syllabus copy of the courses highlighting the focus on employabilty / entepreneurship / skill devlopment

SEMESTER I

TRIGONOMETRY AND LAPLACE TRANSFORMS

TOTAL HOURS: 75 hrs **COURSE CODE: MC18/1C/TLT// MA18/1C/TLT**

CREDITS: 4 **L-T-P: 3 2 0**

COURSE OBJECTIVES:

Enable students to

1. Know the principles and concepts of Trigonometry and Laplace Transforms.
2. Compute logarithm of complex quantities.
3. Apply Laplace Transform to solve differential equations.

COURSE OUTLINE:

UNIT I : Expansion of sin *nx*, cos *nx*, tan *nx*, $\sin^n x$, $\cos^n x$. Expansion of sin*x*, cos*x*, tan*x* in ascending powers of *x.*

Book 1: Chap 3 - Sec 1, 2, 4 and 5. (15 hrs)

UNIT II : Hyperbolic Functions: Definition, Relation between hyperbolic functions and Inverse hyperbolic functions

Book 1: Chap 4 - Sec 1,2.1,2.2,2.3 (20 hrs)

UNIT III: Logarithm of complex quantities

Book 1: Chap 5 - Sec 5 – 5.1,5.2. (10 hrs)

UNIT IV: Summation of Trigonometric series by using complex quantities: C+iS Form, Gregory series (only simple problems in both the cases)

Book 1: Chap 6 - Sec 3. (15 hrs)

UNIT V: Laplace Transform: Laplace Transform- Inverse Transform, Properties. Applications of Laplace Transforms to solution of the first and second Order linear differential equations (with constant coefficients)

Book 2: Chap 9 (15 hrs)

RECOMMENDED TEXT:

1. S. Narayan and T.K. ManicavachagomPillay (2013), Trigonometry, S.Viswanathan printers and publishers Pvt. Ltd, Chennai.
2. S. Narayan and T.K. ManicavachagomPillay (2003), Differential Equations and its Applications,S.Viswanathan printers and publishers Pvt. Ltd, Chennai.
3.

REFERENCE BOOKS:

1. A.Singaravelu, Algebra and Trigonometry Volume I (2003), Meenakshi Agency, Chennai
2. S.L.Loney, Plane Trigonometry – Part-II (1982), Cambridge University Press London.
3. Dr. M.D. Raisinghania, H.C.Saxena, H. K. Dass, Trigonometry (1999), S. Chand & Company Pvt. Ltd., New Delhi.
4. B.S. Grewal Higher Engineering Mathematics (2002), Khana Publishers, New Delhi.
5. Dr. A. Singaravelu, Differential Equations and Laplace Transforms, New Revised Edition (2015). A.R.S. Publications, Chennai.

JOURNALS:

Algebra and Trigonometry
International Journal of Mathematical Education in Science and Technology.

E-LEARNING RESOURCES:

https://www.mathsisfun.com/algebra/trigonometry.html
http://mathsfirst.massey.ac.nz/Trig/TrigGenSol.htm
https://www.mathwarehouse.com/trigonometry/
http://dsp-book.narod.ru/TAH/ch05.pdf
http://tutorial.math.lamar.edu/Classes/DE/LaplaceTransforms.aspx

COURSE OUTCOMES: Upon successful completion of Trigonometry and Laplace Transform students will be able to

CO No.	CO Statement
CO 1	Expand and solve problems involving Trigonometric functions in terms of series of multiple of θ.
CO 2	Evaluate the hyperbolic functions and inverse hyperbolic functions and study the relation between them.
CO 3	Analyse and calculate the logarithm of complex quantities.
CO 4	Discuss and find the summation of series of complex quantities.
CO 5	Applying Laplace Transforms and Inverse Laplace Transforms, to solve problems of linear differential equations.

MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	3	3	2	2
CO2	3	2	3	2	2
CO3	3	3	3	2	2
CO4	3	3	3	2	2
CO5	3	2	3	2	2
AVERAGE	**3**	**2.6**	**3**	**2**	**2**

KEY: **S**TRONGLY CORELATED-3 **M**ODERATELY CORELATED-2**W**EAKLY CORELATED-1 **N**O CORELATION-0

TEACHING METHODOLOGY:

Lecture (Chalk and Talk-LCD), Flipped Learning/Blended Classroom-E Content, Videos, Problem Solving-Group Discussion, Quiz-Seminar, Peer Learning, Field Visits, Self-Study Papers.

QUESTION PAPER PATTERN:

Knowledge Level	Section	Word Limit	Marks	Total	Special Instructions if any
K 1	A-10X2 marks	50	20	100	-
K1, K 2	B-5/8x7 marks	200	35		
K2, K 3	C-3/5x15 marks	500	45		

SEMESTER I

PROGRAMMING LANGUAGE C

TOTAL HOURS: 45 **COURSE CODE : MC18/1C/PLC**

CREDITS: 3 **L-T-P: 2 - 1- 0**

COURSE OBJECTIVES:

Enable the students

1. Introduce the concept of programming language and to enable the students to understand the basic concepts of C.
2. Impart knowledge in control statements like if, if else switch etc.
3. Study about arrays and operations.
4. Enable the students to understand about functions and pointers.
5. Impart knowledge about structures and to teach about file management in C.

COURSE OUTLINE:

UNIT I:

About C – Introduction – Data types and variables – Character set – C tokens keywords – Identifiers – Constants – Variables – Data types declaration – Assigning values to the variables – Operators and expressions.

(6hrs)

UNIT II:

Control statements: Decision making and looping - Decision making and branching. (10hrs)

UNIT III:

Arrays: One and Two dimensional arrays – Initializing two dimensional arrays – Strings – Handling of character strings – Declaring and initializing string variables – Reading strings from the terminal – Writing strings to screen – Arithmetic operation on characters – String handling function.

(9 hrs)

UNIT IV:

Functions: Defining, accessing – Passing arguments to functions – Specifying argument data types – Recursion. Pointers: Understanding pointer – Accessing address of a variable – Declaring and initializing pointer – Accessing a variable through its point – Points and arrays – Pointers and character strings (11 hrs)

UNIT V:

Structures: Structure definition giving values to members – Structure initialization – Arrays of structures – Arrays within structures. File Management in C**:** Introduction – Defining and opening a File-closing file - Input/output operations on file.

(9 hrs)

RECOMMENDED TEXT:

1. Programming in ANSI C, Sixth edition, E. Balagurusamy (case study excluded), Tata McGraw Hill, New Delhi.

REFERENCE BOOKS:

1. Programming in 'C', Schaum Series, Bryon S. Gottfried, Tata Mc-Graw Hill, New Delhi.
2. Let us C, Yashavant P. Kanetkar, BPB Publications.
3. The C Programming Language, Brian W. Kernighan, Dennis M. Ritchie, Pearson Publications.
4. C Programming Absolute Beginner's Guide, greg Perry and Dean Miller, Third Edition Que.
5. The C Programming Language, Brain w. Kernighan, Dennis M. Ritchie, Second Edition, Prentice Hall Software Series

JOURNALS:

International journal of Computer science and Security
Programming journal (magazines)

WEBSITES & e-LEARNING SOURCES:

http://www.technopedia.com/c-programming

http://www.guru99.com/c-programming-language.html

http://computer.howstuffsworks.com/c.2html

http://www.program1z.com/c-programming

http://fresh2.refresh.com/c-programming

COURSE OUTCOMES: Upon successful completion of Programming Language C students will be able to

CO No.	CO Statement
CO 1	Revise the basic concepts of programming and enable students to understand about data types input output statements and write simple programs.
CO 2	Explain about decision making statements like if, if else, else if ladder, switch, goto etc.
CO 3	Explain and Use the concept of one dimensional array, two dimensional array and operators in Programs.
CO 4	Analyze about in-build functions, user defined functions and study about pointers and recursion to develop programs.
CO 5	Explain the basics of file handling and structure concepts like arrays of structures, arrays within structures.

MAPPING- COURSE OUTCOMES WITH PROGRAM SPECIFIC OUTCOMES

CO / PO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	2	2	2	2	2
CO 2	2	3	3	3	3
CO 3	2	2	3	3	3
CO 4	2	3	3	3	3
CO 5	2	3	3	3	3
Average	**2**	**2.6**	**2.8**	**2.8**	**2.8**

KEY:**S**TRONGLY CORELATED-3 **M**ODERATELY CORELATED-2**W**EAKLY CORELATED-1 **N**O CORELATION-0

TEACHING METHODOLOGY:

Lecture (Chalk and Talk-LCD), Flipped Learning/Blended Classroom-E Content, Videos, Problem Solving-Group Discussion, Quiz-Seminar, Peer Learning, Field Visits, Self-Study Papers.

QUESTION PAPER PATTERN:

Knowledge Level	Section	Word Limit	Marks	Total	Special Instructions if any
K 1	A-10X2 marks	50	20	100	-
K1, K 2	B-5/8x7 marks	200	35		
K2, K 3	C-3/5x15 marks	500	45		

SEMESTER – I

PROGRAMMING IN C – PRACTICALS

TOTAL HOURS: 30 **COURSE CODE: MC18/1C/PR1**

CREDITS: 1 **L-T-P: 0- 0 -2**

COURSE OBJECTIVES

Enable the students

1. Develop programming skills using the concept of control statements arrays, functions.
2. Impart the knowledge of writing algorithm for programming.

COURSE OUTLINE:

PRACTICAL PROGRAMS

Implement the following programming concepts using C

1. Control statements.
2. Arrays.
3. Functions.
4. Pointers.
5. Structures.
6. File handling

Two to three programs under each heading

RECOMMENDED TEXT:

1. Programming in ANSI C, Sixth edition, E. Balagurusamy (case study excluded), Tata McGraw Hill, New Delhi.

REFERENCE BOOKS:

1. Programming in 'C', Schaum Series, Bryon S. Gottfried, 1998, Tata Mc-
2. GrawHill, New Delhi.
3. Let us C, Yashavant P. Kanetkar, BPB Publications.
4. The C Programming Language, Brian W. Kernighan, Dennis M. Ritchie, Pearson Publications.
5. C Programming Absolute Beginner's Guide, greg Perry and Dean Miller, Third Edition Que.
6. The C Programming Language, Brain w. Kernighan, Dennis M. Ritchie, Second Edition, Prentice Hall Software Series

JOURNALS:

International journal of Computer science and Security
Programming journal (magazines)

WEBSITES & e-LEARNING SOURCES:

https://www.programmingsimplified.com/c-program-examples
https://www.programiz.com/c-programming/examples
https://beginnersbook.com/2015/02/simple-c-programs
https://www.studyonight.com.c/programs
https://www.javapoint.com/c-programs

COURSE OUTCOMES: Upon successful completion of Programming Language C- Practical students will be able to

CO No.	CO Statement
CO 1	Create different programs using if, if else, for , arrays, functions and pointers and prepare the students to write programs.
CO 2	Apply the concept of structures and file handling to develop programs.

MAPPING-COURSE OUTCOMES WITH PROGRAM SPECIFIC OUTCOMES

CO / PO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	2	3	3	3	3
CO 2	2	3	3	3	3
Average	**2**	**3**	**3**	**3**	**3**

***Mapping Levels: 1 – Slight (Low) 2 – Moderate (Medium) 3 – Substantial (High)**

Question Paper Pattern

Duration – 3 hours**.**
Maximum marks – 100 (Internal 40 + External 60)
Practical Examination – 60 (2 x 30)

One Internal Examiner and one External Examiner to be appointed to conduct the practical examination.

SEMESTER I

CALCULUS OF FINITE DIFFERENCES – I

TOTAL HOURS: 90 **COURSE CODE: MC18/1A/FD1// MA18/1A/FD1**

CREDITS: 5 **L-T-P: 3 3 0**

COURSE OBJECTIVES:

Enable the students to

1. Solve Mathematical problem using difference operators.
2. Compute Numerical solutions of Differential and Integration problems.
3. Interpolate an unknown value from a given set of data.

