



**SOURASHTRA COLLEGE, MADURAI- 625004**  
(An Autonomous Institution Re-accredited with 'B' grade by NAAC)  
**B.Sc., MATHEMATICS (COMPUTER APPLICATION)**  
**SYLLABUS**  
(Under CBCS w.e.f. 2017 - 2018 onwards)

645

**I SEMESTER**

Sl.No.	Subject Code	Nature	Subject Title	Hrs /Week	Exam hrs	CA	SE	Tot	Crd
1	17 UAC T11/H11/S11	PART I	Tamil/Hindi/Sanskrit	6	3	25	75	100	3
2	17 UAC E11	PART II	English	6	3	25	75	100	3
3	17 UMC C11	PART-III CORE	Differential Calculus	4	3	25	75	100	4
4	17 UMC C12	PART-III CORE	Discrete Mathematics	4	3	25	75	100	3
5	17 UMC A11	PART-III ALLIED	C Language Theory	5	3	25	75	100	4
6	17 UMC SP1	PART-IV SBS	C Language Lab	3	3	40	60	100	3
7	14 UAC VE1	PART-IV	Value Education	2	3	25	75	100	2
			<b>Total</b>	<b>30</b>					<b>22</b>

Passed in the BOS Meeting  
held on 15-3-17

Signature of Chairman/HOD



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<b>Part III : CORE</b>	<b>Title : DIFFERENTIAL CALCULUS</b>	<b>Subject Code : 17 UMC C11</b>
<b>Semester : I</b>	<b>Hours : 4 Hours / Week</b>	<b>Credits : 4</b>

**Objectives:**

To develop the Students to know about Differential Calculus.

**UNIT –I**

Differentiation- Standard forms- general theorems on differential coefficients- Logarithmic differentiation-Differentiation of implicit functions- Differentiation of one function with respect to another.

**UNIT-II**

Successive differentiation: The  $n^{\text{th}}$  derivative - Standard results-Trigonometrical transformations- Formations of equations involving derivative.- Leibnitz's formula.

**UNIT –III**

Partial differentiation- Successive partial derivatives- Function of function rule- Total differential coefficient- Special case- Homogeneous functions- Partial derivatives of a function of two functions.

**UNIT-IV**

Tangents and normal-Equation of the tangent and normal at any point of the curve – Angle of intersection of curves sub tangent and sub normal – Length of arc- Polar co-ordinates.

**UNIT-V**

Envelopes, curvature of plane curves- Curvature- centre of curvature- Radius of curvature- co-ordinates of centre of curvature- Evolute and involute – p-r equations.

Textbook : Calculus – Volume I

Author : S.Narayanan, T.K.Manickavasakam Pillai.

Publication : S.Visvanathan( Printers & Publisers) PVT LTD - 2009

<b>UNIT</b>	<b>CHAPTER</b>	<b>SECTION</b>
I	II	2-7
II	III	1-2
III	VIII	1.1-1.7
IV	IX	1.1-4.6
V	X	2.1-2.8

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<b>Part III : CORE</b>	<b>Title : DISCRETE MATHEMATICS</b>	<b>Subject Code : 17 UMC C12</b>
<b>Semester : I</b>	<b>Hours : 4 Hours / Week</b>	<b>Credits : 3</b>

**Objectives:**

To develop the Students to know about Discrete Mathematics.

**UNIT -I**

RELATIONS: Cartesian product of two sets- Relations- Representation of relations- Operations of relations- Composite relations- Equivalence relations.

**UNIT-II**

CODING THEORY: Introduction- Hamming distance- Encoding message- Group codes- Decoding and error correction-An example of single error – Correcting code.

**UNIT-III**

True false statements – connectives – Atomic compound statements – Parsing trees – Truth table of formula – Tautology – Tautological implementations and formulae – Replacement process.

**UNIT-IV**

Normal forms – Disjunctive normal form and conjunctive normal form – Principle disjunctive normal form and principle conjunctive normal form.

**UNIT-V**

Lattices – Hasse diagram – Properties of Lattices – New lattices – Lattice homomorphism.

**TEXT BOOK:** DISCRETE MATHEMATICS

AUTHOUR : Dr.M.K.VENKADARAMAN, Dr.N.SRIDHARAN,  
V.CHANDRASEKARAN.

PUBLICATIONS: THE NATIONAL PUBLISHING COMPANY-2012

UNIT	CHAPTER	SECTION
I	2	2,3,4,5
II	8	1-7
III	9	2-9
IV	9	11-12
V	10	1-3

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<b>PART III : ALLIED</b>	<b>Title : C LANGUAGE THEORY</b>	<b>Subject Code : 17 UMC A11</b>
<b>Semester : I</b>	<b>Hours : 5 Hours / Week</b>	<b>Credits : 4</b>

**Objectives:**

**To develop the Students to know about C-Language Theory.**

**Unit I** C Program – The form - Character Set – C Token – C Identifiers – Keywords – Constants – Data types – Variables – Float – Character – Void – The ‘const’ keyword – Operators – Assignment operators – Arithmetic operators – Relational operators – Logical operators – Auto Increment / Decrement operators – Ternary operator

**Unit II** scanf function – printf function – Simple if statement – Simple if-else statement – Bloc if statement – Block if-else statement – Nested ifs – Looping – for loop – looping using while – looping using do-while – break statement – continue statement – exit ( ) function – switch statement – goto statement

**Unit III** One dimensional array – array initialization – two dimensional array – initialization of two dimensional arrays – two dimensional sorting – multidimensional arrays – what is a C function – return statement – calling a function – call by value – call by reference –calling a function with no argument and no return value – calling a function with arguments but no return value – calling a function with arguments and return values – nesting functions – functions with arrays – recursion

**Unit IV** Declaration of string variable – reading string – writing string – string handling functions – string handling using library functions – array of strings – what is a pointer – pointer operators – how to access a variable through pointer – pointer expression – call by value – call by reference

**Unit V** What is a structure – giving values to structure elements – structure initialization – arrays of structure – arrays within structure – nested structure – union – typedef – enumerated data type.

Textbook(s) : C Programming  
 Author(s) : P.RadhaGanesan  
 Publisher(s) : SciTech Publications  
 Reference(s) : Programming in ANSI C by E.Balagurusamy

UNIT	CHAPTER	SECTION
I	1&2	1.9-2.18
II	3&4	3.2,3.5,4.2-4.6
III	5&6	5.1-5.7,6.1-6.8
IV	7&8	7.1-7.6,8.1-8.6
V	10	10.1-10.13

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### SYLLABUS

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<b>PART – IV</b> <b>SBS</b>	<b>Title : C LANGUAGE LAB</b>	<b>Subject Code : 17 UMC SP1</b>
<b>Semester : I</b>	<b>HOURS : 3 hours / Week</b>	<b>CREDITS : 3</b>

#### Objectives:

To develop the Students know about C Language Lab.

1. To calculate Simple Interest and Compound Interest
2. To calculate Sum of first n natural numbers
3. To find the biggest number among 3 numbers
4. To calculate the temperature from Celsius to Fahrenheit
5. To solve quadratic equation
6. To arrange the numbers in Ascending Order.
7. To find the product of two square matrices.
8. To compute the surface area and volume of a cube
9. To accept 'n' integers and store them in an array ar. The odd elements in the ar are copied into oar and other elements are copied into ear. Display the contents of oar and ear.
10. To find the reverse the number and its sum of the digits.
11. To find any one of the special numbers ( Armstrong / Adam / Prime / Perfect )
12. To generate nth Addition / Multiplication Table where n and range are given.
13. To swap using temporary variable, arithmetic, and xor operators.
14. Check whether the given two square matrices are equal or not.

