

**MANONMANIAM SUNDARANAR UNIVERSITY,  
TIRUNELVELI  
UG COURSES – AFFILIATED COLLEGES  
B.Sc. MATHEMATICS**

**(Choice Based Credit System)**

**(with effect from the academic year 2017-2018 onwards)**

Sem	Part	Sub. No	Subject Status	Subject title	Hrs / Week	Cre-dits	Mark				
							Maximum			Passing minimum	
							Int.	Ext.	Tot.	Ext.	Tot.
III	I	13	Language	Tamil/Other Languages	6	4	25	75	100	30	40
	II	14	Language	English	6	4	25	75	100	30	40
	III	15	Core-5	Real Analysis-I	6	4	25	75	100	30	40
		16	Allied-II	Statistics-I	6	3	25	75	100	30	40
				OR Physics/ Chemistry/Computer With Practicals	6	4	25	75	100	30	40
17	Skill Based core	Vector Calculus	4	4	25	75	100	30	40		
	IV	18	Non-major Elective	Any one of the following  1.1) Mathematics for Competitive Examinations- I 1.2 ) Fundamentals of Statistics-I	2	2	25	75	100	30	40
				19	Common	Yoga*	2	2	25	75	100

IV	I	20	Language	Tamil/Other Languages	6	4	25	75	100	30	40
	II	21	Language	English	6	4	25	75	100	30	40
	III	22	Core-6	Abstract Algebra- I	6	4	25	75	100	30	40
		23	Allied-II	Statistics II	6	3	25	75	100	30	40
				OR Physics/ Chemistry/ Computer with Practicals	6	4	25	75	100	30	40
	24	Skill Based Core	Trigonometry, Fourier Series and Laplace Transforms	4	4	25	75	100	30	40	
	IV	25	Non-major Elective	Any one of the following2.1) Mathematics for Competitive Examinations- II	2	2	25	75	100	30	40
2.2) Fundamentals of Statistics II											
	26	Common	Computers for Digital Era*	2	2	25	75	100	30	40	
	V		Extension Activities	NCC/NSS/YRC/YWF/PE	-	1	-	-	-	-	-

## SEMESTER – III

### CORE PAPER –V

#### REAL ANALYSIS - I (90 Hours) (SMMA31)

L	T	P	C
2	4	0	4

#### Objectives:

- To lay a good foundation of classical analysis
- To study the behaviour of sequences and series

#### Unit I      **Real number system :**

The field of axioms, the order axioms, the rational numbers, the irrational numbers, upper bounds, maximum element, least upper bound (supremum). The completeness axiom, absolute values, the triangle inequality. Cauchy – schwartz's inequality. **11L**

#### Unit II      **Sequences :** Bounded sequences – monotonic sequences – convergent sequences – divergent and oscillating sequences – The algebra of limits. **17L**

#### Unit III      Behaviour of monotonic sequences – Cauchy's first limit theorem – Cauchy's second limit theorem – Cesaro's theorem – subsequences - Cauchy sequence – Cauchy's general principle of convergence. **19L**

#### Unit IV      **Series :** Infinite series – $n^{\text{th}}$ term test – Comparison test – Kummer's test – D'Alembert's ratio test – Raabe's test - Gauss test – Root test **23L**

#### Unit V      Alternating series – Leibnitz's test - Tests for convergence of series of arbitrary terms – Multiplication of series- Abel's Theorem-Mertens theorem-Power Series- Radius of convergence **20L**

#### Text Books:

- Arumugam .S and Thengapandi Issac – “sequences and series”, New Gamma publishing House, Palayamkottai – 627 002.
- Tom M. Apostol – Mathematical Analysis, II Edition, Narosa Publishing House, New Delhi (unit I)

#### Book for Reference :

- Goldberg .R – Methods of Real Analysis, Oxford and IBH Publishing Co., New Delhi.

