Enclosure –BMTII

Shree Manibhai Virani and Smt. Navalben Virani Science College, Rajkot (Autonomous)
Affiliated to Saurashtra University, Rajkot

Core Course (Theory) For the students admitted from A.Y. 2021-2022 & onwards		
Offering Department: **Mathematics**	Offered to: **B.Sc. Mathematics**	
Semester – IV		
Course Code	Course Title	Course Credit and Hours
21UMTCC401	**Core 9: Fundamentals of Linear Algebra (F)**	**4 Credits - 4 hrs/wk (4 Theory)**

Course Description:

Linear algebra is a branch of mathematics that studies vector space, linear combination, span, subspace, basis, dimension and linear transformation in this course. In Linearly dependent and independent vectors students will learn the concept of how to check whether vectors are linearly dependent or not. Furthermore they will learn the conditions of Trivial and Non Trivial Solutions along with Direct Sum of Subspaces. The concepts of linear algebra are extremely useful in physics, economics and social sciences, natural sciences, and engineering.

Course Purpose:

The main purpose of this course is to study the fundamental concept of linear algebra, which is one of the basic pillars of modern mathematics. This is a required course for all B.Sc. Mathematics majors in the area of applied as well as pure Mathematics. Study of linear algebra develops mathematical maturity in the students.

Course Outcomes: Upon completion of this course, the learner will be able to

CO No.	**CO Statement**	**Blooms taxonomy Level (K_1 to K_6)**
CO_1	Define and interpret the concept of a vector space and its properties.	K_1, K_2
CO_2	Analyze and evaluate the concept of linear combination and span. Apply further to decide the set of vectors are linearly dependent or independent.	K_1, K_2, K_3

CO_3	Explore the concept of subspace and solve the problems based on sum and direct sum of subspaces.	K_2, K_4
CO_4	Identify and critically analyze basis and dimension of vector space.	K_1, K_3, K_4
CO_5	Define the concept of Inner product space. Apply the properties of the inner product, the norm and the Cauchy Schwartz. Construct an orthonormal basis for an inner product space by using the Gram Schmidt process.	K_1, K_2, K_3, K_4

Course Contents	**Hours**
Unit-I: Concept of a Vector Space	**9**
• Introduction of Vector space and vectors in R^n & C^n. • Definition of a Field • Definition of Vector space. • Examples of Vector space. • Properties of Vector space.	
Unit-II: Linear Combination and Span	**10**
• Concept of Linear combination and its examples. • Concept of span and its examples. • Linear dependence of vectors. • Linear independence of vectors. • Theorem and Examples based on linearly dependence and independence.	
Unit- III: Subspace and Related Topics	**10**
• Concept of Subspaces. • Theorem related to subspaces. • Sum and Direct sum of subspaces and their examples. • Complementary subspace, Disjoint subspace, Quotient space.	
Unit- IV: Basis and Dimension of a Vector Space	**10**
• Basis of a vector space. • Invariance of the number of the elements of a basis set. • Examples and theorem of basis. • Definition of a dimension of Vector space. • Dimension of sum of subspaces. • Example & Theorem based on dimension.	
Unit- V: Inner Product Space	**9**
• Inner Product Space • Norm of a vector • Distance between vectors • Cauchy Schwartz's inequality	

• Orthogonal bases • Orthonormal bases • Gram Schmidt Process	

Pedagogic Tools:

- Chalk and board
- Power point presentation
- Seminars
- Online resources

Text Books:

- V. Krishnamurthy, V.P. Mainra, and J. L. Arora, (2001), An Introduction to Linear Algebra, East-West Publications Pvt. Ltd.
- D. C. Lay, (2006), Linear Algebra & Its Applications, Addition Wesley Publishing Company.
- F. R. Deutsch, (2010), Best Approximation in Inner Product Spaces, Springer.
- G. Strang, (2016), Introduction to Linear Algebra (5^{th} Edition), Wellesley-Cambridge Press.

Reference Books:

- S. Lang, (2000), Introduction to Linear Algebra (2^{nd} Edition), Springer Publication.
- S. Kumaresan, (2004), Linear Algebra (A Geometrical Approach), PHI learning Pvt. Ltd. New Delhi.
- S. Friedberg, A. Insel, and L. Spence, (2018), Linear Algebra (5^{th} Edition), Pearson.

