

**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	Sub. Code	Name of the Course	L	T	P	SS	H	C
CC-3 (DSC3A)	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
AECC1	XGE105	Study Skills	1	0	2	4	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	-	3	-
		TOTAL	14	5	0	4	26	17

SEMESTER II

Type	Sub. Code	Name of the Course	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	-	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 1 Lab	XMT206	Fundamental Physics(Practical -1)	0	0	3	-	3	2
		TOTAL	19	6	5	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*	2	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	1	2	0	3	2
UMAN 2	XUM306	Disaster Management	0	0	0	3*	0	0
Minor Course * Extra Credit		Office Automation (15 hours)	0	0	0	0	0	1*
Total			16	4	2	5*	22	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	XPH604	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

Semester I

Subject Name		Classical Algebra		
Subject Code		XMT101		
L –T –P –C 3 - 1 – 0 - 4		C:P:A 4:0:0	L –T –P –H 3 - 2 – 0 - 5	
Course Outcome:			Domain/Level C or P or A	
CO1	Define set, the axioms of set theory and to construct arbitrary Cartesian product of sets.		C(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.		C (Remembering Understanding Applying)	
CO3	Explain Binomial theorem for any rational index and to find Exponential and Logarithmic Series.		C (Remembering Understanding)	
CO4	Explain Summations of series by difference series, Successive difference series and Recurring series.		C (Remembering& Applying	
CO5	Explain Number theory, Euler’s functions Divisibility and Congruence relations and to state and apply Fermat’s theorem and Wilson’s theorem.		C (Remembering Applying	
COURSE CONTENT				
UNIT I				15 hrs
	Concept of a set- Finite and Infinite set – Axiom of extension – Set Algebra – Cartesian Product of sets.			
UNIT II				15 hrs
	Relations and their types – Functions and their types-Countable and Uncountable sets.			
UNIT III				15 hrs
	Binomial theorem for any rational index - Exponential and Logarithmic Series.			
UNIT IV				15 hrs
	Summations of series – summation by difference series – Successive difference series-			

	Recurring series.	
UNIT V		15 hrs
	Number Theory: Prime Numbers and Composite Numbers - Euler's function - Divisibility and Congruence relations - Fermat's theorem - Wilson's theorem.	
	L=45 hrs T=30 hrs Total = 75 hrs	
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		
1. www.nptel.ac.in		

Course Code	XMT102	L	T	P	C
Course Name	mwptpay; jkpo;	3	0	0	3
Prerequisite		L	T	P	H
C:P:A	3:0:0	3	0	0	3
COURSE OUTCOMES		DOMAIN		LEVEL	
After the completion of the course, students will be able to					
CO1	Recognize(milahsk; fhZjy;)gy;NtWmwptpay; Jiwruh;e;jEl;gq;fs;>fiyr; nrhy;yhf;fcj;jpfs; Nghd;wtw;iwj; jkpo;nkhop %yk; mwpe;Jnfhs;sy;.	Cognitive		Remember	
CO2	Choose (njupTnra;jy;)tlknhopNtu;r;nrhw;fs;>Gtpapay;>epytpay; gw;wpg; goe;jkpo; ,yf;fpaq;fs; %yk; mwpe;Jnfhs;sy;.	Cognitive		Remember	
CO3	Describe(tpsf;Fjy;)njhy;fhg;gpak; %yk; mwptpay; nra;jpfisczu;jy;.	Cognitive		Understand	
CO4	Apply (gad;gLj;Jjy;)gy;NtWfy;tpj;Jiwruh;e;jgpupTfs;>gy;NtWfy;tpj;	Cognitive		Apply	