## SEMESTER III

### Skill Based Core

#### Paper – I

### VECTOR CALCULUS (60 Hours) (SSMA3A)

L	T	P	C
4	0	0	4

#### Objectives:

- To provide basic knowledge of vector differentiation and vector integration
- To solve problems related to that

<b>Unit I</b>	Vector point functions – Scalar point functions – Derivative of a Vector & Derivative of sum of vectors – Derivative of product of a Scalar and Vector point function – The vector operator ‘del’ – Gradient <b>13L</b>
<b>Unit II</b>	Divergence – Curl, solenoidal, irrotational vectors – Laplacian operator. <b>12L</b>
<b>Unit III</b>	Integration of point function – Line integral – Surface integral, <b>13L</b>
<b>Unit IV</b>	Volume integral – Gauss divergence theorem (statement only) – Problems. <b>12L</b>
<b>Unit V</b>	Greens theorem and Stoke’s theorem (statements only) – problems. <b>10L</b>

#### Text Book:

- Durai Pandian.P and Laxmi Durai Pandian – Vector Analysis (Revised Edition – Reprint 2005) Emerald Publishers.

#### Books for Reference :

- Dr. S. Arumugam and others – Vector Calculus, New Gamma Publishing House.
- Susan .J.C - Vector Calculus, (4<sup>th</sup> Edn.) Pearson Education, Boston 2012.
- Anil Kumar Sharma, - Text book of Vector Calculus, Discovery Publishing House, 1993.

## INTRODUCTION TO COMPUTERS

(For the Institutions with B.Sc. (Maths) Programme not opting Physics / Chemistry as Allied Subjects with effect from 2017-18 and onwards for Semesters - I & II and also for Semesters - III & IV of the 2016-17 batch )

### **Aim**

The Allied paper is to gain fundamental knowledge in computer

### **Objectives**

- To know the characteristic, parts and applications of computers
- To know the various devices and familiarize with their functions
- To know the usage of internet

### **UNIT I:**

Computer Basics: Introduction, Characteristics of Computers - Generation of Computers, Classification of Computers: Micro computers, Mini Computers, Mainframe, Super Computer, Careers in IT industry. Data representation in Computer: Types of number system, Conversion between Number bases. Coding Schemes: ASCII, EBCDIC, and Unicode.

### **UNIT II:**

Computer Memory and Storage: Introduction, memory hierarchy, Random Access memory (RAM), Read only memory (ROM), RAM, ROM and CPU interaction. Types of Secondary storage devices, Magnetic tape, magnetic disk, types of magnetic disk, optical disk, type of optical disks, USB drives.

### **UNIT III:**

Multimedia Essentials: Introduction, Definition, Building blocks of Multimedia, multimedia system, multimedia applications, Virtual reality, Multimedia and the internet.

### **UNIT IV:**

Operating system: Introduction, definition, Evolution of Operating System, Types of Operating System, Functions of Operating system.

Computer software: definition, categories of Software, Software Piracy.

## **UNIT V:**

The Internet: Introduction, Evolution of Internet – Basic Internet terms – Getting connected to Internet – Internet Applications – Data over Internet.

Emerging trends in IT: Introduction, E-Commerce – Electronic Data Interchange – Mobile Communication – Bluetooth – Global Positioning System – Infrared Communication – Smart Card – Imminent Technologies.

### **Text Book**

Introduction to Computers and Information Technology, Dr. D.Glory Ratna Mary, Mrs. S. Selvanayahi, Dr. V. Joseph Peter, Jupiter Publications

### **Reference Book**

1. Introduction to Computer Science, Second Edition, ITL Education Solutions Ltd, Pearson Education
2. Introduction to Computers, Peter Norton, 7th Edition, Tata McGraw Hill Education
3. Fundamentals of Computers, V.Rajaram, 5th Edition, PHI

**M.S Office –List of Practicals**

**(For the Institutions with B.Sc. (Maths) Programme not opting Physics / Chemistry as Allied Subjects with effect from 2017-18 and onwards for Semesters - I & II and also for Semesters - III & IV of the 2016-17 batch )**

**Objective:** To develop skills in office automation by applying sample problems.

1. Text editing with different styles (Wedding or Invitation Card)
2. Table creation and editing (Calendar or Timetable)
3. Cut, Paste, find and replace usage
4. Mathematical symbols, suffix and super fix, equation creation and editing
5. Worksheet for Payroll
6. Worksheet for EB billing
7. Use any spreadsheet to plot a chart for marks obtained by the students (out of 5) vs. frequency (total number of students in class is 50).
8. Database Creation for library books
9. Database Creation for employee's details
10. Presentation for a seminar with dynamic provisions

**Non-Major Elective -1**  
**Fundamentals of Internet**

**L T P C**  
**2 0 0 2**

**OBJECTIVES:**

To: study the basic concepts of Internet and understand the services provided by the Internet.

