ANNEXURE - 11

MATHEMATICS WITH COMPUTER APPLICATIONS (SF)

VISION:

To generate and disseminate mathematical knowledge through humanism and tolerance for reason, for adventure of ideas and for the search of truth in mathematics.

MISSION:

- *To make students achieve, academic excellence through classroom teaching, practicals, projects and educational tours.*
- *To encourage students with different learning abilities by providing the needed support.*
- *To enable access to education processes through computer based technology by providing hands-on-training.*

Programme Educational Objectives (PEO)

PEO1	Natural navigators and nimble witted in diagnosing problems, in enlisting steps to rectify them and in providing the most effective solutions in the best possible way
PEO2	Moralistic while demonstrating their academic caliber, in recognizing and acknowledging value systems, in making decisions, accepting responsibilities and while concerned about society and public issues and needs
PEO3	Self-reliant in learning and in real life job situations through which they support their peers and become stable and reliable students, workers and citizens
PEO4	Steadfast in shielding and nurturing environment and stimulate its sustainable growth for a bright future
PEO5	Versatile and vibrant communicators in person and through other media. Vigilant/vital in prolonging the long winding richness and tradition of their mother tongue
PEO6	Neoteric global citizens of our nation, who would take the nation's pride around the world by adapting and adopting the scientific and technological developments
PEO7	Civilized and confident graduates, who believe in lifelong learning with the socio-cultural changes in the generations to come

PROGRAM OUTCOMES (PO)

The objectives of this programme is to equip / prepare the students

PO1	Students will be well equipped with knowledge of mathematical facts and logical skills which will rack up with a thorough knowledge of the Mathematics and the Computer papers.
PO2	Develop the knowledge, skills and attitude necessary to pursue higher studies in Mathematics
PO3	Students will acquire the reasoning ability and problem solving skill get through various competitive examinations.
PO4	Adapt the students with better learning ability in the ever changing software industry
PO5	Nurture the students with skills required to become an entrepreneur.

PROGRAM SPECIFIC OUTCOME (PSO)

On the successful completion of B.Sc. Mathematics with Computer Applications, the students will be able to

PSO 1	Understand the fundamental and the advanced concepts in Mathematics and Computer.
PSO 2	Exhibit a computational ability and numerical skills in the various areas.
PSO 3	Develop basic Mathematical and Computer Algorithm and analyze problems.
PSO 4	Build technical, professional, practical and communicative skills to face the industrial with clarity
PSO 5	Develop practical skills to provide solutions for computer oriented problems.

PO - PEO MAPPING

	PEO1	PEO2	PEO3	PEO4	PEO5	PEO6	PEO7
PO1	3	2	3	3	2	2	3
PO2	3	2	2	3	2	2	3
PO3	2	3	3	2	3	3	3
PO4	3	3	2	3	3	3	2
PO5	2	2	2	1	3	2	2

3- Strong   2- Medium   1- Low

B.Sc MATHEMATICS WITH CA

SEM	Part – I	Part – II	Part – III				Part – IV			Part – V (6th Hr)	ACC (6th Hr)			SLC
I Sem.	I Lang (6)	II Lang (6)	Core (5)	Core (5)	Allied Maths CA (4)	Allied Maths CA Lab (2)	SBE (2)	–	Total (30)	NSS / NCC / PED/Rover and Rangers/Library Science and Information (3)	Com.Eng (2)	Comp.Lit (1)	–	–
II Sem.	I Lang (6)	II Lang (6)	Core (4)	Core (5)	Allied Maths CA (4)	Allied Maths CA Lab (2)	SBE (2)	EVS (1)	Total (30)	NSS / NCC / PED/Rover and Rangers/Library Science and Information (3)	Com.Eng (2)	Comp.Lit (1)	–	Number theory
III Sem.	I Lang (6)	II Lang (6)	Core (6)	Core Lab (2)	Allied Maths CA (4)	Allied Maths CA Lab (2)	NME (2)	SBE (2)	Total (30)	NSS / NCC / PED/Rover and Rangers/Library Science and Information (3)	Com.Eng (2)	Comp.Lit (1)	–	History of Mathematics
IV Sem.	I Lang (6)	II Lang (6)	Core (6)	Core Lab (2)	Allied Maths CA (4)	Allied Maths CA Lab (2)	NME (2)	SBE (2)	Total (30)	NSS / NCC / PED/Rover and Rangers/Library Science and Information (3)	Com.Eng (2)	Comp.Lit (1)	–	Discrete Mathematics
V Sem.	Core (6)	Core (6)	Core (4)	Core (4)	Core Lab (2)	Elec. (5)	SBE (2)	WS (1)	Total (30)	–	Com.Eng (2)	Comp.Lit (1)	Skill Development–Career Guidance (3)	Latex
VI Sem.	Core (6)	Core (4)	Core (4)	Core Lab (2)	Elec.II (5)	Elec.III (5)	SBE (2)	VBE (2)	Total (30)	–	Com.Eng (2)	Comp.Lit (1)	Skill Development–Career Guidance (3)	—
								TOTAL	180 Hrs					

I Language	–	Tamil
II Language	–	English
SBE	–	Skill Based Elective
SLC	–	Self Learning Course
EVS	–	Environmental Studies
WS	–	Women Studies
VBE	-	Value Based Education

B.Sc MATHEMATICS WITH CA: CHOICE BASED CREDIT SYSTEM WITH OBE PATTERN
FOR THOSE WHO HAVE JOINED FROM THE ACADEMIC YEAR
2021-22 ONWARDS

Part	Course	Subject	Sub Code	Hrs.	6th Hr.	Cr.	Adl. Cr.	Exam (Hrs)	Marks Int.	Marks Ext.
SEMESTER - I										
I	Lang. – I	Tamil – I	210103101	6		3		3	25	75
II	Lang. – II	English – I	211003101	6		3		3	25	75
III	Core	Calculus	213103101	5		5		3	25	75
	Core	Analytical Geometry of 3D and vector calculus	213103102	5		5		3	25	75
	Al.Mat CA	PC software	213103121	4		4		3	25	75
	Al. Mat CA Lab	MS Office Lab	213103122	2		1		3	40	60
IV	SBE - I	Basic Algebra	214403131	2		2		3	25	75
V	Extension activities	NSS / NCC / PED/Rover and Rangers/Library Science and Information	-			3		–	–	–
Additional Credit Courses		Communicative English–I	-			2		–	–	–
		Computer Literacy	-			1		–	–	–
SEMESTER – II										
I	Lang. – I	Tamil – II	210103201	6		3		3	25	75
II	Lang. – II	English – II	211003201	6		3		3	25	75
III	Core	Sequences and Series & Trigonometry	213103201	4		4		3	25	75
	Core	Differential Equations and Laplace Transformation	213103202	5		4		3	25	75
	Al.Mat CA	Programming in C	213103221	4		4		3	25	75
	Al. Mat CA Lab	C Lab	213103222	2		1		3	40	60
IV	SBE - II	Theory of Equations	214403231	2		2		3	25	75
	EVS	Environmental Studies	214103201	1		1		2	–	100
V	Extension activities	NSS / NCC / PED/Rover and Rangers/Library Science and Information	-			3		–	–	–
Additional Credit Courses		Communicative English–I				2	1	3	25	75
		Computer Literacy	-			1		–	–	–
		SLC - Number Theory	218003231				3	3	–	100
SEMESTER – III										
I	Lang. – I	Tamil – III	210103301	6		3		3	25	75
II	Lang. – II	English – III	211003301	6		3		3	25	75
III	Core	Modern Algebra	213103301	6		5		3	25	75
	Core Lab	Applications of Differential Equations Lab	213103302	2		1		3	40	60
	Al.	Object Orient Programming with C++	213103321	4		4		3	25	75
	Al. Lab	C++ Lab	213103322	2		1		3	40	60
IV	NME - I	Basic Maths – I	214603331	2		2		3	25	75
	SBE –III	Quantitative Aptitude - I	214403331	2		2		3	25	75
V	Extension activities	NSS / NCC / PED/Rover and Rangers/Library Science and Information	-			3		–	–	–
Additional Credit Courses		Communicative English–II	-			2		–	–	–
		Computer Literacy	-			1		–	–	–
		SLC -History of Mathematics	218003331				3	3	–	100

Part	Course	Subject	Sub Code	Hrs.	6thHr.	Cr.	Adl. Cr.	Exam (Hrs)	Marks	
									Int.	Ext.
SEMESTER - IV										
I	Lang. – I	Tamil – IV	210103401	6		3		3	25	75
II	Lang. – II	English – IV	211003401	6		3		3	25	75
III	Core	Linear Algebra	213103401	6		5		3	25	75
	Core Lab	Combinatorial Mathematics Lab	213103402	2		1		3	40	60
	Allied	Java programming	213103421	4		4		3	25	75
	Al. Lab	Java lab	213103422	2		1		3	40	60
IV	NME- II	Basic Maths – II	214603431	2		2		3	25	75
	SBE –IV	Quantitative Aptitude - II	214403431	2		2		3	25	75
V	Extension activities	NSS / NCC* / PED*/Rover and Rangers/Library Science and Information	-			3	1	3	25 *40	75 *60
Additional Credit Courses		Communicative English–II	218003401			2	1	3	25	75
		Computer Literacy	-			1		–	–	–
		SLC - Discrete Mathematics	218003431				4	3	–	100
SEMESTER – V										
III	Core	Real Analysis	213103501	6		5		3	25	75
	Core	Operations Research	213103502	6		4		3	25	75
	Core	Visual Programming	213103503	4		4		3	25	75
	Core	Mechanics	213103504	4		2		3	25	75
	Core Lab	Visual Programming Lab	213103505	2		2		3	40	60
	Elective	Elective– I*	-		5	5		3	25	75
IV	SBE - V	Astronomy	214403531	2		2		3	25	75
	WS	Women Studies		1		1		2	–	100
Additional Credit Courses		Communicative English–III	-		2			–	–	–
		Computer Literacy	-		1			–	–	–
		Skill Development – Career Guidance	-		3			–	–	–
		SLC - Latex	218003531				4	3	–	100
SEMESTER - VI										
III	Core	Complex Analysis	213103601	6		5		3	25	75
	Core	.Net Programming	213103602	4		4		3	25	75
	Core	Numerical Analysis	213103603	4		2		3	25	75
	Core Lab	.Net Lab	213103604	2		2		3	40	60
	Elective	Elective– II	-		5	5		3	25	75
	Elective	Elective– III: Project *Report;@Viva	213103607	5		5		–	40 [24:16]	60 [36:24]
IV	SBE - VI	Graph Theory	214403631	2		2		3	25	75
	VBE	Value Based Education	214303601	2		2		2	–	100
Additional Credit Courses		Communicative English–III	218003601		2		1	3	25	75
		Computer Literacy	218003602		1		1	3	–	100
		Skill Development – Career Guidance	218003603		3		2	3	–	100
		Total		**180**	**36**	**140**	**20**			

*Elective I, II: Each elective paper has two choices, select any one.

