Department of Mathematics
Oriental College, Takyel, Imphal

B.A. / B.Sc. Mathematics (Honours)

Program Outcomes (POs)

PO No.	After completion of the B.A. /B.Sc. Mathematics (Honours) 4 Year UG Programme under the Choice Based Credits System (CBCS), the graduates will be able to understand
PO - 1	Numerical, analytical and logical skills.
PO - 1	Better problem solving skills.
PO - 1	Real world applications
PO - 1	Understand the world better.
PO - 1	Understand hypothesis, theories and proofs.

SEMESTER I
CORE COURSE (CC) – I
Name of the Course: Calculus
Subject Code: MAT – HC – 501

Teaching Plan

No of hours per week	Credits	Total No. of hours	Marks
6	**6** (Theory – 04, Practical – 02)	90 Theory – 60, Practical - 30	**100**

Learning Objectives:

1. The course is designed to focus on basic concepts with tools of Calculus and Geometric properties of different Conic sections which are helpful in solving their applications to the real world problem.
2. Also the Course will provide students essential skills **involving** computational mathematics.

Course Learning Outcomes CO	On successful completion of this Course, the student should be able
CO – 1	to sketch curves in a plane in the different co – ordinate systems of reference.
CO – 2	to understand the Calculus of Vector valued functions.
CO - 3	to apply Calculus to develop basic principles of planetary motions.
CO - 4	to develop basic mathematical problems in any software.

Total contact hours: 90 (Including lectures, practical, assignments, projects , group discussions, seminars, tests, quiz)

Unit	Section	Topics	Lecture hours	Learning outcomes	Pedagogy	Assessment /evaluation
I	**Derivative for curve sketching**					
	1	First and Second derivative tests for Extreme Values of Functions	**3**	To identify the extreme values of functions and to perform first and second derivatives tests for the functions	White Board/ Lecture with illustrations	Test
	2	Concavity and Curve sketching	**3**	To apply the rules to different curves	White Board/ Lecture with lab work using software	Test
	3	Limits to infinity and infinite limits	**3**	Recall the idea of limits, infinity and infinite limits	White Board/ Lecture	Q & A
	4	Indeterminate Forms and L' Hospital's rule	**2**	To understand the indeterminate forms and practice L'	White Board/ Lecture	Formative Assessment Test

				Hospital's form		
	5	Asymptotes	**2**	Recognize the rules of identifying Asymptotes	White Board/ Lecture with illustrations	Test
	6	Higher order derivatives, Leibniz rule	**2**	To understand Leibniz rule and solve problems using the rule	White Board/ Lecture with discussion	Assignment
Unit	**Section**	**Topics**	**Lecture hours**	**Learning outcomes**	**Pedagogy**	**Assessment /evaluation**
II	**Curve tracing in Polar Co-ordinates**					
	1	Parametric representation of curves,	**2**	To understand Curves	White Board/ Lecture	Test
	2	Polar Co-ordinates, Tracing of curves in Polar Co-ordinates	**2**	To practice various problems related to tracing of conics	White Board/ Lecture with lab work using software	Test
	3	Graphing Polar Co-ordinates Equations	**3**	To solve equations	White Board/ Lecture with illustrations	Test
	4	Areas and Lengths in Polar Co-ordinates	**1**	To understand the definition Of areas and lengths	White Board/ Lecture	Test
	5	Classification of conics in Polar Co-ordinates.	**2**	To understand the methods for finding different class of conics	White Board/ Lecture	Quiz

III	**Integration**					
	1	Integration as the limit of a	**2**	To understand	White Board/	