Suggested reading / E-resources:

- https://www.classcentral.com/course/mit-opencourseware-linear-algebra-fall-2011-40964/classroom
- https://www.udemy.com/course/linear-algebra-part-1-vector-spaces/
- https://www.coursera.org/lecture/linear-algebra-concepts-python/linear-transformations-b1pHj

Suggested MOOCs:

- https://onlinecourses.nptel.ac.in/noc21_ma50/preview
- https://ocw.mit.edu/courses/18-06-linear-algebra-spring-2010/video_galleries/video-lectures/

Methods of Assessment & Tools:

Components of CIA: 30 marks

Sr. No.	Component	Content	Duration	Marks	Sub Total
A	Test 1	1st 2 units	$1\frac{1}{2}$ hours	5 (Set for 30)	20
	Test 2	All 5 units	3 hours	15 (Set for 70)	
B	Assignment			04	10
C	Class activity			06	
				Grand Total	**30**

Assignment	• Notes written by the learner on the different topics in the syllabus. • Problem Solving.
Class activity	• Quiz / Surprise Quiz • Seminar • Situation based question etc.

Note: Any other assessment tools or methods can be adopted as per requirement of the course

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Core Course (Theory) For the students admitted from A.Y. 2022-23 & onwards		
Offering Department: **Mathematics**	Offered to: **B.Sc. Mathematics**	
Semester – IV		
Course Code	Course Title	Course Credit and Hours
21UMTCC402	**Core 9: Integral and Vector Calculus**	**3 Credits - 3 hrs/wk (3 Theory)**

Course Description:

This course covers both the basic theory and applications of Vector Calculus. This course presents foundation concepts in analysis that lay the groundwork for further study in pure and applied mathematics. Topics include vectors, multiple integrals, line integrals, surface integrals, and Green's, Divergence, and Stokes' theorems. This course introduces the concepts and applications of differentiation and integration of vector valued functions, differential equations, Laplace Transforms.

Course Purpose:

This course aims to provide a basic understanding of multivariable analysis, including space curves, gradient, multiple integrals, line and surface integrals, vector fields, divergence, curl and flux, the theorems of Green and Stokes, and the divergence theorem. This course is designed in such a way that students will be able to solve mathematical models, to deduce simple mathematical results, and to calculate integrals. Students will be able to define and utilize the concept of integration, understand the concept of Laplace transform.

Course Outcomes: Upon completion of this course, the learner will be able to

CO No.	**CO Statement**	**Blooms taxonomy Level (K_1 to K_6)**
CO_1	Evaluate the double integral in general and polar co-ordinates as well. Reverse the order of integration for a double integration.	K_5
CO_2	Evaluate a triple integral to find volume in rectangular co-ordinates, cylindrical coordinates and spherical co-ordinates.	K_5
CO_3	Evaluate the function using Laplace transform.	K_5

CO_4	Explain the difference between vector point function and scalar point function.	K_2
CO_5	Compute the derivatives and calculate the line integrals of vector functions and interpret their applications	K_4

Course Contents	**Hours**
Unit-I: Double Integrals	**10**
• Introduction • Double integrals over rectangles • Properties of double integrals • Double integrals over general region • Double integrals in Polar co-ordinates • Change of variable from Cartesian to polar co-ordinates	
Unit-II: **Triple Integrals**	**10**
• Introduction to Triple integrals • Triple integrals in cylindrical co-ordinates • Triple integrals in spherical co-ordinates • Change of order of integration • Jacobian of several variables	
Unit- III: **Laplace Transforms & Applications**	**9**
• Laplace Transform • Properties of Laplace Transform • Inverse Laplace Transform • First Shifting theorem • Laplace Transform of derivatives and integrals • Differentiation and integration of Laplace Transform • Convolution theorem	
Unit- IV: Vector Differentiation	**9**
• Vector point functions and Scalar point functions • Vector Differentiation • Laplace operator • Gradient • Divergence and curl	
Unit- V: Vector Integration	**10**
• Line integral • Green's theorem	

• Surface integrals • Gauss divergence theorem (without proof) and examples • Stoke's theorem (without proof) and examples	

Pedagogic Tools:

- Chalk and board
- Power point presentation
- Seminars
- Online resources

Text Books:

- Narayan S. and Mittal P., (2007), Differential Calculus, S. Chand & Company Ltd.
- Malik S. C. and Arora S. (2009), Mathematical Analysis, New Age International(P) Ltd.