**Unit I**

**The Internet:** Introduction – From Computers to the Internet - Advantages of the Internet – Major Internet Services – Hardware and Software in the Internet Age. **Evolution and Growth of the Internet:** Birth of the Internet – Current Networking Technologies – Next Generation Networking..

(5L)

**Unit II**

**Getting Online:** Types of Internet Accounts – Selecting Internet Service Providers – **Electronic Mail:** Advantages of E-mails – E-mail addresses – Mail transfer protocols – Working of E-mail system. **World Wide Web:** Architecture of the World Wide Web – Types of websites – Uniform Resource Locator – Domain Name System – Web Pages and Web Links – Visiting Web Pages – Using Internet Explorer – Searching the Web – Google and Yahoo Search Engines.

(7L)

**Unit III**

**Hosting and Promoting Websites:** Structure of Websites – Web Development tools – Microsoft Front Page –Adobe Dreamweaver – Visual Studio. NET – Hosting Websites – Getting a Domain /name – Visitor Analysis and Statistics – Website Promoting methods.

(6L)

**Unit IV**

**Electronic Commerce:** E-Business and E-Commerce – Types of business in the internet – M-Commerce - Marketing Strategies on the Web – Making Payments in Virtual Stores – Shopping in Virtual Stores –Cookies and E-Commerce – Major issues of E-commerce and M-Commerce – Future of E-commerce.

(6L)

**Unit V**

**Blogs and Social Networking:** Blogs – Uses of Blogs – Blogs System Components – Steps for Blogging – Building a Blog site – Social Networking – Etiquette in networking sites. **Internet Security:** Importance of Internet Security – Internet Threats – Identity theft and Cybersquatting – Hacking – Spamming and Spoofing – Phishing and Pharming – Denial of Service – spyware – Viruses and worms- Security solutions – Firewalls and Intrusion Prevention Systems –Internet Security Precautions- The Information Technology Act.

(6L)

**Text Book:**

The Internet A User's Guide Second Edition by K.L. James – PHI Learning Private Limited .

**Reference Books:**

1. Internet, World Wide Web, How to program, 4<sup>th</sup> Edition, Paul Deital, Harvey M Deitel, Pearson
2. Learning Internet & Email, 4<sup>th</sup> Revised Rdition, Ramesh Bangia, Khanna Book Publishing Co Pvt Ltd.
3. Internet & Ecommerce, C. Nellai Kannan, NELS Publications



## SEMESTER – IV

L	T	P	C
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2	4	0	4
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### CORE PAPER – VI

#### ABSTRACT ALGEBRA-I (90 Hours) (SSMA41)

Objectives:

- To introduce the concept of Groups ,Ring and Field
- To study the concept of homomorphism

**Unit I** Groups – definition and Examples – Subgroup – order of an element – centre of a group – Normalizer and centralizer. Product of two subgroups – order of HK – Intersection and union of subgroups. **18L**

**Unit II** Cyclic groups – generators of a cyclic group – Number of generators of a cyclic groups – Cosets – Partitioning of a group by Cosets – Lagrange’s theorem – Euler’s theorem – Fermat’s theorem **16L**

**Unit III** **Normal subgroups** : Quotient groups – Group Homomorphis – Canonical homomorphism – kernel of a homomorphism – Isomorphism – Automorphism – Inner automorphism – Permutation groups – Cayley’s theorem. **20L**

**Unit IV** **Rings:** Definition and examples – Types of rings – Elementary properties of a ring – Integral domain – Field – Sub rings – Subfields – Ideals – Principal ideal – quotient ring – Maximal and prime ideals - characteristic of a ring – PID – UFD. **18L**

**Unit V** Homomorphism of rings – Isomorphism – kernel of a homomorphism – Fundamental theorem – Field of quotients of an integral domain – polynomial rings – Division algorithm **18L**

**Text Book:**

- Arumugam .S and Tangapandi Issac .A – “Modern Algebra”scitech publications Pvt. Ltd.

