Estd. 1962
"A++" Accredited by NAAC (2021)
With CGPA 3.52

SHIVAJI UNIVERSITY, KOLHAPUR - 416004, MAHARASHTRA
PHONE:EPABX-2609000, www.unishivaji.ac.in, bos@unishivaji.ac.in
शिवाजी विद्यापीठ, कोल्हापूर -४१६००४,महाराष्ट्र
दूरध्वनी-ईपीएबीएक्स -२६०९०००, अभ्यासमंडळे विभाग दुरध्वनी ०२३१—२६०९०९४
०२३१—२६०९४८७

Ref.No.SU/BOS/Science/434 **Date: 15/07/2025**

To,

The Principal,
All Concerned Affiliated Colleges/Institutions
Shivaji University, Kolhapur.

Subject: Regarding revised syllabi of B.Sc. Part-II (Sem.III & IV) degree programme under the Faculty of Science and Technology as per NEP-2020 (2.0)

Ref: No.SU/BOS/Science/270 & 271 Date: 03/05/2025 Letter.

Sir/Madam,

With reference to the subject mentioned above, I am directed to inform you that the university authorities have accepted and granted approval to the syllabi, nature of question paper of B.Sc. Part-II (Sem.III & IV) degree programme under the Faculty of Science and Technology as per NEP-2020 (2.0).

B.Sc.Part-II (Sem. III & IV) as per NEP-2020 (2.0)			
1.	Botany	8.	Geology
2.	Statistics	9.	Zoology
3.	Mathematics	10.	Chemistry
4.	Microbiology	11.	Electronics
5.	Plant Protection	12.	Industrial Microbiology
6.	B.A./B.A.B.Ed. Geography	13.	Biotechnology(Voc/Opt)
7.	Biotechnology(Entire)		

This syllabus, nature of question and equivalence shall be implemented from the academic year 2025-2026 onwards. A soft copy containing the syllabus is attached herewith and it is also available on university website www.unishivaji.ac.in NEP-2020@suk(Online Syllabus)

The question papers on the pre-revised syllabi of above-mentioned course will be set for the examinations to be held in October /November 2025 & March/April 2026. These chances are available for repeater students, if any.

You are, therefore, requested to bring this to the notice of all students and teachers concerned.

Thanking you,

Dy Registrar
Dr. S. M. Kubal

Encl: As above

for Information and necessary action

Copy to:

1	Dean, Faculty of Science & Technology	6	Appointment Section A & B
2	Director, Board of Examinations and Evaluation	7	I.T.Cell /Computer Centre
3	Chairman, Respective Board of Studies	8	Eligibility Section
4	B.Sc.-M.Sc. Exam Section	9	Affiliation Section (T.1) (T.2)
5	Internal Quality Assurance Cell (IQAC Cell)	10	P.G. Seminar Section

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MAHARASHTRA
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शिवाजी विद्यापीठ, कोल्हापूर -४१६००४,महाराष्ट्र
दूरध्वनी-ईपीएबीएक्स -२६०९०००, अभ्याससमंडळे विभाग दुरध्वनी ०२३१—२६०९०९४
०२३१—२६०९४८७

Estd. 1962
"A++" Accredited by
NAAC (2021)
With CGPA 3.52

Ref.No.SU/BOS/Science/270 **Date: 03/05/2025**

To,

The Principal,
All Concerned Affiliated Colleges/Institutions
Shivaji University, Kolhapur.

Subject: Regarding revised syllabi of B.Sc. Part-II (Sem.III & IV) degree programme under the Faculty of Science and Technology as per NEP-2020 (2.0)

Sir/Madam,

With reference to the subject mentioned above, I am directed to inform you that the university authorities have accepted and granted approval to the syllabi, nature of question paper of B.Sc. Part-II (Sem.III & IV) degree programme under the Faculty of Science and Technology as per NEP-2020 (2.0).