COURSE OUTLINE:

UNIT I: FINITE DIFFERENCES

Forward, Backward, Divided Difference and Shift Operators, Relation between operators, Representation of Polynomials in Factorial Notations, Successive differences of Polynomial- Differences of zero.(Proof of theorems in finite differences excluded and simple problems) (20 hrs)

UNIT II: INTERPOLATION

Newton's Forward and Backward formulae for Interpolation finding the missing terms- Central difference formulae- Gauss Forward, Gauss Backward, Stirling's and Bessel's formulae**(**Derivations are not included for all the formulae and simple problems) (15hrs)

UNIT III: INTERPOLATION (contd)

Largange's Formula for Interpolation – Newton's Divided Differences formula. Largange's inverse interpolation **(**Derivations are not included for all the formulae and simple problems) (20hrs)

UNIT IV: NUMERICAL DIFFERENTIATION

Methods of Derivatives using Interpolation Formulae (only first order),Maxima and Minima using Newton's forward formula – simple problems.(Derivations are not included for all the formulae and theorem and simple problems) (15 hrs)

UNIT V: NUMERICAL INTEGRATION

Quadrature Formula for equidistant ordinates based on Newton's Forward formula – Trapezoidal rule – Simpson's one third rule – Simpson's Three Eighth rule. (Derivations are not included for all the formulae and theorems and simple problems) (20 hrs)

RECOMMENDED TEXTBOOKS:

1. B.D.Gupta Numerical Analysis, KonarkPub.Ltd., Delhi.
2. S.G.Venkatachalapathy,Calculus of finite differences and Numerical analysis, Margham publications, Chennai.
3. Dr. M/K.Venkataraman, Numerical Methods in Science & Engineering, Fifth edition, The National Publishing Company, Chennai.

REFERENCE BOOKS:

1. H.C. Saxena , Finite difference and numerical analysis S.Chand&Co.Delhi.
2. S.Arumugham, Numerical Methods, New Gamma Publishing, Palayamkottai.
3. M.K.Jain, S.R.K.Iyengar, R.K.Jain, Numerical methods for scientific and engineering computation, Sixth edition, New age International Publishers, New Delhi.
4. E.Balagurusamy, Numerical Methods ,Tata Mc.Graw Hill, New Delhi.
5. T.K.Manicavachagam Pillai & Prof. S. Narayanan, Numerical Analysis, New Edition S. Viswanathan Printers & publishers Pvt Ltd, Chennai.

JOURNALS:

Journal of Computational and Applied Mathematics
ARPN Journal of Engineering and Applied Sciences

E-LEARNING RESOURCES:

https://divisbyzero.com/2018/02/13/finite-differences-of-polynomials/

https://www.geeksforgeeks.org/newton-forward-backward-interpolation/

https://www.geeksforgeeks.org/bessels-interpolation/

https://www.geeksforgeeks.org/program-stirling-interpolation-formula/

https://www.geeksforgeeks.org/lagranges-interpolation/

https://www.geeksforgeeks.org/newtons-divided-difference-interpolation-formula/

https://en.wikipedia.org/wiki/Numerical_differentiation

https://en.wikipedia.org/wiki/Numerical_integration

COURSE OUTCOMES: Upon successful completion of Calculus of Finite Differences - I students will be able to

CO No.	CO Statement
CO 1	Compare accuracy, precision and errors.
CO 2	Applying the Methods of interpolation to compute the missing value in real life problems.
CO 3	Utilize various numerical operators to find the generalized term.
CO 4	Compute the missing values for unequal intervals using Divided differences and Lagrange Method.
CO 5	Evaluate the approximate values of the first derivative, max and min values of the function using Newton's formula.
CO 6	Compute definite integral for different combinations of integrands using various methods and analyze their accuracy.

MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	2	2	2	2	2
CO2	2	3	2	2	2
CO3	2	3	2	3	2
CO4	3	3	2	2	3
CO5	3	3	3	3	2
AVERAGE	2.4	2.8	2.2	2.4	2.2

KEY:**S**TRONGLY CORELATED-3 **M**ODERATELY CORELATED-2**W**EAKLY CORELATED-1 **N**O CORELATION-0

TEACHING METHODOLOGY:

Lecture (Chalk and Talk-LCD), Flipped Learning/Blended Classroom-E Content, Videos, Problem Solving-Group Discussion, Quiz-Seminar, Peer Learning, Field Visits, Self-Study Papers.

QUESTION PAPER PATTERN:

Knowledge Level	Section	Word Limit	Marks	Total	Special Instructions if any
K 1	A-10X2 marks	50	20	100	-
K1, K 2	B-5/8x7 marks	200	35		
K2, K 3	C-3/5x15 marks	500	45		

SEMESTER -I
OFFICE MANAGEMENT

TOTAL HOURS: 30 **COURSE CODE: MC18/1N/OFM// MC18/1N/OFMH**

CREDITS: 2 **L-T-P: 0-0-2**

COURSE OBJECTIVES

Enable the students to

1. Learn to create, edit, format documents using MS-Word.
2. Learn to create worksheet, align data and to calculate statistical problems using Mathematical functions.
3. Learn to edit data and represent data in a pictorial format such as charts, tables and pictures.

COURSE OUTLINE:

UNIT I:

MS WORD- Text manipulation- Usage of Numbering – Bullets, Tools and Headers – Find & Replace – Text Formatting – Picture Insertion and Alignment- Creation of documents using templates-Creation of templates-Mail Merge Concept.

(10 hrs)

UNIT II:

MS EXCEL- Creation of worksheet and entering information- Aligning- Editing data in cell, Excel function(Date, Time, Statistical-Standard Deviation- Skewness-Mathematical functions)-Changing of column width and row height.

(10 hrs)

UNIT III:

MS EXCEL –Moving, Copying, Inserting - Deleting rows & Columns-Formatting numbers and other numeric formats-Conditional & Pivot Formatting-Drawing borders around cells-Creation of charts.

(10 hrs)

RECOMMENDED TEXT:

Ananthi Seshasaayee and Seshasaayee, Computer Applications in Business and Management, Margham Publications.

REFERENCE BOOKS:

1. Dinesh Maidasani ,Learning Computer Fundamentals, Ms Office and Internet & Web Tech, Firewall Media, An Imprint of Laxmi Publications Pvt Ltd, New Delhi.
2. Dr. S.S. Srivastava ,MS-Office, Firewall Media, An Imprint of Laxmi Publications Pvt Ltd, New Delhi.
3. Joan Lambert ,Microsoft Word 2019 Step by Step, Pearson Education Pvt Ltd.
4. Curtis Frye,Microsoft Excel 2016 Step by Step, Published by Microsoft Press, Washington.

E-LEARNING RESOURCES:

https://youtu.be/IaiZc0jomz4
http://www.electricteacher.com/tutorials.htm
https://youtu.be/RdTozKPY_OQ
https://www.guru99.com/excel-tutorials.html

COURSE OUTCOMES: Upon successful completion of Office Management students will be able to

CO No.	CO Statement
CO 1	Create document and prepare formatted reports with precision and accuracy.
CO 2	Apply the knowledge of mathematical formulae and make the calculation easier for enormous data.
CO 3	Apply the pictorial representation for analysing the data to present it effectively.

MAPPING OF COURSE OUTCOMES WITH PROGRAMME SPECIFIC OUTCOMES

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	2	2	3	3	3
CO 2	2	3	3	3	3
CO 3	3	3	3	3	3
Average	**2**	**2.6**	**3**	**3**	**3**

KEY: **S**TRONGLY CORELATED-3 ,**M**ODERATELY CORELATED-2,**W**EAKLY CORELATED-1,**N**O CORELATION-0

TEACHING METHODOLOGY:

Lecture (Chalk and Talk-LCD), Flipped Learning/Blended Classroom-E Content, Videos, Problem Solving-Group Discussion, Peer Learning, Self-Study Papers

Question Paper Pattern

(All the units to be covered through Practical sessions)

5 Questions are to be answered carrying 10 marks each (Practicals)

SEMESTER-II

CALCULUS

TOTAL HOURS: 75 hrs **COURSE CODE: MC18/2C/CAL**

CREDITS: 4 **L-T-P: 3 2 0**

COURSE OBJECTIVES:

Enable students to

1. Provide understanding of existence of *n*'th order derivative.
2. Find the radius of curvature in Cartesian form and in parametric form.
3. Apply the reduction formula to evaluate definite integral.
4. Develop an understanding of Double and Triple Integrals.
5. Describe methods for solving Beta and Gamma Function.

COURSE OUTLINE:

UNIT I: Differential Calculus:
Successive Differentiation- n^{th} derivative, Standard results – Leibnitz Theorem (without Proof) and its applications
Calculus -Vol I - Chap-3 Section 1.1 -1.6 & Section 2.1 -2.2 (18hrs)

UNIT II: **Envelopes:**
Maxima and Minima, Curvature – Circle, radius and centre of curvature, Cartesian and Polar formula for the radius of curvature.
Calculus- Vol I – Chap – 5 Section 1.1 to 1.5
Chap -10, Section1.1 – 1.3, 2.1-2.3&2.6 (17hrs)

UNIT III: Integral Calculus:
Reduction formulae:$\int e^{ax}\cos bx\,dx$, $\int e^{ax}\sin bx\,dx$-
$\int \sin^m x\cos^n x\,dx$ (m, n being positive integers),
$\int x^m(\log x)^n\,dx$, $\int \cos^m x\cos nx\,dx$, $\int \cos^m x\sin nx\,dx$, Bernoulli's formula.
Calculus –Vol II - Chapter 1 Sec 1.3, 13.1 – 13.10 (15 hrs)

UNIT-IV: Double integrals (Cartesian co-ordinates only), Change of order of integration. Triple integrals (Cartesian co-ordinates only)
Calculus Vol II- Chapter 5 Sec 2.1, 2.2 & 4 (15 hrs)

UNIT-V: Beta and Gamma functions (Applications to simple problems)
Calculus – Vol II - Chapter 7 Sec 2.1-2.3, 3, 4. (10hrs)

RECOMMENDED TEXTBOOKS:

1. S. Narayanan & T.K. Manickavachagom Pillay, Calculus Volume I

(2004), S.Viswanathan Printers & Publishers.

2. S. Narayanan & T.K. Manickavachagom Pillay, Calculus Volume II (2004), S.Viswanathan Printers & Publishers.

REFERENCE BOOKS:

1. Singaravelu, R. Ramaa, Calculus & Co-ordinate Geometry of 2 dimensions (Paper II), Meenakshi Agency, Chennai.
2. P. Kandasamy and K. Thigavathi, Mathematics for B.Sc- Volume II- 2004, S.Chand and Co, New Delhi.
3. Shanti Narayan, Dr. P.K.Mittal, Differential Calculus, Rajendra Ravindra Printers, 2012.
4. George Yankovsky, Differential and integral Calculus (Vol –II), MIR Publishers.
5. N.P.Bali, Differential Calculus, Laxmi Publications Private Limited.

JOURNALS:

Journal of Logic and Computation.
Fractional Differential Calculus.

E-LEARNING RESOURCES:

https://www.scribd.com/doc/34048532/Btech-1st-Sem-Maths-Successive-Differentiation
https://www.math24.net/envelope-family-curves/
https://en.wikibooks.org/wiki/Calculus/Integration_techniques/Reduction_Formula
https://en.wikibooks.org/wiki/Calculus/double Integration_techniques
https://study.com/academy/lesson/gamma-function-properties-examples.html

COURSE OUTCOMES: Upon successful completion of Calculus students will be able to

CO No.	CO Statement
CO 1	Use Leibnitz Theorem to determine the nth derivative of product of functions.
CO 2	Compute radius of curvature for Cartesian curves, parametric curves.
CO 3	Evaluate integral values by appropriate reduction formula.
CO 4	Identify and Evaluate the multiple integral techniques.
CO 5	Analyse the relation between Beta and Gamma Function and solve problems.

MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	3	3	3	2

CO2	3	2	3	2	2
CO3	3	3	3	2	2
CO4	3	2	3	2	2
CO5	3	3	3	2	2
AVERAGE	3	2.6	3	2.2	2

KEY: **S**TRONGLY CORELATED-3 **M**ODERATELY CORELATED-2**W**EAKLY CORELATED-1 **N**O CORELATION-0

TEACHING METHODOLOGY:

Lecture (Chalk and Talk-LCD), Flipped Learning/Blended Classroom-E Content, Videos, Problem Solving-Group Discussion, Quiz-Seminar, Peer Learning, Field Visits, Self-Study Papers.

QUESTION PAPER PATTERN:

Knowledge Level	**Section**	**Word Limit**	**Marks**	**Total**	**Special Instructions if any**
K 1	A-10X2 marks	50	20	100	-
K1, K 2	B-5/8x7 marks	200	35		
K2, K 3	C-3/5x15 marks	500	45		

SEMESTER II

OBJECT –ORIENTED PROGRAMMING WITH C++ (THEORY)

TOTAL HOURS: 45 **COURSE CODE: MC18/2C/C++**
CREDITS : 3 **LTP : 2 1 0**

COURSE OBJECTIVES:

Enable the students to

1. Impart knowledge on Object Oriented Programming C++ and its basic concepts.
2. Introduce data analysis using arrays and friend function.
3. Encourage the students to have a clear knowledge on constructors, destructors and operator overloading.
4. Study the various inheritance while examining the execution.
5. Gain knowledge on file management in Object Oriented Programming C++.