I.1. Mathematical Statistics - I - 213103506

I.2. Functional Analysis - 213103507

II.1. Mathematical Statistics – II - 213103605

II.2. Stochastic Processes - 213103606

ALLIED – MATHEMATICS FOR BCA							
Sem	**Title of the Paper**	**SUB CODE**	**Hrs.**	**Cr.**	**Exam (Hrs)**	**Marks Allotted**	
						Int.	**Ext.**
I	Mathematics for Computer Applications	213103123	4	3	3	25	75
II	Optimization Techniques	213103223	4	3	3	25	75

ALLIED – MATHEMATICS FOR INFORMATION TECHNOLOGY

Sem	**Title of the Paper**	**SUB CODE**	**Hrs.**	**Cr.**	**Exam (Hrs)**	**Marks Allotted**	
						Int.	**Ext.**
III	Discrete Mathematics	213103323	4	4	3	25	75
IV	Resource management Techniques	213103423	4	4	3	25	75

B.Sc MATHEMATICS WITH (CA) : CHOICE BASED CREDIT SYSTEM WITH OBE PATTERN FOR THOSE WHO HAVE JOINED FROM THE ACADEMIC YEAR 2021–22 ONWARDS

Core Subject	**MODERN ALGEBRA**	**Code: 213103301**

SEMESTER III

6 Hrs/Week
Credits 5

COURSE DESCRIPTION:
- ✎ *To describe basic knowledge about the sets, functions, algebraic structures and isomorphism.*

PREAMBLE:
- ✎ *To provide a basic knowledge of fundamental concepts in Algebra.*
- ✎ *To motivate the learners on Algebra there by to lay foundation for future studies.*

COURSE OUTCOMES (COs)

On Successful completion of the course, the student will be able to

No.	Course Outcome	Knowledge Level (According to Bloom's Taxonomy)
CO1	Explain the basic concepts in Groups.	Up to K3
CO2	Apply the logical arguments for proving the characterizations/equivalent conditions of algebraic structure.	Up to K3
CO3	Provide basic concepts in Isomorphism	Up to K3
CO4	Analyze the nature and properties of Rings and Ideals	Up to K3
CO5	Justify the statements in Ideals / Rings.	Up to K3

K1-knowledge   K2- Understand   K3 – Apply

UNIT – I: **[18 Hrs]**

Groups – Definition and examples - Elementary properties of a group - Equivalent definitions of a group - Permutation Groups - Subgroups - Cyclic Groups - Order of an element

UNIT – II: **[18 Hrs]**

Coset's and Lagrange's theorem - Normal subgroups and Quotient Groups - Homomorphisms - Fundamental theorem of group homomorphism.

UNIT – III: **[18 Hrs]**

Isomorphism - Isomorphism is an equivalence relation among groups - Cayle's theorem - Inner automorphisms

UNIT – IV: **[18 Hrs]**

Rings - Definition and examples - Elementary properties of rings - Homomorphism of rings - Isomorphism - Types of rings -Characteristic of a ring.

UNIT – V: **[18 Hrs]**

Subrings-Ideals-Quotient rings - Maximal and prime ideals.

TEXT BOOK:

01. Arumugam S., and Isaac Modern Algebra, Scitech Publications Private Limited, Reprint 2013.

Unit-I: 3.1 to 3.7
Unit-II :   3.8,3.9,3.11
Unit-III: 3.10
Unit-IV: 4.1 to 4.5,4.10
Unit-V: 4.6 to4.9

REFERENCES:

01. Vasishtha A. R., Modern Algebra, Krishna Publications,1998.
02. Frank Ayres, Modern Abstract Algebra, Schaum's Outline Reprint 2020.
03. A. Mahindroo, Topics in Modern Algebra, Laxmi Publications, First edition (2007).

WEB RESOURCES:

01. https://ocw.mit.edu/courses/mathematics/18-703-modern-algebra-spring-2013/lecture-notes/
02. https://onlinecourses.swayam2.ac.in/cec20_ma15/preview
03.https://people.math.umass.edu/~havens/m235Lectures/

PEDAGOGY: Black Board; chalk; LCD Projector

COURSE CONTENTS & TEACHING / LEARNING SCHEDULE

Module No.	Topic	No.of Lectures	Content Delivery Method	Teaching Aids
UNIT – I [18 Hrs]				
1.1	Definition and examples	3	Chalk & Talk	Black Board
1.2	Elementary properties of a group	3	Chalk & Talk	Black Board
1.3	Equivalent definitions of a group	3	Chalk & Talk	Black Board
1.4	Permutation Groups	3	Chalk & Talk	Black Board
1.5	Subgroups and Cyclic Groups	3	Chalk & Talk	Black Board
1.6	Order of an element	3	Chalk & Talk	Black Board
UNIT – II [18 Hrs]				
2.1	Cosets and Lagrange's theorem	8	Chalk & Talk	Black Board
2.2	Normal subgroups and Quotient Groups	4	Chalk & Talk	Black Board
2.3	Homomorphisms	3	Chalk & Talk	Black Board
2.4	Fundamental theorem of group homomorphism.	3	Chalk & Talk	Black Board
UNIT – III [18 Hrs]				
3.1	Isomorphism	7	Chalk & Talk	Black Board
3.2	Isomorphism is an equivalence relation among groups	2	Chalk & Talk	Black Board
3.3	Cayle's theorem	2	Chalk & Talk	Black Board
3.4	Inner automorphisms	7	Chalk & Talk	Black Board
UNIT – IV [18 Hrs]				
4.1	Definition and examples	3	Chalk & Talk	Black Board
4.2	Elementary properties of rings	2	Chalk & Talk	Black Board
4.3	Homomorphism of rings	3	Chalk & Talk	Black Board
4.4	Isomorphism	3	Chalk & Talk	Black Board
4.5	Types of rings	5	Chalk & Talk	Black Board
4.6	Characteristic of a ring	2	Chalk & Talk	Black Board

UNIT – V		[18 Hrs]		
5.1	Subrings	4	Chalk & Talk	Black Board
5.2	Ideals	4	Chalk & Talk	Black Board
5.3	Quotient rings	3	Chalk & Talk	Black Board
5.4	Maximal and prime ideals	7	Chalk & Talk	Black Board

MAPPING OF COs WITH POs

	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	3
CO2	3	3	3	3	2
CO3	3	3	2	2	2
CO4	2	3	3	3	2
CO5	2	3	2	2	2

Strong – 3   Medium – 2   Low – 1

COURSE DESIGNER : Mrs . P DEEPA

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Core Lab   APPLICATIONS OF DIFFERENTIAL EQUATIONS LAB
SEMESTER III   Code: 213103302
2 Hrs/Week
Credit 1

PREAMBLE:
  ? ***To help the students to understand how differential equations area applied in real life problems.***

LIST OF PRACTICALS:
   01. Mixture problem
   02. An application involving a snowplow
   03. First order R.C. series circuits
   04. Drug distribution in human body by a decay model
   05. Brachistochrone problem
   06. Damped vibrations
   07. Electric circuits
   08. Second order RLC Electric circuits
   09. Derivation of a Wave equation in a vibrating string
   10. Derivation of Heat flow in a rectangular plate
   11. Solving circuit equations
   12. Solving a spring mass system that is critically damped

REFERENCE:
   01. Narayanan S., Manicavasagam T.K.Pillay, Differential equations and its applications, Viswanathan S. Printers & Publishers pvt Ltd - 2009.
   02. George F. Simmons, Steven G.Krantz, Differential equations, Tata Mc Graw Hill Edition - 2009.