**TEXT BOOK:** As per Theory Paper

**REFERENCE BOOK:** As per Theory Paper

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**II SEMESTER**

S. No	Sub. Code	Nature	Subject Title	Hrs /Week	Exam hrs	CA	SE	Tot	Crd
1	17 UAC T21/H21/S21	PART I	Tamil/Hindi/Sanskrit	6	3	25	75	100	3
2	17 UAC E21	PART II	English	6	3	25	75	100	3
3	17 UMC C21	PART-III CORE	Integral Calculus	4	3	25	75	100	4
4	17 UMC C22	PART-III CORE	Classical Algebra	4	3	25	75	100	3
5	17 UMC A21	PART-III ALLIED	C++ Language Theory	5	3	25	75	100	4
6	17 UMC SP2	PART-IV SBS	C++ Language Lab	3	3	40	60	100	3
7	14 UAC ES1	PART-IV	Environmental Studies	2	3	25	75	100	2
			<b>Total</b>	<b>30</b>					<b>22</b>

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<b>Part III CORE</b>	<b>Title : INTEGRAL CALCULUS</b>	<b>Subject Code : 17 UMC C21</b>
<b>Semester : II</b>	<b>Hours : 4 hours /week</b>	<b>Credits : 4</b>

**Objectives:**

To develop the Students know about the Integral Calculus.

**UNIT-I**

Integration- Definite integral- Methods of integration- Integrals of functions- Involving  $a^2+x^2$  forms of integrals.

**UNIT –II**

Integration of rational algebraic forms- Special cases- Integration of irrational functions.

**UNIT –III**

Properties of definite integrals- Integration by Parts- Reduction formulae-Bernoulli's formula.

**UNIT-IV**

Multiple integrals - Definition of double integrals- double integral in polar coordinates-Triple integrals.(Problems only)

**UNIT-V**

$\beta$  and  $\gamma$  functions- Definitions- Recurrence formula of  $\gamma$  functions- Properties of  $\beta$  functions.- Relation between  $\beta$  and  $\gamma$  functions.

**TEXT BOOK:** CALCULUS-VOLUME II

**AUTHOUR:** S.NARAYANAN,T.K.ManicavasamPillai

**PUBLICATIONS :** S.VISVANATHAN. ( Printers & Publishers) -Pvt.Ltd.-2009

UNIT	CHAPTER	SECTION
I	I	1- 6
II	I	7-10
III	I	11-15.1
IV	V	1-4
V	VII	2-5



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<b>PART - III CORE</b>	<b>Title : CLASSICAL ALGEBRA</b>	<b>Subject Code : 17 UMC C22</b>
<b>Semester : II</b>	<b>HOURS : 4 hours /week</b>	<b>CREDITS : 3</b>

**Objectives:**

To develop the Students know about classical algebra

**UNIT –I**

SEQUENCES: Introduction – Bounded sequences – Monotonic sequences – problems – Divergent and oscillating sequences – The algebra of limits – Problems.

**UNIT-II**

Behaviors of monotonic sequences – Some theorems on limits – Cesaro's theorems – Cauchy's second limit theorem – Problems.

**UNIT– III**

SERIES AND POSITIVE TERMS: Definite series – Cauchy's general principle of convergence – Comparison test – Kummer's test – D'Alembert's ratio test – Raabe's test – Gauss test – Problems.

**UNIT-IV**

THEORY OF EQUATIONS: Introduction – Formation of equations – Relation between roots and co-efficients – Reciprocal equations – Problems.

**UNIT-V**

Transformations of equations – Removal of terms – Nature and position of roots – Descarte's rule of sign – Approximate solutions of numerical equations – Newton's method and Horner's method.

**TEXT BOOK:** (i) Sequence and series for unit I, II, III, New Gamma Publishing house, Edition 2006

(ii) Algebra for unit IV, V New Gamma Publishing house , Edition 2011.

**AUTHOUR:** Dr.S.ARUMUGAM & S. THANGAPANDI ISSAC.

<b>UNIT</b>	<b>CHAPTER</b>	<b>SECTION</b>
I	3	3.0-3.6
II	3	3.7,3.8
III	4	4.1-4.3
IV	5	5.1,5.2,5.4
V	5	5.5,5.7,5.10

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<b>PART – III ALLIED</b>	<b>Title : C++ LANGUAGE THEORY</b>	<b>Subject Code : 17 UMC A21</b>
<b>Semester : II</b>	<b>HOURS : 5 hours / Week</b>	<b>CREDITS : 4</b>

**Objectives:**

**To develop the Students know about C++ Language Theory.**

**Unit I** : Software Evolution – Basic Concepts of Objects Oriented Programming – Benefit of Object Oriented Programming - Applications of Objected Oriented Programming - What is C++ - An Example with Class – Structure of C++ Program

**Unit II** : Tokens – Keywords – Identifiers & Constants – Basic Data Types – User-Defined Data Types – Derived Data Types – Operators in C++ - Scope Resolution Operator – Expressions and their types – Operator Overloading – Control Structures

**Unit III** : Inline functions – Default Arguments – Function Overloading – Specifying a Class – Defining Member Functions – Nesting of Member Functions – Private Member Functions – Arrays within a Class – Memory Allocation for Objects – Static Data Members – Static Member Functions – Array of Objects – Objects as Function Arguments – Friendly Functions – Pointers to Members

**Unit IV** : Constructors – Multiple Constructors in a Class – Constructors with Default Arguments – Dynamic Initialization of Objects – Copy Constructor – Dynamic Constructors – Destructors – Defining Operator Overloading – Overloading Unary Operators - Overloading Binary Operators – Rules for Overloading Operators

**Unit V** : Introduction to Inheritance – Defining Derived Classes – Single Inheritance – Multilevel Inheritance – Multiple Inheritance – Hierarchical Inheritance - Hybrid Inheritance – Virtual Base Class – Constructors in Derived Class – Pointers to Objects – this Pointer – Virtual Functions

**Textbook(s)** : Programming in ANSI C++ by E.Balagurusamy

<b>UNIT</b>	<b>CHAPTER</b>	<b>SECTION</b>
I	1&2	1.2,1.5-1.8,2.1-2.6
II	3	3.1-3.7,3.13-3.24
III	4&5	4.6-4.9,5.3-5.18
IV	6&7	6.2-6.11,7.2-7.7
V	8&9	8.1-8.11,9.3-9.6



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<b>PART – IV SBS</b>	<b>Title : C++ LANGUAGE LAB</b>	<b>Subject Code : 17 UMC SP2</b>
<b>Semester : II</b>	<b>HOURS : 3 hours / Week</b>	<b>CREDITS : 3</b>

**Objectives:**

To develop the Students know about C++ Language Lab.

**C++ PROGRAMMING LAB**

1. To perform Area calculation using Function overloading (min three functions).
2. To perform string manipulation using functions overloading.
3. To demonstrate the concept of friend function.
4. To swap two values between two classes objects using friend function.
5. To find minimum of two numbers between two classes objects using friend function.
6. To overload unary minus operator which changes sign of given vector (3 elements).
7. To overload Binary +operator which adds two complex numbers?
8. Implementation of mathematical operations on strings { Overload two operators + and <= }
9. To demonstrate single inheritance of a public data member and a private data member
10. To process students mark list using multiple inheritance.
11. To process employee details using hierarchical inheritance.
12. To process inventory details using multilevel inheritance.
13. To process family details using hybrid inheritance
14. To illustrate the use of Virtual base class
15. To illustrate the macro definition.