COURSE OUTLINE:

UNIT – I: Procedure Oriented Programming, Object- Oriented Programming Paradigm –Basic concepts of object- oriented programming – Benefits of OOP – Applications of OOP. Introduction to C++ Operators, Manipulators, Expressions and their types.

(7 hrs)

UNIT – II: Functions in C++ - Main Function- Function prototyping- Call by Reference- Return by references Inline functions – Inheritance introduction -Functions overloading. Classes and objects- Arrays within a class, Arrays of objects- Friend functions

(10 hrs)

UNIT- III: Constructors and destructors – Multiple constructors in a class – Constructor with Default arguments, Copy constructors- Dynamic constructors – destructors- Operator overloading and Type conversions.

(11 hrs)

UNIT- IV: Inheritance – Single inheritance – Multilevel Inheritance- Multiple Inheritances-Hierarchical Inheritance- Hybrid Inheritance.

(9 hrs)

UNIT – V: Working with files – Classes for file stream operations – Opening and closing a file– Command Line arguments.

(8 hrs)

(Case studies excluded in all the units)

RECOMMENDED BOOK:

1. E. Balaguruswamy , Object Oriented Programming with C++,Tata McGraw- Hill ,Fifth edition.

REFERENCES BOOKS:

1. Schaum's Outline of , "Fundamentals of Computing with C++"John R.Hubbard
2. Herbert Schildt, The Complete Reference C++, Tata McGraw – Hill
3. Robert Lafore Object – Oriented Programming in Microsoft C++ ,Galgotia Publications Pvt.ltd.
4. Mastering C++ programming by jeganathan swaminathan, packt publishing pvt.ltd.
5. Object oriented programming using C++, kavitha pabreja,neethu narwal,IK international publishing pvt.ltd.

JOURNALS:

Object-Oriented Finite Element Analysis of Metal Working Processes- scientific research.
Programming journal(magazines)

E-LEARNING SOURCES :

http://www. c++tutor.com

http://www.opensource.org

https://www.studytonight.com/cpp/basics-of-cpp.php

https://www.studytonight.com/cpp/constructors-and-destructors-in-cpp.php

https://www.sitesbay.com/cpp/cpp-file-handling.

COURSE OUTCOMES: Upon successful completion of Object Oriented Programming with C++ students will be able to

CO No.	CO Statement
CO 1	Identify the data and understand the basic concepts in Object Oriented Programming C++.
CO 2	Apply the concepts of arrays and friend function for program development and execution.
CO 3	Evaluate the data and use constructors, destructors and operator overloading in the program for execution.
CO 4	Demonstrate the usage of inheritance while examining the execution.
CO 5	Formulate the file management of Object Oriented Programming C++ for writing program.

MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	2	2	3	3	3
CO2	2	2	3	3	3
CO3	2	3	3	3	3
CO4	2	2	3	3	3
CO5	2	2	3	3	3
AVERAGE	2	2.2	3	3	3

KEY: **S**TRONGLY CORELATED-3 **M**ODERATELY CORELATED-2 **W**EAKLY CORELATED-1 **N**O CORELATION-0

TEACHING METHODOLOGY:

Lecture (Chalk and Talk-LCD), Flipped Learning/Blended Classroom-E Content, Videos, Problem Solving-Group Discussion, Quiz-Seminar, Peer Learning, Field Visits, Self-Study Papers.

QUESTION PAPER PATTERN:

Knowledge Level	Section	Word Limit	Marks	Total	Special Instructions if any
K 1	A-10X2 marks	50	20	100	-
K1, K 2	B-5/8x7 marks	200	35		
K2, K 3	C-3/5x15 marks	500	45		

SEMESTER II

OBJECT –ORIENTED PROGRAMMING USING C++ - PRACTICALS

Total Hours: 30 hrs **Course Code: MC18/2C/PR2**

Credit: 1 **LTP: 0 02**

COURSE OBJECTIVES

Enable the students to

1. Impart knowledge on Object Oriented Programming C++ and its basic concepts.
2. Introduce data analysis using arrays and friend function.
3. Encourage the students to have a clear knowledge on constructors, destructors and operator overloading.
4. Study the various inheritance while examining the execution.
5. Gain knowledge on file management in Object Oriented Programming C++.

COURSE OUTLINE:

Implement the following programming concepts using C++

1. Classes and objects
2. Friend function.
3. Function overloading
4. Operator overloading
5. Constructors and destructors.
6. Inheritance (Single, Multiple).

Two to three programs under each heading

RECOMMENDED BOOK:

1. E.Balaguruswamy , Object Oriented Programming with C++,Tata McGraw- Hill ,Fifth edition.

REFERENCES BOOKS:

1. Schaum's Outline of , "Fundamentals of Computing with C++"John R.Hubbard
2. Herbert Schildt, The Complete Reference C++, Tata McGraw – Hill
3. Robert Lafore Object – Oriented Programming in Microsoft C++ ,Galgotia Publications Pvt.ltd.
4. Mastering C++ programming by jeganathan swaminathan, packt publishing pvt.ltd.
5. Object oriented programming using C++, kavitha pabreja,neethu narwal,IK international publishing pvt.ltd.

JOURNALS:

Object-Oriented Finite Element Analysis of Metal Working Processes- scientific research.
Programming journal(magazines)

E-LEARNING SOURCES:

http://www. c++tutor.com
http://www.opensource.org
https://www.studytonight.com/cpp/basics-of-cpp.php
https://www.studytonight.com/cpp/constructors-and-destructors-in-cpp.php
https://www.sitesbay.com/cpp/cpp-file-handling.

COURSE OUTCOMES : Upon successful completion of Object Oriented Programming with C++ - Practicals students will be able to

CO No.	CO Statement
CO 1	Identify the data and understand the basic concepts in Object Oriented Programming C++.
CO 2	Apply the concepts of arrays and friend function for program development and execution.
CO 3	Evaluate the data and use constructors, destructors and operator overloading in the program for execution.
CO 4	Demonstrate the usage of inheritance while examining the execution.
CO 5	Formulate the file management of Object Oriented Programming C++ for writing program.

MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	2	2	3	3	3
CO2	2	2	3	3	3
CO3	2	3	3	3	3
CO4	2	2	3	3	3
CO5	2	2	3	3	3
AVERAGE	2	2.2	3	3	3

KEY: **S**TRONGLY CORELATED-3 **M**ODERATELY CORELATED-2 **W**EAKLY CORELATED-1 **N**O CORELATION-0

TEACHING METHODOLOGY:

Lecture (Chalk and Talk-LCD), Flipped Learning/Blended Classroom-E Content, Videos, Problem Solving-Group Discussion, Quiz-Seminar, Peer Learning, Field Visits, Self-Study Papers.

Question Paper Pattern

Duration – 3 hours**.**
Maximum marks – 100 (Internal 40 + External 60)
Practical Examination – 60 (2 x 30)

One Internal Examiner and one External Examiner to be appointed to conduct the practical examination.

SEMESTER II

CALCULUS OF FINITE DIFFERENCES – II

TOTAL HOURS: 90 **COURSE CODE: MC18/2A/FD2 // MA18/2A/FD2**

CREDITS: 5 **L-T-P: 3 3 0**

COURSE OBJECTIVES:

Enable students to

1. Find the numerical solutions of Algebraic, Transcendental & Simultaneous equations.
2. Understand the fundamental concepts of difference equation.
3. Compute the numerical solution of ordinary differential equation.

COURSE OUTLINE:

UNIT I: SUMMATION OF SERIES

Use of forward difference operators – Summation Using Euler – Maclaurin's formula.

(15hrs)

UNIT II: SOLUTION OF ALGEBRAIC AND TRANSCEDENTAL EQUATIONS

Numerical solutions of polynomial and Transcendental equations in one variable.

i. Bisection Method
ii. Method of false position (Regular falsi Method)
iii. Method of Iteration
iv. Newton Raphson Method

(Derivations are not included for all the formulae and theorems and simple problems)

(20 hrs)

UNIT III: SOLUTION OF A SYSTEM OF ALGEBRAIC EQUATIONS

Numerical solution of Simultaneous Linear Equations in three variables by

i. Gauss Elimination Method
ii. Gauss Jordan Method
iii. Jacobi Iteration Method
iv. Gauss Seidel Method

(Derivations are not included for all the formulae and theorems and simple problems)

(20hrs)

UNIT IV: DIFFERENCE EQUATIONS

Definition, method of solutions, first order linear difference equation with constant, variable coefficients, second order linear difference equation with constant Coefficients- Particular integrals of type

i. a^x
ii. x^m
iii. $x^m a^x$ – Simple problems. (15 hrs)

UNIT V: NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS OF FIRST ORDER.

i. Euler's Method
ii. Modified Euler Method
iii. Picard's method of successive approximation
iv. Runge- Kutta Method of order four.

(20hrs)

RECOMMENDED TEXTBOOKS:

1. B.D.Gupta (2001) Numerical Analysis, KonarkPub.Ltd., Delhi.
2. S.G.Venkatachalapathy,Calculus of finite differences and Numerical analysis, Margham publications, Chennai. (2003).
3. Dr. M/K.Venkataraman, Numerical Methods in Science & Engineering, Fifth edition (1999), The National Publishing Company, Chennai.

REFERENCE BOOKS:

1. H.C. Saxena (1991) Finite difference and numerical analysis S.Chand&Co.Delhi.
2. S.Arumugham(2003) Numerical Methods, New Gamma Publishing, Palayamkottai.
3. M.K.Jain, S.R.K.Iyengar, R.K.Jain, Numerical methods for scientific and engineering computation, Sixth edition(2012), New age International Publishers, New Delhi.
4. E.Balagurusamy, Numerical Methods (1999),Tata Mc.Graw Hill, New Delhi.
5. T.K.Manicavachagam Pillai & Prof. S. Narayanan, Numerical Analysis, New Edition (2001), S. Viswanathan Printers & publishers Pvt Ltd, Chennai.

JOURNALS:

Science Direct Journal
LMS Journal of Computation and Mathematics

E-LEARNING SOURCES:

https://en.wikipedia.org/wiki/Euler%E2%80%93Maclaurin_formula
https://www.shodor.org/unchem/math/newton/
https://en.wikipedia.org/wiki/Bisection_method
https://en.wikipedia.org/wiki/Regula_falsi
https://brilliant.org/wiki/newton-raphson-method/
https://en.wikipedia.org/wiki/Gaussian_elimination
https://en.wikipedia.org/wiki/Euler_method
https://www.math24.net/linear-differential-equations-first-order/

COURSE OUTCOMES: Upon successful completion of Calculus of Finite Differences - II students will be able to

CO No.	CO Statement
CO 1	Compute the summation of series by applying Numerical operators and Euler Maclaurin Method
CO 2	Apply Numerical Methods to evaluate numerical solution of algebraic and transcendental equations.
CO 3	Solve Simultaneous linear equation in three variables.
CO 4	Formulate difference equation for the given problem and solve the equation.
CO 5	Evaluate the solution of first order differential equation using Euler, Picard's and Runge-Kutta Methods.

MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	3	3	2	2
CO2	3	3	3	2	2
CO3	3	2	3	3	3
CO4	3	3	2	2	2
CO5	3	3	3	2	2
AVERAGE	3	2.8	2.8	2.2	2.2

KEY:**S**TRONGLY CORELATED-3 **M**ODERATELY CORELATED-2**W**EAKLY CORELATED-1 **N**O CORELATION-0

TEACHING METHODOLOGY:

Lecture (Chalk and Talk-LCD), Flipped Learning/Blended Classroom-E Content, Videos, Problem Solving-Group Discussion, Quiz-Seminar, Peer Learning, Field Visits, Self-Study Papers.

QUESTION PAPER PATTERN:

Knowledge Level	Section	Word Limit	Marks	Total	Special Instructions if any
K 1	A-10X2 marks	50	20	100	-
K1, K 2	B-5/8x7 marks	200	35		
K2, K 3	C-3/5x15 marks	500	45		

SEMESTER II
WEB DESIGNING

TOTAL HOURS: 30 **COURSE CODE: MC18/2N/WEB// MC18/2N/WEBH**

CREDITS: 2 **L-T-P: 0-0-2**

COURSE OBJECTIVES

Enable the students to

1. Learn the language of the web: HTML.
2. Understand the principles of creating an effective web page.
3. Learn to embed other media links into web pages.

COURSE OUTLINE:

UNIT I:

Introduction – HTML Basics – Understanding Tags

(10 hrs)

UNIT II:

Tags for Document structure(HTML,Head,Body,Tag), Block level elements:(bold, italic, font, small, strong, strike, big tags).

(10 hrs)

UNIT III:

List: Types of lists: Ordered, Unordered- Nesting Lists- Other tags: Marqueue, HR, BR – Using Images- Creating Hyperlinks.

