CURRICULUM AND SYLLABUS FOR
B.Sc. (Mathematics) - BACHELOR OF SCIENCE
(THREE YEAR - FULL TIME)
REGULATION – 2017 REVISION -I
(Applicable to the students admitted from the academic year 2017-2018 onwards)

SEMESTER I								
Type	**Course Code**	**Course Name**	**L**	**T**	**P**	**SS**	**H**	**C**
CC 3 (DSC 3A)	XMT101	Classical Algebra	3	2	0	-	5	4
UMAN 1	XMT102	Ariviyal Tamil	3	0	0	-	3	3
CC 1	XMT103	Fundamental Physics	3	1	0	-	4	4
CC 2 (DSC 2A)	XMT104	Foundation Course in Mathematics	3	2	0	-	5	4
AECC 1	XGE105	Study Skills	1	0	0	2	3	1
UMAN 2	XUM106	Human Ethics, Values, Rights and Gender Equality	1	0	0	2	3	1
CC 1 lab	-	Fundamental Physics(Practical -1*)	0	0	0	0	3	-
		Total	**14**	**5**	**0**	**4**	**26**	**17**

*Continued in XMT206

SEMESTER II								
Type	**Course Code**	**Course Name**	**L**	**T**	**P**	**SS**	**H**	**C**
AECC 2	XGE201	Speech and Business Communication	3	0	0	-	3	3
AECC 3	XES202	Environmental Studies	2	1	0	0	3	2
CC 4	XMT 203	Modern Physics	3	1	0	-	4	4
CC 5 (DSC 2B)	XMT204	Calculus	4	2	0	-	6	5
CC 6 (DSC 3B)	XMT205	Sequences and Series	4	2	0	-	6	5
GE1	-	*Open Elective to be chosen by student	3	0	0	-	3	3
CC 4 Lab	XMT206	Fundamental Physics(Practical -1)	0	0	3	-	3	2
		Total	**19**	**6**	**3**	**0**	**28**	**24**

SEMESTER III								
Type	**Course Code**	**Course Name**	**L**	**T**	**P**	**SS**	**H**	**C**
SEC 1	XMT301	Logic and Sets	2	0	0	2	4	2
CC 7	XMT302	Programming in C	3	1	0	0	4	4
CC 8 (DSC 2C)	XMT303	Real Analysis	4	1	0	0	5	5
CC 9 (DSC 3C)	XMT304	Analytical Geometry 3D	4	1	0	0	5	5
GE 1		*Open Elective - To be chosen by student	3	0	0	0	3	3
CC 7 lab	XMT305	Programming in C – Practical	0	0	2	0	4	2
UMAN 2	XUM306	Disaster Management	3	0	0	0	3	0
Minor Course * Extra Credit		Office Automation (15 hours)	0	0	0	0	0	1*
		Total	**19**	**3**	**2**	**2**	**28**	**21+1***

SEMESTER IV								
Type	**Course Code**	**Course Name**	**L**	**T**	**P**	**SS**	**H**	**C**
SEC 2	XMT401	Theory of Equations	2	0	0	2*	2	2
CC 10	XMT402	Introduction to Matlab	3	1	0	0	4	4
CC 11 (DSC 2D)	XMT403	Vector Calculus and Fourier Series	4	1	0	0	5	5
CC 12 (DSC 3D)	XMT404	Algebra	4	1	0	0	5	5
GE 2		*Open Elective - To be chosen by student	3	0	0	0	3	3
CC 10 Lab	XMT405	Introduction to Matlab - Practical	0	1	2	0	3	2
Minor Course * Extra Credit		Animation Software I (15 hours)	0	0	0	0	0	1*
		Total	**16**	**4**	**2**	**2***	**22**	**21+1***

SEMESTER V								
Type	**Course Code**	**Course Name**	**L**	**T**	**P**	**SS**	**H**	**C**
SEC 3	XMT501	Probability and Statistics	2	0	0	2*	2	2
DSE 1A	XMT502A	Matrices	4	2	0	0	6	6
	XMT502B	Discrete Mathematics						
DSE 2A	XMT503A	Numerical Methods	4	2	0	0	6	6
	XMT503B	Mechanics						
DSE 3A	XMT504A	Linear Algebra	4	2	0	0	6	6
	XMT504B	Astronomy						
GE 3		*Open Elective - To be chosen by student	3	0	0	0	3	3
Minor Course * Extra Credit		Animation Software II (15 hours)	0	0	0	0	0	1*
		Total	**17**	**6**	**0**	**2***	**23**	**23+1***

SEMESTER VI								
Type	**Course Code**	**Course Name**	**L**	**T**	**P**	**SS**	**H**	**C**
SEC 4	XMT601	Graph Theory	2	0	0	2*	2	2
DSE 1B	XMT602A	Complex Analysis	4	2	0	0	6	6
	XMT602B	Number Theory						
DSE 2B	XMT603A	Linear Programming	4	2	0	0	6	6
	XMT603B	Stochastic Processes						
DSE 3B	XMT604	Project	0	0	0	0	8	6
	–	NSS/NCC/NSO....	0	0	0	0	0	1*
Total			**10**	**4**	**0**	**2***	**22**	**20+1***

DSC: Department Specific Core DSE: Discipline Specific Elective *Extra Credit
SEC: Skill Enhancement course AECC: Ability Enhancement Compulsory Course
GE: Generic Elective UMAN: University Mandatory

L - Lecture **T- Tutorial** **P – Practical** **C-Credit**

Summary

Semester	S1	S2	S3	S4	S5	S6	P1	P2	Others
I	AECC 1	LAN	CC 1	CC 2 (DSC 2A)	CC 3 (DSC 3A)	UMAN 1	CC 1 Lab		
II	AECC 2	AECC 3	CC 4	CC 5 (DSC2B)	CC 6 (DSC3B)			CC 4 Lab	
III	SEC 1	CC 7	CC 8 (DSC2C)	CC 9 (DSC3C)	GE1	UMAN2	CC 7 Lab		Minor Course*
IV	SEC 2	CC 10	CC 11 (DSC2D)	CC 12 (DSC3D)	GE2		CC 10 Lab		Minor Course*
V	SEC 3	DSE 1A	DSE 2A	DSE3A	GE3				Minor Course*
VI	SEC 4	DSE1B	DSE 2B	DSE3B (PROJECT)					NSS/ NCC/NSO....

* Extra Credit

Total Number of subjects proposed with the credits is given below:

S. No.	Type of Courses	Numbers	Total Credit	UGC Norms
1	AECC (Theory)	03	06	04
2	Core Course (Theory & Lab)	12	64	72
3	DSE (Theory & Lab)	06	36	36
4	SEC	04	08	08
5	GE	03	09	
6	UMAN	02	00	
7	LAN	01	03	
	Minor courses, NSS / NCC...	4*	4*	
Total		**31 + 4***	**126 + 4***	**120**

*Extra credit

DSC:

Branch	Total Credit	Core DSC (%)	DSE (%)	SEC (%)	AECC (%)	GE (%)	UMAN (%)	LAN (%)	Minor Course, IPT& NSS/NCC..
B.Sc.(Maths)	126+4*	64 (50.80%)	36 (28.57%)	8 (6.35%)	6 (4.76%)	9 (7.14%)	0 (0%)	3 (2.38%)	4* (Extra Credit)

Department Specific Core
SEC: Skill Enhancement course
DSE: Discipline Specific Elective
AECC: Ability Enhancement Compulsory Course
GE: Generic Elective
UMAN: University Mandatory

COURSE CODE			COURSE NAME	L	T	P	C
XMT 101			Classical Algebra	3	1	0	4
C	P	A		L	T	P	H
4	0	0		3	2	0	5

PREREQUISITE: Basic concept of Algebra and Trigonometry

COURSE OUTCOMES:

Course outcomes:	Domain	Level
CO1 Define set, the axioms of set theory and to construct arbitrary cartesian product of sets.	Cognitive	Remembering Understanding
CO2: Define relation, function and **apply** properties to determine whether a function is one-one, many-one, onto or into and to **explain** about countable and uncountable sets.	Cognitive	Remembering Understanding Applying
CO3: Explain Binomial theorem for any rational index and to find Exponential and Logarithmic Series.	Cognitive	Remembering Understanding
CO4: Explain Summations of series by difference series, Successive difference series and Recurring series.	Cognitive	Remebering Applying
CO5: Explain Number theory, Euler's functions Divisibility and Congruence relations and to **state** and **apply** Fermat's theorem and Wilson's theorem.	Cognitive	Remembering Applying

UNIT I	**15**
Concept of a set- Finite and Infinite set – Axiom of extension – Set Algebra – Cartesian Product of sets.	
UNIT II	**15**
Relations and their types – Functions and their types-Countable and Uncountable sets.	
UNIT III	**15**
Binomial theorem for any rational index - Exponential and Logarithmic Series.	

UNIT IV			**15**
Summations of series – summation by difference series – Successive difference series- Recurring series.			
UNIT V			**15**
Number Theory: Prime Numbers and Composite Numbers - Euler's function - Divisibility and Congruence relations - Fermat's theorem - Wilson's theorem.			
	LECTURE	**TUTORIAL**	**TOTAL**
	45	**30**	**75**

TEXT BOOKS

1. S. Narayanan& T. K. ManickavasagamPillai, "Algebra", Vol. 1, S. Viswanathan Pvt. Ltd., Chennai, 1999.

   Unit 1, 2: Chapter 2.