		sum, fundamental theorem of Integral Calculus		The basic concepts in limit and theorem	Lecture with lab work using software	Test
	2	Definite integrals, Reduction formula for indefinite and definite integrals	**3**	Identifying Reduction formula and results based on them	White Board/ Lecture with illustrations	Formative Assessment Test
	3	Definition of improper integral,	**1**	To learn improper functions	White Board/ Lecture	Q & A
	4	Simple properties of Beta and Gamma functions.	**4**	To learn Beta and Gamma functions and their properties, to solve problems based on Beta and Gamma functions	White Board/ Lecture with discussion	Test
Unit	**Section**	**Topics**	**Lecture hours**	**Learning outcomes**	**Pedagogy**	**Assessment /evaluation**
IV	**Vector Calculus and its applications**					
	1	Vector valued functions and their graphs	**2**	To understand the basic concepts in vector valued functions & their graphs	White Board/ Lecture	Test
	2	Limits and continuity of vector functions	**2**	To understand the definition of limits and continuity of vector functions	White Board/ Lecture with discussion	Test
	3	Differentiations and integration of	**3**	To understand the method	White Board/	Assessment Test

		vector functions		of finding differentiations and integration of vector functions	Lecture with illustrations	
	4	Projectile motion	**2**	To practice various problems on projectiles	White Board/ Lecture	Assignment
	5	Unit tangent, Normal and binomial vectors	**3**	To understand the definition of Unit tangent, Normal and binomial vectors	White Board/ Lecture	Quiz
	6	Curvature, Kepler's Second Law(Equal Area Law).	**3**	To understand the definition of Curvature, Kepler's Second Law and practice problems	White Board/ Lecture with group discussion	Brain storming

Course Instructor: Kh. Bikramjit Singh
Assistant Professor

HOD: Dr. L. Ibeni Devi
Associate Professor

Recommended books:

1. Thomas, Jr. George B., Weir, Maurice D., & Hass, Joel (2014). Thomas' *Calculus* (13th ed.) Person Education, Delhi. Indian Reprint 2017.
2. B.C. Das, B.N. Mukherjee. *Differential Calculus* (55th Edition), U.N. Dhur & Sons Private Ltd.

SEMESTER I
CORE COURSE (CC) – II
Name of the Course: Algebra, Complex Trigonometry & Logic
Subject Code: MAT – HC – 502

Lesson Plan

No of hours per week	Credits	Total No. of hours	Marks
6	**6**	90	**100**

Learning Objectives:

1. The objective of the course is to introduce the students to the existing world of theory of equations, complex numbers, number theory and matrices and their applications.

2. to develop the ability of logical and analytical thinking

Course Learning Outcomes CO	On successful completion of this Course, the student should be able
CO – 1	to learn various methods of obtaining roots of real and complex polynomials and will understand relations between the roots and coefficients of these polynomial equations.
CO – 2	to employ De Moivre's theorem and its applications
CO - 3	to apply Euclid's algorithm and backwards substitution to find greatest common divisor.
CO - 4	to recognize consistent and inconsistent systems of linear equations by using rank.

Total contact hours: 90 (Including lectures, assignments, projects , group discussions, seminars, tests, quiz)

Unit	Section	Topics	Lecture hours	Learning outcomes	Pedagogy	Assessment /evaluation
I	**Theory of equations**					
	1	Polynomial functions, Division algorithm, Synthetic division, Remainder Theorem, Factor Theorem	**4**	To identify Polynomial functions, Division algorithm, Synthetic division & practice Remainder Theorem, Factor Theorem	White Board/ Lecture with illustrations	Test
	2	Polynomial equations, Relation between roots and Co-efficient of a polynomial equation,	**4**	To solve Polynomial equations and finding the roots	White Board/ Lecture with discussion	Test
	3	Symmetric function of the roots of an equation, sum of powers of the roots	**4**	To compute Symmetric function of the roots	White Board/ Lecture	Q & A
	4	Solution of cubic and biquadratic equations.	**3**	To solve cubic and biquadratic equations	White Board/ Lecture with illustration	Formative Assessment Test