Reference Books:

- Narayan S. and Mittal P, (2015), Integral Calculus, S. Chand & Company Ltd.
- Malik S. C. (2010), Principles of Real Analysis, New Age International (P) Ltd, Publishers, 2nd Edition.

Suggested reading / E-resources:

- https://nitkkr.ac.in/docs/5-Multiple%20Integrals%20and%20their%20Applications.pdf
- https://blogmedia.testbook.com/blog/wp-content/uploads/2018/01/vector-integration-gate-study-material-66dc4abd.pdf

Suggested MOOCs:

- https://archive.nptel.ac.in/courses/111/105/111105122/
- https://archive.nptel.ac.in/courses/111/102/111102129/

Methods of Assessment & Tools:

Components of CIA: 30 marks

Sr. No.	Component	Content	Duration	Marks	Sub Total
A	Test 1	1st 2 units	$1\frac{1}{2}$ hours	5 (Set for 30)	20
	Test 2	All 5 units	3 hours	15 (Set for 70)	
B	Assignment			04	10
C	Class activity			06	
				Grand Total	**30**

Assignment	• Notes written by the learner on the different topics in the syllabus. • Problem Solving.
Class activity	• Quiz / Surprise Quiz • Seminar • Situation based question etc.

Note: Any other assessment tools or methods can be adopted as per requirement of the course.

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Core Course (Practical) For the students admitted from A.Y. 2021-2022 & onwards		
Offering Department: **Mathematics**	Offered to: **B.Sc. Mathematics**	
Semester – IV		
Course Code	Course Title	Course Credit and Hours
21UMTCC404	**Core Practical 4: Practical on Numerical Methods and Plotting including Mathematical Software**	**4 Credits- 8 hrs/wk**

Course Description:

This course is to obtain approximate solutions to mathematical problems by using different numerical methods. This course includes different numerical methods like graphical method, bisection method, Newton-Raphson's method, False position method and Iteration method. This course will also include finding value of derivative of polynomial at a point by synthetic division method and Horner's method to solve polynomial equation. This also include the plotting and programing using SCILAB .

Course Purpose:

This course aims to provide basic understanding of numerical methods which are used to obtain approximate solutions to the equation. In this course, students can derive numerical methods for various mathematical operations and tasks and will able to understand that how the solution of mathematical problems can be obtained by different methods. This also aims to learn SCILAB software to plot graphs and other programming methods.

Course Outcomes: Upon completion of this course, the learner will be able to

CO No.	**CO Statement**	**Blooms taxonomy Level (K_1 to K_6)**
CO_1	Find value of derivative of polynomial at a point by synthetic division method.	K1, K2
CO_2	Identify the nature of roots of the equations after the transformations.	K2, K3, K4

CO_3	Find the numerical approximations to the roots of an equation by sketching the graph.	K1, K2, K3
CO_4	Apply bisection method, Newton-Raphson's method, False position method, Iteration method and Horner's method to obtain approximate solution.	K1, K2, K3
CO_5	Utilize the user interface of SCILAB including SCINOTES, file browser, variable browser, the command history and general commands including clc & clear	K1, K3
CO_6	Plot graphs of mathematical functions including Cartesian form, parametric form and polar forms of equations	K2, K3

List of Practical

Sr.	Experiments	Hrs
1	Derivatives of a polynomial by synthetic division method.	4
2	Transformation of equations.	4
3	Solution of algebraic and transcendental equation by Graphical method.	4
4	Solution of algebraic and transcendental equation by Bisection method.	4
5	Solution of algebraic and transcendental equation by False position method (Regula-Falsi Method).	8
6	Solution of algebraic and transcendental equation by Secant Method.	4
7	Solution of algebraic and transcendental equation by Iteration method.	4
8	Solution of algebraic and transcendental equation by Newton-Raphson's Method.	4
9	Applications of Newton-Raphson's Method.	8
10	Horner's method for solving polynomial equation.	4
11	To solve the following system of simultaneous linear algebraic equations using GAUSS-JACOBI method using SCILAB.	4
12	To solve the following system of simultaneous linear algebraic equations using GAUSS- SEIDAL method using SCILAB.	4
13	Introduction to 2D plotting commands including linspace(), plot(), plot2D( ).using SCILAB	8
14	Plotting commands including clf( ),xlabel( ), ylabel( ), title( ), xgrid(),legend( ), getcolor(), axis editor, scf( ) etc. using SCILAB	4