2. S. Narayanan& T. K. ManickavasagamPillai, "Algebra", Vol. 2, S. Viswanathan Pvt. Ltd. Chennai, 2004.

   Unit 2: Chapter 2. Unit 5: Chapter 5.

3. S. Narayanan & T. K. ManickavasagamPillai, "Modern Algebra", Vol. 1, S. Viswanathan Pvt. Ltd. Chennai, 2004.

   Unit 3, 4: chapter: 3, 4, 5.

REFERENCES

1. Seymour Lipschutz, Set theory & Related Topics, Schaum'soutlines, 2nd Edition, Tata McGraw Hill, New Delhi, 2005.
2. Arumugam&Issac, Classical Algebra, New gamma Publishing house, Tirunelveli, 2003.

E REFERENCES

www.nptel.ac.in

COURSE CODE			COURSE NAME	L	T	P	C
XMT 104			Foundation Course in Mathematics	3	1	0	4
C	P	A		L	T	P	H
4	0	0		3	2	0	5
PREREQUISITE: Basic concept of Algebra and Trigonometry							
COURSE OUTCOMES:							

Course outcomes:	**Domain**	**Level**
CO1: **Define** and **Apply** fundamental theorem of algebra to find the relation between roots and coefficients.	Cognitive	Remembering Applying
CO2: **Explain** the transformation of equation and to **solve** the reciprocal equation using Newton's method.	Cognitive	Understanding Applying
CO3: **Expand** the trigonometric functions and to find the series of trigonometric functions by **apply** the related properties to **Solve** the problems.	Cognitive	Understanding Applying
CO4: **Explain** hyperbolic and inverse hyperbolic functions and to find the logarithm of the complex numbers.	Cognitive	Remembering Applying
CO5: **Explain** Summations of trigonometric series and apply properties to find their related problems.	Cognitive	Remembering Applying

UNIT I	**15**
Theory of Equations: Fundamental Theorem of Algebra - Relations between roots and coefficients - Symmetric functions of roots.	
UNIT II	**15**
Transformation of Equations - Reciprocal Equations - Newton's Method of Divisors - Descartes' rule of signs – Horner's Method.	
UNIT III	**15**
Trigonometry: Expansion of functions, sinnx, cosnx, tannx- Expansion of $\sin^n x$ and $\cos^n x$ interms of sinx and cosx - Properties and their -related problems.	
UNIT IV	**15**
Hyperbolic functions -Inverse hyperbolic functions- Logarithm of Complex Numbers.	
UNIT V	**15**
Summations of trigonometric series- Properties and their related problems.	

LECTURE	**TUTORIAL**	**TOTAL**
60	**15**	**75**

TEXT BOOKS

1. S. Narayanan & T. K. ManickavasagamPillai, "Algebra", Vol. 2, S. Viswanathan Pvt. Ltd., Chennai, 2004.

   Unit 1: Chapter 6, Secs 6.1- 6.14.

   Unit 2 : Chapter 6, Secs 6.15- 6.30.

2. S. Narayanan & T. K. ManickavasagamPillai, "Trigonometry", S. Viswanathan Pvt. Ltd., Chennai, 2001.

   Unit 3: Chapter 3

   Unit 4: Chapter 4 & 5.

Unit 5: Chapter 6.
REFERENCE
1. Arumugam & Issac, "Theory of Equations, Theory of Numbers and Trigonometry", New gamma Publishing house, Tirunelveli, 2011.

COURSE CODE			**COURSE NAME**	**L**	**T**	**P**	**C**
XMT204			**Calculus**	**4**	**1**	**0**	**5**
C	**P**	**A**					
5	**0**	**0**		**L**	**T**	**P**	**H**
				4	**2**	**0**	**6**
PREREQUISITE:							
COURSE OUTCOMES:							
Course outcomes:			**Domain**	**Level**			
CO1: Find the radius and centre of curvature,evolutes and to apply successive differentiation and Leibnitz theorem.			Cognitive	Remembering Applying			
CO2: Explain Properties of definite integrals - Integration by parts , Reduction formulae and Bernoulli's formula.			Cognitive	Understanding			
CO3: Evaluate double integral both in Cartesian and polar coordinates.			Cognitive	Understanding Applying			
CO4: Explain and evaluate beta and gamma integrals and their relations.			Cognitive	Understanding			

CO5: Find Jacobian , Change of variable in the case of two variables and three variables ,Transformation from Cartesian to polar coordinates.	Cognitive	Remembering

UNIT I Differential Calculus:			**18**
Successive Differentiation - Leibnitz theorem and its applications - Curvature - Radius of Curvature and Centre of Curvature - Evolutes and Involutes.			
UNIT II Integral Calculus:			**18**
Properties of definite integrals - Integration by parts - Reduction formulae - Bernoulli's formula.			
UNIT III Integration as limit of an infinite sum. Multiple Integrals:			**18**
Definition of double integral - Evaluation of double integral - double integral in polar coordinates.			
UNIT IV Triple integrals. Improper Integrals:			**18**
Beta and Gamma integrals and their relations.			
UNIT V Change of Variables:			**18**
Jacobian - Change of variable in the case of two variables and three variables - Transformation from Cartesian to polar coordinates - Transformation from Cartesian to spherical polar coordinates.			
	LECTURE	**TUTORIAL**	**TOTAL**
	60	**30**	**90**

TEXTBOOKS

1. S. Narayanan & T. K. Manickavasagam Pillai, "Calculus", Vol.1. S. Viswanathan Pvt. Ltd., Chennai, 2004.

   Unit 1: Chapter III, Chapter X Secs 10.2.1-10.3.1

2. S. Narayanan & T. K. Manickavasagam Pillai, "Calculus", Vol.2. S. Viswanathan Pvt. Ltd., Chennai, 2004.

Unit 2: Chapter 1 Secs 1.1.1-1.15.1

Unit 3: Chapter I Secs 1.15.2, Chapter 5 Secs 5.1-5.3.2

Unit 4 : Chapter 5 Secs 5.4-5.5.4 Chapter 7 Secs 7.1.1-7.5

Unit 5: Chapter 6

REFERENCES

1. George B. Thomas, JR &Ross L. Finney, "Calculus and Analytic Geometry", Sixth edition, Narosa Publishing House, New Delhi, 1986.
2. Arumugam & Isaac, "Calculus",Vol.1&2, New Gamma Publishing House, 1999.

COURSE CODE			COURSE NAME	L	T	P	C
XMT205			Sequences and Series	4	1	0	5
C	P	A					
4	0.5	0.5		L	T	P	H
				4	2	0	6

PREREQUISITE: Foundation course in Mathematics

COURSE OUTCOMES:

Course outcomes:	Domain	Level
CO1: Explain Bounded Sequences, Monotonic Sequences , Convergent Sequence , Divergent Sequences , Oscillating sequences.	Cognitive	Understanding
CO2: Explain Behavior of Monotonic functions.	Cognitive Psychomotor	Understanding Guided Response
CO3: Explain subsequences , limit points and Cauchy sequences.	Cognitive	Understanding
CO4: Apply comparison test **to** infinite series to test the convergence and to **Explain** Cauchy's general principal of convergence.	Cognitive	Understanding Applying
CO5: Apply D Alembert's ratio test, Cauchy's root test to test convergence and to test the Alternating Series and Absolute Convergence of the series	Cognitive Affective	Applying Receiving

UNIT I Sequences	15
Bounded Sequences – Monotonic Sequences – Convergent Sequence – Divergent Sequences – Oscillating sequences.	

UNIT II Algebra of Limits	**15**
Behavior of Monotonic functions.	
UNIT III Some theorems on limits	**15**
Subsequences – limit points : Cauchy sequences.	
UNIT IV Series	**15**
Infinite series – Cauchy's general principal of convergence – Comparison – test theorem and test of convergence using comparison test (comparison test statement only, no proof).	
UNIT V Test of convergence using D Alembert's ratio test	**15**
Cauchy's root test – Alternating Series – Absolute Convergence (Statement only for all tests).	

LECTURE	TUTORIAL	TOTAL
60	15	75

TEXT BOOKS

1. Dr. S.Arumugam & Mr. A.Thangapandi Isaac "Sequences and Series" – New Gamma Publishing House, Edition 2002.

   Unit I : Chapter 3 : Sec. 3.0 – 3.5 Page No : 39-55

   Unit II : Chapter 3 : Sec. 3.6, 3.7 Page No:56 – 82

   Unit III : Chapter 3 : Sec. 3.8-3.11, Page No:82-102

   Unit IV: Chapter 4: Sec. (4.1 & 4.2) Page No: 112-128.

   Unit V: Relevant part of Chapter 4 and Chapter 5: Sec. 5.1 & 5.2 Page No:157-167.

REFERENCES

1. S.Surya Narayan Iyer, "Algebra", Margham Publications, Chennai, 2002.
2. M.I.Francis Raj, "Algebra" , Margham Publications, Chennai, 2004.