**Books for Reference :**

- Anton .H and C. Rorres - Elementary Linear Algebra (9<sup>th</sup> Edn) John Wiley and Sons, Inc., New York 2005.
- Manicavasagam Pillai .T.K and others – Modern Algebra, S. Viswanathan Publishers, Chennai 1993.
- Herstein .I.N – Topics in Algebra, Vikas Publishing Pvt. Ltd. 1975, New Delhi.

## SEMESTER – IV

L	T	P	C
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4	0	0	4
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### Skill Based Core

### Paper – II

## TRIGONOMETRY, LAPLACE TRANSFORMS AND FOURIER SERIES

(60 Hours) (SSMA4A)

Objectives:

- To understand the concept of Trigonometry
- To know the concept of Laplace transform
- To study the concept of Fourier series

**Unit I** Trigonometry : Expansions of  $\sin nx$ ,  $\cos nx$ ,  $\tan nx$  and expansions of  $\sin^n x$  &  $\cos^n x$ . **10L**

**Unit II** Hyperbolic functions – Relations between hyperbolic functions and circular functions – Inverse hyperbolic functions – Logarithm of complex numbers – Summation of series by  $C + iS$  method. **13L**

**Unit III** Laplace Transforms – Inverse Laplace Transforms. **13L**

**Unit IV** Solving linear differential equations with constant coefficients and simultaneous equations using Laplace Transforms. **12L**

**Unit V** Fourier Series – Definition - Finding Fourier coefficients for a given periodic function with period  $2\pi$  and  $2l$  – Odd and even functions – Half range series. **12L**

### Text Books:

Arumugam .S and Tangapandi Issac .A -Trigonometry and Fourier Series

Manichavasagam Pillai, T.K., and S. Narayanan-Differential Equations and its Applications

### Books for Reference :

- Manichavasagam Pillai, T.K., and S. Narayanan, - Trigonometry, Viswanathan Publishers and Printers Pvt. Ltd.
- Loney - Trigonometry.
- Robert T. Seeley - Fourier Series and Integrals, Dover Publications, New York, 2006.
- Ray Hanna J., - Fourier Series, Transforms and Boundary Value Problems, Dover Publications, New York, 2008.

## **Programming in C**

**(For the Institutions with B.Sc. (Maths) Programme not opting Physics / Chemistry as Allied Subjects with effect from 2017-18 and onwards for Semesters - I & II and also for Semesters - III & IV of the 2016-17 batch )**

**Objective:** To obtain knowledge about the structure of the programming language C and to develop the program writing and logical thinking skill.

### **Unit – I: INTRODUCTION**

C Declarations:- Character Set – C tokens – Keywords and Identifiers – Identifiers – Constants – Variables – Data types – Declaration of Variables – Declaration of Storage Class – Assigning Values to Variables – Defining Symbolic Constants – Declaring Variable as Constant. Operators and Expressions:- Introduction – Arithmetic Operators – Relational Operators – Logical Operators – Assignment Operators – Increment and Decrement Operators – Conditional Operator – Bitwise Operators – Special Operators – Arithmetic Expressions – Evaluation of Expressions – Precedence of Arithmetic Expressions. Managing Input and Output Operations:- `getchar( )` – `putchar( )` – `scanf( )` – `printf( )`.

### **Unit – II: CONTROL STRUCTURES**

Decision Making and Branching:- Decision Making with IF Statement – Simple IF statement – The IF...Else Statement – Nesting of IF...Else Statements – The ELSE IF ladder – The Switch Statement – The ?: Operator – The GOTO statement. Decision Making and Looping:- The WHILE Statement – The DO Statement – The FOR statement.

### **Unit – III: ARRAYS**

One-dimensional arrays – Declaration of One-dimensional arrays – Initialization of One-dimensional arrays - Two-dimensional arrays – Initialization of Two-dimensional arrays – Multi-dimensional arrays. Character Arrays and Strings:- Declaring and Initializing String Variables – Reading Strings from Terminal – Writing Strings to Screen – String Handling Functions.