WEB RESOURCES:
   01. https://www.youtube.com/watch?v=6wk9zWa-Fww
   02. https://mathworld.wolfram.com/BrachistochroneProblem.html#:~:text=The%20brachistochrone%20problem%20was%20one,405).&text=When%20Jakob%20correctly%20did%20so,Boyer%20and%20Merzbach%201991%2C%20p.
   03. http://www.sharetechnote.com/html/DE_Modeling_Example_ElectricCircuit.html

PEDAGOGY: Black Board; chalk; LCD Projector

COURSE DESIGNER : Mrs . P KAYATHRI

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Allied Maths   OBJECT ORIENTED PROGRAMMING WITH C++

SEMESTER III   **Code: 213103321**

4 Hrs/Week

Credits 4

COURSE DESCRIPTION:

✎ ***To describe basic knowledge about OOPs concepts and improve their programming skills.***

PREAMBLE:

✎ ***To introduce the fundamental concept in object oriented Programming.***

✎ ***To lay foundation for future studies in C++ Programming.***

COURSE OUTCOMES (COs)

On Successful completion of the course, the student will be able to

No.	Course Outcome	Knowledge Level (According to Bloom's Taxonomy)
CO1	Explain the basic concepts of OOPs	Up to K3
CO2	Discuss arrays, member functions.	Up to K3
CO3	Explain the principles of OOPs and distinguish classes and objects.	Up to K3
CO4	Compare different types of overloading and inheritance.	Up to K3
CO5	Identify various concepts of files.	Up to K3

K1-knowledge   K2- Understand   K3 – Apply

UNIT – I: **[12 Hrs]**

Introduction – Tokens – Keywords – Identifiers and constants – Data types – Variables – Operators – Manipulators – Expressions – Control structures

UNIT – II: **[12 Hrs]**

Functions in C++: The main function – Function prototyping – Call by value – Call by reference – Inline functions – Function overloading – Friend function.

UNIT – III: **[12 Hrs]**

Classes and objects: Specifying a class – Defining member functions – Objects – constructors, destructors – Operator overloading – Type conversions.

UNIT – IV: **[12 Hrs]**

Inheritance – Single inheritance – Multilevel inheritance – Multiple inheritance – Hierarchical inheritance – Hybrid inheritance – Pointer to objects, this pointer – Virtual functions – C++ streams – C++ stream classes – Unformatted I/O operators – Formatted console I/O operators.

UNIT – V: **[12 Hrs]**

Working with files – Classes – Opening and closing a file – File pointers – Updating a file – Command line Arguments.

TEXT BOOK:

01. Balagurusamy E., Object-Oriented Programming with C++, 4th Edition, Tata McGraw – Hill Publishing Company Ltd, New Delhi. Chapters – 3, 4, 5, 6, 7, 8.1 to 8.8, 9.1 to 9.4, 9.6, 10.1 to 10.5, 11

REFERENCES:

01. John R., Hubbard, Programming with C++, Tata McGraw – Hill Publishing Company Ltd, New Delhi.
02. Herbert Schildt, C++ The Complete Reference, Tata McGraw – Hill Publishing Company Ltd 4th Edition 2002
03. Reema Thareja, object oriented programming with c++, oxford,2018

WEB RESOURCES:

1. https://www.tutorialspoint.com/cplusplus/cpp_quick_guide.htm
2. https://www.toptal.com/c/the-ultimate-list-of-resources-to-learn-c-and-c-plus-plus
3. https://www.certiology.com/tutorials/c-plus-plus-tutorial.html

PEDAGOGY: Black Board; chalk; LCD Projector

COURSE CONTENTS & TEACHING / LEARNING SCHEDULE

Module No.	Topic	No.of Lectures	Content Delivery Method	Teaching Aids
UNIT – I [12 Hrs]				
1.1	Tokens – Keywords – Identifiers and constants	2	Chalk & Talk	Black Board
1.2	Data types	1	Chalk & Talk	Black Board
1.3	Variables – Operators	2	Chalk & Talk	Black Board
1.4	Manipulators	2	Chalk & Talk	Black Board
1.5	Expressions	2	Chalk & Talk	Black Board
1.6	Control structures	3	Chalk & Talk	Black Board
UNIT – II [12 Hrs]				
2.1	The main function – Function prototyping	3	Chalk & Talk	Black Board
2.2	Call by value – Call by reference	3	Chalk & Talk	Black Board
2.3	Inline functions – Function overloading	3	Chalk & Talk	Black Board
2.4	Friend function	3	Chalk & Talk	Black Board
UNIT – III [12 Hrs]				
3.1	Specifying a class – Defining member functions	3	Chalk & Talk	Black Board
3.2	Objects – constructors, destructors	3	Chalk & Talk	Black Board
3.3	Operator overloading	3	Chalk & Talk	Black Board
3.4	Type conversions	3	Chalk & Talk	Black Board
UNIT – IV [12 Hrs]				
4.1	Single inheritance – Multilevel inheritance – Multiple inheritance –Hierarchical inheritance– Hybrid inheritance	2	Chalk & Talk	Black Board
4.2	Pointer to objects	2	Chalk & Talk	Black Board
4.3	this pointer	1	Chalk & Talk	Black Board
4.4	Virtual functions	1	Chalk & Talk	Black Board
4.5	C++ streams – C++ stream classes	2	Chalk & Talk	Black Board
4.6	Unformatted I/O operators	2	Chalk & Talk	Black Board

4.7	Formatted console I/O operators	2	Chalk & Talk	Black Board
UNIT – V [12 Hrs]				
5.1	Working with files	2	Chalk & Talk	Black Board
5.2	Classes	2	Chalk & Talk	Black Board
5.3	Opening and closing a file	3	Chalk & Talk	Black Board
5.4	File pointers	2	Chalk & Talk	Black Board
5.5	Updating a file	2	Chalk & Talk	Black Board
5.6	Command line Arguments	1	Chalk & Talk	Black Board

MAPPING OF COs WITH POs

	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	3
CO2	3	3	3	3	2
CO3	3	3	2	2	2
CO4	2	3	3	3	2
CO5	2	3	2	2	2

Strong – 3   Medium – 2   Low – 1

COURSE DESIGNER : Mr. S SEENIRAJAN
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Allied Lab Maths CA   **C++ LAB**   Code: 213103321
                         SEMESTER III   **2 Hrs/Week**
                                         Credit 1

PREAMBLE:
   ? *To give hands on training in C++ Programming.*
   ? *To lay foundation for future studies in C++ Programming.*

Program List

01. Write a program to convert temperature Fahrenheit in to Celsius.

02. Write a program to print the following output using for loops
    i.   1
    ii. 2 2
    iii. 3 3 3
    iv. And so on

03. Write a macro that obtains the largest among the given numbers.

04. Write a program to calculate variance and Standard deviations of N number.

05. Write a program to find largest values of two numbers using nesting the member function.

06. Write a program to overload the unary minus operator.

07. Write a program to overload the operator using friends.

08. Write a program to overload the binary operator for adding two complex numbers.

09. Write a program to overload the binary operator for multiplying two complex numbers.

10. Write a program to maintain the employees information using inheritance.

11. Write a program to maintain the library details using constructor and destructor.

12. Write a program to find the magnitude of a vector using conversion function.

REFERENCE:
01. Balagurusamy E., Object-Oriented Programming with C++, 4th Edition, Tata McGraw – Hill Publishing Company Ltd, New Delhi.
02. Herbert Schildt, C++ The Complete Reference, Tata McGraw – Hill Publishing Company Ltd 4th Edition 2002

WEB RESOURCES:
1. https://www.sanfoundry.com/
2. https://www.javatpoint.com/cpp-overloading
3. https://www.geeksforgeeks.org/inheritance-in-c/

PEDAGOGY: Black Board; chalk; LCD Projector

COURSE DESIGNER : Mr. S SEENIRAJAN

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Part – IV	**BASIC MATHS – I**	Code: 214603331
Non Major-Electives	**SEMESTER III**	**2 Hrs/Week**
		Credits 2

COURSE DESCRIPTION:
  ? *To describe basic knowledge about the H.C.F and L.C.M of numbers, problems on ages, average and surds.*

PREAMBLE:
  ? *To give fundamental concepts in mathematics.*
  ? *To help the students in preparing for Competitive Examinations.*

COURSE OUTCOMES (COs)

On Successful completion of the course, the student will be able to

No.	Course Outcome	Knowledge Level (According to Bloom's Taxonomy)
CO1	Introduce concepts of Mathematics along with analytical ability	Up to K3
CO2	Develop the computational skills needed	Up to K3
CO3	Improve the ability to face the competitive examinations	Up to K3
CO4	Face the Competitive Examination bravely in future on employability	Up to K3
CO5	Develop mathematical aptitude skills.	Up to K3

K1-knowledge   K2- Understand   K3 – Apply

UNIT – I: **[6 Hrs]**

  H.C.F and L.C.M of numbers.