COURSE CODE			COURSE NAME	L	T	P		C
XMT301			Logic and Sets	2	0	0		2
C	P	A						
2	0	0		L	T	P	SS	H
				2	0	0	2	4

PREREQUISITE: Foundation course in Mathematics		
COURSE OUTCOMES:		
Course outcomes:	**Domain**	**Level**
CO1: Define and Explain Statements and Notations, Connectives, Statements formula and truth tables-Conditional and biconditional, Well formed formulae-Equivalence of formulae and Normal forms.	Cognitive	Remembering Understanding
CO2: Define and Explain Theory of inference for a statement calculus, rules of inference, related problems and Indirect method of proof.	Cognitive	Remembering Understanding
CO3: Define and Explain Predicate Calculus, The statement functions, variables and quantifiers predicate formulae, free and bounded variables and the universe of discourse.	Cognitive	Remembering Understanding
CO4: Define and Explain The rule of sum and product – permutation – combination of binomial theorem – Multinomial theorem.	Cognitive	Remembering Understanding
CO5: Define and Explain Mathematical Induction, The pigeon hole principle and The principle of inclusive and exclusive Derangements.	Cognitive	Remembering Understanding

UNIT I Logic	**6**
Statements and Notations- Connectives- Statements formula and truth tables-Conditional and biconditional – Well formed formulae- Equivalence of formulae- Normal forms.	
UNIT II	**6**
Theory of inference for a statement calculus – rules of inference – related problems – Indirect method of proof.	
UNIT III	**6**
Predicate Calculus – The statement functions – variables and quantifiers – predicate formulae – free and bounded variables – the universe of discourse.	
UNIT IV Combinatorics	**6**

The rule of sum and product – permutation – combination of binomial theorem – Multinomial theorem.		
UNIT V :		**6**
Mathematical Induction – The pigeon hole principle – The principle of inclusive and exclusive Derangements.		
LECTURE		**TOTAL**
30		**30**

TEXTBOOK

1. R.P. Grimaldi, "Discrete Mathematics and Combinatorial Mathematics", Pearson Education, 1998.

REFERENCES

1. P.R. Halmos, Naive "Set Theory", Springer, 1974.
2. E. Kamke, "Theory of Sets", Dover Publishers, 1950.
3. G. Ramesh and Dr.C. Ganesamoorthy ,Discrete Mathematics, Researchgate, Feb, 2018.

COURSE CODE	COURSE NAME	L	T	P	C
XMT302	Programming In C	3	1	0	4

C	P	A
3	0.5	0.5

L	T	P	H
3	1	0	4

PREREQUISITE: Nil

COURSE OUTCOMES:

Course Outcomes:	Domain	Level
CO1: Explain Constants, Variables, Data types , Operator and Expressions.	Cognitive	Understanding
CO2: Explain Input and Output operations, Decision Making and Branching, Decision making and Looping.	Cognitive Psychomotor	Understanding Guided Response

CO3: Explain Character Arrays and Strings and User defined Functions.	Cognitive	Understanding
CO4: Explain and Apply Structures and unions, Pointers and File management in C.	Cognitive	Understanding Applying
CO5: Apply Dynamic memory allocation, Linked lists, Preprocessors and Programming Guide lines.	Cognitive Affective	Applying Receiving

UNIT I	**12**
Introduction to C – Constants, Variables, Data types – Operator and Expressions.	
UNIT II	**12**
Managing Input and Output operations – Decision Making and Branching – Decision making and Looping.	
UNIT III	**12**
Arrays – Character Arrays and Strings – User defined Functions.	
UNIT IV	**12**
Structures and unions – Pointers – File management in C.	
UNIT V	**12**
Dynamic memory allocation – Linked lists- Preprocessors – Programming Guide lines.	

LECTURE	**TUTORIAL**	**TOTAL**
45	**15**	**60**

TEXT BOOK

1. Balagurusamy E .,"Programming in ANSI C" , Sixth Edition, McGraw-Hill, 2012.

REFERENCE

1. Bichkar, R.S., "Programming with C", University Press, 2012.

COURSE CODE	COURSE NAME	L	T	P	C
XMT303	Real Analysis	4	1	0	5

C	P	A	L	T	P	H
5	0	0	4	1	0	5

PREREQUISITE: Nil

Course Outcomes:

	Domain	Level
CO1: Explain The field axioms, Field properties, Order in R, Absolute value, Completeness , Representation of Real numbers on a straight line , Intervals , Countable and Uncountable sets.	Cognitive	Understanding
CO2: Define and Explain Open sets, Closed sets, Limit points of a set and Closure of a set.	Cognitive	Remembering Understanding
CO3: Define and Explain Limits, Continuous functions, Types of discontinuities, Algebra of Continuous functions and Boundedness of continuous functions.	Cognitive	Remembering Understanding
CO4: Define and Explain Derivability and continuity, Algebra of derivatives, Inverse function theorem for derivatives and Darboux's theorem.	Cognitive	Remembering Understanding
CO5: State and Explain conditions for integrability, properties of integrable functions, continuity and derivability of integral functions, Mean value theorems, the fundamental theorem of Calculus and the first mean value theorem.	Cognitive	Remembering Understanding

UNIT I Real numbers: **15**

The field axioms- Field properties-Order in R- Absolute value- Completeness – Represenation of Real numbers on a straightline – Intervals – Countable and Uncountable sets.

UNIT II Neighbourhoods and limit points: **15**

Open sets – Closed sets –Limit points of a set – Closure of a set.		
UNIT III Limits and Continuity:		**15**
Limits – Continuous functions – Types of discontinuities- Algebra of Continuous functions – Boundedness of continuous functions.		
UNIT IV Derivatives:		**15**
Introduction – Derivability and continuity- Algebra of derivatives – Inverse function theorem for derivatives – Darboux's theorem.		
UNIT V		**15**
Riemann Integration- Definition – Daurboux's theorem – conditions for integrability – properties of integrable functions – continuity and derivability of integral functions – Mean value theorems – the fundamental theorem of Calculus and the first mean value theorem.		
LECTURE	**TUTORIAL**	**TOTAL**
60	**15**	**75**

TEXT BOOKS

1. M.K.Singhal and Asha Rani Singhal , "A first course in Real Analysis"., R. Chand & Co., June,1997 (Units I to IV).

2. Shanthi Narayan, "A Course of Mathematical Analysis", S.Chand & Co. 1995 (Unit-V).

Unit-I Chapter 1, Sec. 1.1 – 1.10

Unit-II Chapter 2 Sec 2.1 – 2.6

Unit-III Chapter 5 Sec 5.1 – 5.5

Unit – IV Chapter 6 Sec 6.1 – 6.5

Unit – V Chapter 6 Sec 6.2 , 6.3 & 6.5 6.7 6.8, 6.9 of [2]

COURSE CODE			COURSE NAME	L	T	P	C
XMT304			Analytical Geometry 3D	4	1	0	5
C	P	A					
5	0	0		L	T	P	H
				4	1	0	5

PREREQUISITE: Nil

COURSE OUTCOMES:

Course outcomes:	Domain	Level
CO1: Find coordinates in space, direction cosines of a line , angle between line and to **explain** angle between planes and distance of a plane from a point.	Cognitive	Remembering Understanding

CO2: Find line of intersection of planes, coplanar lines, skew lines, Shortest distance between skew lines.	Cognitive	Remembering
CO3: Explain section of sphere by plane-tangent planes , condition of tangency and system of spheres generated by two spheres.	Cognitive	Understanding
CO4: Explain and to **find t**he equation of surface, cone, intersection of straight line and quadric cone , tangent plane and normal.	Cognitive	Remembering Understanding
CO5: Explain the condition for plane to touch the quadric cone, condition that the cone has three mutually perpendicular generators and condition for the plane to touch the conicoid.	Cognitive	Understanding

UNIT I	**15**
Coordinates in space-Direction cosines of a line in space-angle between lines in space – equation of a plane in normal form. Angle between planes – Distance of a plane from a point.	
UNIT II	**15**
Straight lines in space – line of intersection of planes – plane containing a line. Coplanar lines – skew lines and shortest distance between skew lines- length of the perpendicular from point to line.	
UNIT III	
General equation of a sphere-Section of sphere by plane-tangent planes –condition of tangency-system of spheres generated by two spheres - System of spheres generated by a sphere and plane.	
UNIT IV	**15**
The equation of surface – cone – intersection of straight line and quadric cone – tangent plane and normal	
UNIT V :	**15**
Condition for plane to touch the quadric cone - angle between the lines in which the plane cuts the cone. Condition that the cone has three mutually perpendicular generators- Central quadrics – intersection of a line and quadric – tangents and tangent planes – condition for the plane to touch the conicoid.	