**TEXTBOOK** : Programming in ANSI C++ by E.Balagurusamy

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**III SEMESTER**

S. No	Subject Code	Nature	Subject Title	Hrs / Week	Exam hrs	CA	SE	Total	Crd
1	17 UAC T31/H31/S31	PART I	Tamil/Hindi/Sanskrit	6	3	25	75	100	3
2	17UACE31	PART II	ENGLISH	6	3	25	75	100	3
3	17UMCC31	PART-III CORE	Modern Algebra	4	3	25	75	100	4
4	17UMCC32	PART-III CORE	Differential equations	4	3	25	75	100	3
5	17UMCA31	PART-III ALLIED	VISUAL BASIC Theory	5	3	25	75	100	4
6	17UMCSP3	PART-IV SBS	VISUAL BASIC Lab	3	3	40	60	100	3
7	17UMCN31	PART-IV NME	FUNDAMENTALS of Mathematics - I	2	3	25	75	100	2
<b>Total</b>				<b>30</b>					<b>22</b>

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<b>PART - III CORE</b>	<b>Title : MODERN ALGEBRA</b>	<b>Subject Code : 17 UMC C31</b>
<b>Semester : III</b>	<b>HOURS : 4 hours /week</b>	<b>CREDITS : 4</b>

**Objectives:**

**To develop the Students know about Modern Algebra.**

**UNIT I SET**

Introduction – The concept of a set – Set inclusion – Union of sets – Intersection of sets – Difference of sets – Complement of a set – Symmetric Difference of two sets – Cartesian product of sets.

**UNIT II RELATIONS AND MAPPING**

Relations – Equivalence Relations – Partial order - Functions – Binary Operations.

**UNIT III GROUPS**

Introduction – Definition and Example – Elementary Properties of a Group – Equivalent Definitions of a Group - Permutation Groups - Subgroups – Cyclic Groups .

**UNIT IV GROUPS**

Order of an Element - Cosets and Lagrange’s Theorem – Normal Subgroups and Quotient Groups – Isomorphism – Homomorphisms.

**UNIT V RINGS**

Definition and Example – Elementary properties of rings – Isomorphism – Types of rings – Characteristic of a ring – Subrings.

**TEXT:** Modern Algebra, S.Arumugam, Isaac, Scitech Publications, Edition 2003.

UNIT I	CHAPTER	1	SECTION	1.0, 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8.
UNIT II	CHAPTER	2	SECTION	2.1, 2.2, 2.3, 2.4, 2.5.
UNIT III	CHAPTER	3	SECTION	3.0, 3.1, 3.2, 3.3, 3.4, 3.5,3.6
UNIT IV	CHAPTER	3	SECTION	3.7, 3.8, 3.9, 3.10, 3.11.
UNIT V	CHAPTER	4	SECTION	4.1, 4.2, 4.3, 4.4, 4.5, 4.6.



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<b>PART - III CORE</b>	<b>Title : DIFFERENTIAL EQUATIONS</b>	<b>Subject Code : 17 UMC C32</b>
<b>Semester : III</b>	<b>HOURS : 4 hours /week</b>	<b>CREDITS : 3</b>

**Objectives:**

To develop the Students know about Differential Equations.

**UNIT I**

Differential Equation – Equations of First Order and First Degree – Exact Differential Equations – Integrating Factors – Linear Equations – Bernoulli's Equations.

**UNIT II**

Linear Equations of Higher Order – Linear Equation with Constant Co-efficients – Methods of Finding complementary Functions – Methods of Finding Particular Integrals – Homogeneous Linear Equations.

**UNIT III**

Linear Equations with Variable Coefficients – Removal of First Derivative – Changing the Independent Variables – Methods of Variation of Parameters – Simultaneous Linear Differential Equations.

**UNIT IV** Laplace Transform – Inverse Laplace Transform and application of D.E using Laplace Transform.

**UNIT V** Partial Differential Equations – Formation – Elimination of Arbitrary Functions – First Order Partial Differential Equations – Lagrange's Equations – Standard Forms.

**Textbook(s)** : Differential Equations & Applications  
**Author(s)** : Dr. S.Arumugam & Prof. A.Thangapandi Issac  
**Publication(s)** : New Gamma Publishing House, 2008

Unit I	Chapter 1	Section: 1.1 – 1.6
Unit II	Chapter 2	Section: 2.1 – 2.4
Unit III	Chapter 2	Section: 2.5 – 2.6
Unit IV	Chapter 3	Section: 3.1 – 3.2
Unit V	Chapter 4	Section: 4.1 – 4.4

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<b>PART - III</b> <b>ALLIED</b>	<b>Title : VISUAL BASIC THEORY</b>	<b>Subject Code : 17 UMC A31</b>
<b>Semester : III</b>	<b>HOURS : 5 hours / Week</b>	<b>CREDITS : 4</b>

**Objectives:**

**To develop the Students know about Visual Basic Theory.**

**Unit I**

Introduction to Visual Basic – Visual Basic 6.0 Programming Environment – Working with Forms – Developing an application

**Unit II**

Variables, Data types and Modules – Procedures and Control Structures – Arrays in Visual Basic – Examples & Exercises

**Unit III**

Introduction - Creating and Using Controls – Working with Control Arrays – Examples & Exercises

**Unit IV**

Introduction – Mouse Events – Dialog Boxes – Examples & Exercises

**Unit V**

Introduction - Graphics for Application – Multiple Document Interface – Using FlexGrid Control – Examples & Exercises

**TEXT:** Visual Basic 6.0 Programming, Content Development Group, TMH Publications, Chennai.

UNIT I	Sections	1.1, 1.2, 1.3, and 1.4	Pages: 001 – 017
UNIT II	Sections	1.5, 1.6, and 1.7	Pages: 017 – 033
UNIT III	Sections	2.1, 2.2, and 2.3	Pages: 067 – 083
UNIT IV	Sections	3.1, 3.2, and 3.3	Pages: 109 – 128
UNIT V	Sections	4.1, 4.2, 4.3, and 4.4	Pages: 162 – 179

**REFERENCE:**EBook:Computer Programming Concepts & Visual Basic, David I. Schneider

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<b>PART - IV</b> <b>SBS</b>	<b>Title : VISUAL BASIC LAB</b>	<b>Subject Code : 17 UMC SP3</b>
<b>Semester : III</b>	<b>HOURS : 3 hours /week</b>	<b>CREDITS : 3</b>

**Objectives:**

**To develop the Students know about Visual Basic Lab.**

1. Write a program in VB to manipulate arithmetic / string operations.
2. Write a program in VB to manipulate matrix operations.
3. Write a program in VB to check whether Adam / Armstrong / Perfect / Prime or not.
4. Write a program in VB to print Fibonacci sequences for a given range.
5. Write a program in VB to calculate Simple Interest / Compound Interest / EMI
6. Write a program in VB to generate EB Bill / Student Mark sheet / Result Analysis.
7. Write a program in VB to generate Customer / Employee / Student Report.
8. Write a program in VB to create simple explorer using controls.
9. Write a program in VB to display student data using controls.
10. Write a program in VB to create login / logoff form.
11. Write a program in VB to create a database using controls.
12. Write a program in VB to sort given numbers / strings.