Unit	Section	Topics	Lecture hours	Learning outcomes	Pedagogy	Assessment / evaluation
II	**Complex Trigonometry**					
	1	Polar representation of complex numbers	**1**	To recall the fundamental of polar representation	White Board/ Lecture	short test
	2	The Cube roots of unity, De Moivre's theorem and its applications,	**3**	To solve the problems applying De Moivre's theorm	White Board/ Lecture with discussion	Test
	3	Exponential functions of complex arguments,	**2**	To identify Exponential functions of complex arguments and results based on them	White Board/ lecture	Assignment
	4	Gregory's series and Hyperbolic functions.	**4**	To identify Gregory's series , Hyperbolic functions and results based on them	White Board/ Lecture With illustration	Test
Unit	**Section**	**Topics**	**Lecture hours**	**Learning outcomes**	**Pedagogy**	**Assessment /evaluation**
III	**Relations, Functions, Basic Number Theory & Logic**					
	1	Binary relations, Partial order relation, Equivalence relations	**2**	To understand Binary relations, Partial order relation, Equivalence relations	White Board/ Lecture with illustrations	Formative Assessment Test
	2	Functions, Inverse and composition, One to one corresponden	**2**	To identify Functions, Inverse and composition, One to one	White Board/ Lecture with discussion	Test

		ce		corresponden ce		
	3	Cardinality of a set, Division Algorithm, Divisibility and the Euclidean Algorithm	**3**	To understand Cardinality of a set, Division Algorithm, Divisibility and the Euclidean Algorithm and solve problems based on it	White Board/ Lecture	Formative Assessment Test
	4	Prime Numbers, Congruence and applications	**3**	To identify prime numbers, congruence and to solve their applications	White Board/ Lecture with illustration	Formative Assessment Test
	5	Principles of Mathematical induction	**1**	To understand the basic concepts of Mathematical induction	White Board/ Lecture	Q & A
	6	Sentences and Statements, Negation of a Statement, Truth values of Statements, Truth Tables	**2**	To understand the basic concepts of Sentences, truth values & truth tables	PPT/ Lecture with illustrations	Assignment
	7	conjunction, disjunction, Implications, precedence of logical operators	**3**	To identify conjunction, disjunction, Implications, precedence of logical operators	PPT/ lecture	Q & A
	8	Tautology,	**2**	To understand the concept of Tautology	PPT/ lecture	Test

	9	Importance of Tautology, Contradiction	**2**	To identify importance of Tautology & Contradiction	White Board/ lecture	Assignment
Unit	**Section**	**Topics**	**Lecture hours**	**Learning outcomes**	**Pedagogy**	**Assessment /evaluation**
IV	**Matrices**					
	1	The Rank of a matrix, and elementary operations	**3**	To understand the basic concepts in matrices	White Board/ Lecture	Test
	2	Row reduction and Echelon forms	**3**	To identify Row reduction and Echelon forms	L White Board/ ecture with discussion	Test
	3	System of linear equations, Solution of the matrix equation $AX = B$, Solution sets of linear systems	**4**	To practice various problems related to the Solution of the matrix equation $AX = B$	White Board/ Lecture with illustration	Formative Assessment Test
	4	linear independence Eigenvectors and Eigen values	**4**	To identify linear independence Eigenvectors and Eigen values of matrix	White Board/ Lecture with illustration	Assignment
	5	The Characteristic equation	**2**	To identify &evaluate the Characteristic equation	White Board/ Lecture	Q & A
	6	Cayley Hamilton Theorem	**4**	To understand Cayley Hamilton Theorem, solve problems based on it	White Board/ Lecture with illustration	Formative Assessment Test

Course Instruction: L. Ragini Devi **HOD: Dr. L. Ibeni Devi**

Recommended books:

1. Binder, Donald & Erickson, Martin (2011). A student's guide to the Study, Practice, and Tools ofModern Mathematics. CRC Press, Taylor & Francis Group, LLC.
2. Hillier and Hillier (2003). Introduction to Management Science: A Modeling and Case StudiesApproach with Spreadsheet, Second Edition, McGraw-Hill.
3. Eugene Don, Ph. D., Schaum's Outlines Mathematica, Mc-Graw Hill (2009).