	LECTURE	**TUTORIAL**	**TOTAL**
	60	**15**	**75**

TEXT BOOKS

1. Shanthi Narayanan and Mittal P.K,"Analytical Solid Geometry"' 16th Edition S.Chand & Co., New Delhi,2005.
2. Narayanan and Manickavasagam Pillay, T.K.," Treatment as Analytical Geometry"' S.Viswanathan (Printers & Publishers) Pvt. Ltd.,2008

Unit I : Chapter I, Sec 1.5 to 1.9, Chapter II Sec 2.1 to 2.3, Pages : 10-31
Chapter II Sec 2.4 to 2.8 pages : 32-47 of [1]

Unit II : Chapter III section 3.1-3.7, pages 55-89 of [1]

Unit III : Chapter VI Sec. 6.1 to 6.6 pages : 121-143 of [1]

Unit IV : Chapter V Sec.43 to 47 pages : 103-113 of [2]

Unit V : Chapter V Sec.49 to 53, Pages:115-125 of [2]

REFERENCE

1. P.Duraipandian & others, "Analytical Geometry 3 Dimensional", Edition, 1998.

COURSE CODE	COURSE NAME	L	T	P	C
XMT 305	Programming In C (Practical)	0	0	2	2

C	P	A
2	0	0

L	T	P	H
0	0	2	4

PREREQUISITE: Nil

COURSE OUTCOMES:

Course Outcomes:	Domain	Level
CO1: Apply Constants, Variables, Data types , Operator and Expressions to write simple programmes	Cognitive	Understanding
CO2: Apply Input and Output operations, Decision to write simple programmes	Cognitive Psychomotor	Understanding Guided Response
CO3: Apply Character Arrays and Strings and User defined Functions to write simple programmes	Cognitive	Understanding
CO4: Apply Structures and unions, Pointers and File management in C to write simple programmes	Cognitive	Understanding Applying
CO5: Apply Dynamic memory allocation, Linked lists, Preprocessors and Programming Guide lines to write simple programmes	Cognitive Affective	Applying Receiving

List of Programmes	
1. Write a Program to convert temperature from degree Centigrade to Fahrenheit. 2. Write a Program to find whether given number is Even or Odd. 3. Write a Program to find greatest of three numbers. 4. Sorting given list of names in alphabetical order 5. Sorting given list of numbers in ascending order 6. Write a Program to using switch statement to display Monday to Sunday. 7. Write a Program to display first Ten Natural Numbers and their sum. 8. Write a Program to find Sum and Multiplication of Two Matrices. 9. Write a Program to find the maximum number in Array using pointer. 10. Write a Program to reverse a number using pointer. 11. Write a Program to solve Quadratic Equation using functions. 12. Write a Program to find factorial of a number using Recursion. 13. Write a program to calculate Mean, Variance and SD of N numbers 14. Write a Program to create a file containing Student Details.	

COURSE CODE			COURSE NAME	L	T	P		C
XMT401			Theory of Equations	2	0	0		2
C	P	A						
2	0	0		L	T	P	SS	H
				2	0	0	2	4

PREREQUISITE: Foundation Course in Mathematics		
COURSE OUTCOMES:		
Course outcomes:	**Domain**	**Level**
CO1: Explain Graphical representation of a polynomials, maximum and minimum values of a polynomials.	Cognitive	Remembering Applying
CO2: Apply General properties of equations, Descarte's rule of signs positive and negative rule to find the Relation between the roots and the coefficients of equations.	Cognitive	Remembering Applying
CO3: Define and **Explain** Sets, subsets, Set operations, the laws of set theory and Venn diagrams. Examples of finite and infinite sets.	Cognitive	Remembering Applying
CO4: Define and Explain with Examples Finite sets and counting principle. Empty set, properties of empty set. Standard set operations. Classes of sets. Power set of a set.	Cognitive	Understanding Applying
CO5: Solve reciprocal and binomial equations, and to find algebraic solutions of the cubic and biquadratic with Properties of the derived functions.	Cognitive	Understanding

UNIT I	**6**
General properties of polynomials, Graphical representation of a polynomials, maximum and minimum values of a polynomials,	
UNIT II	**6**
General properties of equations, Descarte's rule of signs positive and negative rule, Relation between the roots and the coefficients of equations.	
UNIT III	**6**
Sets, subsets, Set operations, the laws of set theory and Venn diagrams. Examples of finite and infinite sets.	
UNIT IV	**6**
Finite sets and counting principle. Empty set, properties of empty set. Standard set operations. Classes of sets. Power set of a set.	
UNIT V :	**6**
Solutions of reciprocal and binomial equations. Algebraic solutions of the cubic and biquadratic.	

Properties of the derived functions.			
	LECTURE		**TOTAL**
	30		**30**
TEXTBOOKS			
1. W.S. Burnside and A.W. Panton, “The Theory of Equations”, Dublin University Press, 1954. 2. C. C. MacDuffee, “Theory of Equations”, John Wiley & Sons Inc., 1954.			

COURSE CODE	COURSE NAME	L	T	P	C
XMT402	Introduction to Matlab	3	1	0	4

C	P	A
4	0	0

L	T	P	H
3	1	0	4

PREREQUISITE: Nil

COURSE OUTCOMES:

Course outcomes:	Domain	Level
CO1: Apply Variables, assignment, statements, expressions, characters, encoding, vectors and matrices.	Cognitive	Applying
CO2: Explain about creating row vectors and column vectors , dimensions in using functions with vectors and matrices.	Cognitive	Applying

CO3: Apply Matlab Scripts, Input and Output, scripts with input and output, user defined functions in simple applications.	Cognitive	Applying
CO4: Apply Selection Statement, relational expressions,SWITCH statement, menu function, looping, FOR loop, nested FOR loop, WHILE loop.	Cognitive	Applying
CO5: Apply String manipulations, creating string variable, operations on strings, fundamentals of arrays, structure and file operations with simple applications.	Cognitive	Applying

UNIT I	**12**
Introduction to MATLAB – Variables and assignment statements –expressions – characters and encoding – vectors and matrices	
UNIT II	**12**
Creating row vectors and vectors – matrix variables – dimensions in using functions with vectors and matrices.	
UNIT III	**12**
MATLAB Programmes – Matlab Scripts, Input and Output, scripts with input and output, Introduction to file input and output – user defined functions – simple applications.	
UNIT IV	**12**
Selection Statement – relational expressions, SWITCH statement, menu function, looping – FOR loop, nested FOR loop, WHILE loop,	
UNIT V	**12**
String manipulations, creating string variable, operations on strings, fundamentals of arrays, structure and file operations- simple applications on the above.	

LECTURE	**TUTORIAL**	**TOTAL**

	45	**15**	**60**
TEXT BOOK			
1. Stormy Attaway, "MATLAB - A Practical Approach", Butterworth-Heinemann Publications, 2009.			

COURSE CODE			**COURSE NAME**	**L**	**T**	**P**	**C**
XMT403			**Vector Calculus & Fourier Series**	**4**	**1**	**0**	**5**
C	**P**	**A**					
5	**0**	**0**		**L**	**T**	**P**	**H**
				4	**1**	**0**	**5**
PREREQUISITE: Differential Calculus and Integral Calculus							
COURSE OUTCOMES:							
Course outcomes:				**Domain**		**Level**	
CO1: Find Gradient of a vector, Directional derivative, divergence & curl of a vector, solenoidal & irrotational vector functions, Laplacian double operator and to **solve** simple problems.				Cognitive		Remembering Applying	

CO2: Find vector integration ,tangential line integral ,conservative force field, scalar potential, work done by a force, Normal surface integral, Volume integral and to **solve** simple problems.	Cognitive	Remembering Applying
CO3: Use Gauss Divergence Theorem, Stoke's Theorem, Green's Theorem and to **solve** Simple problems & Verification of the theorems for simple problems.	Cognitive	Remembering Applying
CO4: Explain Fourier Series expansion of periodic functions with Period 2π Make **Use** of odd & even functions in Fourier Series.	Cognitive	Understanding Applying
CO5: Explain Half-range Fourier cosine Series & sine series, Change of interval & Combination of series.	Cognitive	Understanding

UNIT I		**15**
Vector differentiation –velocity & acceleration-Vector & scalar fields –Gradient of a vector-Directional derivative – divergence & curl of a vector solinoidal & irrotational vectors –Laplacian double operator –simple problems.		
UNIT II		**15**
Vector integration –Tangential line integral –Conservative force field –scalar potential- Work done by a force - Normal surface integral- Volume integral – simple problems.		
UNIT III		**15**
Gauss Divergence Theorem – Stoke's Theorem- Green's Theorem – Simple problems & Verification of the theorems for simple problems.		
UNIT IV		**15**
Fourier series- definition - Fourier Series expansion of periodic functions with period 2π – Use of odd & even functions in Fourier Series.		
UNIT V		**15**
Half-range Fourier Series – definition- Development in Cosine series & in Sine series - change of interval – Combination of series.		
LECTURE	**TUTORIAL**	**TOTAL**
60	**15**	**75**
TEXT BOOKS		

1. M.L. Khanna, “Vector Calculus”, Jai Prakash Nath and Co., 8th Edition, 1986.
2. S. Narayanan, T.K. Manicavachagam Pillai, “Calculus”, Vol. III, S. Viswanathan Pvt Limited, and Vijay Nicole Imprints Pvt Ltd, 2004.

UNIT – I - Chapter 1 Section 1 & Chapter 2 Sections 2.3 to 2.6 , 3 , 4 , 5 , 7 of [1]

UNIT – II - Chapter 3 Sections 1 , 2 , 4 of [1]

UNIT – III - Chapter 3 Sections 5 & 6 of [2]

UNIT – IV - Chapter 6 Section 1, 2, 3 of [2]

UNIT – V - Chapter 6 Section 4, 5.1, 5.2, 6, 7 of [2]

REFERENCES

1. P.Duraipandiyan and Lakshmi Duraipandian, “Vector Analysis”, Emarald publishers 1986.
2. Dr. S.Arumugam and prof. A.Thangapandi Issac, “Fourier series”, New Gamma publishing house 2012.