(10 hrs)

RECOMMENDED TEXT:

HYPERTEXT MARK UP LANGUAGE, Dr. S. Aruna, Margham Publications

REFERENCE BOOKS:

1.Jon Duckett, HTML and CSS: Design and Build Websites, John Wiley & Sons, Inc.
2.IztokFajfar ,Start Programming Using HTML, CSS, and JavaScript, CRC Press, Taylor & Francis Group.
3.Jennifer Robbins, Learning Web Design: A Beginner's Guide to HTML, CSS, JavaScript, and Web, USA.
4.A.A.Puntambekar, Web Technologies, Technical Publications, Pune.

E-LEARNING RESOURCES:

https://www.w3schools.com/html/html_intro.asp
https://youtu.be/CmsoTHqdTn8
https://html.com/

COURSE OUTCOMES : Upon successful completion of Web Designing will be able to

CO No.	CO Statement
CO 1	Develop skills to write HTML programming.
CO 2	Develop an understanding of the formalistic aspects of design.
CO 3	Implement other sources of data into webpage and creates an attractive webpage.

MAPPING -COURSE OUTCOMES WITH PROGRAMME SPECIFIC OUTCOMES

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	2	3	3	3	3
CO 2	2	3	3	3	3
CO 3	2	3	3	3	3
Average	**2**	**3**	**3**	**3**	**3**

KEY: **S**TRONGLY CORELATED-3 ,**M**ODERATELY CORELATED-2, **W**EAKLY CORELATED-1, **N**O CORELATION-0

TEACHING METHODOLOGY:

Lecture (Chalk and Talk-LCD), Flipped Learning/Blended Classroom-E Content, Videos, Problem Solving-Group Discussion, Peer Learning, Self-Study Papers

Question Paper Pattern

(All the units to be covered through Practical sessions)

5 Questions are to be answered carrying 10 marks each (Practicals)

SEMESTER III
CLASSICAL ALGEBRA

Total Hours: 75 **Course Code: MC18/3C/CLA**
Credits : 4 **L T P : 3 2 0**

COURSE OBJECTIVES

Enable the students to

1. Impart knowledge and skill in various summation of series.
2. Study the logics of polynomial equations.
3. Introduce the Reciprocal equation and various rules on finding the roots of the equation.
4. Study the concepts of divisibility and primes.
5. Introduce the concept of congruence and primitive roots of number theory.

COURSE OUTLINE:

UNIT-I: Summation of series using Binomial, Exponential and Logarithm-Series
Book1:VolI:Chapter-3 Section: 10
Chapter-4 Section: 3, 4 (15 hrs)

UNIT-II: Theory of Equation: Polynomial equation – Relation between roots and coefficient – Symmetric function of rules, Formation of equations
Book1:VolI:Chapter - 6, Section 1-12. (15hrs)

UNIT-III: Transformation of equations, Reciprocal equations, Discard's rule of signs, Approximation of roots of cubic equation by Horner's Methods.
Book 1: Vol I: Chapter – 6 Section: 5 – 17, 24, 30. (15hrs)

UNIT-IV: Introduction – Divisibility- Primes.
Book 2:Chapter 1: Sections - 1.1 to 1.3 (15 hrs)

UNIT-V: Congruences, Solution of Congruences, Chinese Remainder Theorem-Primitive roots and Power Residues.
Book 2: Chapter: 2: Sections 2.1 to 2.3, (15 hrs)

RECOMMENDED TEXT:

1. Algebra Vol I, T.K.ManicavachagamPillay, T.Natarajan, K.S. Ganapathy S.VishwanathanPvt,.Ltd, 2008.
2. An introduction to the Theory of Numbers (5th edition) by Ivan Niven, Herbert S. Zuckarmanand Hugh L. Montgometry John Wiley & Sons, Inc.2001.

REFERENCE BOOKS:

1. Elementary theory of numbers, cy. Hsiung, Allied publishers, 1995.
2. Elementary Number Theory, Allyn and Bacon Inc., Boston, 1980.
3. Introduction to Analytic Number Theory, Tom. M. Apostol, Narosa Publishing House, New Delhi, 1989.
4. Allied Mathematics, S.G.Venkatachalapathy, Margham Publishers.
5. Allied Mathematics, P.R.Vittal, Margham Publishers.

JOURNALS:

ScienceDirect.com – Journal – on – Algebra
ScienceDirect.com – Journal of Number thoery

E-LEARNING SOURCES:

https://en.wikipedia.org/wiki/Binomial_theorem
https://en.wikipedia.org/wiki/List_of_mathematical_series
http://www.mathforum.org
http://poincare.matf.bg.ac.rs/~zarkom/Polynomials_EJBarbeau.pdf
https://www.pdfdrive.com/number-theory-art-of-problem-solving-aops-d1505092.html

COURSE OUTCOMES: Upon successful completion of Classical Algebra students will be able to

CO No.	CO Statement
CO 1	Evaluate the summation of series using Binomial, Exponential and Logarithmic methods.
CO 2	Compare and identify the polynomial equations
CO 3	Apply the analytical techniques in finding the roots of any polynomial equation.
CO 4	Demonstrate the concept of divisibility and primes.
CO 5	Apply the procedure to find congruence and primitive roots.

MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	2	3	3	2	2
CO2	3	3	2	2	2
CO3	3	3	2	2	2
CO4	3	3	2	2	2
CO5	3	3	2	2	2
AVERAGE	2.8	3	2.2	2	2

TEACHING METHODOLOGY:

Lecture (Chalk and Talk-LCD), Flipped Learning/Blended Classroom-E Content, Videos, Problem Solving-Group Discussion, Quiz-Seminar, Peer Learning, Field Visits, Self-Study Papers.

QUESTION PAPER PATTERN:

Knowledge Level	Section	Word Limit	Marks	Total	Special Instructions if any
K 1	A-10X2 marks	50	20	100	-
K1, K 2	B-5/8x7 marks	200	35		
K2, K 3	C-3/5x15 marks	500	45		

SEMESTER III

DIFFERENTIAL EQUATIONS AND FOURIER SERIES

TOTAL HOURS: 75 **COURSE CODE: MC18/3C/DEF**

CREDITS: 4 **L-T-P: 3 2 0**

COURSE OBJECTIVES:

Enable students to

1. Use the method of integrating factors to solve linear, first-order DEs.
2. Find the complete solution of a non homogeneous differential equation.
3. Solve the first order differential equations using variable separable method.
4. Introduce and solve linear Partial Differential with different methods.
5. Expand odd or even functions periodically extended beyond that range in fourier series.

COURSE OUTLINE:

UNIT I: Differential Equations of first order: Bernoulli's equations, Exact Differential Equations, Equations solvable for p, Equations solvable for x, Equations Solvable for *y*, Clairaut's Equation
Chapter 1: Sections 2.5, 3.1, 5.1, 5.2,5.3, 5.4, 6.1 (16 hrs)

UNIT II: Linear equations: Linear equations with Variable Coefficients, Equations reducible to the linear homogeneous equations, Method of Variation of Parameters.
Chapter 2: Sections 8, 9, 10 (15hrs)

UNIT III: Simultaneous Differential equations: Simultaneous equations of first Order and first degree, Solutions of dx/P = dy/Q = dz/R, Total differential equations.
Chapter 3: Section 2, 3, 7, 7.2, 7.3, 7.4 (15 hrs)

UNIT IV: **Partial Differential equations:** Formation of P.D.E by eliminating constants and by eliminating variables, Different integrals of Partial differential equations, Standard types of first order equations.
Chapter 4: Section2.1, 2.2, 3, 4, 5.1, 5.2, 5.3, 5.4 (19hrs)

UNIT V: Fourier series: Fourier series of periodic functions, Fourier series of odd and even functions.
Chapter 6: Section – 1, 2, 3 (10 hrs)

RECOMMENDED TEXT:

1. S.Narayanan & T.K. Manicavachagam Pillay, Calculus Vol III, S.Vishwanathan Printers and publishers pvt.ltd, Chennai.(2016).

REFERENCE BOOKS:

1. N.P. Bali, Differential Equations, Firewall Media Publications, (2006).
2. S.Narayanan, Differential Equations and its Applications, Dhivya Subramanian for Anand Book Depot (2017).
3. Kalipada Maity, Introduction to Differential Equations, Narosa Publishing House Private Limited- 2017.
4. V. Venkateswara rao , S. Sanganatham , S. Anjaneya Sastry , N. Krishnamurthy & B.V.S.S. Sarma, Differential Equations, S.Chand Publishing House, Chennai, (2018).
5. A.R.Forsyth, A Treatise on Differential Equations, 6th Edition, Macmillan & Co. Limited.

JOURNALS:

Journal of Differential Equations.
International Journal of Differential Equations.

E-LEARNING RESOURCES:

https://brilliant.org/wiki/first-order-differential-equations-problem-solving/
https://en.wikipedia.org/wiki/Variation_of_parameters.
http://mathsfirst.massey.ac.nz/Algebra/SystemsofLinEq.htm.
https://en.wikipedia.org/wiki/List_of_partial_differential_equation_topics
https://en.wikipedia.org/wiki/Fourier_series

COURSE OUTCOMES: Upon successful completion of Differential Equation and Fourier series students will be able to

CO No.	CO Statement
CO 1	Evaluate and solve Separable, Homogeneous, Exact, and Linear first order differential equations.
CO 2	Analyse and solve differential equations using variable coefficients and variation of parameters
CO 3	Formulate the separation of variables and solve simultaneous equations and analyze the behaviour of solutions.
CO 4	Formulate P.D.E by eliminating arbitrary constants and variables and solve its standard types.
CO 5	Identify the nature of the Fourier series that represent even and odd functions and examine the derivations of a Fourier series

MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	3	3	3	2
CO2	3	3	3	2	2
CO3	3	3	3	2	2
CO4	3	3	3	3	2
CO5	3	3	2	3	2
AVERAGE	**3**	**3**	**2.8**	**2.6**	**2**

KEY: **S**TRONGLY CORELATED-3 **M**ODERATELY CORELATED-2**W**EAKLY CORELATED-1 **N**O CORELATION-0

TEACHING METHODOLOGY:

Lecture (Chalk and Talk-LCD), Flipped Learning/Blended Classroom-E Content, Videos, Problem Solving-Group Discussion, Quiz-Seminar, Peer Learning, Field Visits, Self-Study Papers.

QUESTION PAPER PATTERN:

Knowledge Level	Section	Word Limit	Marks	Total	Special Instructions if any
K 1	A-10X2 marks	50	20	100	-
K1, K 2	B-5/8x7 marks	200	35		
K2, K 3	C-3/5x15 marks	500	45		

SEMESTER IV

DATA STRUCTURES AND ALGORITHMS

TOTAL HOURS: 75 **COURSE CODE: MC18/4C/DSA**

CREDITS: 4 **L-T-P: 3-2-0**

COURSE OBJECTIVES

Enable the students to

1. Impart the basic concepts of data structure, array and its operations.
2. Introduce the concept of linked list and its operations.
3. Understand the concept of Stack & Queue , its representation and operations.
4. Understand the concept of Tree & Graph , its representation and operations.
5. Study the basic concepts of algorithms and step by step approach in writing algorithms with help of fundamental data structures .

COURSE OUTLINE:

UNIT I: Data Structures: Definition of a Data structure – Data structure operations-primitive and composite Data Types, Arrays-Linear Arrays-Representation of Linear Array in Memory-Traversing Linear Array-Inserting and Deleting in Linear Arrays (15hrs)

Chapter 1: 1.3-1.4 & Chapter 4: 4.1-4.5

UNIT II: Linked list-Representation of Linked lists in Memory-Insertion into a linked list-Deletion from a linked list. (15 hrs)

Chapter 5: 5.1-5.3, 5.7-5.8

UNIT III: Stack- Array representation of stack-Linked representation of Stack-Application of Stack (infix to postfix conversion)-**Queue**-Linked representation of Queue. (15 hrs)

Chapter 6: 6.1-6.4 , 6.10-6.11

UNIT IV: Trees- Binary trees-Representing Binary tree in Memory-Traversing Binary

trees. **Graph-** Graph terminology- Sequential representation of graph: Adjacency matrix, Linked representation- Traversing a graph(Breadth First Search & Depth First Search)-Warshall's& Shortest path Algorithm.

(20hrs)

Chapter 7: 7.1-7.4 Chapter 8: 8.1-8.5, 8.7

UNIT V: Algorithms – Definitions-examples, Complexity of Algorithms- Bubble sort – linear Search

(10 hrs)

Chapter 1: 1.5 Chapter 2: 2.5 Chapter 4: 4.6-4.7

RECOMMENDED TEXT:

DATASTRUCTURES by SEYMOUR LIPSCHUTZ, Edition 2006,TataMcGraw-hill Publications.