SEMESTER I
Skill Enhancement Course(SEC – I)
LaTeX
Subject Code: MAT – SE – 501

Lesson Plan

No of hours per week	Credits	Total No. of hours	Marks
4	**4** Theory – 3, Practical -1	60	**100**

Learning Objectives:

The purpose of this course is

1. to acquaint students with the latest typesetting skills, which shall enable them to prepare high quality typesetting
2. to manage beamer presentation and webpages

Course Learning Outcomes CO	On successful completion of this Course, the student should be able to
CO – 1	Typeset mathematical formulas, use nested list, tabular & array environments.
CO – 2	create or import graphics
CO - 3	use beamer to create presentation

Total contact hours: 60 (Including lectures, practical, assignments, projects , group discussions, seminars, tests, quiz)

Unit	Section	Topics	Lecture hours	Learning outcomes	Pedagogy	Assessment /evaluation
	Getting started with LaTeX					
	1	Introduction to **TeX**		To understand	Black board/ Lecture	

I		**and LaTeX**	**1**	the markup language TeX and lingua franca of the scientific world **LaTeX**	with lab work on a computer	Q. & A. Assessment Test
	2	Typesetting a simple document	**1**	To create a minimal LaTeX file	Black board/Lecture with lab work on a computer	Test
	3	Adding basic information to a document,.	**4**	Practice to add basic information to a document	Black board /Lecture with lab work on a computer	Test
	4	Environments, Footnotes, Sectioning and displayed material	**4**	To define different LaTeX commands	Black board/ Lecture with lab work on a computer	Q & A
Unit	**Section**	**Topics**	**Lecture hours**	**Learning outcomes**	**Pedagogy**	**Assessment/evaluation**
II	**Mathematical Typesetting with LaTeX**					
	1	Accents and symbols, Mathematical Symbols Mathematical Typesetting	**2**	To identify Mathematical symbols & structures	Black board/ Lecture with discussion /computer	Quiz
		Subscript,		To	Black	

	2	Superscript , Fractions, Roots, Ellipsis,	**3**	recognize LaTeX inputs for Subscript, Superscript , Fractions, Roots, Ellipsis	board /Lecture with lab work on a computer	Formative Assessment Test
	3	Arrays, Delimiters, Multiline formulas	**3**	To create Arrays in the array environments, to identify available delimiters, to produced unnumbered equations	Black /board Lecture with lab work on a computer	Assignment
	4	Spacing and charging style in math mode	**2**	To identify Spacing and charging style in math mode	Black board /Lecture with lab work on a computer	Formative Assessment Test
Unit	**Section**	**Topics**	**Lecture hours**	**Learning outcomes**	**Pedagogy**	**Assessment /evaluation**
III	**Graphics and Beamer Presentation in LaTeX**					
	1	Graphics in LaTeX	**2**	To identify Graphics to a specified region in LaTeX	Black board/ Lecture with lab work on a computer	Q & A
	2	Simple pictures using PS Tricks	**2**	to learn important features of PSTricks	Black board/ Lecture with lab work on a	Quiz

					computer	
	3	Plotting of functions	**3**	to learn plotting of functions using PSTricks	Black board /Lecture with lab work on a computer	Assignment
	4	Beamer presentation.	**3**	To enhance a Beamer presentation	Black board/ Lecture with lab work on a computer	Assessment Test

Recommended Books:

1. Binder, Donald & Erickson, Martin, (2011). *A Student's Guide to the Study, Practice, and Tools of Modern Mathematics*, CRC Press, Taylor & Francis Group, LLC.
2. Lamport, Leslie (1994), LaTeX: A Document Preparation System, User's Guide and Reference Manual(2nd ed.), Pearson Education Indian Reprint.

Course Instructor: Dr. L. Ibeni Devi

SEMESTER I
Skill Enhancement Course(SEC – I)
Computational Mathematics Laboratory

Subject Code: MAT – SE – 501

Lesson Plan

No of hours per week	Credits	Total No. of hours	Marks
4	**4** Theory – 3, Practical -1	60	**100**

Learning Objectives:
This course is designed to introduce the student to the basics of power point presentations and working with spread sheets. Also the students of mathematics will have the chance to gain essential skills involving computational mathematics software called mathematica.

Course Learning Outcomes CO	**On successful completion of this Course, the student should be able to**
CO – 1	Develop, manage power point presentations while preparing for presentations in seminars with additional skills such as inserting pictures, objects, multimedia etc.
CO – 2	Work out with excel files with skill of preparing charts to represent the information found in daily lifesituations
CO - 3	Use mathematica software to plot the graph of various functions.