COURSE CODE			COURSE NAME	L	T	P	C
XMT404			Algebra	4	1	0	5
C	P	A					
5	0	0		L	T	P	H
				4	1	0	5

PREREQUISITE: Nil

COURSE OUTCOMES:

Course outcomes:	Domain	Level
CO1: Define groups, abelian and non-abelian groups with examples and to explain integer under addition and multiplication modulo n.	Cognitive	Remembering
CO2: Explain Cyclic groups from number systems, complex roots of unity, circle group, the general linear group GLn (n,R), groups of symmetries of (i) an isosceles triangle, (ii) an equilateral triangle, (iii) a rectangle, and (iv) a square, the permutation group Sym (n), Group of quaternions.	Cognitive	Understanding
CO3: Explain Subgroups, cyclic subgroups, the concept of a subgroup generated by a subset and the commutator subgroup of group, examples of subgroups including the center of a group.	Cognitive	Understanding
CO4: State and Explain Cosets, Index of subgroup, Lagrange's theorem, order of an element, Normal subgroups, Quotient groups.	Cognitive	Remembering Understanding

CO5: Define and **Explain** rings, commutative and non-commutative rings with rings from number systems, Zn the ring of integers modulo n, rings of matrices, polynomial rings, and rings of continuous functions.	Cognitive	Remembering Understanding

UNIT I	**15**
Definition and examples of groups, examples of abelian and non-abelian groups, the group Zn of integers under addition modulo n and the group U(n) of units under multiplication modulo n.	
UNIT II	**15**
Cyclic groups from number systems, complex roots of unity, circle group, the general linear group GLn (n,R), groups of symmetries of (i) an isosceles triangle, (ii) an equilateral triangle, (iii) a rectangle, and (iv) a square, the permutation group Sym (n), Group of quaternions.	
UNIT III	**15**
Subgroups, cyclic subgroups, the concept of a subgroup generated by a subset and the commutator subgroup of group, examples of subgroups including the center of a group.	
UNIT IV	**15**
Cosets, Index of subgroup, Lagrange's theorem, order of an element, Normal subgroups: their definition, examples, and characterizations, Quotient groups.	
UNIT V :	**15**
Definition and examples of rings, examples of commutative and non-commutative rings: rings from number systems, Zn the ring of integers modulo n, ring of real quaternions, rings of matrices, polynomial rings, and rings of continuous functions. Subrings and ideals, Integral domains and fields, examples of fields: Zp, Q, R, and C. Field of rational functions.	

LECTURE	**TUTORIAL**	**TOTAL**
60	**15**	**75**

TEXT BOOKS

1. S. Narayanan& T. K. ManickavasagamPillai, "Algebra", Vol. 1, S. Viswanathan Pvt. Ltd., Chennai, 2004.
2. S. Narayanan& T. K. ManickavasagamPillai, "Algebra", Vol. 2, S. Viswanathan Pvt. Ltd.

Chennai, 2004.

3. Joseph A Gallian, "Contemporary Abstract Algebra", 4th Ed., Narosa, 1999.
4. George E Andrews, "Number Theory", Hindustan Publishing Corporation, 1984.

REFERENCES

1. John B. Fraleigh, "A First Course in Abstract Algebra", 7th Ed., Pearson, 2002.
2. M. Artin, "Abstract Algebra", 2nd Ed., Pearson, 2011.

COURSE CODE			COURSE NAME	L	T	P	C
XMT 405			Introduction to Matlab(Practical)	0	0	2	2
C	P	A					
2	0	0		L	T	P	H
				0	0	2	4

PREREQUISITE: Nil

COURSE OUTCOMES:

Course outcomes:	Domain	Level
CO1: Find the prime numbers, Fibonacci series, ascending order, alphabetical order.	Cognitive	Remembering
CO2: Compute simple and compound interest values, biggest among three numbers, biggest among N integers.	Cognitive	Understanding
CO3: Compute factorial of a given number using recursive function	Cognitive	Understanding
CO4: Solve a quadratic equation and test with three types of roots.	Cognitive	Applying
CO5: Compute matrix multiplication using functions	Cognitive	Understanding

List of Programmes
1. List the prime numbers in a given range
2. Display Fibonacci series
3. Sorting given list of names in alphabetical order
4. Sorting given list of numbers in ascending order

5. Read and display for a given matrix of any order

6. Compute simple and compound interest values

7. Computer biggest among three numbers

8. Compute biggest among N integers

9. Compute factorial of a given number using recursive function

10. Write a program to swap the values using functions

12. Write a program to solve a quadratic equation and test with three types of roots.

14. Write a program to calculate variance and SD of N numbers

15. Write a program to read two matrices and compute matrix multiplication using functions

COURSE CODE			**COURSE NAME**	**L**	**T**	**P**		**C**
XMT501			**Probability and Statistics**	**2**	**0**	**0**		**2**
C	**P**	**A**						
2	**0**	**0**		**L**	**T**	**P**	**SS**	**H**
				2	**0**	**0**	**2**	**4**

PREREQUISITE: Algebra

COURSE OUTCOMES:

Course outcomes:	**Domain**	**Level**
CO1: Define and Explain Sample space, probability axioms, real random variables (discrete and continuous), cumulative distribution function, and probability mass/density functions.	Cognitive	Remembering Understanding
CO2: Define and Explain Mathematical expectation, moments, moment generating function, characteristic function.	Cognitive	Remembering Understanding

CO3: Define and Explain Discrete distributions: uniform, binomial, Poisson, continuous distributions: uniform, normal, exponential.	Cognitive	Remembering Understanding
CO4: Define and Explain Joint cumulative distribution function and its properties, joint probability density functions, marginal and conditional distributions.	Cognitive	Remembering Understanding
CO5: Define and Explain Expectation of function of two random variables, conditional expectations, and independent random variables.	Cognitive	Remembering Understanding

UNIT I	**6**
Sample space, probability axioms, real random variables (discrete and continuous), cumulative distribution function, and probability mass/density functions.	
UNIT II	**6**
Mathematical expectation, moments, moment generating function, characteristic function.	
UNIT III	**6**
Discrete distributions: uniform, binomial, Poisson, continuous distributions: uniform, normal, exponential.	
UNIT IV	**6**
Joint cumulative distribution function and its properties, joint probability density functions, marginal and conditional distributions.	
UNIT V	**6**
Expectation of function of two random variables, conditional expectations, independent random variables.	

LECTURE	**TOTAL**
30	**30**

TEXT BOOK

1. S.C.Gupta and Kapoor, "Fundamentals of Mathematical Statistics", tenth revised edition Sultan Chand and Sons, New Delhi, 2002.

REFERENCES

1. Irwin Miller and Marylees Miller, John E. Freund, "Mathematical Statistics with Application", 7th Ed., Pearson Education, Asia, 2006.
2. Sheldon Ross, "Introduction to Probability Model", 9th Ed., Academic Press, Indian Reprint, 2007.

COURSE CODE			COURSE NAME	L	T	P	C
XMT502A			Matrices	4	2	0	6
C	P	A					
6	0	0		L	T	P	H
				4	2	0	6

PREREQUISITE: Nil

COURSE OUTCOMES:

Course outcomes:	Domain	Level
CO1: Explain Concept of Linear Independence and examples of different bases. Subspaces of R2, R3.	Cognitive	Understanding
CO2: Explain Matrix form of basic geometric transformations. Interpretation of eigen values and eigen vectors for such transformations and eigen spaces as invariant subspaces.	Cognitive	Understanding
CO3: Solve linear homogeneous and non-homogeneous equations with number of equations and unknowns upto four.	Cognitive	Applying
CO4: Explain Matrices in diagonal form upto matrices of order 3, the computation of matrix inverses using elementary row operations and to find rank of the matrix.	Cognitive	Understanding
CO5: Solve a system of linear equations using matrices.	Cognitive	Applying

UNIT I	**18**
R, R2, R3 as vector spaces over R. Standard basis for each of them. Concept of Linear Independence and examples of different bases. Subspaces of R2, R3.	
UNIT II	**18**
Translation, Dilation, Rotation, Reflection in a point, line and plane. Matrix form of basic geometric transformations. Interpretation of eigen values and eigen vectors for such transformations and eigen spaces as invariant subspaces.	
UNIT III	**18**
Types of matrices. Rank of a matrix. Invariance of rank under elementary transformations. Reduction to normal form, Solutions of linear homogeneous and non-homogeneous equations with number of equations and unknowns upto four.	
UNIT IV	**18**
Matrices in diagonal form. Reduction to diagonal form upto matrices of order 3. Computation of matrix inverses using elementary row operations. Rank of matrix.	
UNIT V	**18**
Solutions of a system of linear equations using matrices. Illustrative examples of above concepts from Geometry, Physics, Chemistry, Combinatorics and Statistics.	

LECTURE	**TUTORIAL**	**TOTAL**
60	**30**	**90**

TEXT BOOKS

1. A.I. Kostrikin, "Introduction to Algebra", Springer Verlag, 1984.
2. S. H. Friedberg, A. L. Insel and L. E. Spence, "Linear Algebra", Prentice Hall of India Pvt. Ltd., New Delhi, 2004.
3. Richard Bronson, "Theory and Problems of Matrix Operations", Tata McGraw Hill, 1989.