15	Plotting of curve when equations are of polar or parametric form using SCILAB.	4
16	Graphical solution of **equations** using plotting commands of SCILAB.	8
17	Introduction to **SCINOTES** and its interface	4
18	To further understand and utilize the program editor SciNotes and including its toolbar and menu-bar writing and executing small Scilab scripts using **SCINOTES**.	4
19	To create programs in SCINOTE understand usage of commands including clear, clear all, clf, clc,. etc.	4
20	Introduction to variables and input statement in SCILAB, Introduction to the loop structure of SCILAB.	4

Pedagogic Tools:

- Chalk and Board
- Power point presentation
- Handouts
- Computer
- Video

Text books:

- M. K. Jain, S.R.K. Iyengar and R.K. Jain, (2022), Numerical Methods, 8th Edition, New Age International Publishers, New Delhi.
- Numerical Methods with C++ Programming, (2009), Nita H. Shah, PHI Learning Pvt. Ltd.
- Scilab Group, SCILAB REFERENCE MANUAL, On-line Documentation, INRIA Meta2 Project / ENPC Cergrene, INRIA.

Reference books:

- S. D. Conte and Carl De Boor, (2018), Elementary Numerical Analysis, 3rd Edition, McGraw-Hill, New York.
- S.S. Sastry, (2012), Introductory Methods of Numerical Analysis, 5th Edition, PHI Learning Private Limited, New Delhi.
- Vinu V. Das, Programming in Scilab, New Age International (P) Limited,2008
- Domaine de Voluceau - Rocquencourt – B, INTRODUCTION TO SCILAB Consortium SCILAB, November 2010.
- Gilberto E. Urroz, Programming with SCILAB, September 2002.

- Tejas Sheth, SCILAB: A Practical Introduction to Programming and Problem
- Solving, 25 August 2016.

Suggested reading / E-resources:

- https://www.coursera.org/search?query=numerical%20methods&
- https://www.classcentral.com/tag/numerical-methods
- https://ocw.mit.edu/courses/18-335j-introduction-to-numerical-methods-spring-2019/
- http://www.scilab.org/ (Main website of Scilab)
- http://www.scilab.org/support/documentation (Official documentation of Scilab)
- http://www.scilab.org/products/scilab/download (Download Scilab software)
- http://help.scilab.org/docs/5.4.0/en_US/ (Help on Scilab)
- http://ekalavya.it.iitb.ac.in/contents.do?topic=Scilab IIT, Bombay portal
- http://spoken-tutorial.org/Study_Plans_Scilab/ (Spoken-tutorial)

Suggested MOOCs:

- https://swayam.gov.in/explorer?searchText=numerical%20methods
- https://www.mooc-list.com/tags/numerical-methods

Methods of Assessment & Tools:

Components of CIA: 40 marks

Sr. No.	Component	Content	Duration	Marks	Sub Total
A	Test 1	1-10 Experiments	$1\frac{1}{2}$ hours	15	30
	Test 2	11-20 Experiments	$1\frac{1}{2}$ hours	15	
B	Attendance and Regularity			5	10
C	Class Activities			5	
				Grand Total	**40**
Class activity	• Quiz • Situation based question • Handbook				

Note: Any other assessment tools or methods can be adopted as per requirement of the course.

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Core Elective Course (Theory) For the students admitted from A.Y. 2021-2022 & onwards		
Offering Department: **Mathematics**	Offered to: **B.Sc. Mathematics**	
Semester – IV		
Course Code	Course Title	Course Credit and Hours
21UMTDA401	**Core Elective 1:** **Introduction to Graph theory**	**3 Credits – 3 hrs/wk** **(3 Theory)**

Course Description:
This course introduces in an elementary way some basic knowledge and the primary methods in Graph Theory. This course deals with some basic concepts in graph theory different types of graphs, Eulerian graphs, Hamiltonian graphs, trees, binary trees, cut-set, planar graphs, connectivity, vector associated with a graph and coloring, covering and matrix representation of graphs.