UNIT – II: **[6 Hrs]**

  Average

UNIT – III: **[6 Hrs]**

  Problems on numbers

UNIT – IV: **[6 Hrs]**

  Problems on ages

UNIT – V: **[6 Hrs]**

  Surds and indices

TEXT BOOK:

01. Aggarwal R.S., Quantitative Aptitude, S.Chand & company Ltd, New Delhi, Revised Edition (Reprint 2013)

Unit – I	:	Chapter 2 (worked examples only)
Unit – II	:	Chapter 6(worked examples only)
Unit – III	:	Chapter 7(worked examples only)
Unit – IV	:	Chapter 8(worked examples only)
Unit – V	:	Chapter 9(worked examples only)

REFERENCES:

01.Abhijit Guha, Quantitative Aptitude for Competitive Examinations, Tata Mc Graw–Hill Publishing Company Limited, New Delhi

02. Rajesh varma, Fast Track Objective arithmetic, Arihant Publications, 2018

03. Arora P.N, Quantitative Aptitude Math - Vol. 1, S.Chand, 2010.

WEB RESOURCES:

01.https://www.cuemath.com/numbers/

02.https://www.careerride.com/

03.http://www.mathsmutt.co.uk/files/ind.htm

PEDAGOGY: Black Board; chalk; LCD Projector

COURSE CONTENTS & TEACHING / LEARNING SCHEDULE

Module No.	Topic	No.of Lectures	Content Delivery Method	Teaching Aids
UNIT – I [6 Hrs]				
1.1	Concepts and formula	1	Chalk & Talk	Black Board
1.2	Problems of H.C.F.	3	Chalk & Talk	Black Board
1.3	Problems of L.C.M.	2	Chalk & Talk	Black Board
UNIT – II [6 Hrs]				
2.1	Basic concepts	1	Chalk & Talk	Black Board
2.2	Problems	5	Chalk & Talk	Black Board
UNIT – III [6 Hrs]				
3.1	Basic concepts	1	Chalk & Talk	Black Board
3.2	Problems	5	Chalk & Talk	Black Board
UNIT – IV [6 Hrs]				
4.1	Basic concepts	1	Chalk & Talk	Black Board
4.2	Problems	5	Chalk & Talk	Black Board
UNIT – V [6 Hrs]				
5.1	Concepts and formula	1	Chalk & Talk	Black Board
5.2	Problems	5	Chalk & Talk	Black Board

MAPPING OF COs WITH POs

	PO1	PO2	PO3	PO4	PO5
CO1	2	2	3	2	3
CO2	2	2	3	3	2
CO3	2	2	2	2	2
CO4	2	2	3	3	2
CO5	2	2	2	2	2

Strong – 3   Medium – 2   Low – 1

COURSE DESIGNER : Mrs . P KAYATHRI

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Part - IV   **QUANTITATIVE APTITUDE – I**   Code: 214403331
Skill Based Elective-Major   **SEMESTER III**   **2 Hrs/Week**
                           Credits 2

COURSE DESCRIPTION:
- ✍ *To describe basic knowledge about the average, percentage, profit and loss, ratio and problems on numbers.*

PREAMBLE:
- ✍ *To motivate and to lay foundation for the beginners in Mathematics*
- ✍ *To help the students in preparing for Competitive Examinations*

COURSE OUTCOMES (COs)

On Successful completion of the course, the student will be able to

No.	Course Outcome	Knowledge Level (According to Bloom's Taxonomy)
CO1	Introduce concepts of Mathematics along with analytical ability	Up to K3
CO2	Develop the computational skills needed	Up to K3
CO3	Improve the ability to face the competitive examinations	Up to K3
CO4	Face the Competitive Examination bravely in future on employability	Up to K3
CO5	Develop mathematical aptitude skills.	Up to K3

K1-knowledge   K2- Understand   K3 – Apply

UNIT – I: **[6 Hrs]**

Average

UNIT – II: **[6 Hrs]**

Problems on Numbers – Problems on ages

UNIT – III: **[6 Hrs]**

Percentage

UNIT – IV: **[6 Hrs]**

Profit and Loss

UNIT – V: **[6 Hrs]**

Ratio and Proportion

TEXT BOOK:
    01. Aggarwal R.S., Quantitative aptitude, S. Chand & company limited, New Delhi, Revised Edition (Reprint 2013)
              Unit – I   : Chapter 6   (worked examples only)
              Unit – II   : Chapter 7, 8 (worked examples only)
              Unit – III   : Chapter 10 (worked examples only)
              Unit – IV   : Chapter 11 (worked examples only)
              Unit – V   : Chapter 12 (worked examples only

REFERENCES:
    01. Abhijit Guha, Quantitative Aptitude for Competitive Examinations, Tata Mc Graw–Hill Publishing Company Limited, New Delhi
    02. Rajesh varma, Fast Track Objective arithmetic, Arihant Publications, 2018
    03. Arora P.N, Quantitative Aptitude Math - Vol. 1, S.Chand, 2010.

WEB RESOURCES:
01.https://www.bankersadda.com/
02.https://www.vedantu.com/maths/
03.https://www.adda247.com/teaching-jobs-exam/

PEDAGOGY: Black Board; chalk; LCD Projector

COURSE CONTENTS & TEACHING / LEARNING SCHEDULE

Module No.	Topic	No.of Lectures	Content Delivery Method	Teaching Aids
	UNIT – I [6 Hrs]			
1.1	Concepts and formula	1	Chalk & Talk	Black Board
1.2	Problems	5	Chalk & Talk	Black Board
	UNIT – II [6 Hrs]			
2.1	Basic concepts	1	Chalk & Talk	Black Board
2.2	Problems on Numbers	3	Chalk & Talk	Black Board
2.3	Problems on ages	2	Chalk & Talk	Black Board
	UNIT – III [6 Hrs]			
3.1	Concepts and formula	1	Chalk & Talk	Black Board
3.2	Problems	5	Chalk & Talk	Black Board
	UNIT – IV [6 Hrs]			
4.1	Concepts and formula	1	Chalk & Talk	Black Board
4.2	Problems on profit	3	Chalk & Talk	Black Board
4.3	Problems on loss	2	Chalk & Talk	Black Board
	UNIT – V [6 Hrs]			
5.1	Basic concepts	1	Chalk & Talk	Black Board
5.2	Problems on ratio	3	Chalk & Talk	Black Board
5.3	Problems on proportion	2	Chalk & Talk	Black Board

MAPPING OF COs WITH POs

	PO1	PO2	PO3	PO4	PO5
CO1	2	2	3	2	3
CO2	3	2	3	3	2
CO3	3	3	2	2	2
CO4	2	2	3	3	2
CO5	2	3	2	2	2

Strong – 3   Medium – 2   Low – 1

COURSE DESGINER : Mrs . P DEEPA

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Allied Maths (CA)	**DISCRETE MATHEMATICS** **[for IT Major Students]** **SEMESTER III**	**Code: 213103323** **4 Hrs/Week** **Credits 4**

COURSE DESCRIPTION:
  ✎ *Motivate the learners on Relations and functions there by to lay foundation for further studies.*

PREAMBLE:
  ✎ *To give an introductory knowledge of the basic concepts in discrete mathematics.*
  ✎ *To develop logical thinking.*

COURSE OUTCOMES (COs)

On Successful completion of the course, the student will be able to

No.	Course Outcome	Knowledge Level (According to Bloom's Taxonomy)
CO1	Understand the concepts of Relations.	Up to K3

CO2	Brief Knowledge about Concepts of Functions.	Up to K3
CO3	Analyze various mathematical techniques of proof.	Up to K3
CO4	Finding Inverse and Rank of Matrix and Solutions of Simultaneous linear equations.	Up to K3
CO5	Expound the Basic concepts of logic.	Up to K3

K1-knowledge   K2- Understand   K3 – Apply

UNIT – I: **[12 Hrs]**

Relations – Matrix of a relation – Digraph of a relation – operations on Relation – composition of the relations – Equivalance relations.

UNIT – II: **[12 Hrs]**

Functions – one to one – onto functions – special types of functions – Invertible functions – composition of functions.

UNIT – III: **[12 Hrs]**

Mathematical Induction – techniques proof – principle of mathematical induction.

UNIT – IV: **[12 Hrs]**

Matrix Algebra – Introduction – Matrix operations – the inverse of a square matrix – Elementary operations and rank of a matrix – simultaneous linear equations.

UNIT – V: **[12 Hrs]**

Logic Introduction – TF statements – connectives – parsing trees – Truth table of a formula – Tautology – Tautological implications and equivalence of formula

TEXT BOOK:
01. M.K. Venkatraman, Dr. M. Sridharan, and Chandra Sekaran N., Discrete Mathematics, The National Publishing Company, Chennai, 2007.
    Unit – I   :   Chap II   : 1, 2, 3, 4, 5
    Unit – II   :   Chap III   : 1, 2, 3, 4, 5
    Unit – III   :   Chap IV   : 1, 2
    Unit – IV   :   Chap VI   : 1, 2, 3, 4, 5
    Unit – V   :   Chap IX   : 1 to 8

REFERENCES:
01. Tremblay J.P., and Manoharan R., Discrete Mathematical Structures with Applications to Computer Science, McGraw–Hill, New Delhi, 2007.
02. T Veerarajan, Discrete Mathematics with Graph Theroy and Combinatorics, Tata mc graw hill publications, 2017
03. Swapan Kumar Sarkar, Textbook Of Discrete Mathematics, S Chand Publications, 2016

WEB RESOURCES:
1. https://learn.careers360.com/maths/sets-relations-and-functions-chapter/
2. https://cseweb.ucsd.edu/classes/sp14/cse20-a/InductionNotes.pdf
3. https://faculty.math.illinois.edu/~vddries/main2.pdf

PEDAGOGY: Black Board; chalk; LCD Projector

COURSE CONTENTS & TEACHING / LEARNING SCHEDULE

Module No.	Topic	No.of Lectures	Content Delivery Method	Teaching Aids
UNIT – I [12 Hrs]				
1.1	Relations	2	Chalk & Talk	Black Board
1.2	Matrix of a Relation	2	Chalk & Talk	Black Board
1.3	Digraph of a Relation	2	Chalk & Talk	Black Board
1.4	Operations on Relations	2	Chalk & Talk	Black Board
1.5	Composition of Relations	2	Chalk & Talk	Black Board
1.6	Equivalence Relations	2	Chalk & Talk	Black Board
UNIT – II [12 Hrs]				
2.1	Functions	2	Chalk & Talk	Black Board
2.2	one to one and on to functions	2	Chalk & Talk	Black Board
2.3	special types of functions	1	Chalk & Talk	Black Board
2.4	Invertible functions	3	Chalk & Talk	Black Board
2.5	Composition of functions	4	Chalk & Talk	Black Board
UNIT – III [12 Hrs]				
3.1	Mathematical induction	2	Chalk & Talk	Black Board
3.2	Techniques of proof	2	Chalk & Talk	Black Board
3.3	Principles of Mathematical induction	8	Chalk & Talk	Black Board
UNIT – IV [12 Hrs]				
4.1	Introduction	1	Chalk & Talk	Black Board
4.2	Matrix Operations	2	Chalk & Talk	Black Board
4.3	Inverse of a square matrix	3	Chalk & Talk	Black Board
4.4	Elementary operations and Rank of a matrix	3	Chalk & Talk	Black Board
4.5	Simultaneous - linear Equations	3	Chalk & Talk	Black Board
UNIT - V				
5.1	Logic Introduction	1	Chalk & Talk	Black Board
5.2	TF statements	1	Chalk & Talk	Black Board
5.3	Connectives	2	Chalk & Talk	Black Board
5.4	Parsing trees	2	Chalk & Talk	Black Board
5.5	Truth table of a formula	2	Chalk & Talk	Black Board
5.6	Tautology	2	Chalk & Talk	Black Board
5.7	Tautology implications and equivalence of formula.	2	Chalk & Talk	Black Board