	Jiwrhu;e;jgpupTfs; Fwpj;JnjspTngwy;.		
CO5	Analyze(gFj;jy;) mwptpay; rpWfijfspd; Njhw;wk; kw;Wk; tsu;r;rpepiyehlfq;fspd; gq;FFwpj;JnjspTngWjy;.	Cognitive	Analyze
myF– 1	mwptpay;jkpo; mwpKfk;		9
mwptpay;jkpo; - nghwpapay;>njhopy;El;gk;>kUj;Jtk;>cotpay;. jkpopy; mwptpay; - jkpopy; El;gk;. gilg;Gg; gzp– nrhy;yhf;fcj;jpfs; - El;gkhdNtWghLfisczu;e;Jnrhy;yhf;fk; nra;jy; - fiyr;nrhw;fs; - ,e;jpankhopfSf;Fg; nghJthdfiyr; nrhw;fiscUthf;Fjy; - tlkhopNtu;r;nrhw;fiskpFjpahff; nfhz;bUj;jiyg; gad;gLj;Jjy;.			
myF– 2	gpwmwptpay; Jiwfs;		9
Gtpapay;>epytpay; gw;wpgoe;jkpo; ,yf;fpak; Fwpg;gpLk; jfty;fs; - njhy;fhg;gpak; Fwpg;gpLk capupay;>kz;zpay; gw;wpambg;gilr; nra;jpfs; - jkpo; kUj;Jtf; fy;tp - mwptpay; jkpOf;F ,jopay; cj;jpfs - tsu; jkpo;.			
myF– 3	gy;NtWfiyfsy; mwptpay;		9
nkhopapay; fy;tp– fl;llf; fiyf;fy;tp– rKjhaf;fy;tp– Nra;ikf;fy;tp– kz;zpay;>Gtpapay;>fzf;fpay; Mfpait ,ize;jfy;tp - ,f;fhyf; fy;tpg; nghJepiy– fiy>mwptpay; - vd;gtw;wpd; tpsf;fq;fs;.			
myF– 4	mwptpay; jkpopy; rpWfijfspd; gq;F		9
rpWfij -,yf;fzk; cUthf;Fk; cj;jpfs; - rpwe;jrpWfijfs; - rpWfij tiffs; - ey;yrpWfijcUthf;fk; - tuyhW– r%fk; - nkhopngau;g;Gkw;Wk; mwptpay; rpWfijfs;.			
myF– 5	mwptpay; jkpopy; ehlfq;fspd; gq;F		9
ehlfk; - ehlf ,yf;fzk;> ,Utifehlq;fs; - gbg;gjw;Fupaehlfk; - ebg;gjw;Fupaehlfk; - rupj;jpuehlq; >r%fehlq; - eifr;Ritehlq;fs; - mnkr;#u; ehlfq;fs; - njhopy;Kiwehlq;fs;.			
LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	---	---	45
Nkw;ghu;itEhy;fs;:			
1. mwptpay; jkpo; - lhf;lu; th.nr. Foe;ijr;rhkp 2. tsu; jkpo; - ,jo;fs; 3. ,yf;fpatuyhW– rpWfijgw;wpaJ 4. ,yf;fpatuyhW– Gjpdk; gw;wpaJ			

COURSE CODE	XMT103	L	T	P	C
COURSE NAME	FUNDAMENTAL PHYSICS	3	1	0	4
C:P:A	4:0:0	L	T	P	H
PREREQUISITE:		3	1	0	4
CO1	Recall and Explain the basic principle simple harmonic motion and circular motion	Cognitive		Remember , Understand, Analyze	

CO2	Understand the properties of sound, reverberation time and methods of production of ultrasonic waves.	Cognitive	Remember , Analyze
CO3	Understand and determine Young's modulus, rigidity modulus, viscosity and explain surface tension and excess pressure inside a drop.	Cognitive	Analyze , Understand, Application
CO4	Recall the basic concepts and basic laws of thermal physics and determine the thermal conductivity of a bad conductor and solar constant.	Cognitive	Remember , Analyze, Application
CO5	Acquire knowledge on interference, diffraction; be able to determine wavelength of mercury source; understand LASER action and production; propagation of fibre optics.	Cognitive	Understand, evaluation
UNIT I Simple Harmonic Motion and Circular Motion			9+3
Time period - Amplitude - Phase - Spring mass system - Simple pendulum - Composition of two simple harmonic motions along a straight line and at right angles - Lissajous figures - Damping force - Damped harmonic oscillator - Uniform circular motion - Acceleration of a particle in a circle - Centripetal and centrifugal forces - Banking on curved tracks - Motion of a bicycle and a car around a circle.			
UNIT II Sound Uniform circular motion			9+3
Classification of sound - Characteristics of musical sound - Loudness - Weber Fechner law - Decibel - Absorption co-efficient - Reverberation - Reverberation time - Ultrasonic waves - Properties - Production : Magnetostriction and Piezo-electric method and uses.			
UNIT III Properties of Matter			9+3
Elasticity - Elastic constants - Bending of beams - Young's modulus by non-uniform bending - Torsion in a wire - Determination of rigidity modulus of torsional pendulum - Viscosity - Coefficient of viscosity by Poiseuille's method - Stoke's law - Terminal velocity - Surface Tension - Molecular theory of surface tension - Excess pressure inside a drop and bubble - Surface tension by drop weight method.			
UNIT IV Thermal Physics			9+3
Kinetic theory of gases - Basic postulates - Ideal gas equation - Vanderwaal's equation of states - Laws of thermodynamics - Entropy - Change of entropy in reversible and irreversible processes - Lee's disc method for conductivity of bad conductor - Stefan's law of radiation - Solar Constant - temperature of the sun.			
UNIT V Optics			9+3
Interference in thin films - Air wedge - Diffraction - Theory of plane transmission grating			