B.Sc.Part-II (Sem. III & IV) as per NEP-2020 (2.0)			
1.	Botany	8.	Geology
2.	Physics	9.	Zoology
3.	Statistics	10.	Chemistry
4.	Mathematics	11.	Electronics
5.	Microbiology	12.	Drug Chemistry
6.	Plant Protection	13.	Industrial Microbiology
7.	Astrophysics and Space Science	14.	Sugar Technology (Entire)

This syllabus, nature of question and equivalence shall be implemented from the academic year 2025-2026 onwards. A soft copy containing the syllabus is attached herewith and it is also available on university website www.unishivaji.ac.in NEP-2020@suk(Online Syllabus)

The question papers on the pre-revised syllabi of above-mentioned course will be set for the examinations to be held in October /November 2025 & March/April 2026. These chances are available for repeater students, if any.

You are, therefore, requested to bring this to the notice of all students and teachers concerned.

Thanking you,

Yours faithfully,

By Registrar
Dr. S. M. Kubal

Encl: As above

for Information and necessary action

Copy to:

1	Dean, Faculty of Science & Technology	6	Appointment Section A & B
2	Director, Board of Examinations and Evaluation	7	I.T.Cell /Computer Centre
3	Chairman, Respective Board of Studies	8	Eligibility Section
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5	Internal Quality Assurance Cell (IQAC Cell)	10	P.G. Seminar Section

SHIVAJI UNIVERSITY, KOLHAPUR.

Accredited By NAAC with 'A++' Grade

Structure and Syllabus in Accordance with

National Education Policy - 2020

with Multiple Entry and Multiple Exit

Bachelor of Science (Mathematics) Part II (Level-5.0)

Semester III and IV

under the

Faculty of Science and Technology

(To Be Implemented from Academic Year 2025-26)

SHIVAJI UNIVERSITY, KOLHAPUR
NEP-2020(2.0): Credit Framework for UG(B.Sc.) Programme under Faculty of Science and Technology

PROGRAM STRUCTURE:

Structure in Accordance with National Education Policy – 2020 With Multiple Entry and Multiple Exit Options B.Sc. (Mathematics) Part – II (Level-5.0)									
SEM (Level)	**COURSES**			**OE**	**VSC/SEC**	**AEC/VEC/IKS**	**OJT/FP/CEP /CC/RP**	**Total Credits**	**Degree/Cum. Cr. MEME**
	MAJOR		**MINOR**						
SEM – III (5.0)	**MAJOR -V (2)** Differential Equations - II **MAJOR -VI (2)** Numerical Methods **MAJOR Pract.-III(2)** Mathematics Practical-III	--	**MIN-V (2)** Computational Mathematics for Sciences-I **MIN-VI (2)** Improper Integrals & Special Functions **MIN Pract.-III(2)** Mathematics Practical-III	**OE-3 (2) (P)** Vedic Mathematics Part- II [वैदिक गणित भाग-१]	**VSC-I(2)(P)** Introduction to SciLab **SEC-I(2)(P)** Mathematics Typesetting using Latex-I	**AEC-I(2)** (English)	**CC-I(2)**	**22**	**UG Diploma 88**
SEM - IV (5.0)	**MAJOR -VII (2)** Differential Calculus **MAJOR -VIII (2)** Integral Calculus **MAJOR Practi.-IV (2)** Mathematics Practical-IV	--	**MIN-VII (2)** Computational Mathematics for Sciences-II **MIN-VIII (2)** Laplace Transform **MIN Practi.-IV(2)** Mathematics Practical-IV	**OE-4 (2) (P)** Vedic Mathematics Part- II [वैदिक गणित भाग-२]	**SEC-II(2)(P)** Mathematics Typesetting using Latex-II	**AEC-II(2)** (English) **VEC-II(2)** (Environmental Studies)	**CEP-I(2)**	**22**	
Credits	**8(T)+4(P)=12**		**8(T)+4(P)=12**	**2(P)+2(P)=4**	**4(P)+2(P)=6**	**2+4=6**	**2+2=4**	**44**	**Exit Option:4 credits NSQF/Internship/Skillcourses**

Abbreviations:

AEC	Ability Enhancement Course
CC	Co-curricular Courses
CEP	Community Engagement and Service
DSC	Department Specific Core
DSE	Department Specific Elective
FP	Field Project
GE	Generic Elective
IDC	Inter-Disciplinary Course
IKS	Indian Knowledge System
MDC	Multidisciplinary Course
MIN	Minor
OE	Open Elective
OEC	Open Elective Course
OJT	On Job Training
P	Practical
RP	Research Project
SEC	Skill Enhancement Course
T	Theory
VEC	Value Education Course
VSC	Vocational Skill Course