REFERENCE BOOKS:

1. Data Structures and Algorithms , L. MathuKrithigaVenkatesh, Margham Publications.
2. R. Kruse C.L. Tondo and B. Leung ,1997, Data Structures and Program design in C, PHI.
3. Cangsam,Auguenstein, Tenenbaum,Data Structures using C & C++,PHI
4. D.Samantha,2005, Classic Data Structures, PHI,New Delhi.
5. A.A.Puntambekar, Data Structures And Algorithms, Technical Publications, Pune.

JOURNALS

http://computers.journalspub.info/index.php?journal=JDSA&page=article&op=view&path%5B%5D=79

https://arxiv.org/format/1908.03042

E-LEARNING RESOURCES:

http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-851-advanced-data-structures-spring-2012/

https://www.studytonight.com/data-structures/introduction-to-data-structures

https://cs.lmu.edu/~ray/notes/algds/

https://www.cs.cmu.edu/~adamchik/15-121/lectures/Arrays/arrays.html

https://www.programiz.com/dsa/linked-list

https://www.cs.cmu.edu/~adamchik/15121/lectures/Stacks%20and%20Queues/Stacks%20and%20Queues.html

https://www.hackerearth.com/practice/algorithms/graphs/graph-representation/tutorial/

https://www.tutorialride.com/data-structures/trees-in-data-structure.htm

https://www.tutorialspoint.com/data_structures_algorithms/algorithms_basics.htm

COURSE OUTCOMES : Upon successful completion of Data Structures and Algorithm students will be able to

CO No.	CO Statement
CO 1	Identify the data and apply the suitable concepts of data structure in programming.
CO 2	Demonstrate linked list and its operations for programming.
CO 3	Explain and utilize the concepts of stack and queue for programming.
CO 4	Compare the data in the required format using search and sort techniques.
CO 5	Ability to analyze and check the algorithms.

MAPPING OF COURSE OUTCOMES WITH PROGRAMME SPECIFIC OUTCOMES

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	2	3	2	3	3
CO 2	2	3	3	3	3
CO 3	2	3	3	3	3
CO 4	2	3	3	3	3
CO 5	2	3	3	3	3
Average	**2**	**3**	**2.8**	**3**	**3**

KEY: **S**TRONGLY CORELATED-3 ,**M**ODERATELY CORELATED-2, **W**EAKLY CORELATED-1, **N**O CORELATION-0

TEACHING METHODOLOGY:

Lecture (Chalk and Talk-LCD), Flipped Learning/Blended Classroom-E Content, Videos, Problem Solving-Group Discussion, Quiz-Seminar, Peer Learning, Field Visits, Self-Study Papers.

QUESTION PAPER PATTERN:

Knowledge Level	Section	Word Limit	Marks	Total	Special Instructions if any
K 1	A-10X2 marks	50	20	100	-
K1, K 2	B-5/8x7 marks	200	35		
K2, K 3	C-3/5x15 marks	500	45		

SEMESTER V
ALGEBRAIC STRUCTURES

TOTAL HOURS: 75 **COURSE CODE: MC18/5C/ALS**

CREDITS: 4 **L-T-P: 3-2-0**

COURSE OBJECTIVES

Enable the students to

1. Present the relationships between abstract algebraic structure groups & subgroups with familiar number system such as integers and real numbers.
2. Impart knowledge of normal and quotient subgroups.
3. Understand the relation between groups and permutation by Cayley's theorem.
4. Learn the extended concept of group & field such as rings and its properties.
5. Introduce the concept of ideals and its types to define Euclidean ring and unique factorization theorem.

COURSE OUTLINE:

UNIT I : Groups –Subgroups. (15 hrs)

UNIT II: A Counting Principle –Normal subgroups –Quotient groups. (15 hrs)

UNIT III: Homomorphism –Isomorphism- Automorphism - Cayley's theorem. (15hrs)

UNIT IV: Rings: Definitions- Examples - Some Special Classes of rings- Homomorphism- Isomorphism. (15hrs)

UNIT V: Ideals and Quotient Rings-Maximal Ideals, Principal Ideals, Definition of Euclidean Ring, Unique Factorization Theorem (Theorem 3.7.2 only) (15hrs)

RECOMMENDED TEXT:

I.N.Herstein (1989) Topics in Algebra(2^{nd} edition) Wiley Eastern Ltd. New Delhi.

Chapter-2: Sec2.1 to 2.9 (except applications1 and 2 of section 2.7, Examples 2.8.1 & 2.8.2 and applications of section 2.9),
Chapter-3: Sec 3.1 to 3.5, 3.7 (definition and theorem 3.7.2 only)

REFERENCE BOOKS:

1. Joseph Gallian, Contemporary Abstract Algebra 8th Edition, Brooks/Cole, Cengage Learning, USA.
2. John B Fraleigh, A First Course in Abstract Algebra 7th Edition, Pearson Education in South Asia.
3. S. Arumugam, A.ThangapandiIssac, Modern algebra, New Gamma Publishinghouse, Palayamkottai.
4. K. ViswanathaNaik, Modern algebra, Emerald Publishers.
5. Vijay K Khanna, S K Bhambri, A Course in Abstract Algebra 4th Edition, Vikas Publishing House Pvt Ltd.

JOURNALS

https://link.springer.com/chapter/10.1007%2F978-1-4684-9458-7_6

https://www.researchgate.net/publication/270222541_Group_Algebra_and_Coding_Theory

https://www.jstor.org/stable/27956028?seq=1#page_scan_tab_contents

E-LEARNING RESOURCES:

https://www.mathsisfun.com/sets/groups-introduction.html

http://www.math.niu.edu/~beachy/aaol/groups2.html

https://ysharifi.wordpress.com/tag/cayleys-theorem/

https://www.emathzone.com/tutorials/group-theory/introduction-to-rings-in-algebra.html

https://study.com/academy/lesson/field-theory-definition-examples.html#lesson

https://www.bubblyprimes.com/prime-factorization/

COURSE OUTCOMES : Upon successful completion of Algebraic Structures students will be able to

CO No.	CO Statement
CO 1	Demonstrate the importance of algebraic properties and definitions.
CO 2	Explain the equivalence relation between sets and equivalence classes to form a normal subgroup and quotient group.
CO 3	Demonstrate the embedding of any group into a group of permutations.
CO 4	Identify the rings and analyse the basic theoretical proofs.
CO 5	Formulate any given integer either as prime or product of primes in unique way.

MAPPING -COURSE OUTCOMES WITH PROGRAMME SPECIFIC OUTCOMES

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	3	3	3	2	2
CO 2	3	3	3	2	2
CO 3	3	3	2	2	2
CO 4	3	3	2	2	2
CO 5	3	3	3	2	2
Average	**3**	**3**	**2.6**	**2**	**2**

KEY: **S**TRONGLY CORELATED-3 ,**M**ODERATELY CORELATED-2, **W**EAKLY CORELATED-1, **N**O CORELATION-0

TEACHING METHODOLOGY:

Lecture (Chalk and Talk-LCD), Flipped Learning/Blended Classroom-E Content, Videos, Problem Solving-Group Discussion, Quiz-Seminar, Peer Learning, Field Visits, Self-Study Papers.

QUESTION PAPER PATTERN:

Knowledge Level	Section	Word Limit	Marks	Total	Special Instructions if any
K 1	A-10X2 marks	50	20	100	-
K1, K 2	B-5/8x7 marks	200	35		
K2, K 3	C-3/5x15 marks	500	45		

SEMESTER V
PYTHON PROGRAMMING (THEORY)

TOTAL HOURS: 75 **COURSE CODE: MC18/5C/PYT**

CREDITS : 3 **L T P : 2 3 0**

COURSE OBJECTIVES

Enable the students to

1. Impart knowledge and skill in getting started with Python basic concepts.
2. Expose to the concepts of sequences, string and built-in-fuctions of python.
3. Introduce the various control statements and loopings for decision making.
4. Study the exceptions and error handling in program execution.
5. Gain the knowledge on file management in Python Programming.

COURSE OUTLINE:

UNITI : Introduction to Python – Origins – Features – Downloading and Installing Python – Running Python – Python Documentation. Getting Started – Program Output statement – Program Input function – Python Basics – Statements and syntax – Variable Assignment – Identifiers – Numbers – Introduction – Integers – Double Precision Floating Point Numbers – Complex Numbers – Operators – Built-in functions for all numeric types.

(15hrs)

UNITII: Sequences: Strings, Lists and Tuples – Sequences – Strings – Strings and Operators – String-Only Operators – Built-in Functions – String Built-in Methods – Lists – Operators - Built-in Functions – List Type Built-in Methods – Tuples – Tuple Operators and Built-in Functions - Mapping and Set Types: Dictionaries – Mapping Type Operators – Mapping Type Built-in Functions and Built-in Methods– Dictionary Keys. (15 hrs)

UNIT III: Conditionals and Loops – If statement – else statement – elif statement – Conditional expressions – while statement – for statement – break statement – Continue statement – pass statement - Functions and Functional Programming – Calling Functions – Creating Functions – Passing Functions – Formal Arguments – Variable-Length Arguments. (15 hrs)

UNIT IV: Errors and Exceptions – Exceptions in Python – Detecting and Handling Exceptions Context Management – with statement – Raising Exceptions – Modules – What are Modules? – Modules and Files – Namespaces – Importing Modules – Features of Module - Import – Module Built-in Functions – Packages – Other Features of Modules

(15 hrs)

UNIT V: Files and Input / Output: File Objects – File Built-in Functions – File Built-in Methods – File Built-in Attributes – Command-Line Arguments - File System – Object-oriented Programming – Introduction – Classes – Class Attributes – Instances– Instance Attributes – Binding and Method Invocation – Subclassing Inheritance.

(15 hrs)

RECOMMENDED TEXT

Wesley J. Chun, "Core Python Programming", 2nd Edition, Pearson Education LPE, New Delhi, 2007.

REFERENCE BOOKS:

1. Mark Summerfield,Programming in Python 3, Pearson Education LPE, New Delhi, 1996.
2. Python Programming,Brain draper,kindle unlimited pvt.ltd.
3. Core Python Programming,Dr.R.Nageswara Rao, dreamtech pvt ltd. Kindle.
4. The complete reference on Python,Martin.C.Brown MAC Graw Hill pvt.ltd.
5. Coding for beginers using Python, Louie Stowell, kindle publishing pvt.ltd.

JOURNALS:

Python to learning-IOP Science
Python – Fastest learning Programming Language - IRJET

E-LEARNING SOURCES :

www.udemy.com/Python/Online-Course
https://www.educba.com/python-programming-beginners-tutorial/
https://en.wikiversity.org/wiki/Python_Concepts
https://www.tutorialspoint.com/python/
https://www.w3resource.com/python-exercises/math/

COURSE OUTCOMES: Upon successful completion of Python Programming students will be able to

CO No.	CO Statement
CO 1	Analyze data and understand the basic concepts in Python.
CO 2	Apply the concept of sequences, string and built-in-fuction of python for program development and execution.
CO 3	Identify the data and use correction control statements for executing the inputs.
CO 4	Apply the knowledge of error correction to execute the python program
CO 5	Formulate the file management in Python Programming.

MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	2	2	3	3	3
CO2	2	3	3	3	3
CO3	2	2	3	3	3
CO4	2	2	2	3	3
CO5	2	2	3	3	2
AVERAGE	2	2.2	2.8	3	2.8

KEY: **S**TRONGLY CORELATED-3 **M**ODERATELY CORELATED-2 **W**EAKLY CORELATED-1 **N**O CORELATION-0

TEACHING METHODOLOGY:

Lecture (Chalk and Talk-LCD), Flipped Learning/Blended Classroom-E Content, Videos, Problem Solving-Group Discussion, Quiz-Seminar, Peer Learning, Field Visits, Self-Study Papers.

QUESTION PAPER PATTERN:

Knowledge Level	Section	Word Limit	Marks	Total	Special Instructions if any
K 1	A-10X2 marks	50	20	100	-
K1, K 2	B-5/8x7 marks	200	35		
K2, K 3	C-3/5x15 marks	500	45		

SEMESTER V
PYTHON PROGRAMMING (PRACTICALS)

TOTAL HOURS: 45 **COURSE CODE: MC18/5C/PR3**

CREDITS : 1 **LTP : 0 0 3**

COURSE OBJECTIVES

Enable the students to

1. Impart knowledge and skill in getting started with Python basic concepts.
2. Expose to the concepts of sequences, string and built-in-function of python.
3. Introduce the various control statements and looping for decision making.
4. Study the exceptions and error handling in program execution.
5. Gain the knowledge on file management in Python Programming.