(normal incidence only) - LASER - Population inversion - Pumping - Laser action - Nd-YAG laser - CO ₂ laser - Fibre optics - Principle and propagation of light in optic fibres - Numerical aperture and acceptance angle.			
	LECTURE	TUTORIAL	TOTAL
	45	15	60
TEXT BOOKS			
1. A Sundaravelusamy, “ Allied Physics I”, Priya Publications, 2009.			
2. R. Murugesan, I B.Sc. “Ancillary Physics”, S. Chand & Co., 2010.			
REFERENCES			
1. Saigal. S, “Sound”, Chand & Co., Delhi,1990			
2. Brijlal and Subramanian, “Elements of properties of matter”, S. Chand Limited, 1974.			
3. Brijlal and Subramanian, “Heat and Thermodynamics”, S. Chand Limited,2008			
4. Brijlal and Subramanian, “Optics”, S. Chand Limited,2012.			

COURSE CODE			COURSE NAME	L	T	P	C
XMT104			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, $\sin nx$, $\cos nx$, $\tan nx$ - Expansion of $\sin^n x$ and $\cos^n x$ in terms of $\sin x$ and $\cos x$ - 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. Manickavasagam Pillai, "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. Manickavasagam Pillai, "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 NAME	STUDY SKILLS	
COURSE CODE	XGE105	
L –T –P –C 1 - 0 – 0 - 1	C:P:A 0.6:0.2:0.2	L –T –P –SS- H 1 - 0 – 0 – 2- 3
Course Outcome:	Domain/Level C or P or A	
Identify different strategies of reading and writing skills.	C(Remember)	
Revise the library skills in their learning process.	A(Internalizing Values)	
Apply different techniques to various types of material such as a	C(Apply)	

novel, newspaper, poem, drama and other reading papers.	
Use visual aids to support verbal matters into language discourse.	C(Understanding)
Prepare to face the written exam with confidence and without any fear or tension.	P(Guided Response)
COURSE CONTENT	
INTRODUCTION TO STUDY SKILLS	9 hrs
Learning Skills and Strategies of Learning - Cognitive Study skills and physical study skills, Library skills (How to use Library), familiarization of library facilities by the librarian - familiarization of basic cataloguing techniques, how to ransack the library etc.	
REFERENCE SKILLS	9 hrs
How to use the library facilities for research and to write assignments - how to find out reference books, articles, journals and other e- learning materials - how to use a dictionary and thesaurus.	
READING RELATED STUDY SKILLS	9 hrs
Process of reading, various types of reading materials and varied reading techniques - familiarization to materials written by various authors - features of scientific writing and familiarization to scientific writing by renowned authors - note making skills.	
WRITING RELATED STUDY SKILLS	9 hrs
Process of writing - characteristics of writing - discourse analysis - use of visual aids, and note making and note taking skills.	
EXAM PREPARATION SKILLS	9 hrs
Anxiety reduction skills - familiarization with various types of exam / evaluation techniques etc	
L=15hrs ; T=0 hrs ; SS = 30hrs ; Total = 45 hrs	
TEXT BOOKS	
1. Narayanaswamy,"Strengthen Your Writing",Orient Longman, New Delhi, 2006 2. Sasikumar, "Writing with A Purpose", Champa Tickoo, Oxford University Press.2009 3. Freeman, Sarah," <i>Study Strategies</i> ",New Delhi: Oxford University Press, New	

Delhi 1979.

4. Peter Viney,"*Streamline English: Destinations*", Oxford University Press, 1992.

REFERENCES

1. Susan Fawcett, "Evergreen: A Guide to Writing with Readings" Paperback – 2013
2. Raymond Murphy,"English. Grammar in Use *A reference and practice book for Intermediate*", Third Edition, OUP, New Delhi, 2010
3. Kiranmai Dutt and Geetha Rajeevan,"*A Course in Listening and Speaking I & II*", New Delhi: Foundation Books, Cambridge House, 2006.
4. David Bolton, "English Grammar in Steps", Richmond Publishing, New Delhi,2000

COURSE CODE	XUM106	L	T	P		C
COURSE NAME	Human Ethics, Values, Rights and Gender Equality	1	0	0		1
PREREQUISITES	Not Required	L	T	P	SS	H
C:P:A	1:0:0.0	1	0	0	2	3

COURSE OUTCOMES		Domain	Level
CO1	Relate and Interpret the human ethics and human relationships	Cognitive	Remember, Understand
CO2	Explain and Apply gender issues, equality and violence against women	Cognitive	Understand, Apply
CO3	Classify and Develop the identify of women issues and challenges	Cognitive & Affective	Analyze Receive
CO4	Classify and Dissect human rights and report on violations.	Cognitive	Understand, Analyze
CO5	List and respond to family values, universal brotherhood, fight against corruption by common man and good governance.	Cognitive & Affective	Remember, Respond