REFERENCE

1. S. Narayanan& T. K. ManickavasagamPillai, "Algebra", Vol. 2, S. Viswanathan Pvt. Ltd. Chennai, 2004.

COURSE CODE	COURSE NAME	L	T	P	C

XMT502B			Discrete Mathematics	4	2	0	6
C	P	A					
6	0	0		L	T	P	H
				4	2	0	6

PREREQUISITE: Logic and Sets

COURSE OUTCOMES:

Course outcomes:	Domain	Level
CO1:Define and Apply truth tables and the rules of propositional and predicate calculus.	Cognitive	Remembering Applying
CO2: Apply the following methods direct proof, indirect proof, and proof by contradiction, and case analysis to formulate short proofs.	Cognitive	Applying
CO3: Solve linear recurrence relation with constant coefficients, non homogeneous recurrence relations and non homogeneous recurrence relations using methods of generating functions.	Cognitive	Applying
CO4: Explain Basic theorems on Boolean Algebra, Duality principle Boolean. functions.	Cognitive	Understanding
CO5: Apply Boolean algebra, Logic gates and circuits combinatorial circuits, Boolean expression and karnaugh map.	Cognitive	Applying

UNIT I	**18**
Mathematical Logic- Propositional calculus- Basic Logical operators- conditional statements- Bi conditional statement- tautologies- contradictions- equivalence implications.	
UNIT II	**18**
Norms forms- Theory of inference for the statement calculus- The predicate calculus inference theory and predicate calculus.	
UNIT III	**18**
Recurrence relations and generating functions- recurrence relation- solution of linear recurrence relation with constant coefficients- Non homogeneous recurrence relations solution of Non – homogeneous recurrence relations- Methods of generating functions.	
UNIT IV	**18**
Basic theorems on Boolean Algebra- Duality principle Boolean functions.	
UNIT V :	**18**
Boolean functions- Applications of Boolean algebra- Logic gates and circuits -combinatorial	

circuits- Boolean expression – karnaugh map.		
LECTURE	**TUTORIAL**	**TOTAL**
60	**30**	**90**
TEXT BOOK		
1.J.B.Tremblay, R. Manohar, "Discrete Mathematical structures with applications to Computer Science", Tata McGraw Hill, International edition New Delhi, 1997, Reprint 2007.		
REFERENCE		
1. M.K. Venkatraman, N.Sridharan & N.Chandrasekaran, "Discrete Mathematics", The National Publishing company India, 2000.		

COURSE CODE			**COURSE NAME**	**L**	**T**	**P**	**C**
XMT503A			**Numerical Methods**	**4**	**2**	**0**	**6**
C	**P**	**A**					
6	**0**	**0**		**L**	**T**	**P**	**H**
				4	**2**	**0**	**6**

PREREQUISITE: Differential Calculus and Integral Calculus

COURSE OUTCOMES:

Course outcomes:	**Domain**	**Level**
CO1: Explain and Solve Algorithms, Convergence, Bisection method, False position method, Fixed point iteration method, Newton's method.	Cognitive	Remembering Applying
CO2: Solve system of linear equations using iterative methods Gauss-Jacobi, Gauss-Seidel and SOR iterative methods.	Cognitive	Remembering Applying
CO3: Explain Lagrange and Newton interpolation: linear and higher order, finite difference operators.	Cognitive	Remembering Applying
CO4: Apply forward difference, backward difference and central Difference to find Numerical differentiation:	Cognitive	Understanding Applying
CO5: Solve Integration using trapezoidal rule, Simpson's rule, and Euler's method.	Cognitive	Understanding

UNIT I	**18**

Algorithms, Convergence, Bisection method, False position method, Fixed point iteration method, Newton's method.	
UNIT II	**18**
Secant method, LU decomposition, Gauss-Jacobi, Gauss-Siedel and SOR iterative methods.	
UNIT III	**18**
Lagrange and Newton interpolation: linear and higher order, finite difference operators.	
UNIT IV	**18**
Numerical differentiation: forward difference, backward difference and central Difference.	
UNIT V :	**18**
Integration: trapezoidal rule, Simpson's rule, Euler's method.	

LECTURE	**TUTORIAL**	**TOTAL**
60	**30**	**90**

TEXT BOOKS

1. B. Bradie, "A Friendly Introduction to Numerical Analysis", Pearson Education, India, 2007.
2. M.K. Jain, S.R.K. Iyengar and R.K. Jain, "Numerical Methods for Scientific and Engineering Computation", 5th Ed., New age International Publisher, India, 2007.

COURSE CODE			**COURSE NAME**	**L**	**T**	**P**	**C**
XMT503B			**Mechanics**	**4**	**2**	**0**	**6**
C	**P**	**A**					
6	**0**	**0**		**L**	**T**	**P**	**H**
				4	**2**	**0**	**6**

PREREQUISITE: Algebra

COURSE OUTCOMES:		
Course outcomes:	**Domain**	**Level**
CO1: Define basic Concepts and Principles ,Forces acting at a Point to **Explain** Lami's Theorem and Applications , Parallel Forces , Like and Unlike Parallel Forces ,Moment of a force , Couples related Problems.	Cognitive	Remembering Understanding
CO2: Explain Equilibrium of Three Forces acting on a rigid body, Friction, Laws of Friction, Angle of Friction, Cone of Friction, Properties and related problems.	Cognitive	Understanding
CO3: Explain Motion in a Straight line under uniform acceleration, Newton's Laws of motion. Projectiles: **Define and explain** Path of Projectile, Range on an inclined Plane, Properties and Problems.	Cognitive	Remembering Understanding
CO4: Explain Collision of Elastic Bodies , Direct and oblique Impact , Loss of Kinetic Energy related properties and problems.	Cognitive	Understanding
CO5: Explain central Orbits Properties and related problems.	Cognitive	Understanding

UNIT I	**18**
Basic Concepts and Principles - Forces acting at a Point - Lami's Theorem and Applications - Parallel Forces - Like and Unlike Parallel Forces - Moment of a force – Couples – Related problems.	
UNIT II	**18**
Equilibrium of Three Forces acting on a rigid body - Friction - Laws of Friction - Angle of Friction - Cone of friction - Properties and related problems.	
UNIT III	**18**
Motion in a Straight line under uniform acceleration - Newton's Laws of motion. Projectiles: Definition - Path of Projectile - Range on an Inclined Plane - Properties and Problems.	
UNIT IV	**18**
Impulse and Impact: Collision of Elastic Bodies – Direct and Oblique Impact – Loss of Kinetic Energy – Related Properties and Simple Problems.	
UNIT V :	**18**
Central Orbits: Motion under the action of Central Forces - Properties and Related Problems - Differential Equation of Central Orbit - Pedal Equation of Central Orbit - Velocities in a Central Orbit - Law of Forces - Properties and Related Problems	

LECTURE	TUTORIAL	TOTAL
60	30	90

TEXT BOOKS

1. M. K. Venkataraman, “Statics”, Agasthiar Publications, Trichy, 2004.

   Unit 1: Chapters 2, 3, 4 Unit 2: Chapters 5, 7

2. M. K. Venkataraman, “Dynamics”, Agasthiar Publications, Trichy, 2004.

   Unit 3: Chapters 3: section 3.22, Chapter 4: Section 4.3, Chapter 6

   Unit 4: Chapter 8 Unit 5: Chapter 11

REFERENCES

1. T. K. ManickavasagamPillai, “Statics”, S. Viswanathan & Co., Chennai, 1980.

2. S. Narayanan, “Dynamics”, S. Chand & Co., New Delhi, 1980.

COURSE CODE			COURSE NAME	L	T	P	C
XMT504A			Linear algebra	4	2	0	6
C	P	A					
6	0	0		L	T	P	H
				4	2	0	6

PREREQUISITE: Matrices

COURSE OUTCOMES:

Course outcomes:	Domain	Level
CO1: Define and **Explain** vector spaces, subspaces, linear transformation, and span of a set with examples.	Cognitive	Remembering Understanding
CO2: Define Linear Independence, Basis and Dimension and to **find** Rank and Nullity.	Cognitive	Remembering
CO3: Explain matrix of a linear transformation ,Inner product space and to **Define** with examples orthogonality,Gram Schmidt orthogonalisation process and orthogonal complement.	Cognitive	Remembering Understanding
CO4: Define Algebra of Matrices, Types of Matrices and to find the inverse of a matrix and Rank of a matrix.	Cognitive	Remembering

CO5: Explain Characteristic equation and Cayley -Hamilton theorem and to **find** Eigen values and Eigen vectors.	Cognitive	Remembering Understanding

UNIT I : Vector Spaces	**18**
Vector spaces – Definition and examples – Subspaces-linear transformation – Span of a set.	
UNIT II : Basis and Dimension	**18**
Linear Independence – Basis and Dimension –Rank and Nullity.	
UNIT III : Matrix and Inner Product Space	**18**
Matrix of a linear transformation -Inner product space – Definition and examples – Orthogonality – Gram Schmidt orthogonalisation process – Orthogonal Complement.	
UNIT IV : Theory of Matrices	**18**
Algebra of Matrices - Types of Matrices – The Inverse of a Matrix – Elementary Transformations – Rank of a matrix.	
UNIT V : Characteristic equation and Bilinear forms	**18**
Characteristic equation and Cayley -Hamilton theorem – Eigen values and Eigen vectors	