**REFERENCE:** Visual Basic 6.0 Programming, Content Development Group, TMH Publications, Chennai.

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<b>PART IV : NME</b>	<b>Title : FUNDAMENTALS OF MATHEMATICS- I</b>	<b>Subject Code : 17 UMC N31</b>
<b>Semester : III</b>	<b>Hours : 2 Hours / Week</b>	<b>Credits : 2</b>

**Objectives:**

To enable the students to acquire the basic knowledge in Calculus and matrices.

**Unit I**

Theory of indices, ratio and proportion.(Page 54 to 65 in Text Book)

**Unit II**

Differential calculus and Integral calculus (Simple problems). (Page 192 to 235 and Page 283 to 308 in Text Book)

**Unit III**

Theory of Matrices-Addition, Multiplication of two matrices.  
(Page 329 to 375 in Text Book)

**Unit IV**

Finding the nth term and sum to n terms of an A.P and G.P-Arithmetic mean.

**Unit V**

Solving the quadratic equations-finding the roots- forming the equation when roots are given (only second degree).

**Text Book:**

Business mathematics by .M.Manoharan, Dr.C.Elango and K.L.Eswaran,Paramount publications-Reprint 2007.

Unit I	Page No: 54-65
Unit II	Page No: 192-235,283-308
Unit III	Page No: 329-375
Unit IV	Refer Relevant Book
Unit V	Refer Relevant Book

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**IV SEMESTER**

S. No.	Subject Code	Nature	Subject Title	Hours / Week	Exam hrs	CA	SE	Total	Crd
1	17 UAC T41/H41/S41	PART I	Tamil/Hindi/Sanskrit	6	3	25	75	100	3
2	17UACE41	PART II	ENGLISH	6	3	25	75	100	3
3	17UMCC41	PART-III CORE	Linear Algebra	4	3	25	75	100	4
4	17UMCC42	PART-III CORE	Number Theory	4	3	25	75	100	3
5	17UMCA41	PART-III ALLIED	JAVA Language Theory	5	3	25	75	100	4
6	17UMCSP4	PART-IV SBS	JAVA Language Lab	3	3	40	60	100	3
7	17UMCN41	PART-IV NME	Fundamentals of Mathematics II	2	3	25	75	100	2
8		PART-V	Extension Activities	0				100	1
			<b>Total</b>	<b>30</b>					<b>23</b>

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<b>PART - III CORE</b>	<b>Title : LINEAR ALGEBRA</b>	<b>Subject Code : 17 UMC C41</b>
<b>Semester : IV</b>	<b>HOURS : 4 hours /week</b>	<b>CREDITS : 4</b>

**Objectives:**

To enable the students to acquire the basic knowledge in Linear Algebra.

**UNIT I**

Vector spaces – Definition and Examples – Subspace – Linear Transformation-  
Fundamental theorem of homomorphism.

**UNIT II**

Span of a Set – Linear Independents – Basis and Dimensions – Rank Nullity – Matrix  
of a Linear Transformation.

**UNIT III**

Inner product space – Definition and Examples – Orthogonality – Orthogonal  
Complement.

**UNIT IV**

Introduction – Algebra of Matrices – Types of Matrices – The Inverse of the Matrix –  
Elementary Transformations – Rank of Matrix – Simultaneous Linear Equations –  
Characteristics Equation and Cayley – Hamilton Theorem – Eigen Values and Eigen Vectors.

**UNIT V**

Introduction – Bilinear forms – Matrix of a bilinear form – Quadratic forms –  
Reduction to Quadratic form.

**Textbook(s)** : Modern Algebra  
**Author(s)** : Dr. S.Arumugam & Prof A.Thangapandi Issac  
**Publication(s)** : 2003, Scitech Publications (India) Private Ltd, Chennai.

Unit I	Chapter 5	Section:	5.1-5.3
Unit II	Chapter 5	Section:	5.4-5.8
Unit III	Chapter 6	Section:	6.1-6.3
Unit IV	Chapter 7	Section:	7.1-7.8
Unit V	Chapter 8	Section:	8.0-8.2

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<b>PART - III CORE</b>	<b>Title : NUMBER THEORY</b>	<b>Subject Code : 17 UMC C42</b>
<b>Semester : IV</b>	<b>HOURS : 4 hours /week</b>	<b>CREDITS : 3</b>

**Objectives:**

To develop the Students know about Number Theory.

**UNIT-I**

**DIVISIBILITY:** Divisibility of integers – Division of Algorithms – Greatest common divisor – Least common multiple – Examples.

**UNIT II**

**PRIME AND COMPOSITE NUMBERS:** Prime number – Composite number – Co-primes – Twin primes – Euclid’s theorem – Unique factorization theorem – Divisors of integers – Arithmetic functions – product of divisors – Perfect numbers – Euclid’s theorems – Euler functions – Example problems.

**UNIT III**

**DISTRIBUTION OF PRIMES:** Introduction – Fermat’s conjecture – Mersenne number – Gap theorem – Example problems.

**UNIT IV**

**CONGRUENCES:** Definitions – Theorems – Residue theorem – Magic numbers – Divisibility tests – Linear congruence – Chinese Remainder theorem.

**UNIT V**

**THEOREMS OF FERMAT’S WILSON:** Introduction – Fermat’s theorem – Wilson’s theorem – Lagranges’s theorem – Wolstenholme theorem.

**TEXT BOOK:** ELEMENTS OF NUMBER THEORY.

**AUTHOUR:** KUMARAVELU & SUSHEELA KUMARAVELU.

**PUBLICATIONS :** SKV – FIRST EDITION 2002.

<b>UNIT</b>	<b>CHAPTER</b>	<b>PAGENUMBER</b>
I	3	45-59
II	4	61-106
III	5	148-162
IV	6	163-206
V	7	208-244



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<b>PART - III</b> <b>ALLIED</b>	<b>Title : JAVA LANGUAGE</b> <b>THEORY</b>	<b>Subject Code : 17 UMC A41</b>
<b>Semester : IV</b>	<b>Hours : 5 Hours / Week</b>	<b>Credits : 3</b>

**Objectives:**

**To develop the Students know about Java Language.**

**UNIT I**

Object Oriented Programming Concepts - Features of Java Language - Types of Java Programs - Java Architecture – Literals - Data types - Variables

**UNIT II**

Structure of a Java program – Comments - Expressions and Statements - Type Conversions - Arithmetic Operators - Bitwise Operators - Relational Operators - Boolean Logical Operators - Ternary Operators (?)

**UNIT III**

The if ... else statement - The switch statement - The while statement - The do ... while statement - The for statement - The break statement - The continue statement - One-Dimensional Arrays - Multi-Dimensional Arrays

**UNIT IV**

Defining a Class - The new Operator and Objects - The dot (.) Operator - Method Declaration and Calling – Constructors - Method Overloading – Creating Subclasses - Method Overriding - Object Destruction and Garbage Collection

**UNIT V**

Package - The import Statement - Access Modifier – Interfaces - Types of Exceptions - Catching Exceptions – Multitasking - Creating a Thread – Applet Basics – Methods of Building an Applet – The HTML Applet Tag – Colors in Applet

**TEXT:** Programming in Java 2 by Dr. K. Somasundaram

UNIT	CHAPTER	SECTIONS
UNIT I	1 & 2	1.1, 1.2, 1.3, 1.4, 2.1, 2.2, 2.3
UNIT II	3 & 4	3.1, 3.2, 3.3, 3.4, 4.1, 4.2, 4.3, 4.4, 4.5
UNIT III	5 & 6	5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 6.1, 6.2
UNIT IV	7 & 8	7.1, 7.2, 7.3, 7.4, 7.5, 7.8, 8.1, 8.2, 8.6
UNIT V	9, 12, 15 & 16	9.1, 9.2, 9.3, 9.4, 12.1, 12.2, 15.1, 15.2, 16.1, 16.2, 16.6, 16.8

**REFERENCE:**

EBook: Java 2, The Complete Reference, Fifth Edition, Herbert Schildt.