Semester III

B.Sc. (Mathematics) (Part II) (Level 5.0)

(Semester – III) (NEP – 2020)

Syllabus to be implemented from Academic Year 2025-26

Course type	**:**	**Minor - V(Theory)**
Title of course	**:**	**Computational Mathematics for Sciences-I**
Credit	**:**	**02**

Course Learning Outcomes: Upon successful completion of this course students will able to:

CO 1. learn the partial differentiation and Euler's theorem on homogeneous functions.

CO 2. learn the concept of Jacobian of a transformation.

CO 3. understand the concepts of gradient, divergence and curl of point functions in terms of cartesian co-ordinate system.

CO 4. evaluate the gradient, divergence and curl of point functions

Unit 1: Partial differentiation and Jacobians ***(15 Hrs.)***

1.1. Partial differentiation

1.1.1. Revision of Partial derivatives

1.1.2. Partial derivatives of composite Functions

1.1.3. Homogeneous functions: definition

1.1.4. Euler's theorems on homogeneous functions

1.1.4.1. If is a homogeneous function of degree in and y, then

a) $\frac{\partial z}{\partial x} + \frac{\partial z}{\partial y} =$ z.

b) $\frac{\partial^2 z}{\partial x^2} + 2 \frac{\partial^2 z}{\partial x \partial y} + \frac{\partial^2 z}{\partial y^2} = (- 1)$

1.1.4.2. If is a homogeneous function of degree in and and = ( ), then

a) $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} = \frac{f(u)}{f'(u)}$

b) $\frac{\partial^2 u}{\partial x^2} + 2 \frac{\partial^2 u}{\partial x \partial y} + \frac{\partial^2 u}{\partial y^2} = ( )('( ) - 1)$ where $( ) = \frac{f(u)}{f'(u)}$

1.1.5. Examples based on 1.1.2, 1.1.3, 1.1.4

1.2. Jacobian

1.2.1. Definition of Jacobian

1.2.2. Properties of Jacobians.

1.2.2.1. If is Jacobian of u, v with respect to x, y and ' is Jacobian of x, y with respect to u, v then $JJ' = 1$.

1.2.2.2. If is Jacobian of u, v with respect to x, y and ' is Jacobian of x, y with respect to u, v then $JJ' = 1$.

1.2.2.3. If , are functions of , and , are functions of , then prove that $\frac{\partial(p, q)}{\partial(u, v)} = \frac{\partial(p, q)}{\partial(x, y)} \cdot \frac{\partial(x, y)}{\partial(u, v)}$

1.2.2.4. If , , are functions of , , and , , are functions of , , then prove that $\frac{\partial(p, q, r)}{\partial(u, v, w)} = \frac{\partial(p, q, r)}{\partial(x, y, z)} \cdot \frac{\partial(x, y, z)}{\partial(u, v, w)}$

1.2.3. Jacobian of implicit functions (without proof)

1.2.4. Examples based on 1.2.1, 1.2.2, 1.2.3

Unit 2: Vector Calculus ***(15 Hrs.)***

2.1 Partial differentiation of vectors

2.1.1 The Scalar and Vector valued Point functions

2.1.2 The Operator A

2.1.3 Gradient of a Scalar Point Function: definition

2.1.4 Directional derivatives of scalar and vector point functions

2.1.5 Geometrical Interpretation of grad $\varnothing$, where $\varnothing$ is a scalar point function

2.1.6 Divergence of vector point function: definition

2.1.7 Curl of vector point function: definition

2.1.8 Gradient, Divergence and Curl of sums

i. $\text{grad}(\varnothing \pm \psi) = \text{grad}\,\varnothing \pm \text{grad}\,\psi$

ii. $\text{div}(\bar{f} \pm \bar{g}) = \text{div}\,\bar{f} \pm \text{div}\,\bar{g}$

iii. $\text{curl}(\bar{f} \pm \bar{g}) = \text{curl}\,\bar{f} \pm \text{curl}\,\bar{g}$