MAPPING OF COs WITH POs

	PO1	PO2	PO3	PO4	PO5
CO1	2	2	2	3	3
CO2	2	2	3	3	2
CO3	3	3	2	2	3
CO4	3	3	2	2	2
CO5	2	3	2	3	3

Strong – 3   Medium – 2   Low – 1

COURSE DESIGNER : Mrs . P KAYATHRI
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Self Learning Course   **HISTORY OF MATHEMATICS**   **Code: 218003331**

SEMESTER III   **Addl. Credits 3**

PREAMBLE:

- ✍ ***To provide the basic knowledge of the history of mathematics.***

UNIT – I:

Foundations of Mathematics – the arithmetic method – Geometry according to Euclid – Non – Euclidean Geometry – the formal Axiomatic method – Description of the formal axiomatic method – Analysis of the axiomatic method – consistency of an axiom system – independence of Axioms – completeness of an axiom system – categoricalness of an axiom system – Advantages and disadvantages of the axiomatic method.

UNIT – II:

The Genetic method – the theory of sets – Equivalent sets – cardinal numbers – cantor's Diagonal procedure – The Axiom of choice – objective to cantor's theory – paradoxes in set theory.

UNIT – III:

Axiomatic set theory – the Three schools of thought – Logicism – Aristotle's logic – symbolic logic – Basic symbols – propositions and propositional functions – the primitive propositions – propositional calculus – truth – tables method – the predicate calculus.

UNIT – IV:

The ancient and medieval period – Messopotaamia – Egypt, Greece – Pythagorean arithmetic – Pythagorean geometry – The Athenian school – Hellenistic mathematics – Pappus and Disphantus.

UNIT – V:

The modern period – the sixteenth century – the seventeenth century – Descartes, Pascal, Newton, Leibnity, Te Bernoullis – The Eighteenth century – Euler, Maclaurin, Lagrange – The nineteenth century. Gauss, poisson, fourier, Cauchy, Galosis, Hamilton, Book, Weierstrass, canton – Twentieth century – Ramanujan.

TEXT BOOK:
  01. Narayanan K.S., A History of Mathematics, Taj printers, Tirunelveli, Reprint Jan 1985.
        Unit – V   :   Chap IX   : 1 to 8

REFERENCES:
  1. David E Smith, Histroy of Mathematics
  2. T.S. Bhanumurthy, A Modern Introduction to Ancient Indian Mathematics, new age international publishers.

WEB RESOURCES:
  1. https://en.wikipedia.org/wiki/Genetic_method
  2. https://gonitsora.com/a-brief-history-of-ancient-indian-mathematics-part-i/
  3. https://www.britannica.com/science/mathematics

PEDAGOGY: Black Board; chalk; LCD Projector

COURSE DESIGNER : Mr. S SEENIRAJAN
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Core Subject	**LINEAR ALGEBRA**	Code: 213103401
	SEMESTER IV	**6 Hrs/Week**
		Credits 5

COURSE DESCRIPTION:

 ? ***To provide the basic knowledge about the vector spaces, linear transformations and Matrices.***

PREAMBLE:

 ? ***To provide a basic knowledge of fundamental concepts in Algebra.***

 ? ***To motivate the learners on Algebra there by to lay foundation for future studies.***

COURSE OUTCOMES (COs)

On Successful completion of the course, the student will be able to

No.	Course Outcome	Knowledge Level (According to Bloom's Taxonomy)
CO1	Explain the fundamental concepts of linear space.	Up to K3
CO2	Prove theorems, results and corollaries on linear Transformation.	Up to K3
CO3	Discuss the properties of inner Product Spaces	Up to K3
CO4	Analyze the characteristics and equivalence criterions of linear space and matrix theory	Up to K3
CO5	solve problems in linear algebra and compute eigen values and eigen vectors	Up to K3

K1-knowledge K2- Understand K3 – Apply

UNIT – I: **[18 Hrs]**

 Vector Spaces: Definition and Examples – subspaces – linear transformation - span of a set.

UNIT – II: **[18 Hrs]**

 Linear Independence – Basis and Dimension – Rank and Nullity – Matrix of a Linear Transformation

UNIT – III: **[18 Hrs]**

 Inner product spaces - Definition and Examples – Orthogonality – Orthogonal complement.

UNIT – IV: **[18 Hrs]**

 Theory of matrices - Algebra of matrices – Types of Matrices – The inverse of a matrix – Elementary Transformations – Rank of a matrix.

UNIT – V: **[18 Hrs]**

 Simultaneous Linear Equations – Characteristic Equations and Cayley Hamilton Theorem – Eigen Values and Eigen vectors.

REFERENCES:

 01.Vasishtha A. R., Modern Algebra, Krishna Publications,1998.
 02. Frank Ayres, Modern Abstract Algebra, Schaum's Outline Reprint 2020.
 03.A. Mahindroo, Topics in Modern Algebra, Laxmi Publications, First edition (2007)

WEB RESOURCES:
01. https://ocw.mit.edu/courses/mathematics/18-703-modern-algebra-spring-2013/lecture-notes/
02. https://onlinecourses.swayam2.ac.in/cec20_ma15/preview
03. https://people.math.umass.edu/~havens/m235Lectures/

PEDAGOGY: Black Board; chalk; LCD Projector

COURSE CONTENTS & TEACHING / LEARNING SCHEDULE

Module No.	Topic	No.of Lectures	Content Delivery Method	Teaching Aids
	UNIT – I [18 Hrs]			
1.1	Definition and examples	4	Chalk & Talk	Black Board
1.2	Subspaces	4	Chalk & Talk	Black Board
1.3	Linear transformation	5	Chalk & Talk	Black Board
1.4	Span of a set.	5	Chalk & Talk	Black Board
	UNIT – II [18 Hrs]			
2.1	Linear Independence	4	Chalk & Talk	Black Board
2.2	Basis and Dimension	7	Chalk & Talk	Black Board
2.3	Rank and Nullity	3	Chalk & Talk	Black Board
2.4	Matrix of a Linear Transformation.	4	Chalk & Talk	Black Board
	UNIT – III [18 Hrs]			
3.1	Inner product spaces	5	Chalk & Talk	Black Board
3.2	Definition and Examples	5	Chalk & Talk	Black Board
3.3	Orthogonality	5	Chalk & Talk	Black Board
3.4	Orthogonal complement	3	Chalk & Talk	Black Board
	UNIT – IV [18 Hrs]			
4.1	Theory of matrices	3	Chalk & Talk	Black Board
4.2	Algebra of matrices	2	Chalk & Talk	Black Board
4.3	Types of Matrices	3	Chalk & Talk	Black Board
4.4	The inverse of a matrix	3	Chalk & Talk	Black Board
4.5	Elementary Transformation	5	Chalk & Talk	Black Board
4.6	Rank of a matrix	2	Chalk & Talk	Black Board
	UNIT – V [18 Hrs]			
5.1	Simultaneous Linear Equations	4	Chalk & Talk	Black Board
5.2	Characteristic Equation	5	Chalk & Talk	Black Board
5.3	Cayley Hamilton Theorem	1	Chalk & Talk	Black Board
5.4	Eigen Values and Eigen vectors.	8	Chalk & Talk	Black Board

MAPPING OF COs WITH POs

	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	2
CO2	3	3	3	3	2
CO3	3	3	2	2	2
CO4	2	3	3	3	2
CO5	2	3	2	2	2

Strong – 3   Medium – 2   Low – 1

COURSE DESIGNER : Mrs . P DEEPA
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Core lab   **COMBINATORIAL MATHEMATICS LAB**   **Code:213103402**
                        SEMESTER IV   **2 Hrs/Week**
                                                        Credits 1

PREAMBLE:

  ✍ *To help the learners to has to find the solutions.*

01. Obtain the formula for the sum of the first n triangular numbers by Mathematical induction.

02. Obtain the formula for the sum of the first n harmonic numbers by Mathematical induction.

03. Let f_i are Fibonacci numbers, prove that $\forall n \in Z^+, \sum_{i=1}^{n} f_i^2 = f_n \times f_{n+1}$ using recursive definition.

04. Find Lucas numbers using the principle of inclusion and exclusion.

05. Determine the number of positive integers n where $1 \leq n \leq 100$ and n is not divisible by 2, 3 and 5 where $s = \{1, 2, 3, \dots, 100\}$ and N = 100, for $n \in s$, n satisfies

   (a) Condition C_1 if n is divisible by 2.

   (b) Condition C_2 if n is divisible by 3 and

   (c) Condition C_3 if n is divisible by 5.