PRACTICAL PROGRAMS

1. Program for System configuration
2. Working with Strings
3. Working with Lists
4. Working with Tuples
5. Working with Dictionary
6. Working with conditional loops – if, else, elif
7. Working with conditional expressions – for, while, break, continue
8. Implementing programs on functions
9. Working with function – formal arguments and variable-length arguments
10. Working with Detecting and Handling Exception
11. Working with modules
12. Working with Built-in Functions
13. Working with file handling
14. Working with classes
15. Working with Inheritance

RECOMMENDED TEXT

Wesley J. Chun, "Core Python Programming", 2nd Edition, Pearson Education LPE, New Delhi, 2007.

REFERENCE BOOKS:

1. Mark Summerfield,Programming in Python 3, Pearson Education LPE, New Delhi, 1996.
2. Python Programming,Brain draper,kindle unlimited pvt.ltd.
2. Core Python Programming,Dr.R.Nageswara Rao, dreamtech pvt ltd. Kindle.
3. The complete reference on Python,Martin.C.Brown MAC Graw Hill pvt.ltd.
4. Coding for beginers using Python, Louie Stowell, kindle publishing pvt.ltd.

JOURNALS:

Python to learning-IOP Science
Python – Fastest learning Programming Language - IRJET

E-LEARNING SOURCES :

www.udemy.com/Python/Online-Course
https://www.educba.com/python-programming-beginners-tutorial/
https://en.wikiversity.org/wiki/Python_Concepts
https://www.tutorialspoint.com/python/
https://www.w3resource.com/python-exercises/math/

COURSE OUTCOMES: Upon successful completion of Python Programming – Practical students will be able to

CO No.	CO Statement
CO 1	Analyze data and understand the basic concepts in Python.
CO 2	Apply the concept of sequences, string and built-in-fuction of python for program development and execution.
CO 3	Identify the data and use correction control statements for executing the inputs.
CO 4	Apply the knowledge of error correction to execute the python program
CO 5	Formulate the file management in Python Programming.

MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	2	2	3	3	3
CO2	2	3	3	3	3
CO3	2	2	3	3	3
CO4	2	2	2	3	3
CO5	2	2	3	3	2
AVERAGE	2	2.2	2.8	3	2.8

KEY: **S**TRONGLY CORELATED-3 **M**ODERATELY CORELATED-2 **W**EAKLY CORELATED-1 **N**O CORELATION-0

TEACHING METHODOLOGY:

Lecture (Chalk and Talk-LCD), Flipped Learning/Blended Classroom-E Content, Problem Solving-Group Discussion, Quiz-Seminar, Peer Learning, Field Visits, Self-Study Papers.

Question Paper Pattern

Duration – 3 hours**.**

Maximum marks – 100 (Internal 40 + External 60)

Practical Examination – 60 (2 x 30)

One Internal Examiner and one External Examiner to be appointed to conduct the practical examination.

SEMESTER V

OPERATIONS RESEARCH – I

TOTAL HOURS: 90 **COURSE CODE: MC18/5E/OR1**

CREDITS: 5 **L-T-P: 3 3 0**

COURSE OBJECTIVES:

Enable the students to

1.Introduce concepts based on optimization.

2. Study in detail the various concepts of optimization.

3. Learn the concept of optimization using Transportation Techniques.

4. Optimise the allocation of resources and minimize the cost using assignment.

5. Study the Mathematical models of strategic interactions between rational decision makers.

COURSE OUTLINE:

UNIT I: LINEAR PROGRAMMING

General LPP- Mathematical formulation-Solution for LPP By Graphical Method and Simplex Method (finite optimal solution, unbounded solution, alternative optimal solution)- Slack and surplus variables – Solution for LPP with unrestricted variables
Chapter 6: Sections 6.1 - 6.12 (20hrs)

UNIT II: LINEAR PROGRAMMING

Artificial Variable Technique- Big-M Method (Charner's Penalty Method) – Concept of Duality- Dual theorem (only statement)- Reading solution of the dual from the final simplex table of the primal and vice-versa
Chapter 6: Section 6.23- 6.28, 6.31,6.33,6.34 (20hrs)

UNIT III: TRANSPORTATION PROBLEMS

Mathematical formulation- North-West corner Rule - Least cost Method- Vogel's approximation method- Optimality test
Chapter 9 : Section 9.1- 9.7 (20 hrs)

UNIT IV: ASSIGNMENT PROBLEMS

Hungarian method of solving an assignment problem – Unbalanced assignment problems – Travelling Salesman (routing) problem
Chapter 8 : Section 8.1 – 8.5, Chapter 10 : Section 10.9 (15hrs)

UNIT V: GAME THEORY

Two persons zero sum games, the Maxmin- Minmax principle, Saddle point and Value of games, Games without saddle points, Pure and mixed strategies, Properties of optimal mixed strategies, Dominance property, Graphical method for 2 X norm X2 games
Chapter 12 : Section 12.1 – 12.16 (15 hrs)

RECOMMENDED TEXTS:

1. R.K. Gupta, Operations Research, Krishna Prakash

REFERENCE BOOKS:

1. Taha, Operation Research, Printice Hall, New Delhi.
2. Springer series in Operations Research ,George S. Fishman, Monte Carlo.
3. Kalavathy , Operations Research Vikas Publishing House Pvt .Ltd.
4. Gupta P.K &Hira D.S ,Problems in Operations Research, S.Chand& Co, Delhi
   S.D. Sharma, Operations Research, KedharNath Ram Nath& co, Meerut
5. V.Sundaresan, K.S. Ganapathy Subramanian, &K.Ganesan, Resource Management Techniques (Operations Research), A.R. Publications, Nagapattinum District .

JOURNALS:

International journal of Operational Research (Inderscience)
European journal of Operations Research(Elsevier)

E-LEARNING SOURCES:

http://www.yourarticlelibrary.com/linear-programming/simplex-method-of-linear-programming/34866

https://en.wikipedia.org/wiki/Big_M_method

https://en.wikipedia.org/wiki/Dual_linear_programhttps://www.linearprogramming.info/vogel-approximation-method-transportation-algorithm-in-linear-programming/

https://www.linearprogramming.info/northwest-corner-method-transportation-algorithm-in-linear-programming/

https://businessjargons.com/least-cost-method.html

https://en.wikipedia.org/wiki/Hungarian_algorithm

https://en.wikipedia.org/wiki/Min-max_theorem

https://www.slideshare.net/Anupamthecooldude/game-theory-and-principle-of-dominance

COURSE OUTCOMES: Upon successful completion of Operations Research – I students will be able to

CO No.	CO Statement
CO 1	Analyse and study the concepts in linear programming problems to optimize the solution.
CO 2	Examine, Analyse , formulate and evaluate the optimal solutions using various methods in linear programming.
CO 3	Evaluate the optimal solution for various industry oriented problems using quantitative and qualitative tools like Modi‘s method
CO 4	Compute the optimal solution by using Hungarian method to minimize the cost.
CO 5	Analyse the application of game theory in various fields and obtain the best solution to optimize the function.

MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	3	3	3	3
CO2	3	3	2	3	3
CO3	3	3	3	3	2
CO4	3	3	2	3	3
CO5	3	2	3	2	2
AVERAGE	3	2.8	2.6	2.8	2.6

KEY: **S**TRONGLY CORELATED-3 **M**ODERATELY CORELATED-2**W**EAKLY CORELATED-1 **N**O CORELATION-0

TEACHING METHODOLOGY:

Lecture (Chalk and Talk-LCD), Flipped Learning/Blended Classroom-E Content, Videos, Problem Solving-Group Discussion, Quiz-Seminar, Peer Learning, Field Visits, Self-Study Papers.

QUESTION PAPER PATTERN:

Knowledge Level	Section	Word Limit	Marks	Total	Special Instructions if any
K 1	A-10X2 marks	50	20	100	-
K1, K 2	B-5/8x7 marks	200	35		
K2, K 3	C-3/5x15 marks	500	45		

SEMESTER – VI

PROGRAMMING IN JAVA – THEORY

TOTAL HOURS: 90 **COURSE CODE: MC18/6C/JAV**

CREDITS: 3 **L-T-P: 2 - 4 - 0**

COURSE OBJECTIVES

Enable the students to

1. Introduce the concept of object oriented programming and to enable the students to understand the introduction of Java Programming.
2. Impart knowledge in basic concepts of Java and learn about control statements like if, if else and for.
3. Study about decision making and looping, classes, methods and strings.
4. Enable the students to understand about interfaces and packages.
5. Impart knowledge about multithreading, Exceptions, Applet and Graphic programming.

COURSE OUTLINE:

UNIT I: Introduction to Java- Java features- Difference between Java and C & Java and C++ , Java and World Wide Web, Introduction to Java language, Java program structure, Java tokens, Java statements, Java virtual machine, Command line arguments.

(15hrs)

UNIT II: Constants, variables, Data types, Type casting, Getting values to variables, Standard default values, Operators and Expressions, Decision making and Branching – if , if-else, nested if, elseif ladder, switch, ?: operator

(20 hrs)

UNIT III: Decision making and looping – while, do, for, jumps in loops, Labelled loops, Classes and Objects, Methods and Strings. (20hrs)

UNIT IV: Interfaces, Multiple Inheritance, Packages, Putting classes together. (15 hrs)

UNIT V: Multi threading programming, Managing errors and exceptions – Applet programming, Graphic programming. (20hrs)

RECOMMENDED TEXT:

1. E. Balagurusamy , Programming with Java, second edition, Tata- McGraw-hill publishing co. Ltd.

REFERENCES:

1. Herbert Schildt , The Complete Reference Java 5th edition , Tata- McGraw-hill publishing co. ltd
2. Y. Daniel ziang , An Introduction to Java Programming, Prentice – Hall of India Pvt. Ltd.
3. Core Java Programming A Practical Approach, Tushar B. Kute.
4. Java: Programming Basicsfor Absolute Beginners, Nathan Clark.
5. Core Java Fundamenntals Volume – 1, Cay s. Horstmann, Eleventh Edition.

E-LEARNING SOURCES:

https://howtodoinjava.com

https://www.programiz.com/java-programming

https://www.theserverside.com/javaprogramming

https://www.guru99.com/java-platform.html

https://www.technopedia.com/java

COURSE OUTCOMES: Upon successful completion of Programming in Java students will be able to

CO No.	CO Statement
CO 1	Explain the basic concepts of object oriented programming and enable students to understand about introduction of Java programming.
CO 2	Discuss about data types operators and decision making statements like if, if else, else if ladder etc.
CO 3	Use the concept of decision making and looping, classes, objects, methods, and strings to develop programs.
CO 4	Analyze and to understand the concepts of interfaces inheritance and packages.
CO 5	Explain and develop programs in applet and Graphic Programming, Multithreading and Managing errors and Exceptions.

MAPPING - COURSE OUTCOME WITH PROGRAM SPECIFIC OUTCOMES

CO / PO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	2	2	2	2	2
CO 2	2	3	3	3	3
CO 3	2	2	3	3	3
CO 4	2	3	3	3	3
CO 5	2	3	3	3	3
Average	**2**	**2.6**	**2.8**	**2.8**	**2.8**

KEY:**S**TRONGLY CORELATED-3 **M**ODERATELY CORELATED-2**W**EAKLY CORELATED-1 **N**O CORELATION-0

TEACHING METHODOLOGY:

Lecture (Chalk and Talk-LCD), Flipped Learning/Blended Classroom-E Content, Videos, Problem Solving-Group Discussion, Quiz-Seminar, Peer Learning, Field Visits, Self-Study Papers.

QUESTION PAPER PATTERN:

Knowledge Level	Section	Word Limit	Marks	Total	Special Instructions if any
K 1	A-10X2 marks	50	20	100	-
K1, K 2	B-5/8x7 marks	200	35		
K2, K 3	C-3/5x15 marks	500	45		

x

SEMESTER – VI
PROGRAMMING IN JAVA – PRACTICALS

TOTAL HOURS: 45 **COURSE CODE: MC18/6C/PR4**
CREDITS: 1 **L-T-P: 0 - 0 - 3**

COURSE OBJECTIVES

Enable the students to

1. Develop programming skills using the concept of classes and objects, arrays multithreading and exceptional handling.
2. Impart the knowledge of writing algorithm for programming.

COURSE OUTLINE:

Implement the following programming concepts using Java

1. Classes and objects
2. Arrays
3. Multithreading
4. Exception handling
5. Inheritance
6. Applet programming

Two or three programs under each heading

RECOMMENDED TEXT:

1. E. Balagurusamy , Programming with Java, second edition, Tata- McGraw-hill publishing co. Ltd.
2. Herbert Schildt, Dale Skrien, Java Fundamentals, Mc Graw Hills Publications.