Total contact hours: 60 (Including lectures, practical, assignments, projects , group discussions, seminars, tests, quiz)

Unit	Section	Topics	Lecture hours	Learning outcomes	Pedagogy	Assessment /evaluation
I	**PowerPoint Presentation**					
	1	Navigate the PowerPoint interface, creating new presentation from scratch or by using beautiful templets	**2**	To understand PowerPoint interface	Black board/ Lecture /compute r	Formative Assessment Test
	2	Add text, Pictures, Sound, Movies and Charts	**1**	To practice various problems related to Add text, Pictures, Sound, Movies and Charts	Black board/ Lecture /computer	Test
	3	Designing slides using themes, colours and special effects,	**1**	To understand the steps of desiging slides	Black board/ Lecture /computer	Test
	4	Animate objects on slides, work with Master slides to make presentation easy.	**1**	To understand the steps of animation	Black board/ Lecture /computer	Assessment Test
Unit	**Section**	**Topics**	**Lecture hours**	**Learning outcomes**	**Pedagogy**	**Assessment /evaluation**
II	**Spreadsheets**					
	1	Examine spreadsheet concepts and	**3**		Black board/	Assessment

		explore the Microsoft Office Excel environment, Create, Open and View a workbook			Lecture /computer	Test
	2	Save and print workbooks. Enter and Edit data. Modify a worksheet and workbook.	**1**		Black board/ Lecture /computer	Assessment Test
	3	Work with cell references. Learn to use functions and formulas.	**4**	To learn use of functions and formulas	Black board/ Lecture /computer	Test
	4	Create and edit charts and Graphics. Import and Export data	**2**	To learn to Create and edit charts and Graphics. Import and Export data	Black board/ Lecture /computer	Test
Unit	**Section**	**Topics**	**Lecture hours**	**Learning outcomes**	**Pedagogy**	**Assessment /evaluation**
III	**Mathematica, Two Dimensional Graphics, Three Dimensional Graphics**					
	1	Getting Acquainted with the notation and convention, the Kernel and the Front End, Built-functions. Basic operations	**1**		Black board/ Lecture /computer	Quiz
	2	Assignme	**3**			

		ntand Replace ment. Logical Relations Sum and Products, Loops.				
	3	**Two Dimensional Graphics** – plotting functions of a single variable, Additional Graphics Commands, Animations	**4**			Test
	4	plotting functions of two variables, Special three dimensional plots.	**3**			
	5	Equation(s) solving commands, Matrix operations – vectors andmatrices operations	**2**			
	6	eigenvalues and eigenvectors, trace, adjoint, inverse, diagonalizati on etc.	**2**			

Recommended books:

1. Binder, Donald & Erickson, Martin (2011). A student's guide to the Study, Practice, and Tools ofModern Mathematics. CRC Press, Taylor & Francis Group, LLC.
2. Hillier and Hillier (2003). Introduction to Management Science: A Modeling and Case StudiesApproach with Spreadsheet, Second Edition, McGraw-Hill.
3. Eugene Don, Ph. D., Schaum's Outlines Mathematica, Mc-Graw Hill (2009).

(L. Ibeni Devi)
HOD
Dept. of Mathematics

SEMESTER II

CORE COURSE (CC) – I
Real Analysis
Subject Code: MAT – HC – 503

No of hours per week	Credits	Total No. of hours	Marks
6	**6**	90	**100**

Learning Objectives:
The course will develop a deep and rigorous understanding of real line R and of defining terms to prove results about convergence and divergence of sequences and series of real numbers.