06. Determine in how many ways can the letters in the word ARRANGEMENT be arraged so that

   (a) There are exactly two pairs of consecutive identical letters.

   (b) Atleast two pairs of consecutive identical letters.

07. Find generating function for

   (a) For the sequence 1, 2, 6, 12, …

   (b) 1, – 1, 1, – 1, 1, – 1, …

08. Find the coefficient of

   (a) $x^0 \ in \ (4x^3 - 5/x)^{16}$

   (b) $x^{50} \ in \ (x^7 + x^8 + x^9 \dots)^6$

09. Determine the number of integral solutions of the equation $x_1 + x_2 + x_3 + x_4 = 18$ subject to $1 \leq x_1 \leq 5, -2 \leq x_2 \leq 4,$ $0 \leq x_3 \leq 5, 3 \leq x_4 \leq 9$.

10. Tower of Hanoi.

REFERENCES:
01. Ralph P. Grimaldi and B.V. Ramana, Discrete and Combinatorial Mathematics – an applied introduction, Pearson Education, 5th edition, 2007.
02. Richard A Brualdi, Introductory Combinatorics, Pearson Publications, 2008.

WEB RESOURCES:
   1. https://cseweb.ucsd.edu/classes/sp14/cse20-a/InductionNotes.pdf
   2. https://www.askiitians.com/maths/permutation-and-combination.html

3. https://www.hackerearth.com/blog/developers/tower-hanoi-recursion-game-algorithm-explained/

PEDAGOGY: Black Board; chalk; LCD Projector

COURSE DESIGNER: Mrs . P KAYATHRI

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Allied.Maths CA	**JAVA PROGRAMMING**	Code: 213103421
	SEMESTER IV	**4 Hrs/Week**
		Credits 4

COURSE DESCRIPTION:

   ? *To describe basic knowledge about JAVA concepts and improve their programming skills.*

PREAMBLE:

   ? *To introduce the fundamental concepts in Java programming.*

   ? *To lay foundation for future studies in Java programming.*

COURSE OUTCOMES (COs)

On Successful completion of the course, the student will be able to

No.	Course Outcome	Knowledge Level (According to Bloom's Taxonomy)
CO1	Importance of java with its data types, control statements and class fundamentals.	Up to K3
CO2	Classify and apply the core programming Logics.	Up to K3
CO3	Discuss about Class, constructor and Overload.	Up to K3
CO4	Explain the reason of inheritance, concurrency, and usage of packages and interfaces.	Up to K3
CO5	Experiment with exception handling and multithreading.	Up to K3

K1-knowledge   K2- Understand   K3 – Apply

UNIT – I: **[12 Hrs]**

Java History – Java features – Simple Java Programming – Class declaration – Java tokens – Comments – Java Statements – JVM – Implementing Java Program – Command line arguments – Constants, Variables and data types – Operators and expressions.

UNIT – II: **[12 Hrs]**

Decision making statements – Simple if statement – if – else statements – Nested if – else statements – else if ladder – Switch statement – Ternary operator. Looping – Looping statements – While, do, for, loop statements.

UNIT – III: **[12 Hrs]**

Creation of class – Objects and methods – Accessing class members – Constructors – method overloading – Overloading – Static Members.

UNIT – IV: **[12 Hrs]**

        Inheritance – Interface – Java API packages – System package – Creating and accessing user defined and system package.

UNIT – V: **[12 Hrs]**

        Multithreaded Programming – Multithreaded in Java – Thread Class – Life Cycle of Thread – Exception – Priority – Synchronization – Managing errors and exceptions.

TEXT BOOK:
  01. Balagursamy E., Programming with JAVA, 3rd Edition, The McGraw – Hill, New Delhi.
             UNIT – I: Chapter 2,3,4,5
             UNIT – II: Chapter 6,7
             UNIT – III: Chapter 8,9
             UNIT – IV: Chapter 10,11
             UNIT –V: Chapter 12,13

REFERENCES:
  01. Peitel H.M., and Peitel P.J., JAVA – How to Program, Pearson Education, New Delhi, 2003.
  02. Herbert Schildt, C++ The Complete Reference, Tata McGraw – Hill Publishing Company Ltd 4th Edition 2011
  03. Ken Arnold David holmes, James Goslin Prakash Goteti, The Java Programming Language, Pearson Education, India.

WEB RESOURCES:
  01. https://www.geeksforgeeks.org/java/
  02. https://www.tutorialspoint.com/java/java_tutorial.pdf
  03. https://www.guru99.com/java-tutorial.html

PEDAGOGY: Black Board; chalk; LCD Projector

COURSE CONTENTS & TEACHING / LEARNING SCHEDULE

Mod ule No.	Topic	No.of Lectures	Content Delivery Method	Teaching Aids
UNIT – I [12 Hrs]				
1.1	Java History – Java features	1	Chalk & Talk	Black Board
1.2	Simple Java Programming – Class declaration	2	Chalk & Talk	Black Board
1.3	Java tokens – Comments	2	Chalk & Talk	Black Board
1.4	Java Statements – JVM	2	Chalk & Talk	Black Board
1.5	Implementing Java Program – Command line arguments	2	Chalk & Talk	Black Board
1.6	Constants, Variables and data types – Operators and expressions.	3	Chalk & Talk	Black Board
UNIT – II [12 Hrs]				
2.1	Simple if statement – if – else statements – Nested if – else statements – else if ladder	4	Chalk & Talk	Black Board
2.2	Switch statement	2	Chalk & Talk	Black Board
2.3	Ternary operator	2	Chalk & Talk	Black Board
2.4	Looping statements – While, do, for, loop statements	4	Chalk & Talk	Black Board

	UNIT – III	[12 Hrs]		
3.1	Creation of class – Objects and methods – Accessing class members	3	Chalk & Talk	Black Board
3.2	Constructors	3	Chalk & Talk	Black Board
3.3	method overloading – Overloading	3	Chalk & Talk	Black Board
3.4	Static Members	3	Chalk & Talk	Black Board
	UNIT – IV	[12 Hrs]		
4.1	Interface	3	Chalk & Talk	Black Board
4.2	Java API packages	3	Chalk & Talk	Black Board
4.3	System package	3	Chalk & Talk	Black Board
4.4	Creating and accessing user defined and system package	3	Chalk & Talk	Black Board
	UNIT – V	[12 Hrs]		
5.1	Multithreaded in Java	2	Chalk & Talk	Black Board
5.2	Thread Class	2	Chalk & Talk	Black Board
5.3	Life Cycle of Thread	3	Chalk & Talk	Black Board
5.4	Exception – Priority	2	Chalk & Talk	Black Board
5.5	Synchronization	2	Chalk & Talk	Black Board
5.6	Managing errors and exceptions.	1	Chalk & Talk	Black Board

MAPPING OF COs WITH POs

	PO1	PO2	PO3	PO4	PO5
CO1	2	2	2	3	3
CO2	2	3	3	3	3
CO3	3	2	3	2	2
CO4	3	3	3	2	2
CO5	2	2	2	2	2

Strong – 3   Medium – 2   Low – 1

COURSE DESIGNER : Mr. S.SEENIRAJAN

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Allied Maths CA	**JAVA LAB**	Code:213103422
	SEMESTER IV	**2 Hrs/Week**
		Credit 1

PREAMBLE:
   - *To give hands on training in Java programming.*
   - *To lay foundation for future studies in Java programming.*

Program List

01. Simple programs (Prime Number, Adam Number, Reverse the Number, Sum of Digits, Factorial, Biggest of n numbers, Sort the given numbers, Sort the strings.

02. Array Manipulations.

03. Simple Constructor, Constructor, Overloading.

04. Inheritance.

05. Arithmetic Exception.

06. Throne Exception, Thronging Exception.

07. Interface.

08. Package.

09. Try & Catch.

10. Multiple Catch.

REFERENCES:

   01. Balagursamy E., Programming with JAVA, 3rd edition, Tata McGraw – Hill, New Delhi.

   02. Herbert Schildt, C++ The Complete Reference, Tata McGraw – Hill Publishing Company Ltd 4th Edition 2011

   03. Ken Arnold David holmes, James Goslin Prakash Goteti, The Java Programming Language, Pearson Education, India.

WEB RESOURCES:

1. https://www.programiz.com/java-programming/arrays
2. https://beginnersbook.com/2013/03/inheritance-in-java/
3. https://exlskills.com/learn-en/courses/java-exceptions-exceptions_java/

PEDAGOGY: Black Board; chalk; LCD Projector

COURSE DESIGNER : Mr. S.SEENIRAJAN

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Part - IV	**BASIC MATHS – II**	Code: 214603431
Non Major-Electives	SEMESTER IV	**2 Hrs/Week**
		Credits 2

COURSE DESCRIPTION:

   ✎ *To describe basic knowledge about the percentage, profit and loss, ratio , time and work and simple interest.*

PREAMBLE:

   ✎ *To give fundamental concepts in mathematics.*

   ✎ *To help the students in preparing for Competitive Examinations.*

COURSE OUTCOMES (COs)

On Successful completion of the course, the student will be able to

	Course Outcome	**Knowledge Level** (According to Bloom's Taxonomy)
CO1	Introduce concepts of Mathematics along with analytical ability	Up to K3
CO2	Develop the computational skills needed	Up to K3
CO3	Improve the ability to face the competitive examinations	Up to K3
CO4	To face the Competitive Examination bravely in future on employability	Up to K3
CO5	Develop mathematical aptitude skills.	Up to K3

K1-knowledge   K2- Understand   K3 – Apply

UNIT – I: **[6 Hrs]**

   Percentage.