2.1.9 Gradient, Divergence and Curl of Products

i. $\text{grad}(\varnothing\,\psi) = \varnothing\ \text{grad}\,\psi + \psi\,\text{grad}\,\varnothing$

ii. $\text{div}(\varnothing\bar{f}) = \varnothing\ \text{div}\,\bar{f} + (\text{grad}\,\varnothing)\cdot\bar{f}$

iii. $\text{div}(\bar{f} \times \bar{g}) = \bar{g}\cdot\text{curl}\,\bar{f} - \bar{f}\cdot\text{curl}\,\bar{g}$

iv. $\text{curl}(\varnothing\bar{f}) = \text{grad}\,\varnothing \times \bar{f} + \varnothing\ \text{curl}\,\bar{f}$

2.1.10 Second order differential operators

i. $\text{div grad}\,\varnothing = A\cdot A\varnothing = \frac{6^2\varnothing}{6x^2} + \frac{6^2\varnothing}{6y^2} + \frac{6^2\varnothing}{6z^2}$

ii. $\text{curl grad}\,\varnothing = A \times A\varnothing = 0$

iii. $\text{div curl}\,\bar{f} = A\cdot A \times \bar{f} = 0$

2.1.11 The Laplacian Operators ❑

2.1.12 Solenoidal and Irrotational vector fields

2.1.13 Examples based on 2.1.3, 2.1.4, 2.1.6, 2.1.7, 2.1.12

Recommended books:

1. Differential Calculus, Shanti Narayan and P.K. Mittal, S. Chand publishing, 15th edition (2016) – For Unit 1 of the syllabus.
   [Scope: Chapter -11: 11.1, 11.6, 11.7, 11.8, Chapter -12: 12.1, 12.2, 12.3]
2. A text book of Vector Calculus, Shanti Narayan & P. K. Mittal:, S. Chand & CO (Pvt) Ltd, Ram nagar, New Delhi-110055.- For Unit 2 of the syllabus.
   [Scope: Chapter -6: 6.1 to 6.17]

Reference books:

1. Differential Calculus, Gorakh Prasad, Pothishala Pvt. Ltd., 19th edition (2016).
2. Mathematical Physics, B. D. Gupta, Vikas Publishing House Pvt. Ltd Fourth edition (2022).
3. Higher Engineering Mathematics, B. S. Grewal, Khanna Publishers, New Delhi-110002.
4. Advanced Engineering Mathematics R. K. Jain & S. R. K. Iyengar, fourth edition, Narosa Publishing House New Delhi.

B.Sc. (Mathematics) (Part II) (Level 5.0) (Semester – III)
(NEP – 2020)
Syllabus to be implemented from Academic Year 2025-26

Course type	**:**	**Minor - VI(Theory)**
Title of course	**:**	**Improper Integrals and Special Functions**
Credit	**:**	**02**

Course Learning Outcomes: Upon successful completion of this course students will able to:

CO 1. analyze and evaluate improper integrals with infinite limits.

CO 2. apply Beta and Gamma functions to solve integrals and demonstrate their properties and interrelationships.

CO 3. evaluate parameter-dependent improper integrals and understand the conditions for interchanging limits, differentiation, and integration.

CO 4. interpret and apply the Error function in solving integrals and problems arising in applied mathematics and engineering contexts.