LECTURE	**TUTORIAL**	**TOTAL**
60	**30**	**90**

TEXT BOOK

1. Arumugam S and Thangapandi Isaac A, "Modern Algebra", SciTech Publications (India) Ltd., Chennai, Edition 2012.

Unit1: Chapter 5, Sec 5.1 to 5.4 Unit2: Chapter 5, Sec 5.5 to 5.7
Unit3: Chapter 5,Sec 5.8, Chapter 6, Sec 6.1 to 6.3
Unit4: Chapter 7 Sec 7.1 to 7.5 Unit5: Chapter 7, Sec 7.7, 7.8

REFERENCE

1. I. N. Herstein, "Topics in Algebra", Second Edition, John Wiley & Sons (Asia), 1975.

COURSE CODE			**COURSE NAME**	**L**	**T**	**P**	**C**
XMT504B			**Astronomy**	**4**	**2**	**0**	**6**
C	**P**	**A**					

6	0	0		L	T	P	H
				4	2	0	6

PREREQUISITE: Nil

COURSE OUTCOMES:

Course outcomes:	Domain	Level
CO1: Explain Relevant properties of sphere and formulae in spherical trigonometry (no proof, no problems) , Celestial sphere and diurnal motion ,Celestial coordinates and sidereal time.	Cognitive	Understanding
CO2: Define and Explain Morning and evening stars, circumpolar stars, diagram of the celestial sphere, zones of earth, perpetual day, dip of horizon and twilight.	Cognitive	Remembering Understanding
CO3: Define and Explain Refraction, laws of refraction, tangent formula, Cassini's formula, horizontal refraction, geocentric parallax and horizontal parallax.	Cognitive	Remembering Understanding
CO4: Define and Explain Kepler's laws, verification of 1st and 2nd laws in the case of earth, Anomalies, Kepler's equation, Seasons, causes and kinds of years.	Cognitive	Remembering Understanding
CO5: Define and Explain Moon, sidereal and synodic months, elongation, phase of moon, eclipses, umbra and penumbra, lunar and solar eclipses, ecliptic limits, maximum and minimum number of eclipses near a node and in a year and Saros.	Cognitive	Remembering Understanding

UNIT I	**18**
Relevant properties of sphere and formulae in spherical trigonometry (no proof, no problems) - Celestial sphere and diurnal motion -Celestial coordinates-sidereal time.	
UNIT II	**18**
Morning and evening stars -circumpolar stars- diagram of the celestial sphere -zones of earth -perpetual day-dip of horizon-twilight.	
UNIT III	**18**
Refraction - laws of refraction -tangent formula-Cassini's formula - horizontal refraction-geocentric parallax -horizontal parallax.	
UNIT IV	**18**

Kepler's laws - verification of 1st and 2nd laws in the case of earth - Anomalies -Kepler's equation - Seasons -causes -kinds of years.

UNIT V :	**18**

Moon-sidereal and synodic months - elongation - phase of moon - eclipses-umbra and penumbra - lunar and solar eclipses - ecliptic limits - maximum and minimum number of eclipses near a node and in a year - Saros.

LECTURE	**TUTORIAL**	**TOTAL**
60	**30**	**90**

TEXT BOOK

1. Kumaravel, S. and Susheela Kumaravel, "Astronomy", 8th Edition, SKV Publications, 2004.
   Unit 1: Sec: 39-79
   Unit 2: Sec: 80-90,106-116
   Unit3: Sec: 117-144
   Unit 4: Sec: 146-162,173-178
   Unit 5: Sec: 229-241,256-275

REFERENCE

1. G V Ramachandran, "Text Book of Astronomy", Mission Press, Palayamkottai, 1965.

COURSE CODE			COURSE NAME	L	T	P		C
XMT601			Graph Theory	2	0	0		2
C	P	A						
2	0	0		L	T	P	SS	H
				2	0	0	2	4
PREREQUISITE: Matrices								
COURSE OUTCOMES:								
Course outcomes:				**Domain**		**Level**		
CO1: Define and Explain The Konigsberg Bridge Problem, Graphs and subgraphs, Degrees, Subgraphs , Isomorphism. , independent sets and coverings.				Cognitive		Remembering Applying		

CO2: Define and Explain Matrices , Operations on Graphs , Walks, Trails and Paths ,Connectedness and Components and Eulerian Graphs.	Cognitive	Remembering Applying
CO3: Define and Explain Hamiltonian Graphs, Characterization of Trees and Centre of a Tree.	Cognitive	Remembering Applying
CO4: Define and Explain Planarity, Properties and Characterization of Planar Graphs.	Cognitive	Understanding Applying
CO5: Define and Explain Directed Graphs, Basic Properties ,Some Applications, Connector Problem , Kruskal's algorithm , Shortest Path Problem and Dijkstra's algorithm.	Cognitive	Understanding

UNIT I	**6**
Introduction - The Konigsberg Bridge Problem - Graphs and subgraphs: Definition and Examples - Degrees - Subgraphs – Isomorphism. –independent sets and coverings.	
UNIT II	**6**
Matrices - Operations on Graphs - Walks, Trails and Paths – Connectedness and Components - Eulerian Graphs.	
UNIT III	**6**
Hamiltonian Graphs (Omit Chavatal Theorem) - Characterization of Trees - Centre of a Tree.	
UNIT IV	**6**
Planarity: Introduction - Definition and Properties - Characterization of Planar Graphs.	
UNIT V :	**6**
Directed Graphs: Introduction - Definitions and Basic Properties – Some Applications: Connector Problem - Kruskal's algorithm - Shortest Path Problem – Dijkstra's algorithm.	

LECTURE	**TOTAL**
30	**30**

TEXT BOOK

1. S. Arumugam and S. Ramachandran, "Invitation to Graph Theory", SciTech Publications

(India) Pvt. Ltd., Chennai, 2006.

Unit-I Chapter-1 Sec 1.0, 1.1 and Chapter -2 Sec 2.0, 2.1, 2.2, 2.3, 2.4.2.6

Unit-II Chapter-2 Sec 2.8,2.9 ,Chapter-4 Sec 4.1,4.2 and Chapter-5 Sec 5.0,,5.1

Unit-III Chapter-5 Sec 5.2, Chapter-6 Sec 6.0, 6.1, 6.2.

Unit-IV Chapter-8 Sec 8.0, 8.1, 8.2.

Unit-V Chapter-10 Sec 10.0, 10.1 Chapter-11 Sec 11.0, 11.1, 11.2

REFERENCES

1. Narsingh Deo, "Graph Theory with applications to Engineering and Computer Science", Prentice Hall of India, 2004.

2. Gary Chartrand and Ping Zhang, "Introduction to Graph Theory", Tata McGraw-Hill Edition, 2004.

COURSE CODE			COURSE NAME	L	T	P	C
XMT602A			Complex Analysis	4	2	0	6
C	P	A					
6	0	0		L	T	P	H
				4	2	0	6

PREREQUISITE: Differential Calculus and Integral Calculus

COURSE OUTCOMES:

Course outcomes:	Domain	Level
CO1: Use CR Equations in cartesian and polar co-ordinates to find analytic function and to **Explain** Harmonic function Properties and applications.	Cognitive	Understanding Applying
CO2: Explain Conformal mappings - Linear and Non-linear transformations and to **Apply** cross ratio to construct Bilinear transformations.	Cognitive	Understanding Applying
CO3: Solve the integral using cauchy's integral theorem , cauchy's integral formula and to **Explain** Liouville's theorem , Maximum modulus theorem and to apply them in simple problems.	Cognitive	Understanding Applying
CO4: Using Taylors series and laurent's series Expansion of functions in Power series and to explain types of singularities.	Cognitive	Applying
CO5: Apply Cauchy residue theorem to **Solve** Integration of functions of the type involving cosx, sinx.	Cognitive	Applying

UNIT I	**18**
Analytic function - Cauchy Riemann Equation in Cartesian and polar co-ordinates - Harmonic function Properties and applications.	
UNIT II	**18**
Conformal mappings - Linear and Non-linear transformations – Bilinear transformations - Properties and applications	
UNIT III	**18**
Integration in the Complex plane - Cauchy's Integral theorem - Cauchy's Integral formula - Liouville's theorem - Maximum modulus theorem - Applications and simple problems.	
UNIT IV	**18**
Taylor's and Laurent's series - Expansion of functions in power series - Singular points - Types of singularities - Properties of	

singularities - Identification of singularities.

UNIT V :	**18**

Calculus of Residues: Residue theorem - Integration of functions of the type involving cosx , sinx- Applications and problems relating to residues.

LECTURE	**TUTORIAL**	**TOTAL**
60	**30**	**90**

TEXT BOOK

1. S. Narayanan & T.K. ManickavasagamPillai, "Complex Analysis", S. Viswanathan Publishers, Chennai, 1997.
   - Unit 1: Chapter 1
   - Unit 2: Chapter 2
   - Unit 3: Chapter 3
   - Unit 4: Chapter 4
   - Unit 5: Chapter 5

REFERENCES

1. S. Arumugam, A. Thangapandi Isaac& A. Somasundaram, "Complex Analysis", SciTech Publications, India, Pvt. Ltd., 2004.
2. S. Ponnusamy, "Foundations of Complex Analysis", 2ndEdition, Narosa Publication, New Delhi, 2005.
3. R. V. Churchill & J.W.Brown, "Complex variables and applications", 5thEdition, McGraw Hill, Singapore, 1990.