UNIT – II: **[6 Hrs]**

   Profit & Loss.

UNIT – III: **[6 Hrs]**

   Ratio & proportion

UNIT – IV: **[6 Hrs]**

   Time & Work

UNIT – V: **[6 Hrs]**

      Simple Interest

TEXT BOOK:

01.Aggarwal R.S, Quantitative Aptitude, S.Chand & Company Ltd, NewDelhi, Revised Edition (Reprint 2014)

Unit-I	Chapter 10 worked examples only
Unit-II	Chapter 11 worked examples only
Unit-III	Chapter 12 worked examples only
Unit-IV	Chapter 15 worked examples only
Unit-V	Chapter 21 worked examples only

REFERENCES:

01.Abhijit Guha, Quantitative Aptitude for Competitive Examinations, Tata Mc Graw–Hill Publishing Company Limited, New Delhi

02. Rajesh varma, Fast Track Objective arithmetic, Arihant Publications, 2018

03. Arora P.N, Quantitative Aptitude Math - Vol. 1, S.Chand, 2010.

WEB RESOURCES:

1. https://www.cuemath.com/
2. https://www.careerride.com/
3. http://www.mathsmutt.co.uk/files/ind.htm

PEDAGOGY: Black Board; chalk; LCD Projector

COURSE CONTENTS & TEACHING / LEARNING SCHEDULE

Module No.	Topic	No.of Lectures	Content Delivery Method	Teaching Aids
UNIT – I	[6 Hrs]			
1.1	Concepts and formula	1	Chalk & Talk	Black Board
1.2	Problems	5	Chalk & Talk	Black Board
UNIT – II	[6 Hrs]			
2.1	Concepts and formula	1	Chalk & Talk	Black Board
2.2	Problems on profit	3	Chalk & Talk	Black Board
2.3	Problems on loss	2	Chalk & Talk	Black Board
UNIT – III	[6 Hrs]			
3.1	Basic concepts	1	Chalk & Talk	Black Board
3.2	Problems on ratio	3	Chalk & Talk	Black Board
3.3	Problems on proportion	2	Chalk & Talk	Black Board
UNIT – IV	[6 Hrs]			
4.1	Basic concepts	1	Chalk & Talk	Black Board
4.2	Problems	5	Chalk & Talk	Black Board
UNIT – V	[6 Hrs]			
5.1	Concepts and formula	1	Chalk & Talk	Black Board
5.2	Problems	5	Chalk & Talk	Black Board

MAPPING OF COs WITH POs

	PO1	PO2	PO3	PO4	PO5
CO1	2	2	3	2	3
CO2	2	2	3	3	2
CO3	3	3	2	2	2
CO4	2	2	3	3	2
CO5	2	2	2	2	2

Strong – 3   Medium – 2   Low – 1

COURSE DESIGNER: Mrs . P KAYATHRI

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Part - IV **QUANTITATIVE APTITUDE – II** Code: 214403431
Skill Based Elective **SEMESTER IV** **2 Hrs/Week**
Credits 2

COURSE DESCRIPTION:
- ✎ ***To describe basic knowledge about the partnership, simple interest and compound interest.***

PREAMBLE:
- ✎ ***To motivate the learners of mathematics there by to lay foundation for further studies***
- ✎ ***To help the students in preparing for Competitive Examinations***

COURSE OUTCOMES (COs)
On Successful completion of the course, the student will be able to

No.	Course Outcome	Knowledge Level (According to Bloom's Taxonomy)
CO1	Introduce concepts of Mathematics along with analytical ability	Up to K3
CO2	Develop the computational skills needed	Up to K3
CO3	Improve the ability to face the competitive examinations	Up to K3
CO4	Face the Competitive Examination bravely in future on employability	Up to K3
CO5	Develop mathematical aptitude skills.	Up to K3

K1-knowledge   K2- Understand   K3 – Apply

UNIT – I: **[6 Hrs]**

Partnership

UNIT – II: **[6 Hrs]**

Time and Work

UNIT – III: **[6 Hrs]**

Time and Distance – Problem on trains

UNIT – IV: **[6 Hrs]**

Simple interest

UNIT – V: **[6 Hrs]**

Compound interest

TEXT BOOK:
01. Aggarwal R.S., Quantitative aptitude, S. Chand & company limited, New Delhi, Revised Edition (Reprint 2013)
   - Unit – I : Chapter 13 (worked examples only)
   - Unit – II: Chapter 15 (worked examples only)
   - Unit – III: Chapter 17, 18 (worked examples only)
   - Unit – IV : Chapter 21 (worked examples only)
   - Unit – V : Chapter 22 (worked examples only)

REFERENCES:
01. Abhijit Guha, Quantitative Aptitude for Competitive Examinations, Tata Mc Graw–Hill Publishing Company Limited, New Delhi
02. Rajesh varma, Fast Track Objective arithmetic, Arihant Publications, 2018
03. Arora P.N, Quantitative Aptitude Math - Vol. 1, S.Chand, 2010.

WEB RESOURCES:
1. https://www.bankersadda.com/
2. https://www.vedantu.com/maths/
3. https://www.adda247.com/teaching-jobs-exam/

PEDAGOGY: Black Board; chalk; LCD Projector

COURSE CONTENTS & TEACHING / LEARNING SCHEDULE

Module No.	Topic	No.of Lectures	Content Delivery Method	Teaching Aids
UNIT – I [6 Hrs]				
1.1	Concepts and formula	1	Chalk & Talk	Black Board
1.2	Problems	5	Chalk & Talk	Black Board
UNIT – II [6 Hrs]				
2.1	Concepts and formula	1	Chalk & Talk	Black Board
2.2	Problems	5	Chalk & Talk	Black Board
UNIT – III [6 Hrs]				
3.1	Concepts and formula	1	Chalk & Talk	Black Board
3.2	Problems on time and distance	3	Chalk & Talk	Black Board
3.3	Problem on trains	2	Chalk & Talk	Black Board
UNIT – IV [6 Hrs]				
4.1	Concepts and formula	1	Chalk & Talk	Black Board
4.2	Problems	5	Chalk & Talk	Black Board
UNIT – V [6 Hrs]				
5.1	Concepts and formula	1	Chalk & Talk	Black Board
5.2	Problems	5	Chalk & Talk	Black Board

MAPPING OF COs WITH POs

	PO1	PO2	PO3	PO4	PO5
CO1	2	2	3	2	3
CO2	3	2	3	3	2
CO3	3	3	2	2	2
CO4	2	2	3	3	2
CO5	2	3	3	3	2

Strong – 3   Medium – 2   Low – 1

COURSE DESIGNER : Mrs . P DEEPA

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Allied	**RESOURCE MANAGEMENT TECHNIQUES**	**Code: 213103423**
	[for IT Major Students]	**4 Hrs/Week**
	SEMESTER IV	**Credits 4**

COURSE DESCRIPTION:
- ✍ *To describe basic knowledge about the linear programming problem, Duality, Transportation and Assignment.*

PREAMBLE:
- ✍ *To introduce a basic knowledge of formation of Linear Programming problems.*
- ✍ *To motivate the learners to find the solutions.*

COURSE OUTCOMES (COs)

On Successful completion of the course, the student will be able to

No.	Course Outcome	Knowledge Level (According to Bloom's Taxonomy)
CO1	Explain LPP, canonical & standard form and sub / special classes of LPP.	Up to K3

CO2	Apply efficient computational techniques and algorithms that are needed to solve optimization problems.	Up to K3
CO3	Solve the balanced / unbalanced problems in sub/special classes of LPP	Up to K3
CO4	Examine feasible, infeasible, IBFS, unbounded, degenerate/non degenerate solutions to Transportation problem.	Up to K3
CO5	Know the application of Assignment problems	Up to K3

K1-knowledge   K2- Understand   K3 – Apply

UNIT – I: **[12 Hrs]**

Linear programming problem – General form of a L.P.P. - Graphical solution method: Linear programming problem - Mathematical formulation of the problem – Illustrations on mathematical formulation of LPPs – Graphical solution method – some Exceptional cases – slack & surplus variable – canonical & standard forms of L.P.P.

UNIT – II: **[12 Hrs]**

Simplex method: Introduction – fundamental properties of solutions (Problems only) – the computational procedure – use of Artificial Variables. (Big – M method only)

UNIT – III: **[12 Hrs]**

Duality of Linear programming: Introduction – General primal – Dual pair – formulating a dual problem - Primal – Dual pair in matrix form – duality and simplex method.

UNIT – IV: **[12 Hrs]**

Transportation problem – Introduction – LP formulation of the transportation problem – Existance of solution in T.P. – the Transportation table – loops in Transportation table – solution in T.P –finding an Initial Basic feasible solution – test for optimality – degeneracy in T.P - Transportation Algorithm (Modi method) – some exceptional cases.

UNIT – V: **[12 Hrs]**

Assignment problem – mathematical formulation of the problem – solution methods of Assignment problem – special cases in Assignment problem – (Maximization Assignment problem and unbalanced Assignment problem). The Travelling salesman problem

TEXT BOOK:
   01.Dr. S. Arumugam and Thangapandi Isaac A., Linear Programming, New Gamma Publishing House, Palayam Kottai, 2010.

        Unit – I   :   Chap III   : 1, 2, 3, 4
        Unit – II   :   Chap III   : 5, 6
        Unit – III   :   Chap III   : 9, 10
        Unit – IV   :   Chap IV   : 1, 2
        Unit – V   :   Chap V   : 1, 2

REFERENCES:
  01. Kanti Swarap; Gupta P K: Manmohan, Operations Research, 13th edition, Sultan Chand and Sons, New Delhi, reprint 2008
  02. S D Sharma, Operations Research, Kedarnath Ramnath & Co, 12th edition, 2007
  03. R.Panneerselvam, OPERATIONS RESEARCH, PHI Learning Pvt. Ltd., 2006.