Unit 1. Improper Integrals ***(15 Hrs.)***

1.1 Introduction
1.2 Improper Integrals of the First Kind (Range of Integration is Infinite) (Definition)
1.3 Improper Integral of the Second Kind (Definition)
1.4 Gamma Function
1.5 Some Identities of Gamma Function
1.5 1. $\Gamma(1) = 1$
1.5.2. $\Gamma(\quad + 1) = \quad \Gamma(\quad)$
1.5.3. $\Gamma(\quad + 1) = \quad !$, for any positive integer .
1.5.4. $\Gamma(\frac{1}{2}) = \sqrt{\quad}$
1.5.5. $\Gamma(\quad) = 2 \int_0^{\infty} \quad ^{-x^2} \quad ^{2n-1} \quad , \quad > 0$
1.5.6. $\Gamma(\quad) = \quad ^{n} \int_0^{\infty} \quad ^{kx} \quad ^{n-1} \quad , \quad , \quad > 0$
1.6 Beta Function
1.7 Some Identities of Beta function
1.7.1 $(\quad , \quad) = (\quad , \quad)$
1.7.2 $(\quad , \quad) = 2 \int_0^{\frac{\pi}{2}} \sin^{2m-1} \quad \cos^{2n-1}$
1.7.3 $(\quad , \quad) = \int_0^{\infty} \frac{x^{m-1}}{(1+x)^{m+n}}$
1.7.4 $(\quad , \quad) = \frac{\Gamma(m)\Gamma(n)}{\Gamma(m+n)}$
1.7.5 $(\quad , \quad) = (\quad + 1, \quad) + (\quad , \quad + 1)$
1.7.6 Duplication formula of Gamma function (only statement)
1.8 Examples based on 1.4 to 1.7

Unit 2. Improper integrals involving a parameter and the Error functions ***(15 Hrs.)***

2.1. Definition of improper integral involving a parameter
2.2. Integral with its limits as constants (Statement only)
2.3. Integral with limits as functions of the parameter (Leibnitz's Rule) (Statement only)
2.4. Examples based on 2.2 and 2.3
2.5. Error Function Integral $\mathrm{erf}(\quad)$

2.6. Complementary Error Function Integral $\text{erf}_c(\ )$

2.7. Expression for $\text{erf}(\ )$ in series

2.8. Properties of error-integral functions

i) $\text{erf}(-\ ) = -\text{erf}(\ )$

ii) $\text{erf}(-\ ) = 1 + \text{erf}(\ ) = 2 - \text{erf}_c(\ )$

iii) Derivative of error function: $\frac{d}{dx}[\text{erf}(\ )] = \frac{2a}{\sqrt{\pi}} e^{-a^2x^2}$

iv) Integral of error function: $\int_0^u \text{erf}(\ ) = \text{erf}(\ ) + \frac{e^{-a^2x^2}}{a\sqrt{\pi}} - \frac{1}{a\sqrt{\pi}}$

2.9. Examples based on 2.5 to 2.7

Recommended books:

1. **For Unit. 1 & Unit 2**: R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 4th Edition, Narosa Publishing House, New Delhi, Chenni, Mumbai, Kolkata.
   [**Scope:** Chapter 1: 1.4.1, 1.4.2, 1.4.4 to 1.4.6.]
2. **For Unit. 2**: P. N. Wartikar and J. N. Wartikar, A text Book of Applied Mathematics, Pune Vidyarthi Griha Prakashan, 1786, Sadashiv Peth, Pune-411030, Vol.I, 2011.
   [**Scope:** Chapter 19: 19.1 to 19.3 Chapter 21: 21.2 to 21.5.]

Reference books:

1. P. N. Wartikar and J. N. Wartikar, A text book of Applied Mathematics, Pune Vidhyarthi Griha Prakashan, Pune. Vol. I, 2011.
2. Shanti Narayan and Dr. P. K. Mittal, Integral Calculus, S. Chand and Company, New Delhi, 2015.
3. B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers, Delhi, 2012.
4. Gorakh Prasad, Integral Calculus, Pothishala Pvt. Ltd., Allahabad
5. Dass H. K, Advanced Engineering Mathematics, 22e, S. Chand and Company, New Delhi, 2018.

B.Sc. (Mathematics) (Part II) (Level 5.0) (Semester – III)
(NEP – 2020)
Syllabus to be implemented from Academic Year 2025-26

Course type : Minor (Practical)
Title of course : Mathematics Practical (Minor) - III
Credit : 02
Student Engagement : 04 hrs. per week per batch

Sr. No	Title of the Practical	No. of Practical(s)
1	Euler's theorems on homogeneous functions	02
2	Jacobians	02
3	Curl, Divergence and Gradient	02
4	Solenoidal and Irrotational vector field.	01
5	Directional Derivatives	01
6	Gamma function	02
7	Definition of beta function	01
8	Identities of Beta function	02
9	Differentiation under integral sign	02
	T O T A L	**15**

Semester IV

B.Sc. (Mathematics) (Part II) (Level 5.0) (Semester – IV)
(NEP – 2020)

Syllabus to be implemented from Academic Year 2025-26

Course type	**:**	**Minor – VII(Theory)**
Title of course	**:**	**Computational Mathematics for Sciences-II**
Credit	**:**	**02**

Course Learning Outcomes: Upon successful completion of this course students will able to:

CO 1. apply various interpolation methods.
CO 2. approximate polynomials for the real-life data.
CO 3. construct and interpret finite difference tables for data analysis.
CO 4. apply interpolation techniques in solving problems related to computer science, such as curve fitting and numerical estimation.