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<b>PART - IV</b> <b>SBS</b>	<b>Title : JAVA LANGUAGE LAB</b>	<b>Subject Code : 17 UMC SP4</b>
<b>Semester : IV</b>	<b>Hours : 3 hours / Week</b>	<b>Credits : 3</b>

**Objectives:**

**To develop the Students know about Java Language Lab.**

1. Write a program in Java to manipulate arithmetic / string operations.
2. Write a program in Java to manipulate matrix operations.
3. Write a program in Java to check whether Adam / Armstrong / Perfect / Prime or not.
4. Write a program in Java to print Fibonacci sequences for a given range.
5. Write a program in Java to calculate Simple Interest / Compound Interest / EMI
6. Write a program in Java to implement function overloading.
7. Write a program in Java to implement operator overloading
8. Write a program in Java to implement single inheritance.
9. Write a program in Java to implement package.
10. Write a program in Java to create console / windows application.
11. Write a program in Java to create applet application.
12. Write a program in Java to sort given numbers / strings.
13. Write a program to read 10 values in an array (assume that you read all values positive). Then change each even value in the array with its half value and each odd value with its double value. After change, count how many values are even and how many values are odd. Display the counting.
14. Write a program to generate the following series :

50	40	30	20	10
60	47	34	21	8
70	54	38	22	6

**REFERENCE:**

EBook: Java 2, The Complete Reference, Fifth Edition, Herbert Schildt.



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<b>PART - IV</b> <b>NME</b>	<b>Title : FUNDAMENTALS OF</b> <b>MATHEMATICS – II</b>	<b>Subject Code : 17 UMC N41</b>
<b>Semester : IV</b>	<b>HOURS : 2 hours /week</b>	<b>CREDITS : 2</b>

**Objectives:**

To enable the students to acquire the basic knowledge in statistics

**UNIT I:**

Mean, median, mode (problems only)

**UNIT II:**

Geometric mean, Harmonic mean, range, quartile deviation (problems only)

**UNIT III:**

Mean deviation, standard deviation (problems only)

**UNIT IV:**

Curve fitting (linear and quadratic only) (Simple Problems only).

**UNIT V:**

Analysis of Time series (linear trend method and seasonal variation) (problems only)

**Text Book:**

Statistics by S.Arumugam and Isaac, New Gamma Publications

<b>UNIT</b>	<b>CHAPTER</b>	<b>SECTIONS</b>
UNIT I	2	2.0-2.3
UNIT II	2	2.4,3.1
UNIT III	3	3.1
UNIT IV	5	5.1
UNIT V	10	10.1&10.2

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**V SEMESTER**

S. No.	Subject Code	Nature	Subject Title	Hours / Week	Exam hrs	C A	SE	Tot	Crđ
1	17 UMC C51	PART-III CORE	Graph Theory	5	3	25	75	100	4
2	17 UMC C52	PART-III CORE	Real Analysis	5	3	25	75	100	4
3	17 UMC C53	PART-III CORE	Statistics - I	5	3	25	75	100	4
4	17 UMC C54	PART-III CORE	Trigonometry & Vector Calculus	5	3	25	75	100	4
5A	17 UMCE51	PART-III ELECTIVE	Web Technology Theory*	5	3	25	75	100	5
5B	17UMCEP1	PART-III ELECTIVE	Web Technology Lab*	5	3	40	60	100	5
6A	17 UMCE52	PART-III ELECTIVE	Unix Theory*	5	3	25	75	100	5
6B	17UMCEP2	PART-III ELECTIVE	Unix Lab*	5	3	40	60	100	5
7	16USSS51	Self Study	Soft Skills	-	-	-	-	100	-
			<b>Total</b>	<b>30</b>				<b>700</b>	<b>26</b>

**\*Either (5A & 5B) (or) (6A & 6B) are to be selected as Elective papers**

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<b>PART - III CORE</b>	<b>Title : GRAPH THEORY</b>	<b>Subject Code : 17 UMC C51</b>
<b>Semester : V</b>	<b>HOURS : 5 hours /week</b>	<b>CREDITS : 4</b>

**Objectives:**

To enable the Students to acquire the basic knowledge in Graph Theory.

**UNIT I**

Graphs – Degree - Sub graphs, Isomorphism, Ramsey Numbers - Independent Sets and Coverings - Intersection Graphs - Matrices of Graphs - Operations on Graphs.

**UNIT II**

Degree Sequences - Graphic Sequences - Walks, Trials, and Paths -Connectedness and Components – Blocks - Connectivity

**UNIT III**

Eulerian Graphs - Hamiltonian Graphs – Trees - Characterization of Trees - Centre of a Tree.

**UNIT IV**

Chromatic Number and Chromatic Index – The Five Color Theorem - Four Color Theorem - Chromatic Polynomials

**UNIT V**

Definitions and Basic Properties of Diagraphs - Paths and Connections in Diagraphs – Diagraphs and Matrices

**Textbook(s)** : Invitation to Graph Theory  
**Author(s)** : Dr. S.Arumugam & S.Ramachandran  
**Publication(s)** : Scitech Publications, Nov 2012

**Reference Book(s) :**

Unit I	Chapter 2	Sections: 2-2.9
Unit II	Chapter 3 & 4	Sections: 3.0,3.1,3.2
Unit III	Chapter 5 & 6	Sections: 4.1-4.4,5.1,5.2,6.1,6.2
Unit IV	Chapter 9	Sections: 9.1-9.4
Unit V	Chapter 10	Sections : 10.1-10.3

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<b>PART III : CORE</b>	<b>Title : REAL ANALYSIS</b>	<b>Subject Code : 17 UMC C52</b>
<b>Semester : V</b>	<b>HOURS : 5 hours /week</b>	<b>CREDITS : 4</b>

**Objectives:**

To enable the Students to acquire the basic knowledge in Real Analysis.

**UNIT 1:**

Sets and Functions – Countable Sets – Uncountable Sets – Inequalities of Holder and Minkowski – Metric Spaces – Definitions and Examples.

**UNIT 2:**

Bounded Sets in a Metric Space – Open Ball in a Metric Space – Open Sets – Subspaces – Interior of a Set – Closed Sets – Closure – Limit Point – Dense Sets.

**UNIT 3:**

Introduction – Completeness – Baire's Category Theorem – Continuity – Homeomorphism – Uniform Continuity.

**UNIT 4:**

Introduction – Definition and Examples – Connected Subsets of  $\mathbb{R}$  – Connectedness and Continuity

**UNIT 5:**

Introduction – Compact Space – Compact Subsets of  $\mathbb{R}$  – Equivalent Characterization for compactness.