REFERENCES:

1. Herbert Schildt , The Complete Reference Java 5th edition , Tata- McGraw-hill publishing co. ltd
2. Y. Daniel Ziang , An Introduction to Java Programming, Prentice – Hall of India Pvt. Ltd.
3. Core Java Programming A Practical Approach, Tushar B. Kute.
4. Java: Programming Basics for Absolute Beginners, Nathan Clark.
5. Core Java Fundamentals Volume – 1, Cay s. Horstmann, Eleventh Edition

JOURNALS:

http://www.ijecs.in/index.php/ijecs/article/view/1053

E-LEARNING SOURCES:

https://www.javapoint.com/java-programs
https://beginenersbook.com/2017/09/java-examplea
https://www.programiz.com/java-pgrogramming/examples
https://www.programmingsimplified.com/java-source-codes
https://javatutoring.com/java-programs

COURSE OUTCOMES: Upon successful completion of Programming in Java – Practical students will be able to

CO No.	CO Statement
CO 1	Prepare different programs using if, if else, for , arrays, functions and pointers.
CO 2	Create programs using inheritance and Applet programming.

MAPPING- COURSE OUTCOMES WITH PROGRAM SPECIFIC OUTCOMES

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	2	3	3	3	3
CO 2	2	3	3	3	3
Average	**2**	**3**	**3**	**3**	**3**

KEY:**S**TRONGLY CORELATED-3 **M**ODERATELY CORELATED-2**W**EAKLY CORELATED-1 **N**O CORELATION-0

TEACHING METHODOLOGY

Lecture (Chalk and Talk-LCD), Flipped Learning/Blended Classroom-E Content, Problem Solving-Group Discussion, Quiz-Seminar, Peer Learning, Field Visits, Self-Study Papers

QUESTION PAPER PATTERN

Duration- 3 hours
Maximum Marks- 100 (External – 60, Internal – 40)
Practical Examination- 60 (2 x 30)
One internal and one external should be appointed to conduct the examination

SEMESTER VI

DISCRETE MATHEMATICS

TOTAL HOURS: 75 **COURSE CODE: MC18/6E/DIM**
CREDITS: 4 **L-T-P: 3 2 0**

COURSE OBJECTIVES:

Enable students to

1. Evaluate basic logic statements including compound statements, implications, inverses, converses, and contra positives using truth tables and the properties of logic.
2. Appreciate the basic principles of lattices, and its properties.
3. Simplify expression using the properties of Boolean algebra; basic principles of Boolean algebra
4. Learn core ideas of graph definition and graph operations in graph theory.
5. Study the theorem of Eulerian and Hamiltonian graphs.

COURSE OUTLINE:

UNIT I : Propositional Calculus
Tautology and contradiction – Equivalence of formulae -Duality law – Tautological implications - Normal forms – Disjunctive normal forms – Conjunctive normal forms. (15 hrs)

UNIT II: Lattices - Introduction – Principle of duality - Properties of Lattices – sub Lattice – Distributive Lattice modular lattices – Bounded lattice - Complemented lattice. (15 hrs)

UNIT III: Boolean Algebra
Definition – Other basic laws of Boolean Algebra – Principle of duality for Boolean Algebras – ATOM definition - ATOMIC Boolean algebra – Finite BooleanAlgebra. Boolean expression – Definition – Boolean function – Literal – Minterm and Maxterm, Normal forms and Canonical forms. (15 hrs)

UNIT IV:Graphs, Subgraphs and Connectedness
Introduction – Definition and examples – Degrees – Subgraphs – Isomorphisms – Walks, Trails and Paths –Connectedness and Components – blocks – Connectivity. (15 hrs)

UNIT V: Eulerian and Hamiltonian Graphs
Introduction -Eulerian graphs – Hamiltonian graphs. (15 hrs)

RECOMMENDED TEXTSBOOKS:

1. Dr. S.P. Rajagopalan, Dr.R. Sattanathan, Discrete Mathematics, Margham Publications, Chennai -17, 2011
2. S.Arumugam, S.Ramachandran: Invitation to graph theory, Scitech Publications (India) Pvt.ltd, Chennai -17, 2001.

REFERENCE BOOKS:

1. Dr. M. K. Venkataraman, Dr. S.Sridharan and Dr. M. Chandrasekeran, Discrete Mathematics, the National Publishing Company.
2. Dr. G. Balaji, Discrete Mathematics, G.Balaji Publishers.
3. Seymour Lipschutz , Marc Laras Lipson , Varsha H. Patil, Discrete Mathematics (Schaum's Outlines) Seymour Lipschutz(2017).Trembley
4. J.P and Manohar .R , "Discrete Mathematical Structures with Applications to Computer Science", Tata Mcgraw – Hill Publication Co., limited, New Delhi, 2003.
5. Ralph.P. Grimaldi, " Discrete and Combinatorial Mathematics: An Applied Introduction"4th edition, Pearson Eduncation Asia, Delhi 2002.

JOURNALS:

Discrete Mathematics
Journal Of Graph Theory

E-LEARNING RESOURCES:

https://www.zweigmedia.com/RealWorld/logic/logic2.html
https://en.wikipedia.org/wiki/Lattice_(order)
https://en.wikipedia.org/wiki/Boolean_algebra_(structure)
http://www.cs.rpi.edu/~goldberg/14-CC/Notes/notes-graph.pdf
http://compalg.inf.elte.hu/~tony/Oktatas/TDK/FINAL/Chap%203.PDF

COURSE OUTCOMES: Upon successful completion of Discrete Mathematics students will be able to

CO No.	CO STATEMENT
CO 1	Prepare Mathematical concepts in terms of predicates, quantifiers, and logical connectives.
CO 2	Analyse and Identify the knowledge of lattices and its properties.
CO 3	Evaluate Boolean functions and simplify expressions using the properties of Boolean algebra.
CO 4	Learn to understand, analyse and develop a strong background in graph theory
CO 5	Identify the knowledge of Eulerian and Hamiltonian theorem using terminology of graphs.

MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	2	3	3	2
CO2	3	3	3	3	2
CO3	3	2	2	3	2
CO4	3	3	3	3	2
CO5	3	2	2	3	2
AVERAGE	**3**	**2.4**	**2.6**	**3**	**2**

KEY: **S**TRONGLY CORELATED-3 **M**ODERATELY CORELATED-2**W**EAKLY CORELATED-1 **N**O CORELATION-0

TEACHING METHODOLOGY:

Lecture (Chalk and Talk-LCD), Flipped Learning/Blended Classroom-E Content, Videos, Problem Solving-Group Discussion, Quiz-Seminar, Peer Learning, Field Visits, Self-Study Papers.

QUESTION PAPER PATTERN:

Knowledge Level	Section	Word Limit	Marks	Total	Special Instructions if any
K 1	A-10X2 marks	50	20	100	-
K1, K 2	B-5/8x7 marks	200	35		
K2, K 3	C-3/5x15 marks	500	45		

SEMESTER VI

OPERATIONS RESEARCH – II

TOTAL HOURS: 90 **COURSE CODE: MC18/6E/OR2**

CREDITS: 5 **L-T-P: 3 3 0**

COURSE OBJECTIVES:

Enable the students to

1. Introduce the concepts of inventory to minimize the cost.

2. Study the concepts of profit maximization and price breaks using inventory models.

3. Design systems to enable to obtain optimality using queueing theory.

4. Plan , monitor to control and to minimize the cost ,the concept of network analysis is introduced.

5. Analyse the tasks involved in complex projects to obtain optimality

COURSE OUTLINE:

UNIT I: INVENTORY THEORY

Introduction- Variables in an inventory problem - Need of inventory- Inventory problems - Advantages and disadvantages of inventory- Classification of inventory Models - Economic lot size models

Model I: Economic lot size model with uniform rate size demand, Infinite rate of production and no shortages

Model II: Order level model with Uniform rate of demand (Q to be fulfilled in constant time) infinite rate of production and having shortages
to be fulfilled.

Book 1: Chapter 3: Section 3.1- 3.9, 3.13 (15 hrs)

UNIT II: INVENTORY THEORY

Model III: The general single period model of profit maximization with time independent cost - Discrete case only.

Model IV: Purchase Inventory model with – One price break – Two price breaks. (derivation excluded),Newspaper boy problem (no derivation) problems only.

Book 1: Chapter 3: 3.20, 3.23 (20 hrs)

UNIT III: QUEUING THEORY

General concepts and definitions- Classification of queues-Poisson process, Models (No derivations, only problems)

i. (M/M/1) : (∝/ FCFS)
ii. (M/M/1) : (N/ FCFS)
iii. (M/M/S) : (∝/ FCFS)

Book 1 : Chapter 5: Section 5.1- 5.6, 5.11, 5.12, 5.14, 5.15,5.17,5.18 (15 hrs)

UNIT IV: NETWORK ANALYSIS

Introduction- Network diagram representation - Rules for drawing Network diagram- labeling: Fulkerson's 'I-J' rule- time estimates and critical path - In Network analysis- Forward pass, Backward pass computation- Determination of floats and slack times- Determination of critical path.

Book 2: Chapter 13: Section 13.1 – 13.8 (15 hrs)

UNIT V: PROJECT EVALUATION AND REVIEW TECHNIQUES(PERT)

Optimistic time- most likely Time - Pessimistic time- Expected time-variance- Rules for finding variance of events problems in PERT

Book 2: Chapter 13: Section 13.9, 13.10 (25 hrs)

RECOMMENDED TEXTS:

R.K. Gupta, Operations Research, 12th edition, Krishna Prakash

REFERENCE BOOKS:

1. Taha , , Operations Research, Printice Hall, New Delhi.
2. Springer series in Operations Research ,George S. Fishman, Monte Carlo
3. Kalavathy .S, Operations Research Vikas Publishing House Pvt Ltd
4. Gupta P.K &Hira D.S (2000) Problems in Operations Research, S.Chand& Co, Delhi
5. S.D. Sharma, Operations Research, 8th edition , KedharNath Ram Nath& co, Meerut
6. V.Sundaresan, K.S. Ganapathy Subramanian, &K.Ganesan, Resource ManagementTechniques (Operations Research), Reprint June 2002, A.R. Publications, Nagapattinum District.
7.

JOURNALS:

International journal of Industrial and Operations Research
American journal of Operations Research

E-LEARNING SOURCES:

https://www.whatissixsigma.net/inventory-model-types/
http://ecoursesonline.iasri.res.in/mod/resource/view.php?id=4959
https://nptel.ac.in/courses/112107142/part3/inventory/lecture2.htm
http://www.zeepedia.com/read.php?inventory_control_order_quantity_with_price-break_operations_research&b=66&c=15
https://www.slideshare.net/goyalrama/queuing-model

http://www.yourarticlelibrary.com/industrial-engineering-2/fulkersons-rule-for-numbering-the-events-with-diagram/90595
https://en.wikipedia.org/wiki/Program_evaluation_and_review_technique

COURSE OUTCOMES: Upon successful completion of Operations Research – II students will be able to

CO No.	CO Statement
CO 1	Study and analyse the concepts of inventory and various inventory models to minimize the cost.
CO 2	Analyse and evaluate the profit using inventory models.
CO 3	Analyse the various queueing models and Evaluate the various system performance measures of Queueing.
CO 4	Analyse and ensure optimum utilization of human and other resources.
CO 5	Compute the minimum time required to complete the complex projects using the PERT Technique.

MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	3	3	3	2
CO2	3	3	3	3	3
CO3	3	3	3	2	2
CO4	3	3	3	2	2
CO5	3	3	3	2	2
AVERAGE	3	3	3	2.4	2.2

KEY:**S**TRONGLY CORELATED-3 **M**ODERATELY CORELATED-2**W**EAKLY CORELATED-1 **N**O CORELATION-0

TEACHING METHODOLOGY:

Lecture (Chalk and Talk-LCD), Flipped Learning/Blended Classroom-E Content, Videos, Problem Solving-Group Discussion, Quiz-Seminar, Peer Learning, Field Visits, Self-Study Papers.

QUESTION PAPER PATTERN:

Knowledge Level	Section	Word Limit	Marks	Total	Special Instructions if any
K 1	A-10X2 marks	50	20	100	-
K1, K 2	B-5/8x7 marks	200	35		
K2, K 3	C-3/5x15 marks	500	45		

SEMESTER I

ALLIED MATHEMATICS I (For 1st year B.Sc., Computer Science)

TOTAL HOURS: 90 **COURSE CODE:MC18/1A/AM1// MA18/1A/AM1**

CREDITS: 5 **L-T-P: 3 3 0**

COURSE OBJECTIVES

Enable the students

1. Get equip with the knowledge of matrices and its applications.
2. Understand the concept of reduction formula and integral calculus.
3. Know the principle and concepts of trigonometry.