Course Learning Outcomes CO	On successful completion of this Course, the student should be able
CO – 1	to understand many properties of the real line
CO – 2	to recognize bounded convergent, divergent, Cauchy and monotonic sequences
CO - 3	to understand applications of the ratio, root, alternating series and limit comparison test for convergence and absolute convergence of an infinite series of real numbers**.**

Unit	Section	Topics	Lecture hours	Learning outcomes	Pedagogy	Assessment /evaluation
I	**Fundamental Properties of Real Numbers and Elements of Point Set Topology**					
	1	Interval and its different kinds, Bounded and unbounded sets, Supremum and infimum	**3**	To understand basic concepts of Real numbers ,sets and solving the related problems	White Board/ Lecture with discussion	Q. & A.
	2	in R, Field axioms, Order axioms, Order completeness Archimedean property	**2**	Acquire the knowledge about Field axioms, Order axioms, Order completeness Archimedean property	White Board/ Lecture with discussion	Test
	3	Neighbourhood of a point, Interior points, Open sets and related properties/ theorems,	**4**	To understand the definition of Neighbourhood of a point, Interior points, Open sets	White Board/ Lecture	Test

	4	Limits points and derived set, Bolzano-Weierstrass Theorem	**4**	To understand Limits points and derived set, Bolzano-Weierstrass Theorem solve problems based on it	White Board/ lecture	Test
	5	Adherent point and Closure of a set, Closed sets and related properties/ theorems	**4**	To understand the concepts of Adherent point and Closure of a set, Closed sets and related properties/ theorems	White Board/ Lecture	Q. A.
	6	Concept of compactness; Heine-Borel theorem	**3**	to understand concepts of compactness ,Hein Borel Theorem and solve problems based on it	Lecture with illustration	Formative Assessment Test

Unit	Section	Topics	Lecture hours	Learning outcomes	Pedagogy	Assessment /evaluation
II	**Sequence of Real Numbers**					
	1		**1**		lecture	Quiz
	2					
	3		**4**			Test
	4					

SEMESTER III

CORE COURSE (CC)
Theory of Real Functions
Subject Code: MAT – HC - 601

Lesson Plan

No of hours per week	Credits	Total No. of hours	Marks
6	**6**	90	**100**

Learning Objectives:

This basic course on the study of real valued functions would develop an analytical ability to have a more matured perspective of the key concepts of calculus, namely, limits, continuity, differentiability and their applications.

Course Learning Outcomes CO	On successful completion of this Course, the student should be able
CO – 1	to learn a rigorous approach of the concept of limit of a function.
CO – 2	to learn about continuity and uniform continuity of functions defined on intervals.
CO – 3	to learn the geometrical properties of continuous functions on closed and bounded intervals
CO - 4	to learn derivability and its applications

Total contact hours: 90 (Including lectures, assignments, projects , group discussions, seminars, tests, quiz)

Unit	Section	Topics	Lecture hours	Learning outcomes	Pedagogy	Assessment /evaluation
I	**Limits of Functions**					
	1	Limits of Functions ($\varepsilon - \delta$ $approach$)	**1**	Acquire the knowledge about limits of different functions	Lecture/ white board	Slip Test
	2	Sequential criteria for limits, Divergence criteria	**2**	To understand condition for the existence of a limit, Divergence criteria with some important limits	Lecture/ white board	Assessment Test
	3	Limit theorems and one-sided limits	**3**	To acquire the knowledge of fundamental limit theorems with limits of circular functions, and one sided limits	White Board/ Lecture	Q. & A.
	4	Infinite limits and limits at infinity	**3**	To observe Infinite limits and variables tending to infinity	whiteboard /Lecture with illustrations	Formative Assessment Test
Unit	**Section**	**Topics**	**Lecture hours**	**Learning outcomes**	**Pedagogy**	**Assessment /evaluation**
	Continuous Functions and their Properties					
	1	Continuous functions	**1**	To understand the formal mathematical definition of continuity	whiteboard /Lecture	Slip Test

II	2	Sequential criteria for continuity and discontinuity	2	To understand a clear idea of sequential criteria for continuity and different classes of discontinuity	whiteboard /Lecture with illustrations	Q. & A.
	3	Algebra of continuous functions,	1	To understand the basic concept in algebra of continuous functions	whiteboard /Lecture	Slip Test
	4	Properties of continuous functions on closed and bounded intervals	2	To understand the basic properties of continuous functions in an interval	whiteboard /Lecture	Quiz
	5	Uniform continuity	2	To understand the concepts of uniform continuity by taking elementary functions	whiteboard /Lecture with illustrations	Class Test
	6	Non- uniform continuity criteria	3	To identify non- uniform continuity and practice various problems	whiteboard /Lecture with illustrations	Class Test
	7	Uniform continuity Theorem	3	To identify uniform continuity and practice various theorems	whiteboard /Lecture with illustrations	Formative Assessment Test
Unit	**Section**	**Topics**	**Lecture hours**	**Learning outcomes**	**Pedagogy**	**Assessment /evaluation**