COURSE CODE			COURSE NAME	L	T	P	C
XMT602B			Number Theory	4	2	0	6
C	P	A					
6	0	0		L	T	P	H
				4	2	0	6

PREREQUISITE: Algebra

COURSE OUTCOMES:

Course outcomes:	Domain	Level
CO1: Define and Explain Euclid's Division Lemma, Divisibility, The Linear Diophantine Equation, The Fundamental Theorem of Arithmetic.	Cognitive	Remembering Understanding
CO2: Define and Explain Permutations and Combinations, Fermat's Little Theorem, Wilson's Theorem, Generating Functions.	Cognitive	Remembering Understanding
CO3: Define and Explain Basic Properties of Congruences Residue Systems. Linear Congruences, The Theorems of Fermat and Wilson Revisited.	Cognitive	Remembering Understanding
CO4: Define and Explain The Chinese Remainder Theorem, Polynomial Congruences and Combinational Study of F(n).	Cognitive	Remembering Understanding
CO5: Define and Explain Formulae for d(n) and s(n) – Multiplicative Arithmetic Function – The Mobius Inversion Formula.	Cognitive	Remembering Understanding

UNIT I	**18**
Euclid's Division Lemma – Divisibility – The Linear Diophantine Equation – The Fundamental Theorem of Arithmetic	
UNIT II	**18**
Permutations and Combinations – Fermat's Little Theorem – Wilson's Theorem – Generating Functions	
UNIT III	**18**
Basic Properties of Congruences Residue Systems. Linear Congruences – The Theorems of Fermat and Wilson Revisited.	
UNIT IV	**18**
The Chinese Remainder Theorem – Polynomial Congruences – Combinational Study of F(n).	

UNIT V :		**18**
Formulae for d(n) and s(n) – Multiplicative Arithmetic Function – The Mobius Inversion Formula.		
LECTURE	**TUTORIAL**	**TOTAL**
60	**30**	**90**

TEXT BOOK

1. George E.Andrews , "Number Theory", Hindustan Publishing Corporation – 1984,

Unit I : Chapter - 2 Sec. 2.1 – 2.4 pages 12-29

Unit II : Chapter – 3 Sec. 3.1, 3.4 pages 30-44

Unit III : Chapter – 4Sec. 4.1 – 4.2 Pages 49 – 55, Sec. 5.1- 5.2 Pages 58-65

Unit IV : Chapter – 4 Sec. 5.3 – 5.4 pages 66-74, Sec. 6.1 Pages 75-81

Unit V : Chapter – 5 Sec. 6.2 – 6.3 Pages 82-92

REFERENCES

1. S.B.Malik, "Basic Number Theory", Vikas Publishing House Pvt. Ltd., 2nd Ed.2009.

2. K.C.Chowdhury, " A First Course Theory of Numbers", Asian Books Pvt. Ltd., I Edition 2004.

COURSE CODE			COURSE NAME	L	T	P	C
XMT603A			Linear programming	4	2	0	6
C	P	A					
5	0.5	0.5		L	T	P	H
				4	2	0	6
PREREQUISITE: NIL							
COURSE OUTCOMES:							
Course outcomes:				**Domain**		**Level**	

CO1: Find Graphical Solution, **Solve** LPP using Simplex Method, Big M Method and Two Phase Method.	Cognitive	Remembering Applying
CO2: Solve Linear Programming problem Formulation of Primal , Dual Pairs , Duality and Simplex Method.	Cognitive Psychomotor	Applying Guided Response
CO3: Solve Transportation Problems, finding initial basic feasible solution using North West Corner Rule and Vogel's approximation method , **Solve** unbalanced Transportation Problems, Assignment Problems and Routing Problems.	Cognitive	Applying
CO4: Solve sequencing Problems, Problems with 'n' jobs and 'k' machines , Problems with 'n' jobs and 2 machines, Problems with 2 jobs and k machines and Problems with 2 jobs and 3 machines.	Cognitive Affective	Applying Receiving
CO 5: Solve Game Theory problems Two persons Zero sum games , maximin and minimax principle, Games without saddle points , Mixed strategies, using Graphical method and Dominance property.	Cognitive	Applying

UNIT I	**18**
Introduction to convex sets - Mathematical Formulation of LPP - Graphical Solution - Simplex Method – Big M Method - Two Phase Method.	
UNIT II	**18**
Duality in Linear Programming: Formulation of Primal - Dual Pairs - Duality and Simplex Method - Dual Simplex Method	
UNIT III	**18**
Transportation Problems: Mathematical formulation of the problem - finding initial basic feasible solution using North West Corner Rule and Vogel's approximation method - Moving towards Optimality - Unbalanced Transportation Problems. Assignment Problems: Mathematical formulation of Assignment Problems - Assignment algorithm – Routing Problems.	
UNIT IV	**18**
Sequencing Problems: Problems with 'n' jobs and 'k' machines - Problems with 'n' jobs and 2 machines- Problems with 2 jobs and k machines - Problems with 2 jobs and 3 machines.	
UNIT V :	**18**
Game Theory: Two persons Zero sum games - maximin and minimax principle - Games without saddle points - Mixed strategies - Graphical method - Dominance property.	

LECTURE	**TUTORIAL**	**TOTAL**
60	**30**	**90**

TEXT BOOK

1. KantiSwarup, P. K. Gupta& Man Mohan, "Operations Research", Sultan Chand& Sons, New Delhi, Twelfth Revised Edition, 2005.

Unit 1: chapter 2: 2.1, 2.2, chapter 3: 3.2, chapter 4; 4.1, 4.4.

Unit 2: chapter 5: 5.2, 5.3, 5.7, 5.9.

Unit 3: Chapter 10: 10.2, 10.9, 10.14, Chapter 11: 11.2, 11.3.

Unit 4: Chapter 12: 12.1 – 12.6.

Unit 5: Chapter 17: 17.1 – 17.7.

REFERENCES
1. P. K. Gupta & D. S. Hira, "Operations Research", S. Chand &Company Ltd., New Delhi, 2002. 2. J. K. Sharma, "Operations Research theory and its applications", 2nd Edition, Macmillan, New Delhi, 2006. 3. R. Panneerselvam, "Operations Research", Prentice Hall of India Pvt. Ltd., New Delhi, 2002.

COURSE CODE			**COURSE NAME**	**L**	**T**	**P**	**C**
XMT603B			**Stochastic Processes**	**4**	**2**	**0**	**6**
C	**P**	**A**					
6	**0**	**0**		**L**	**T**	**P**	**H**
				4	**2**	**0**	**6**

PREREQUISITE: Probability and Statistics

COURSE OUTCOMES:

Course outcomes:	**Domain**	**Level**
CO1: Find and Solve Generating function, Laplace transforms, Laplace transforms of a probability distribution function,- Difference equations, Differential difference equations .	Cognitive	Remembering Understanding
CO2: Define and Explain with Examples Stochastic Process, Notion, Specification, Stationary Process, Markov Chains, and Higher transition probabilities.	Cognitive	Remembering Understanding
CO3: Define and Explain Classification of states and chains, Determination of higher transition probabilities, Stability of Markov system, and Limiting behaviour.	Cognitive	Remembering Understanding
CO4: Define and Explain Poisson Process and related distributions,	Cognitive	Remembering

Generalization of Poisson Process, Birth and death process.		Understanding
CO5: Define and Explain Stochastic Process in queuing and reliability, queuing systems, M/M/1 models, Birth and death process in queuing theory, Multi channel models and Bulk Queues.	Cognitive	Remembering Understanding

UNIT I	**18**
Generating function - Laplace transforms – Laplace transforms of a probability distribution function - Difference equations Differential difference equations – Matrix analysis.	
UNIT II	**18**
Stochastic Process - Notion – Specification – Stationary Process - Markov Chains – Definition and examples – Higher transition probabilities.	
UNIT III	**18**
Classification of states and chains – Determination of higher transition probabilities – Stability of Markov system – Limiting behaviour.	
UNIT IV	**18**
Poisson Process and related distributions – Generalization of Poisson Process – Birth and death process.	
UNIT V :	**18**
Stochastic Process in queuing and reliability – queuing systems – M/M/1 models – Birth and death process in queuing theory – Multi channel models – Bulk Queues.	

LECTURE	**TUTORIAL**	**TOTAL**
60	**30**	**90**

TEXT BOOK

1. J.Medhi, "Stochastic Processes", 3rd Ed. New age, International, 2009.

Chapters 1,2,3 (Omitting 3.6,3.7,3.8), Chapter (Omitting 4.5 and 4.6) and Chapter 10

(Omitting 10.6, 10.7). Unit 1: Chapter 1 – Sec 1.1, 1.2, 1.3, Appendix A 1, 2, 3, 4. Unit 2:

Chapter 2 – Sec 2.1, 2.2, 2.3 &

Chapter 3 – Sec 3.1, 3.2. Unit 3: Chapter 3 – Sec 3.4, 3.5, 3.6. Unit 4: Chapter 4 – Sec 4.1,

4.2, 4.3, 4.4 Unit 5: Chapter 10 – Sec 10.1, 10.2, 10.3, 10.4, 10.5

REFERENCES

1. Samuel Karlin, "First Course in Stochastic Processes" 2nd Edition, Elsevier, 2012.
2. Srinivasan and Metha, "Stochastic Processes" TATA McGraw Hill, 1978.
3. U.Narayan, "Elements of Applied Stochastic Processes" A.John wiley & Sons, 2002. .

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