Course Purpose:
This course aims to provide a basic understanding of Graph Theory. This course has diverse applications in the areas of computer science, biology, chemistry, physics, sociology, and engineering. At the end of the course, students shall understand the basic terms of graph theory; be able to reproduce the proofs of some fundamental statements on graphs; be able to solve new graph problems; and be ready to apply this knowledge in other field of science.

Course Outcomes: Upon completion of this course, the learner will be able to

CO No.	**CO Statement**	**Blooms taxonomy Level (K_1 to K_6)**
CO_1	Understand and utilize the fundamental concepts, types of a graph and incidence relation in graph theory.	K_1, K_2
CO_2	Define and recognize walk, paths, circuits. Interpret Euler graphs and Hamiltonian graphs and improve the proof writing skills	K_1, K_2, K_3
CO_3	Define tree and some properties of tree. Define cut-set, connectivity and separability.	K_1, K_2
CO_4	Define planar graphs and their dual graphs. State and prove Kuratowski's first and second graphs are non-planar.	K_1, K_2, K_3
CO_5	Define and explain the vector associated with a graph, Coloring, Covering, Partitioning and Matrix representation of a graph.	K_1, K_2, K_3

Course Contents	Hours
Unit-I: Introduction	**8**
• Basic definitions and simple examples. • Directed, Undirected, multi-graph, mixed graph. • Incidence relation and degree of the graph. • Complete, regular graphs. • Sub graph, connected and disconnected graphs.	
Unit-II: Paths and Circuits	**7**
• Walk and unilateral components. • Euler graphs, Unicursal graph, Operation of graph, Circuit & Tree. • Hamiltonian path and cycles.	
Unit- III: Trees and Fundamental Circuits	**9**
• Tree. • Some properties of Trees. • Distance and Centres of Trees. • Rooted and Binary Trees. • Cut-set, connectivity and separability. • Fundamental Circuit and Cut-Set.	
Unit- IV: Planar and Dual Graphs and Vector space associated with a graph.	**9**
• Planner graphs and their different representation. • Dual of a planar graph. • Euler's formula. • Kuratowski's first and second non-planar graph. • Dual graph, Self dual graph	
Unit- V: Vector associated with a graph, Coloring, Covering, Partitioning and Matrix representation of a graph.	**7**
• Vector associated with a graph. • Vector associated with subgraph of a graph. • Circuit vector and cut sets vector. • Vertex coloring, edge coloring. • Chromatic number, Chromatic partition. • Maximal Independents set, Independence number, MIS • Dominating sets, Domination numbers, MDS • Covering of a graph, Minimal covering. • Cyclic graph and decyclization of cyclic graphs. • Adjacency matrix, Incidence matrix, Path matrix.	

Pedagogic Tools:

- Chalk and board
- Power point presentation
- Seminars
- Online resources

Text Books:

- Narsingh Deo, (1992), Graph Theory with applications to engineering and computer science, Prentice-Hall of India Pvt. Ltd. New Delhi.
- John Clark and Derek Allan Holton (1991), A First Look at Graph Theory, Allied Publishers Limited.

Reference Books:

- R. J. Wilson, (1985), Introduction to Graph Theory, Longman.
- Douglas B. West, Introduction to Graph Theory, Prentice-Hall of India, Second Edition, 2006, ISBN-81-203-2142-1.
- S. Arumugam, S. Ramchandran, (2006), Invitation to Graph Theory, Scitech Publication (India) Pvt. Ltd, Chennai.
- S. A. Choudum, (2000), A First Course in Graph Theory, Macmillan India Limited.

Suggested reading / E-resources:

- https://www.maths.ed.ac.uk/~v1ranick/papers/wilsongraph.pdf
- https://inoerofik.files.wordpress.com/2014/11/firstlook_graphtheory.pdf
- https://www.tutorialspoint.com/graph_theory/index.asp

Suggested MOOCs:

- https://onlinecourses.swayam2.ac.in/cec20_ma03/preview
- https://onlinecourses.nptel.ac.in/noc20_ma05/preview
- https://www.coursera.org/learn/graphs

Methods of Assessment & Tools:

Components of CIA: 30 marks

Sr. No.	Component	Content	Duration	Marks	Sub Total
A	Test 1	1st 2 units	$1\frac{1}{2}$ hours	5 (Set for 30)	20
	Test 2	All 5 units	3 hours	15 (Set for 70)	
B	Assignment			04	10
C	Class activity			06	
				Grand Total	**30**

Assignment	• Notes written by the learner on the different topics in the syllabus. • Prepare the multiple choice questions.
Class activity	• Quiz / Surprise Quiz • Seminar • Situation based question etc.