COURSE OUTLINE:

UNIT I: Matrices:

Eigen values and Eigen vectors, Cayley Hamilton Theorem (No proof) verification of Cayley Hamilton theorem, Inverse of a Matrix using Cayley Hamilton Theorem. (15hrs)

UNIT II: Theory of Equations:

Roots of polynomial Equations, Symmetric functions of roots terms of coefficients, Transformation of equations, Formation of equations, Reciprocal Equations. (22hrs)

UNIT III: Trigonometry:

Expansions of Cos nθ, Sin nθ, Expressions of Cos θ, Sin θ, Tan θ in powers of θ, Hyperbolic functions and Inverse Hyperbolic functions. Real and imaginary parts of sin (α+iβ) , cos (α+iβ), tan (α+iβ), $tan^{-1}(\alpha + i\beta)$. (18 hrs)

UNIT IV: Integral Calculus:

Bernoulli's formula Reduction formulae $\int e^{ax} \cos bx\, dx$, $\int e^{ax} \sin bx\, dx$- $\int \sin^m x \cos^n x\, dx$ (m, n being positive integers), $\int x^m (\log x)^n\, dx$, $\int \cos^m x \cos nx\, dx$, $\int \cos^m x \sin nx\, dx$. (20 hrs)

UNIT V: Fourier Series:

Definition- Finding Fourier coefficients for a given periodicfunctions withperiod 2π- Odd and Even function- Half range series. (15hrs)

RECOMMENDED TEXT:

1. Narayanan and ManicavachagomPillay, Ancillary Mathematics Book I,II, and III Viswanathan Printers and publishers Private limited, Chennai.
2. Dr. A. Singaravelu, Allied Mathematics, 3rd revisied edition, 2011, Meenakshi Agency, Chennai.

REFERENCE BOOKS:

1. P.R.Vittal (2003), Allied Mathematics, Margham Publications,,Chennai.
2. P.Duraipandian and S.Udayabaskaran, (1997) Ancillary Mathematics, vol I &II Muhil Publisher, Chennai.
3. A.Singaravelu and Ramaa, Algebra and Trigonometry, Volume 1, first edition, Menakshi agency.
4. P.Kandasamy and K. Thilagavathy, Mathematics for B.Sc, Volume 2, First edition, S.Chand and co, New Delhi.
5. T.K.Manikavasagam pillai, T.Narayanaa, K.S.Ganapathy, Algebra, Volume 1, Viswanathan Pvt. Ltd.

JOURNALS:

Journals of Mathematical Analysis & Applications-Science Direct
Applied Mathematics & Statistics-Allied Academies

E-LEARNING SOURCES:

http:// www.mathsisfun.com/algebra
http: //m.jagranjosh.com/theory-of-equation
http://www.khanacademy.org/trigonometry
http://www.britannica.com/science/integral-calculus
http://www.math24.net/fourier-series-definitions-typical-example

COURSE OUTCOMES: Upon successful completion of Allied Mathematics – I students will be able to

CO No.	CO Statement
CO 1	Compute Eigen values and Eigen vector of a square matrix and find inverse of matrix using Cayley -Hamilton theorem.
CO 2	Evaluate the roots of the polynomial equation solving the transformation of equation and Reciprocal equation.
CO 3	Evaluate $\cos n\theta, \sin n\theta, \cos\theta, \sin\theta, \tan\theta$ in power of θ . Compute hyperbolic and inverse hyperbolic function.
CO 4	Derive reduction formula and thereby evaluate standard integral

CO 5	Find Fourier series expansion for the given function and evaluate Fourier series for odd and even function.

MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	3	2	2	2
CO2	3	3	3	2	2
CO3	3	3	3	2	2
CO4	3	3	2	2	2
CO5	3	3	2	2	2
AVERAGE	3	3	2.4	2	2

KEY:**S**TRONGLY CORELATED-3 **M**ODERATELY CORELATED-2**W**EAKLY CORELATED-1 **N**O CORELATION-0

TEACHING METHODOLOGY:

Lecture (Chalk and Talk-LCD), Flipped Learning/Blended Classroom-E Content, Videos, Problem Solving-Group Discussion, Quiz-Seminar, Peer Learning, Field Visits, Self-Study Papers.

QUESTION PAPER PATTERN:

Knowledge Level	Section	Word Limit	Marks	Total	Special Instructions if any
K 1	A-10X2 marks	50	20	100	-
K1, K 2	B-5/8x7 marks	200	35		
K2, K 3	C-3/5x15 marks	500	45		

SEMESTER II

ALLIED MATHEMATICS II (For 1st year B.Sc., Computer Science)

TOTAL HOURS: 90 **COURSE CODE:MC18/2A/AM2// MA18/2A/AM2**

CREDITS: 5 **L-T-P: 3 3 0**

COURSE OBJECTIVES

Enable the students to

1. Solve the difference types of linear differential equations
2. Apply Laplace Transform to solve differential equation.
3. Interpolate a value from a given set of data.

COURSE OUTLINES:

UNIT I: Ordinary Differential Equations:

Linear differential equations with constant co-efficient, particular integral of polynomial and Ve^{mx}, where V is a polynomial or sin x or cos x.

(20 hrs)

UNIT II:Partial Differential Equations:

Formation, Complete Integral, Four standard types, Lagrange's Equation, simple problems. (20hrs)

UNIT III:Laplace Transforms:

Laplace Transforms of Standard functions, Simple theorems. (noproof) Inverse Laplace Transforms, solving first order differential equations with constant coefficients using Laplace transform. (20 hrs)

UNIT IV:Vector Analysis:

Introduction, operator∇, Gradient, Directional derivative, unit Normal to surface. Divergence and curl of vectors, solenoidal and irrotational vectors, the operator ∇^2 ,Harmonic functions. (15 hrs)

UNIT V: Interpolation :

Newton's forward and backward formulae for interpolation (no proof) Lagrange's formula for interpolation (No Proof) – Simple problems.

(15 hrs)

RECOMMENDED TEXT:

1. Narayanan and Manicavachagom Pillay, Ancillary Mathematics Book I, II, and III Viswanathan Printers and publishers Private limited, Chennai.

2. Dr.A.Singaravelu, Allied Mathematics, 3rd Revised edition, Meenakshi Agency, Chennai.

REFERENCE BOOKS:

1. P.R.Vittal (2003), Allied Mathematics, Margham Publications, Chennai
2. P.Duraipandian and S.Udayabaskaran, (1997) Ancillary Mathematics, vol I &II Muhil Publisher, Chennai.
3. A.Singaravelu & R.Ramaa, Algebra and Trigonometry, Volume I, First edition, Meenakshi Agency, Chennai.
4. S.Arumugham, Numerical methods, 2nd edition,New Gamma publishing, Palayamkottai.
5. P.R.Vittal,Differential equation and Laplace Transformation, First edition,Margham Publications,Chennai.

JOURNALS:

Journals of Mathematical Analysis & Applications-Science Direct
Applied Mathematics & Statistics-Allied Academies.

E-LEARNING SOURCES:

https://users.math.msu.edu
https://www.maths.ucla.edu
https://www.mathworld.wolfram.com/laplace-transforms
https://www.britannica.com/science/vector-analysis
https://www.britannica.com/science/interpolation

COURSE OUTCOMES: Upon successful completion of Allied Mathematics – II students will be able to

CO No.	CO Statement
CO 1	Solve linear differential equation with constant co-efficient.
CO 2	Recognize the major classification of PDE'S and solve four standard type of PDE.
CO 3	Solve first order differential equation using Laplace and inverse Laplace transform.
CO 4	Determine gradient, divergence and curl of vectors.
CO 5	Analyse and use Newton's forward, backward and Lagrange's formula for interpolation and apply it in real life problems

MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	3	2	2	1
CO2	3	3	3	2	1
CO3	3	3	2	2	1
CO4	3	3	2	2	1
CO5	3	3	3	2	1
AVERAGE	3	3	2.4	2	1

KEY:**S**TRONGLY CORELATED-3 **M**ODERATELY CORELATED-2**W**EAKLY CORELATED-1 **N**O CORELATION-0

TEACHING METHODOLOGY:

Lecture (Chalk and Talk-LCD), Flipped Learning/Blended Classroom-E Content, Videos, Problem Solving-Group Discussion, Quiz-Seminar, Peer Learning, Field Visits, Self-Study Papers.

QUESTION PAPER PATTERN:

Knowledge Level	Section	Word Limit	Marks	Total	Special Instructions if any
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K1, K 2	B-5/8x7 marks	200	35		
K2, K 3	C-3/5x15 marks	500	45		

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SEMESTER I

STATISTICAL METHODS (For 1st year B.C.A)

TOTAL HOURS: 90 **COURSE CODE: MC18/1A/STM**

CREDITS: 5 **L-T-P: 3-3-0**

COURSE OBJECTIVES:

Enable the students to

1. Impart knowledge and skill in probabilities.
2. Study measures of central tendency.
3. Study measures of dispersion.
4. Expose to correlation and regression.
5. Introduce discrete distributions.

COURSE OUTLINE:

UNIT - I: Probability: Trail- Events –Sample spaces-Mutually Exclusive cases- Exhaustive Events- Independent Events-Axiomatic approach to Probability- Additional and Multiplication Theory- Conditional Probability – Baye's theorem (proof Excluded)-Random variables- Discrete and Continuous random variables (one dimensional).
Part – I Chapter – 1, 2. (15 hrs)

UNIT – II: Measures of Central tendency: Arithmetic Mean (Discrete and continuous Series) - Weighted Arithmetic Mean (Discrete and Continuous series)-correcting incorrect Mean –Combined Mean - Median – calculation of Median (Individual and Discrete) – Quartiles(Individual and Discrete) – Mode (Individual and Discrete) – Relation between mean, median and mode.
Part – II Chapter – 5. (20 hrs)

UNIT – III: Measures of Dispersion: Range – Quartile Deviation – Mean Deviation – Standard Deviation – Formula for calculating Standard Deviation – Combined Mean and Standard Deviation – Coefficient of Variation.
Part – II Chapter – 6. (20 hrs)

UNIT – IV: Correlation (one dimension) – Karl Pearson's Coefficient of Correlation -Rank Coefficient – **Regression** – Regression Equation.
Part – I Chapter 8,9. (15 hrs)

UNIT – V: Discrete Distributions – Binomial, Poisson Distribution (Simple

Problems)- Fitting of Binomial Distributions - Fitting of Poisson Distributions- Continuous Distributions – Normal Distributions Simple Problems (derivation excluded).
Part - I Chapter 12, 13, 16 (20 hrs)

RECOMMENDED BOOK:

1. Statistics , R.S.N. Pillai Bagavathi, S.Chand& Company Ltd.

REFERENCE BOOKS:

1. Elements of Mathematical Statistics, S.C.Gupta& V.K. Kapoor,Sultan Chand Publications.
2. Fundamentals of Applied Statistics, S.C.Gupta& V.K. Kapoor,Sultan Chand Publications.
3. Dr.D.C.Sangheti,V.K.Kapor ,Statistics,Sulthan Chand &Sons.
4. J.N.Kapur and H.C.Saxena,Mathematical Statistics,,S.Chand.
5. P.R. Vittal, Mathematical Statistics, Margham Publications

JOURNALS:

Journal of Applied Probability and Statistics-www.isoss.net>japs

E-LEARNING SOURCES:

https://www.hitbullseye.com/Probability-Examples.php

https://www.toppr.com/guides/economics/measures-of-central-tendency/calculation-of-mean-median-and-mode

https://sol.du.ac.in/mod/book/view.php?id=1317&chapterid=1066

https://www.pindling.org/Math/Statistics/Textbook/Examples/Chapter3/chapter3_examples.htm

http://makemeanalyst.com/normal-distribution-binomial-distribution-poisson-distribution/

COURSE OUTCOMES: Upon successful completion of Statistical Methods students will be able to

CO No	CO STATEMENT
CO 1	Understanding the basic probability concepts, random variables, conditional probabilities.
CO 2	Analyse data and compute mean, median and mode.
CO 3	Analyse data and compute mean, quartile, standard deviation and co-efficient of variation.
CO 4	Compute correlation and rank correlation and to find the relation between two variables using regression.
CO 5	Discuss the importance of various distribution and solve problems based on real life conditions.

MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	3	3	2	2
CO2	3	3	3	2	2
CO3	3	3	3	2	2
CO4	3	3	3	2	2
CO5	3	3	3	2	2
AVERAGE	3	3	3	2	2

KEY:**S**TRONGLY CORELATED-3 **M**ODERATELY CORELATED-2**W**EAKLY CORELATED-1 **N**O CORELATION-0

TEACHING METHODOLOGY:

Lecture (Chalk and Talk-LCD), Flipped Learning/Blended Classroom-E Content, Videos, Problem Solving-Group Discussion, Quiz-Seminar, Peer Learning, Field Visits, Self-Study Papers.

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