**TEXT:** Modern Analysis, S. Arumugam, Issac, New Gamma Publishing House – 2007.

<b>UNIT</b>	<b>CHAPTER</b>	<b>SECTIONS</b>
UNIT I	1	1.1, 1.2, 1.3, 1.4
UNIT II	2&3	2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.8, 2.9, 2.10, 3.0, 3.2
UNIT III	4	4.0, 4.1, 4.2, 4.3
UNIT IV	5	5.0, 5.1, 5.2, 5.3
UNIT V	6	6.0, 6.1, 6.2, 6.3

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<b>PART - III CORE</b>	<b>Title : STATISTICS- I</b>	<b>Subject Code : 17 UMC C53</b>
<b>Semester : V</b>	<b>HOURS : 5 hours /week</b>	<b>CREDITS : 4</b>

**Objectives:**

To enable the Students to acquire the basic knowledge in Statistical methods.

**UNIT –I**

CENTRAL TENDENTIES: Introduction – Arithmetic mean – Partition values – (Median , Quantities , Decius, percentiles) – Mode – Geometric mean and Harmonic mean .

**UNIT-II**

MEASURES OF DISPERSION: Introduction – Standard deviation – C.V –Variance.

**UNIT –III**

CURVE FITTING: Introduction – Principles of least squares – Fitting line and parabola.

**UNIT-IV**

THEORY OF ATTRIBUTES: Introduction – Attributes – Consistency of data – independence and association of data.

**UNIT-V**

INDEX NUMBERS: Aggregate method – Simple index numbers – Weighted index numbers – Weighted aggregative method – Weighted average price relative method.

**TEXT BOOK: STATISTICS**

**AUTHOUR: ARUMUGAM & ISSAC.**

**PUBLISHER: New Gamma Publishing House July 2017.**

<b>UNIT</b>	<b>CHAPTER</b>	<b>SECTIONS</b>
I	2	2.1-2.4
II	3	3.0&3.1
III	5	5.0&5.1
IV	8	8.0-8.3
V	9	9.1&9.2

**Reference Book:** Statistical Methods by S.P.Gupta.



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<b>PART - III CORE</b>	<b>Title: TRIGONOMETRY &amp; VECTOR CALCULUS</b>	<b>Subject Code : 17 UMC C54</b>
<b>Semester : V</b>	<b>HOURS : 5 hours /week</b>	<b>CREDITS : 4</b>

**Objectives: To enable the Students to acquire the basic knowledge in Trigonometry and Vector Calculus.**

**UNIT –I**

Application of De Moivre's theorem.

**UNIT-II**

Circular and direct Hyperbolic Functions – Circular and inverse Hyperbolic functions.

**UNIT III**

Skew lines –Shortest distance between two skew lines and its problems.

**UNIT IV**

Vector calculus – Vector differentiation – Gradient – Directional Derivatives – Divergence and Curl.

**UNIT V**

Double and Triple integrals. (Simple problems)

**TEXT BOOK:** Analytic Geometry 3D & vector calculus , Dr.S. Arumugam & Issac , new gamma Publications house 2011.

Trigonometry and fourier series, Arumugam issac Somasundaram,New Gamma Pub. House 1999.

<b>UNIT</b>	<b>CHAPTER</b>	<b>SECTIONS</b>
I	1	1.0-1.4
II	2	2.1
III	3	3.2
IV	5	5.0-5.4
V	6	6.0-6.2

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<b>PART - III ELECTIVE</b>	<b>Title : WEB TECHNOLOGY THEORY</b>	<b>Subject Code : 17 UMC E51</b>
<b>Semester : V</b>	<b>HOURS : 5 hours / Week</b>	<b>CREDITS : 5</b>

**Objectives:**

**To develop the Students know about Web Technology Theory.**

**Unit I**

History of the internet – Internet services and Accessibility – Uses of the internet – Protocols – Web Concepts – The client/Server model of the web – Retrieving data from the web – How the web works – Web browsers Navigation features- Searching information on the web – Internet Standards - SGML – DTD – DTD Elements - Attributes

**Unit II**

Head Section – Body Section – Headers – Paragraphs – Text formatting – Linking – Internet Linking – embedding Images – Lists – Tables – Frames – Other special Tags and Characters – HTML forms

**Unit III**

Need of a Scripting Language – identifiers – Expressions – JavaScript Keywords – Operators – Statements – functions – the Window Object - The Document Object – Forms Object – Textbox and TextArea – Button, Radio button and Checkbox – The Select Object – The Date Object – The Math Object – The String Object – Arrays.

**Unit IV**

Embedding VBScript code in an HTML document – Comments – Variables – Array Variables – Assignment Operator – Numerical Operators – String concatenation – Sub procedure – Function Procedure – Conditional Statements – Looping Constructs

**Unit V**

Introduction – Cascading style Sheets – Coding CSS – Properties of Tags – Property Values – Other Style Properties – Inline Style Sheets – Embedded Style sheets – External Style Sheets – Grouping – Inheritance – Class as Selector – ID as Selector – Contextual Selectors

Textbook(s) : Web Technology.  
 Author(s) : N.P.Gopalan, J.Akilandeswari  
 Publication(s) : PHI Learning Pvt. Ltd, 2011

Unit I : 1.2,1.3,1.4,1.5,1.6,1.6.1,1.6.2,1.6.3,1.6.4,1.6.5,1.7,4.2,4.2.1,4.2.2,4.2.3  
 Unit II: 4.4,4.5,4.5.1,4.5.2,4.5.3,4.5.4,4.5.5,4.5.6,4.5.7,4.5.8,4.5.9,4.5.10,4.6  
 Unit III: 5.1.1,5.2.1,5.2.2,5.2.3,5.2.4,5.2.5,5.2.6,5.3.1,5.3.2,5.3.3,5.3.4,5.3.5,5.3.6  
 Unit IV: 5.4.1,5.4.2,5.4.3,5.4.5,6.1,6.2,6.3,6.4,6.4.1,6.5.1,6.5.2,6.5.3,6.6.1,6.6.2  
 Unit V: 6.7,6.8,7.1,7.2,7.2.1,7.2.2,7.2.3,7.2.4,7.2.5,7.2.6,7.2.7,7.2.8,7.2.9,7.2.12.

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<b>PART - III ELECTIVE</b>	<b>Title : WEB TECHNOLOGY LAB</b>	<b>Subject Code : 17 UMC EP1</b>
<b>Semester : V</b>	<b>HOURS : 5 hours / Week</b>	<b>CREDITS : 5</b>

**Objectives:**

**To develop the Students know about Web Technology Lab.**

1. Write a script to add two integers.
2. Write a script that reads five integers and determines the largest integer in the group.
3. Write a script that reads integers and determines its square root using Math object.
4. Write a script to find the number of occurrences of a given number in a set of stored numbers.
5. Write a script to compare two given numbers whose inputs are from HTML form.
6. Write a script to compare two strings using string object.
7. Write a recursive function to calculate the Fibonacci value of a given number.
8. Write a script to calculate and print the area of circle using function.
9. Write a function that determines pair of integers when the second is a multiple of the first.
10. Write a script to generate random numbers within 1 to 10 and display it in a table.
11. Write a function that takes an integer value and returns the number with its digits reserved.
12. Write a script function to display current data and time using date object.
13. Write a script to validate an HTML form.
14. Write a script to count the number characters entered by a user in a text box and limit it to a particular number.
15. Write a function for distance between two  $(x_1, y_1)$  and  $(x_2, y_2)$ . Incorporate this function into a script that enables the user to enter the coordinates of the points through an HTML form.