Note: Any other assessment tools or methods can be adopted as per requirement of the course.

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Offering Department: **Mathematics**	Offered to: **B.Sc. Mathematics**	
Semester – IV		
Course Code	Course Title	Course Credit and Hours
21UMTDA402	**Core Elective 1: Number Theory**	**3 Credits - 3 hrs/wk (3 Theory)**

Course Description:

This course is an elementary introduction to Number Theory. Topics to be covered include The Principle of Mathematical Induction, Primes, Divisibility, the Fundamental Theorem of Arithmetic, Greatest Common Divisor (GCD), Linear Diophantine Equation, Euclidean Algorithm, The Sieve of Eratosthenes, The Goldbach Conjecture Congruences, and the Chinese Remainder Theorem etc.

Course Purpose:

This course aims to provide a basic understanding of Number Theory. This course is designed in such a way that students will be able to understand Divisibility and Prime. Students will be able to apply and utilize the concept of the Euclidian Algorithm and Linear Diophantine Equation and demonstrate the concept of The Theory of Congruence.

Course Outcomes: Upon completion of this course, the learner will be able to

CO No.	**CO Statement**	**Blooms taxonomy Level (K_1 to K_6)**
CO_1	Apply Mathematical Induction and Binomial Theorem	K_3
CO_2	Recognize and calculate the concept of the division Algorithm, GCD, and LCM	K_1, K_3
CO_3	Implement Euclidian Algorithm and Linear Diophantine Equation	K_2, K_3
CO_4	Recognize Prime and Their Distribution	K_2
CO_5	Apply the Theory of Congruences	K_2, K_3

Course Contents	Hours
Unit-I: Introduction	**9**
• Algebraic Operations with Integers • Well Ordering Principle • Pigeon Hole Principle • Principle of Mathematical Induction • The Binomial Theorem	
Unit-II: Divisibility Theory in The Integer I	**10**
• Divisibility • Division Algorithm • Representation of Integers in Different Bases • The Greatest Common Divisor • Least Common Multiples	
Unit- III: Divisibility Theory in The Integer II	**9**
• The Euclidean Algorithm • Application of The Euclidian Algorithm • Linear Diophantine Equations • Application of Linear Diophantine Equation	
Unit- IV: Prime and Their Distribution	**10**
• Prime and Composite Numbers • Fundamental Theorem of Arithmetic • Canonical Form of A Number • The Sieve of Eratosthenes • The Goldbach Conjecture	
Unit- V: The Theory of Congruences	**10**
• Definition and Basic Properties of Congruence • The Special Divisibility Test • Linear Congruence	

Pedagogic Tools:

- Chalk and board
- PowerPoint presentation
- Seminars
- Online resources

Text Books:

- David M Burton, (2010), Elementary Number Theory, 7th Edition McGraw-Hill Education – Europe.

Reference Books:

- Ivan Niven, Herbert S. Zuckerman, and Hugh L. Montgomery, (2008), The Theory of Numbers, 5th Edition, New York: John Wiley and Sons.
- Hardy, G. H., and E. M. Wright, (1992), An Introduction to the Theory of Numbers, 5th Edition London: Oxford University Press.

Suggested reading / E-resources:

- https://www.maths.ox.ac.uk/members/library/electronic-resources/

Suggested MOOCs:

- https://ocw.mit.edu/courses/18-781-theory-of-numbers-spring-2012/
- https://www.open.edu/openlearn/science-maths-technology/introduction-number-theory/content-section-0?active-tab=description-tab/
- https://nptel.ac.in/courses/111101137
- https://archive.nptel.ac.in/courses/111/104/111104138/

Methods of Assessment & Tools:

Components of CIA: 30 marks

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A	Test 1	1st 2 units	$1\frac{1}{2}$ hours	5 (Set for 30)	20
	Test 2	All 5 units	3 hours	15 (Set for 70)	
B	Assignment			04	10
C	Class activity			06	
				Grand Total	**30**

Assignment	• Notes are written by the learner on the different topics in the syllabus. • Problem Solving.
Class Activity	• Quiz / Surprise Quiz • Seminar

Note: Any other assessment tools or methods can be adopted as per the requirement of the course