $y = \operatorname{sech} x$  or  $y = \operatorname{cosech} x$  or  $\operatorname{coth} x$

Practical No. (4) Draw the graph of cycloid.

Practical No. (5) To find inverse of a matrix using Cayley- Hamilton theorem.

(At least four examples to be written in journal)

Practical No. (6) To find inverse of a matrix using Gauss-Elimination Method.

(At least four examples to be written in journal)

Practical No. (7) To solve the system of simultaneous linear algebraic equations using Gauss Elimination Method. (At least four examples to be written in journal)

Practical No. (8) To solve the given system of simultaneous linear algebraic equations using Gauss-Jordan Method. (At least four examples to be written in journal)

Practical No. (9) Find rank of the given matrix.

Practical No. (10) Find eigen values & eigen vectors of the given matrix.

**Note :**

- There shall be **SIX** periods of **1 hour** per week per batch of **15** students.
- **10** practical should be done during semester-2.
- At the time of examination candidate must bring his/her own practical journal duly certified and signed by **H.O.D.**
- There shall be one question paper of **35 Marks** and **3 Hours** for practical examination
- There shall be 15 marks for Internal Practical Examination  
(i.e. Continuous internal assessment of performance of each student during the practical work.)
- Use of ICT tools and web resources will be appreciated for internal assessment.

## **Format of Question Paper for Practical Examination:**

Question 1	Answer any THREE out of FIVE	[ 9+9+9]=	27 Marks
Question 2	Journal and Viva:		8 Marks
	<b>Total (External)</b>		<b>35 Marks</b>
	Internal Practical Examination		15 Marks
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	<b>Total</b>		<b>50 Marks</b>