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<b>PART - III ELECTIVE</b>	<b>Title : UNIX THEORY</b>	<b>Subject Code : 17 UMC E52</b>
<b>Semester : V</b>	<b>HOURS : 5 hours / Week</b>	<b>CREDITS : 5</b>

**Objectives:**

**To develop the Students know about Unix Theory.**

**UNIT – I** Evolution of the UNIX System – Some Simple Commands – Changing Your Password with *passwd* – The Shell's Use of Special Characters – Print Current or Working Directory with *pwd* – List Directory Contents with *ls* – Changing Working Directory with *cd* – Creating User Directories with *mkdir* – Copying Files with *cp* – Moving and Renaming Files with *mv* – Removing Files with *rm* – Deleting Directories with *rmdir* –

**Unit II**

Ownership and Protection – Printing a File – Sorting Text Files with *sort* – Counting Things In a File with *wc* – Finding Text Patterns In a File with *grep* – Translating Characters with *tr* – Printing Files In Columns using *pr* – Comparing Files with *cmp* – Finding Commonality Between Files with *comm*

**Unit III**

The vi Text Editor – Calling up vi – Getting out of vi – Command Structure – Basic Cursor Movements – Simple Text Additions, Changes, and Deletions – Cursor Positioning over words – Introduction to *awk* –

**Unit IV**

Diagram of the Shell – Some Simple Shell Procedures – Naming Shell Procedures – Shell Variables – Shell Programming – Looping with the *for* statement – Conditional Execution with *if* – The *if* statement – The *exit* statement – The *else* statement – The *elif* statement – The *test* command

**Unit V**

Tests on Numerical values – Tests on File Types – Tests on Character Strings – Looping with the *while* statement – Altering loop execution with *break* and *continue* – The *until* statement – The *true* and *false* commands – Selective Execution using the *case* statement – Comments in Shell Programs.

**Text Book:** Introducing UNIX System V by Rachel Morgan and Henry McGilton – McGraw Hill Publications.



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<b>PART - III ELECTIVE</b>	<b>Title : UNIX LAB</b>	<b>Subject Code : 17 UMC EP2</b>
<b>Semester : V</b>	<b>HOURS : 5 hours / Week</b>	<b>CREDITS : 5</b>

**Objectives:**

**To develop the Students know about Unix Lab**

1. Write a Shell Script for Calculating Simple Interest
2. Write a Shell Script for Swapping Two Numbers
3. Write a Shell Script for Calculating Electricity Board Bill
4. Write a Shell Script for Check the given number is non negative or not
5. Write a Shell Script for Check the given number is odd or even
6. Write a Shell Script for Generate Armstrong Numbers
7. Write a Shell Script for Generate Prime Numbers
8. Write a Shell Script for Check the given number is Adam Number or not
9. Write a Shell Script for Generating nth Multiplication Table with m range.
10. Write a Shell Script for Generating Fibonacci Sequence
11. Write a Shell Script for Finding the Reversed and Sum of digits of given.
12. Write a Shell Script for Occurrence of a Character from given words.

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**VI SEMESTER**

S. No	Sub. Code	Nature	Subject Title	Hours / Week	Exam hrs	C A	SE	Tot	Crd
1	17 UMC C61	PART-III CORE	Numerical Methods	5	3	25	75	100	4
2	17 UMC C62	PART-III CORE	Complex Analysis	5	3	25	75	100	4
3	17 UMC C63	PART-III CORE	Operations Research	5	3	25	75	100	4
4	17 UMC C64	PART-III CORE	Fuzzy Sets	5	3	25	75	100	4
5	17UMC C65	PART-III CORE	Statistics - II	5	3	25	75	100	4
6	17UMC EV1	PART-III ELECTIVE	Project&Viva-Voce	5	3	40	60	100	5
7	16UGKB61	Self Study	General Knowledge	-	-	-	-	100	-
<b>Total</b>				<b>30</b>				<b>700</b>	<b>25</b>

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<b>PART - III</b>	<b>Title : NUMERICAL METHODS</b>	<b>Subject Code : 17 UMCC61</b>
<b>CORE</b>		
<b>Semester : VI</b>	<b>HOURS : 5 hours /week</b>	<b>CREDITS : 4</b>

**Objectives:**

**To develop the Students know about Numerical methods.**

**UNIT I**

Numerical Solutions of Algebraic and Transcendental Equations – Iteration Method – Newton – Method of False Positions – Solutions of Simultaneous Linear Equations – Gauss Elimination Method – Gauss’s Jordan Method – Gauss Jacobi Method – Gauss Seidel Method.

**UNIT II**

Finite Differences- Forward Difference and Backward Differences – Finite Differences – Operators – Relations – Properties – Finding Missing Terms – Inverse Operators – Factorial Notation Interpolation and Newton’s Forward and Backward Formulae.

**UNIT III**

Divided Differences and Properties – Newton’s Divided Differences Formula – Gauss Formula Stirling’s Formula – Bessel Formula – Laplace Everret’s formula – Lagrange Formula – Simple Problems – Inverse Interpolation using Lagrange Formulation.

**UNIT IV**

Numerical Differentiation – Finding the First and Second Derivatives – Maximum and Minimum Values of a function for a given data.

**UNIT V**

Numerical Integration – Newton’s Cote’s Formula – Trapezoidal Rule – Simpson’s One Third Rule – Simpson’s Three Eight Rule – Weddle’s Rule.

Textbook : Numerical Methods, Second Edition  
Author(s) : Dr.S.Arumugam, Thangapandi Issac & Dr.A. Somasundaram  
Publisher : Scitech Publications, Edition 2006.

Unit I Chapter 3 & 4 - Sections : 3.0-3.4,4.0-4.8.  
Unit II Chapter 6 - Sections : 6.0-6.4,7.0&7.1.  
Unit III Chapter 7 - Sections: 7.2-7.6  
Unit IV Chapter 8 - Sections: 8.0-8.4  
Unit V Chapter 8 - Sections : 8.5

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<b>PART - III CORE</b>	<b>Title : COMPLEX ANALYSIS</b>	<b>Subject Code : 17 UMC C62</b>
<b>Semester : VI</b>	<b>HOURS : 5 hours /week</b>	<b>CREDITS : 4</b>

**Objectives:**

**To develop the Students know about Complex Analysis.**

**UNIT I**

Analytic Functions – C~R Equations - Sufficient Conditions - Harmonic Functions.

**UNIT II**

Elementary Transformations - Bilinear Transformations - Cross Ratio - Fixed Points - Special Bilinear Transformations - Real Axis to Axis - Unit Circle to Unit Circle and Real Axis to Unit Circle only.

**UNIT III**

Definite Integral - Cauchy's Fundamental Theorem - Cauchy's Integral Formulae and Formulae for Derivatives - Morera's Theorem - Cauchy's Inequality - Liouville's Theorem - Fundamental Theorem of Algebra.

**UNIT IV**

Taylor's Theorem, Laurent's Theorem - Singular Points – Poles - Argument Principle - Rouche's Theorem.

**UNIT V**

Calculus of Residues - Evaluation of Definite Integrals

Text Book(s) : Complex Analysis  
Author(s) : Dr. S.Arumugam, A.Thangapandi Issac, Dr. A. Somasundaram  
Publication(s) : Scitech Publications.

