Gujarat University

National Education Policy-2020

Syllabus for B. Sc. Sem-I (Mathematics)

Effective from June-2023

Subject Code For UG Science Courses: -MAT

Semester	Discipline Specific Courses - Core (DSC - C)	Minor (DSC - M)	Multi / Inter disciplinary courses (MDC / IDC)	Ability Enhancement Courses (Language) (AEC)	Enhancement Courses / Internship / Dissertation Skill	Common Value Added Courses (VAC / IKS)	Total Credits
I	DSC - C - MAT - 111T : 4 DSC - C - MAT - 112P : 4	DSC - M - MAT - 113T : 2 DSC - M - MAT - 113P : 2	MDC - MAT - 114T : 2 MDC - MAT - 114P : 2	AEC - 115 : 2	SEC - 116 : 2	IKS - 117 : 2	22
II	DSC - C - MAT - 121T : 4 DSC - C - MAT - 122P : 4	DSC - M - MAT - 123T : 2 DSC - M - MAT - 123P : 2	MDC - MAT - 124T : 2 MDC - MAT - 124P : 2	AEC - 125 : 2	SEC - 126 : 2	VAC - 127 : 2	22
III	DSC - C - MAT - 231T : 4 DSC - C - MAT - 232T : 4 DSC - C - MAT - 233P : 4	-	MDC - MAT - 234T : 2 MDC - MAT - 234P : 2	AEC - 235 : 2	SEC - 236 : 2	IKS - 237 : 2	22
IV	DSC - C - MAT - 241T : 4 DSC - C - MAT - 242T : 4 DSC - C - MAT - 243P : 4	DSC - M - MAT - 244T : 2 DSC - M - MAT - 244P : 2	-	AEC - 245 : 2	SEC - 246 : 2	VAC - 247 : 2	22
V	DSC - C - MAT - 351T : 4 DSC - C - MAT - 352T : 4 DSC - C - MAT - 353P : 4	DSC - M - MAT - 354T : 4 DSC - M - MAT - 355P : 4	-	-	SEC - 356 : 2	-	22
VI	DSC - C - MAT - 361T : 4 DSC - C - MAT - 362T : 4 DSC - C - MAT - 363P : 4	DSC - M - MAT - 364T : 2 DSC - M - MAT - 364P : 2	-	AEC - 365 : 2	Internship - 4	-	22
VII	DSC - C - MAT - 471T : 4 DSC - C - MAT - 472T : 4 DSC - C - MAT - 473P : 4	DSC - M - MAT - 474T : 2 DSC - M - MAT - 474P : 2	-	-	-	OJT / RP - 6	22
VIII	DSC - C - MAT - 481T : 4 DSC - C - MAT - 482T : 4 DSC - C - MAT - 483P : 4	DSC - M - MAT - 484T : 2 DSC - M - MAT - 484P : 2	-	-	-	OJT / RP - 6	22

Syllabus for B.Sc. Semester – I (MATHEMATICS)

Course: DSC - C - MAT - 111T: CALCULUS – I

Credit: 4

UNIT I

(a) Successive Derivatives, Standard results for n derivative, Leibniz's theorem.

(b) Taylor's and Maclaurin's theorems, Using Taylor's and Maclaurin's theorems find power series of various functions.

UNIT II

(a) Differential Equations of First order and First Degree:
Variable Separable, Homogeneous & non – homogeneous Differential Equations, Exact Differential Equations, Integrating factors, Linear Differential Equations of First order and First Degree, Bernoulli's Differential Equations.

(b) Method of solving Differential Equations of First order and higher degree:
Solvable for y, Solvable for x, Solvable for p, Clairaut's Differential Equation, Lagrange's Differential Equation.

UNIT III

(a) Roll's Theorem, Lagrange's and Cauchy's Mean Value Theorem, Increasing and decreasing functions.

Indeterminate forms: L' Hospital Rules.

UNIT IV

(a) Introduction to function of several variables, Limit – Continuity of function of several variables and partial derivatives.

(b) Vector Analysis, different notations and its geometric interpretation.

Reference Books:

1) Calculus and Analytic Geometric – G. B. Thomas & R. L. Finney. Pearson Education. Indian Reprint
2) Calculus – James Stewart, Sixth Edition (E -Book)
3) Calculus - T. M. Apostol. Volume – I
4) Differential Calculus – Shanti Narayan, P. K. Mittal, S. Chand & Co
5) Differential Calculus – Harikishan, Atlantic Publishers
6) Calculus – M. Spivak
7) Mathematical Analysis –S C Malik & Savita Arora, Second Edition, New Age Int. (P) Ltd
8) Differential Calculus – Shanti Narayan
9) Calculus – James Stewart

Syllabus for B.Sc. Semester – I (Mathematics Practical)

Course: DSC - C - MAT – 112P: CALCULUS – I

Credit: 4

UNIT I: Problems based -Successive Derivative, Leibniz's theorem.

UNIT II: Problems on solving differential equations

UNIT III: Problems on Mean Value Theorems and L' Hospital Rule

UNIT IV: Example of Limit, Continuity, & Differentiation of function of several variables using definition and Problems based on Vector Analysis

Reference Books:

1) Calculus and Analytic Geometric – G. B. Thomas & R. L. Finney. Pearson Education. Indian Reprint
2) Calculus – James Stewart, Sixth Edition (e -Book)
3) Calculus - T. M. Apostol. Volume – I
4) Differential Calculus – Shanti Narayan, P. K. Mittal, S. Chand & Co
5) Differential Calculus – Harikishan, Atlantic Publishers
6) Calculus – M. Spivak
7) Mathematical Analysis – S. C. Malik & Savita Arora, Second Edition, New Age Int. (P) Ltd
8) Differential Calculus – Shanti Narayan
9) Calculus – James Stewart

List of Practical Problems

Unit-: 1

Practical-1: Problems on Successive Differentiation

Practical-2: Problems on finding n^{th} derivative of the functions by using Leibnitz theorem,

Practical-3: Problems on applications of Leibnitz theorem.

Practical-4: Problems on Successive Derivatives and Leibnitz theorem.

Practical-5: Problems on Expansions of infinite power series using Taylor's formula.

Practical-6: Problems on Expansions of infinite power series using Maclaurin's formula.

Unit-: 2

Practical-7: Problems on solving differential equations based on Variable Separable Method

Practical-8: Problems on solving Homogeneous Differential equations.

Practical-9: Problems on solving Linear Differential equations.

Practical-10: Problems on solving Bernoulli's Differential equations.

Practical-11: Problems on solving Exact and Non-Exact Differential Equations.

Practical-12: Problems on solving First order and Higher degree Differential equations.

Unit-: 3

Practical-13: Problems on Geometric Interpretation and Verification of Mean Value Theorems.

Practical-14: Problems on applications of Mean Value Theorems-1.

Practical-15: Problems on applications of Mean Value Theorems-2.

Practical-16: Problems on application of L 'Hospital's Rules, Evaluating the limits - I

Practical-17: Problems on application of L 'Hospital's Rules, Evaluating the limits - II

Practical-18: Problems on application of L 'Hospital's Rules, Evaluating the limits - III

Unit-: 4

Practical-19: Problems on evaluation of limits by using Definition.

Practical-20: Problems on continuity of functions.

Practical-21: Problems of partial derivatives for functions of two variables at a given point.

Practical-22: Problems on Evaluating $xf_x + yf_y$ for the given functions.

Practical-23: Problems based on Gradient, Divergence and Curl-1.

Practical-24: Problems based on Gradient, Divergence and Curl-2

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