## **Unit – IV: FUNCTIONS**

User-Defined functions:- Need for User-defined functions – Definition of functions – Return Values and their Types – Function Calls – Function Declaration – Category of functions – No Arguments and No return values – Arguments but No return Values – Arguments with return values – No arguments but a return a value – Recursion – Passing Arrays to functions – Passing Strings to functions – The Scope, Visibility and lifetime of a variables. Structures and Unions:- Defining a Structure – Declaring Structure Variables – Accessing Structure Members – Structure Initialization – Arrays of structures –Unions.

## **Unit – V: POINTERS AND FILES**

Pointers:- Understanding pointers – Accessing the Address of a Variable – Declaring Pointer Variables – Accessing a variable through its pointer – Pointer Expressions –Pointers as function arguments. File Management in C:- Defining and Opening a file – Closing a File – Input/output Operations on files – Error Handling during I/O Operations.

### **Text Book:**

Programming in ANSI C – 7<sup>th</sup> Edition by E Balagurusamy – Tata McGraw Hill Publishing Company Limited.

### **Reference Books:**

1. Computer System and Programming in C by Manish Varhney, Naha Singh – CBS Publishers and Distributors Pvt Ltd.
2. Introduction to Computer Science, IITL Education Solutions Limited, Second Edition, Pearson Education
3. Computer Basics and C Programming by V. Rajaraman – PHI Learning Private Limited
4. Programming with C, Third Edition, Byron S Gottfried, Tata McGraw Hill Education Private Limited.

**C Programming - List of Practicals**

**(For the Institutions with B.Sc. (Maths) Programme not opting Physics / Chemistry as Allied Subjects with effect from 2017-18 and onwards for Semesters - I & II and also for Semesters - III & IV of the 2016-17 batch )**

1. Write a program to convert the temperature from Fahrenheit to Celsius.
2. Write a program to test whether the given year is leap year or not.
3. Write a program to read two integers m and n and print the prime numbers in between them.
4. Write a program to evaluate the series  $e^x=1+ x/1!+x^2/2!+\dots$
5. Write a program to arrange the given set of numbers in ascending order.
6. Write a program to read two matrices and to find the sum and product of the matrices.
7. Write a program to check whether a given string is Palindrome or not.
8. Write a program to find Factorial value, Fibonacci, GCD value-Recursion.

## Non-Major Elective 3 HTML

L T P C  
2 0 0 2

### OBJECTIVES:

- To study the basic concepts of Web design using HTML.
- To learn the various tags used in HTML
- To make use of Dynamic HTML

### Unit 1:

Introduction to HTML: Designing a Home page – History of HTML – HTML generations- HTML Documents-Anchor tag –Hyper links –Sample HTML documents. (6L)

### Unit 2:

Head and Body section: Header Section –Title-Prologue-Links-Colorful web page –Comments lines Designing the body: Heading printing –Aligning the headings-Horizontal rule- paragraph-Tab settings-Image and pictures-Embedding PNG format Images (6L)

### Unit 3:

Ordered and unordered lists: List-Unordered lists- headings in a list – ordered lists- Nested lists. Table handling: Tables- table creation in HTML- Width of the Tables and cells-Cells spanning multiple rows/Columns- Coloring cells – Column specification (6L)

### Unit 4:

Frames: Frame set - Definition – Frame definition –Nested Frames Web Page Design Project : Frameset Definition – Animals – Birds – Fish Forms: Action attributes –Method attributes –Enctype attribute – Drop down list- sample forms (6L)

### Unit 5:

DHTML and Style sheets: Defining styles –Elements of styles- Linking a style sheet to an HTML document –Inline styles –Internal & External style sheets –Multiple styles (6L)

### Text Book:

World Wide Web Design with HTML, C. Xavier, TMH, 2001

### Reference Book:

1. Internet & World Wide Web, H.M.Deital, P.J.Deital & A.B.Goldberg, Pearson Education
2. Fundamentals of information technology, Mathew's lenon and Alxis leon, Vijay Nicole private limited, Chennai.