WEB RESOURCES:
  1. http://www.simplynotes.in/formulation-linear-programming-problemlpp-2/
  2. https://www.askmattrab.com/notes/1426-simplex-method-of-solving-linear-programming-problems
  3. https://ocw.ehu.eus/pluginfile.php/40935/mod_resource/content/1/5_Transportation.pdf

PEDAGOGY: Black Board; chalk; LCD Projector

COURSE CONTENTS & TEACHING / LEARNING SCHEDULE

Module No.	Topic	No.of Lectures	Content Delivery Method	Teaching Aids
UNIT – I [12 Hrs]				
1.1	General form of a L.P.P	1	Chalk & Talk	Black Board
1.2	Graphical solution method: Linear programming problem	1	Chalk & Talk	Black Board
1.3	Mathematical formulation of the problem	2	Chalk & Talk	Black Board
1.4	Illustrations on mathematical formulation of LPPs	2	Chalk & Talk	Black Board
1.5	Graphical solution method	2	Chalk & Talk	Black Board
1.6	Some Exceptional cases	2	Chalk & Talk	Black Board
1.7	Slack & surplus variable	1	Chalk & Talk	Black Board
1.8	Canonical & standard forms of L.P.P	1	Chalk & Talk	Black Board
UNIT – II [12 Hrs]				
2.1	Introduction	1	Chalk & Talk	Black Board
2.2	Fundamental properties of solutions (Problems only)	4	Chalk & Talk	Black Board
2.3	The computational procedure	2	Chalk & Talk	Black Board
2.4	Use of Artificial Variables. (Big – M method only)	5	Chalk & Talk	Black Board
UNIT – III [12 Hrs]				
3.1	Introduction – General primal – Dual pair	2	Chalk & Talk	Black Board
3.2	Formulating a dual problem	3	Chalk & Talk	Black Board
3.3	Primal – Dual pair in matrix form	2	Chalk & Talk	Black Board
3.4	Duality and simplex method	5	Chalk & Talk	Black Board
UNIT – IV [12 Hrs]				
4.1	Introduction – LP formulation of the transportation problem	1	Chalk & Talk	Black Board
4.2	Existance of solution in T.P	1	Chalk & Talk	Black Board
4.3	The Transportation table – loops in Transportation table	1	Chalk & Talk	Black Board
4.4	Solution in T.P –finding an Initial Basic feasible solution	2	Chalk & Talk	Black Board
4.5	Test for optimality	1	Chalk & Talk	Black Board
4.6	Degeneracy in T.P	1	Chalk & Talk	Black Board
4.7	Transportation Algorithm (Modi method)	4	Chalk & Talk	Black Board

4.8	some exceptional cases	1	Chalk & Talk	Black Board
UNIT – V [12 Hrs]				
5.1	Mathematical formulation of the problem	1	Chalk & Talk	Black Board
5.2	Solution methods of Assignment problem	3	Chalk & Talk	Black Board
5.3	Special cases in Assignment problem	3	Chalk & Talk	Black Board
5.4	(Maximization Assignment problem and unbalanced Assignment problem). The Travelling salesman problem	5	Chalk & Talk	Black Board

MAPPING OF COs WITH POs

	PO1	PO2	PO3	PO4	PO5
CO1	2	3	3	2	3
CO2	2	3	3	3	2
CO3	2	3	2	2	2
CO4	2	3	3	3	2
CO5	2	3	2	2	2

Strong – 3   Medium – 2   Low – 1

COURSE DESIGNER : Mrs . P KAYATHRI

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Self Learning Course   DISCRETE MATHEMATICS   Code: 218003431

SEMESTER IV   Addl. Credits 4

Objectives:
- ✎ *To give an introductory knowledge of the basic concepts in discrete mathematics.*
- ✎ *To develop logical thinking.*

UNIT – I:

Logic - TF statements – Connectives – Biconditional statements - Parsing trees – Truth table of a formula – Tautology – Replacement process.

UNIT – II:

Logic – Principal Normal Forms – Theory of inference – Indirect Method of Proof – Open Statements – Quantifiers – Valid Formulae and Equivalence.

UNIT – III:

Mathematical induction – Techniques of proof – Principle of Mathematical induction.

UNIT – IV:

Recurrence Relations – solution of finite order Homogenous relations – solution of Non-Homogenous Relations – Generating functions.

UNIT – V:

Finite Automata – Definition of a Finite Automation – Representation of a Finite Automaton – Acceptability of a String by a Finite Automaton – Languages Accepted by a Finite Automation –

Nondeterministic Finite Automata – Acceptability of String by NFA – Equivalence of FA and NFA.

TEXT BOOK:
01. M.K. Venkataraman, Dr. N. Sridharan and Dr. N. Chandra Sekaran, Discrete Mathematics, The National Publishing Company, Chennai, 2009.

REFERENCES:
01. Tremblay J.P., and Manoharan R., Discrete Mathematical Structures with Applications to Computer Science, McGraw–Hill, New Delhi, 2007.
02. T Veerarajan, Discrete Mathematics with Graph Theroy and Combinatorics, Tata mc graw hill publications, 2017
03. Swapan Kumar Sarkar, Textbook Of Discrete Mathematics, S Chand Publications, 2016

WEB RESOURCES:
01. https://cseweb.ucsd.edu/classes/sp14/cse20-a/InductionNotes.pdf
02. https://faculty.math.illinois.edu/~vddries/main2.pdf
03. https://www.cs.rochester.edu/u/nelson/courses/csc_173/fa/fa.html

PEDAGOGY: Black Board; chalk; LCD Projector

COURSE DESIGNER : Mr. S.SEENIRAJAN
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CERTIFICATE COURSE IN ADVANCED QUANTITATIVE TECHNIQUES

(NON-SEMESTER)

Sem		Subject	Teaching Hrs Per Week	Duration of Exam (Hrs)	Marks Allotted	
					Internal	External
II	01	Basics in Quantitative Aptitude (213107201)	2	3	25	75
	02	Advanced Quantitative Aptitude (213107202)	2	3	25	75

BASICS IN QUANTITATIVE APTITUDE

Code:213107201

2 Hrs/Week

Course Description:

- ✎ *To describe basic knowledge about the HCF and LCM, square roots and cube roots. Surds and indices, Boats and streams, allegation of mixture, logarithms and permutations and combinations*

Course Objectives:

- ✎ *To motivate the learners of mathematics there by to lay foundation for further studies*
- ✎ *To help the students in preparing for Competitive Examinations*

UNIT - I: **[6 Hrs]**

HCF and LCM

UNIT II: **[6 Hrs]**

Square roots and Cube roots

UNIT - III: **[6 Hrs]**

Surds and indices

UNIT - IV: **[6 Hrs]**

Boats and Streams – Alligation of mixture

UNIT - V: **[6 Hrs]**

Logarithms – Permutations and Combinations

TEXT BOOK:

02. Aggarwal R.S., Quantitative aptitude, S. Chand & company limited, New Delhi, Revised Edition (Reprint 2013)

        Unit – I : Chapter 2 (worked examples only)

        Unit – II: Chapter 5 (worked examples only)

        Unit – III: Chapter 9 (worked examples only)

        Unit – IV : Chapter 19, 20 (worked examples only)

        Unit – V : Chapter 23, 30 (worked examples only)

REFERENCE:

01. Abhijit Guha, Quantitative Aptitude for Competitive Examinations, Tata Mc Graw–Hill Publishing Company Limited, New Delhi.

ADVANCED QUANTITATIVE APTITUDE

Code: 213107202
2 Hrs/Week

Course Description:

- ✎ *To describe basic knowledge about the area, volume and surface area, calendar. Clocks, true discount and banker's discount, heights and distances, odd man out and series*.

Course Objectives:

- ✎ *To motivate the learners of mathematics there by to lay foundation for further studies*

- ✎ *To help the students in preparing for Competitive Examinations*

UNIT - I: **[6 Hrs]**

    Area

UNIT - II: **[6 Hrs]**

    Volume and Surface area

UNIT - III: **[6 Hrs]**

    Calendar - Clocks

UNIT - IV: **[6 Hrs]**

    True Discount – Banker's Discount

UNIT - V: **[6 Hrs]**

    Heights and Distances – Odd man out and Series

TEXT BOOK:

01. Aggarwal R.S., Quantitative aptitude, S. Chand & company limited, New Delhi, Revised Edition (Reprint 2013)
        Unit – I : Chapter 24 (worked examples only)
        Unit – II: Chapter 25 (worked examples only)
        Unit – III: Chapter 27, 28 (worked examples only)
        Unit – IV : Chapter 32, 33 (worked examples only)
        Unit – V : Chapter 34, 35 (worked examples only)

REFERENCE:

01. Abhijit Guha, Quantitative Aptitude for Competitive Examinations, Tata Mc Graw–Hill Publishing Company Limited, New Delhi.

EVALUATION PATTERN FOR CERTIFICATE COURSES

(Except Communicative English)

Internal   :   25 Marks

External   :   75 Marks

INTERNAL:

Test – 20 (average of the better two of the three tests)

Assignment – 5

Question Paper Pattern:

	INTERNAL			EXTERNAL	
Part – A : 3/5*5	= 15		Part – A : 6/10*5	= 30	
Part – B : 2/3*12.5	= 25		Part – B : 3/5*15	= 45	
	*40			75	

* Internal test mark 40 will be converted to 20.