Unit 1. Interpolation on Evenly Spaced Points ***(15 Hrs.)***

1.1 Introduction: Interpolation, Extrapolation, Interpolating polynomial.

1.2 Finite Differences: Forward Differences (Δ), Backward Differences (∇), Central Differences ( ).

1.3 Shift Operator ( ) and means operator ( ).

1.4 Symbolic Relations and Separation of Symbols.

1.4.1. Show that $\Delta = E - 1$, $\nabla = 1 -$, $= -$, $= ( ) (+)$,

$= 1 + ( )$, $\Delta =$ $=$.

1.4.2. Show that $\equiv$, where $\equiv$ $\frac{d}{dx}$

1.4.3. Show that Δ^n $=$ $-$ $+\frac{n(n-1)}{2}$ $+\cdots+(-1)^n$.

1.4.4. Show that $($ $+$ $+\frac{x^2}{2!}$ $+\cdots)$ $=$ $+$ $+$ $+\frac{x^2}{2!}+\cdots$

1.5 Forward and Backward Differences of a polynomial.

1.6 Newton's Forward and backward Formulae for Interpolation.

1.7 Examples based on 1.1 to 1.6

Unit 2. Interpolation on Unevenly Spaced Points ***(15 Hrs.)***

2.1 Lagrange's Interpolation Formula.

2.2 Divided Difference and Their Properties.

2.3 Newton's General Interpolation Formula.

2.4 Method of successive approximations

2.5 Examples based on 2.1 to 2.4

Recommended Book:

1. S. S. Sastry - Introductory Methods of Numerical Analysis: Fifth Edition, Prentice Hall India Learning

Private Limited, New Delhi (2012).

***Scope*: Unit 1:** Chapter 3 Section 3.1, 3.3, 3.5, 3.6 and 3.7.1, **Unit 2:** Chapter 3 Section 3.9 to 3.1

Reference Books:

1 B. S. Grewal - Numerical Methods in Engineering And Science: C, C++, and MatLab, Mercury Learning and Information, New Delhi (2012).

2 M.K. Jain, S.R.K. Iyengar and R.K. Jain, Numerical Methods for Scientific and Engineering Computation, New Age International Publisher, Mumbai (2012).

B.Sc. (Mathematics) (Part II) (Level 5.0) (Semester – IV)
(NEP – 2020)

Syllabus to be implemented from Academic Year 2025-26

Course type : Minor – VIII(Theory)
Title of course : Laplace Transform
Credit : 02

Course Learning Outcomes: Upon successful completion of this course students will able to:

CO 1. understand definitions and existence conditions of the Laplace transform
CO 2. apply key properties of the Laplace transform
CO 3. understand inverse Laplace transform
CO 4. apply Laplace transform to solve differential equations.

Unit 1. Laplace Transform ***(15 Hrs.)***

1.1 Definitions: Piecewise or Sectional Continuity, Function of Exponential Order, Function of Class 'A'.

1.2 The Transform Concept, Definition of Laplace Transform, Notation.

1.3 Existence of Laplace Transform (Statement only).

1.4 Linear Property, First Shifting Theorem, Second Shifting Theorem and Change of Scale Property.

1.5. Some Standard Results

1.6 Laplace transform of derivatives, Laplace transform of integrals.

1.7 Multiplication by powers of 't', Division by 't'.

1.8 Periodic functions.

1.9 Examples based on 1.1 to 1.8

Unit 2. Inverse Laplace Transform ***(15 Hrs.)***

2.1 Definitions of Inverse Laplace Transform and Null function. Uniqueness Theorem.

2.2 Linear property

2.3 First shifting theorem, second shifting theorem, Unit step function, change of scale property.

2.4 Inverse Laplace transform of derivatives, Division by 's'.

2.5 The Convolution theorem, Multiplication by 's'.

2.6 Inverse Laplace by partial fractions, Heavi-side's Expansion formula.

2.7 Application to solve Ordinary Linear Differential Equations with constant and Variable Coefficients

2.8 Examples based on 2.1 to 2.7

Recommended Book:

1. J. K. Goyal, K. P. Gupta, Integral Transforms, A Pragati Prakashan, Meerut, 21th edition, 2021.

Scope:

Unit 1: Chapter 1 Part I: 1.0 to 1.6, **Unit 2:** Chapter 1 Part II: 1.0 to 1.3. Part III 1.0 to 1.1

Reference Books:

1. Dr. S. Sreenadh, Fourier series and Integral Transform, S. Chand, New Delhi, 2021
2. B. Davies, Integral Transforms and Their Applications, Springer Science, 2017.
3. Murray R. Spiegel, Laplace Transforms, Schaum's outlines , 2018.

B.Sc. (Mathematics) (Part II) (Level 5.0) (Semester – IV)
(NEP – 2020)
Syllabus to be implemented from Academic Year 2025-26

Course type : Minor (Practical)
Title of course : Mathematics Practical (Minor) - IV
Credit : 02
Student Engagement : 4 hrs. per week per batch

Sr. No	Title of the Practical	No. of Practical(s)
1	Properties of Finite Differences	01
2	Forward and Backward Differences of a polynomial	01
3	Examples on Newton's forward difference formula	01
4	Examples on Newton's backward difference formula	01
5	Examples on Lagrange's interpolation formula.	01
6	Examples on Newton's general interpolation formula	01
7	Examples on Method of successive approximations	01
8	Laplace transform of Derivative and Integrals	02
9	Multiplication by powers of 't', and division by 't'.	02
10	Laplace transform of Periodic Functions	01
11	Inverse Laplace by Convolution theorem	01
12	Inverse Laplace by partial fractions	01
13	Application to Linear differential equations	01
	T O T A L	**15**

NATURE OF QUESTION PAPER:

A. **Continuous Assessment (CA):**

Term work shall be of 10 marks for the courses of 2 credits.

B. **End Semester Assessment:**

1. End Semester examination shall be of 40 marks for the courses of 2 credits.
2. The nature of Question Paper for Theory Examination:

Maximum Marks: 40 **Duration: 1.5 hrs.**

Q. 1) Choose the correct alternative from the following and rewrite the sentence. [08]

a) to h) MCQ one mark each with four options

i) ii) iii) iv)

Q. 2) Attempt any TWO of the following [16]

a)

b)

c)

Q. 3) Attempt any FOUR of the following [16]

a)

b)

c)

d)

e)

f)

C. DSC, MIN, VSC Practical Examination:

1. Practical examination shall be of 50 marks for the courses of 02 credits.
2. Distribution of marks: Practical question paper – 40 marks, Certified Journals – 05 marks, Viva – voce – 05 marks and Duration: 04 hrs.
3. The nature of Question Paper for Practical Examination:

Q.1 (A) (10 Marks)

(B) (05 Marks)

OR

Q.1 (A) (10 Marks)

(B) (05 Marks)

Q.2 (A) (10 Marks)

(B) (05 Marks)

OR

Q.2 (A) (10 Marks)

(B) (05 Marks)

Q.3 Attempt any TWO of the following

(A) (05 Marks)

(B) (05 Marks)

(C) (05 Marks)

(D) (05 Marks)

D. SEC and OE Practical Examination:

1. Practical examination shall be of 50 marks for the courses of 02 credits.
2. Distribution of marks: Practical question paper – 40 marks, Certified Journals – 05 marks, Viva – voce – 05 marks and Duration: 04 hrs.
3. The nature of Question Paper for Practical Examination:

Q.1 Attempt any THREE of the following (15 Marks)

(A)
(B)
(C)
(D)

Q.2 Attempt any THREE of the following (15 Marks)

(A)
(B)
(C)
(D)

Q.3 Attempt any TWO of the following (10 Marks)

(A)
(B)
(C)