Reference Book(s) :

Unit I	Chapter 2	Sections: 2.0-2.8
Unit II	Chapter 3	Sections: 3.1-3.5
Unit III	Chapter 6	Sections: 6.1-6.4
Unit IV	Chapter 7	Sections: 7.1-7.4
Unit V	Chapter 8	Sections : 8.1-8.3

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<b>PART - III CORE</b>	<b>Title : OPERATIONS RESEARCH</b>	<b>Subject Code : 17 UMCC63</b>
<b>Semester : VI</b>	<b>HOURS : 5 hours /week</b>	<b>CREDITS : 4</b>

**Objectives:**

**To develop the Students know about Operations Research.**

**UNIT I : LINEAR PROGRAMMING PROBLEM**

Introduction – Mathematical formulation of the problem – Graphical solution method – Some exceptional cases – General LPP – Canonical and Standard forms of LPP.

**UNIT II: LINEAR PROGRAMMING PROBLEM**

Introduction of simplex method – Fundamental properties of solutions – The computational procedure – Two phase method, Big M method – Solution of simultaneous linear equations – General primal dual pair – Primal dual pair in matrix form – Duality and simplex method - Dual simplex method.(omit Theorems)

**UNIT III: TRANSPORTATION PROBLEM**

General transportation problem – The transportation table – Duality in transportation problem – Loops in Transportation tables – LP formulation of the Transportation problem – Solution of a Transportation problem – Finding an initial basic feasible solution – Test for optimality – Degeneracy in transportation problem – Transportation algorithm (MODI METHOD) – Stepping stone solution method – Some exponential cases – Time minimization transportation problem – Transshipment problems.

**UNIT IV: ASSIGNMENT PROBLEM**

Introduction – Mathematical formulation of the problem – The assignment method – Special cases in assignment problems – A typical assignment problem – The travelling salesman problem.

**UNIT V: GAMES AND STRATEGIES**

Introduction – Two-person zero-sum games – Some basic terms – The maxmin-minimax principle – Games without saddle points-mixed strategies – Graphical solution of  $2 \times n$  and  $m \times 2$  games – Dominance property – Arithmetic method for  $n \times n$  games – General solution of  $m \times n$  rectangular games- Game against passivity – Limitations and Extensions.

**TEXT :** OPERATIONS RESEARCH by Kanti Swarup, P.K.Gupta, Man Mohan Sultan Chand & Sons Publications, IX Edition,

Unit I	Chapter 2,3	Pages: 2.1,2.2,3.2-3.5.
Unit II	Chapter 4,5	Pages: 4.1-5.9
Unit III	Chapter 10	Pages: 10.2-10.15
Unit IV	Chapter 11	Pages: 11.1-11.6
Unit V	Chapter 17	Pages: 17.1-17.9.



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<b>PART - III CORE</b>	<b>Title : FUZZY SETS</b>	<b>Subject Code : 17 UMCC64</b>
<b>Semester : VI</b>	<b>HOURS : 5 hours /week</b>	<b>CREDITS : 4</b>

**Objectives:**

To develop the Students know about Fuzzy Sets.

**Unit I Fuzzy Set Theory.**

Introduction – Number system – Interval – Sets – representations – Types of sets – Subsets – Universal sets – Operation on sets – Difference of two sets – Results – Venn diagram – Solved examples.

**Unit II Fuzzy Set Theory.**

Fuzzy Sets – Definitions – Types of fuzzy sets – Properties of fuzzy sets – Important operations – Fuzzy vs crisp – Solved Problems.

**Unit III Operations on Fuzzy Sets.**

Introduction – Important theorems – Extension principle of fuzzy sets – Fuzzy compliment – Further operations on fuzzy sets.

**Unit IV Fuzzy Numbers And Arithmetic.**

Definitions – Fuzzy arithmetic – Arithmetic operations of fuzzy number in the of--- cut sets – Fuzzy equations – Solved problems.

**Unit V Fuzzy Relations.**

General definitions – Projections and cylindrical fuzzy relations n- Composition – Relational join – Binary relations on single set – Compatibility relation – Solved problems.

**Text Book:** Fuzzy Sets & their applications, Pragati Edition by Dr.Sudhir Pundir, Dr. Rimple Pundir, first edition, 2006.

Unit I	Chapter 1	Sections: 1.1-1.15
Unit II	Chapter 1	Sections: 1.16-1.21
Unit III	Chapter 2	Sections: 2.1-2.5
Unit IV	Chapter 3	Sections: 3.1-3.8,3.9 (omit theorem)
Unit V	Chapter 4	Sections: 94 – 110

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<b>PART - III CORE</b>	<b>Title : STATISTICS- II</b>	<b>Subject Code : 17 UMC C65</b>
<b>Semester : VI</b>	<b>HOURS : 5 hours /week</b>	<b>CREDITS : 4</b>

**Objectives:**

To develop the Students know about Statistical methods.

**UNIT I**

**CORRELATIONS & REGRESSION:** Introduction – Correlation simple problems – Rank correlation – Regression – Simple problems.

**UNIT II**

**PROBABILITY:** Introduction – Conditional probability – Properties of independent events – Bayee’s theorem – Boole’s inequalities.

**UNIT III**

**RANDOM VARIABLES:** Introduction – Discrete Random Variable & Continuous Random Variable – Mathematical expectations – Moment generating function – Properties of Moment – Cumulant – Properties of generating function.

**UNIT IV**

**SPECIAL DISTRIBUTIONS:** Binomial distribution – Moments of binomial distribution – Mode of binomial distribution – Poisson distribution – Mode of passion distribution – Fitting Poisson distribution.

**UNIT V**

**NORMAL DISTRIBUTION:** Definition – MGF of normal distribution – Mode of normal distribution –  $\beta$  and  $\gamma$  co-efficient of normal distribution – Simple problems.

**TEXT BOOK: STATISTICS**

**AUTHOUR: ARUMUGAM & ISSAC.**

**PUBLISHER: New Gamma Pub. House June 2007**

**Reference Book:** Statistical methods by S.P.Gupta.

<b>UNIT</b>	<b>CHAPTER</b>	<b>SECTIONS</b>
I	6	6.0-6.3
II	11	11.0-11.2
III	12	12.0-12.5
IV	13	13.1-13.2
V	13	13.3only

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<b>PART - III ELECTIVE</b>	<b>Title : PROJECT WORK &amp; VIVA-VOCE</b>	<b>Subject Code : 17 UMC EV1</b>
<b>Semester : VI</b>	<b>HOURS : 5 hours /week</b>	<b>CREDITS : 5</b>

**Objectives:**

- To give exposure on software development and maintenance
  - To train students, a systematic way of Report writing
  - To practice students for project presentation
1. A maximum of two students can join to do the project work
  2. Students must undertake the project work under the guidance of a faculty member
  3. Progressive reports have to be submitted to the guide periodically
  4. The internal test marks is 40 and is divided into the following components.
    - (i) Two Presentations -  $2 \times 10 = 20$  marks
    - (ii) Progressive Reports - 10 marks
    - (iii) Internal Viva-voce - 10 marks
  5. The external examination will be jointly conducted by both the Internal and external examiners
  6. The students must submit 3 copies (2 copies for 2 students + 1 copy for the Dept.) of their Project Report two weeks before the external examination.
  7. The maximum marks for the external examination is 60 and it may be divided into the following components.
    - (i) Project Report - 20 marks
    - (ii) Project Presentation - 20 marks
    - (iii) Project viva-voce - 20 marks

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