Computer Science & Programming
(in C or using any software)
Subject Code: MAT- HC- 602

Lesson Plan

No of hours per week	Credits	Total No. of hours	Marks
6	**6** (Theory – 04, Practical – 02)	90 Theory – 60, Practical - 30	**100**

Learning Objectives:

- To familiarize students the concept of programming in C and exploring software like MATLAB, PYTHON etc.
- To provide a foundation in use of this software for real time applications and
- To prepare the students to use any software in their project works.

Course Learning Outcomes CO	On successful completion of this Course, the student should be able
CO – 1	to develop basic mathematical programmes in C, MALAB, Python etc
CO – 2	to find importance of mathematical software for Lab Experiment

Total contact hours: 90 (Including lectures, assignments, projects , group discussions, seminars, tests, quiz)

Unit	Section	Topics	Lecture hours	Learning outcomes	Pedagogy	Assessment /evaluation
I	Basic of a computer					
	1	Basic model of a computer, Algorithm, Flow Chart, programming language, Compilers and operating system	**4**	To understand all the physical components and software of a computer	Black board/ Lecture/ computer	Q. & A.
		character set, identifiers and keyword,		To understand tokens, all	Black board/ Lecture	Q.& A.

	2	Constant, variables and data type	**4**	the data types		
	3	operations and expressions, operator precedence and associativity,	**2**	To understand operations and expressions, operator precedence and associativity	Black board/ Lecture/ computer	Test
	4	Basic input/output statements, introduction to simple C-programs.	**5**	To understand some simple C programs	Black board/ Lecture/ computer	Assessment Test
Unit	**Section**	**Topics**	**Lecture hours**	**Learning outcomes**	**Pedagogy**	**Assessment /evaluation**
II	Conditional statements and loops					
	1	Decision making with a program, logical and conditional operators	**5**	To understand Various operators writing different C programs	Black board/ Lecture/ computer	Assessment Test
	2	if statement, nested if else statement, loops, while loop, do-while loop, for loop, nested loops	**5**	To identify various loop constructs by developing programs	Black board/ Lecture/ computer	Written Quiz
	3	break statement, switch statement, continue statement, goto statement, the comma	**5**	To identify various statement available in C	Black board/ Lecture/ Computer With discussion	Assessment Test

		operator				
Unit	**Section**	**Topics**	**Lecture hours**	**Learning outcomes**	**Pedagogy**	**Assessment /evaluation**
III	**Arrays and Function**					
	1	One dimensional arrays, declaration and initialization of one dimensional arrays	**5**	To understand advantage of using Arrays	Black board/ Lecture/ computer	Test
	2	searching, insertion and deletion of an element from an array, sorting an array	**5**	To understand searching, insertion and deletion of an element from an array,	Black board/ Lecture/ computer	Test
	3	Two dimensional arrays.	**5**	To understand advantage of using two dimensional Arrays in programming	Black board/ Lecture/ computer	Test
	4	Defining function, accessing function, function declaration/prototype	**5**	To understand syntax of functions, function declaration/prototype	Black board/ Lecture/ computer	Test
	5	function parameters, return values, passing arguments to a function,	**5**	To develop programs using functions	Black board/ Lecture/ computer	Assessment Test
	6	recursion, passing arrays to function.	**5**		Black board/ Lecture/ computer	Test

REFERENCES

1. **A. Kamtham -** Programming with ANSI & Turbo C, Pearson Education.
2. **B.W. Kernighan and D.M. Ritchie,** The Programming Language, Prentice Hall of India.
3. **V. Rajaraman,** Programming in C, Prentice Hall of India.
4. **Robert C Hutchison** and **Steven B. Just,** Programming using C language, Tata McGraw Hill.

Course Instructor: Dr. L. Ibeni Devi