UNIT I	HUMAN ETHICS AND VALUES	7
HUMAN ETHICS AND VALUES Human Ethics and values - Understanding of oneself and others- motives and needs- Social service, Social Justice, Dignity and worth, Harmony in human relationship: Family and Society, Integrity and Competence, Caring and Sharing, Honesty and Courage, WHO's holistic development - Valuing Time, Co-operation, Commitment, Sympathy and Empathy, Self respect, Self-Confidence, character building and Personality.		
UNIT II	GENDER EQUALITY	9
Gender Equality - Gender Vs Sex, Concepts, definition, Gender equity, equality, and empowerment. Status of Women in India Social, Economical, Education, Health, Employment, HDI, GDI, GEM. Contributions of Dr.B.R. Ambethkar, Thanthai Periyar and Phule to Women Empowerment.		
UNIT III	WOMEN ISSUES AND CHALLENGES	9
Women Issues and Challenges- Female Infanticide, Female feticide, Violence against women, Domestic violence, Sexual Harassment, Trafficking, Access to education, Marriage. Remedial Measures – Acts related to women: Political Right, Property Rights, and Rights to Education, Medical Termination of Pregnancy Act, and Dowry Prohibition Act.		
UNIT IV	HUMAN RIGHTS	9
Human Rights Movement in India – The preamble to the Constitution of India, Human Rights and Duties, Universal Declaration of Human Rights (UDHR), Civil, Political, Economical, Social and Cultural Rights, Rights against torture, Discrimination and forced Labour, Rights and protection of children and elderly. National Human Rights Commission and other statutory Commissions, Creation of Human Rights Literacy and Awareness. -		

Intellectual Property Rights (IPR). National Policy on occupational safety, occupational health and working environment.

UNIT V	GOOD GOVERNANCE AND ADDRESSING SOCIAL ISSUES	11
---------------	---	-----------

Good Governance - Democracy, People's Participation, Transparency in governance and audit, Corruption, Impact of corruption on society, whom to make corruption complaints, fight against corruption and related issues, Fairness in criminal justice administration, Government system of Redressal. Creation of People friendly environment and universal brotherhood.

	LECTURE	SELF STUDY	TOTAL
	15	30	45

References

1. Aftab A, (Ed.), "Human Rights in India: Issues and Challenges", (New Delhi: Raj Publications, 2012).
2. Bajwa, G.S. and Bajwa, D.K. "Human Rights in India: Implementation and Violations" (New Delhi: D.K. Publications, 1996).
3. Chatrath, K. J. S., (ed.), "Education for Human Rights and Democracy" (Shimala: Indian Institute of Advanced Studies, 1998).
4. Jagadeesan. P., "Marriage and Social legislations in Tamil Nadu", Chennai: Elachiapen Publications, 1990).
5. Kaushal, Rachna, "Women and Human Rights in India" (New Delhi: Kaveri Books, 2000)
6. Mani. V. S., "Human Rights in India: An Overview" (New Delhi: Institute for the World Congress on Human Rights, 1998).
7. Singh, B. P. Sehgal, (ed) "Human Rights in India: Problems and Perspectives" (New Delhi: Deep and Deep, 1999).
8. Veeramani, K. (ed) Periyar on Women Right, (Chennai: Emerald Publishers, 1996)
9. Veeramani, K. (ed) Periyar Feminism, (Periyar Maniammai University, Vallam, Thanjavur: 2010).
11. Planning Commission report on Occupational Health and Safety
http://planningcommission.nic.in/aboutus/committee/wrkgrp12/wg_occup_safety.p
11. Central Vigilance Commission (Gov. of India) website: <http://cvc.nic.in/welcome.html>.
12. Weblink of Transparency International: <https://www.transparency.org/>
13. Weblink Status report: <https://www.hrw.org/world-report/2015/country-chapters/india>

Semester II

Course Name		SPEECH AND BUSINESS COMMUNICATION	
Course Code		XGE201	
L –T –P –C 3 – 0 – 0- 3		C:P:A	L –T –P-H 3-0-0-3
Course Outcome			Domain C or P or A
CO1	Define and describe how to make effective speeches academically and in social situations.		C(Remember)
CO2	Identify the forms of language used in different speeches and how to listen actively and critically.		C(Understand)
CO3	Ability to incorporate the modern style of writing in Business Communication		C(Create)
CO4	Produce the proper tone of language required in writing business communication		C(Understand)
CO5	Apply discourse features in business communication, propriety and exactness in language.		C(Understand)

COURSE CONTENT

UNIT I	PUBLIC SPEAKING	9 hrs
	Introduction to public speaking; functions of oral communication; skills and competencies needed for successful speech making; importance of public speaking skills in everyday life and in the field of business, social, private, and all other places of group work	
UNIT II	TYPES OF SPEECHES	9 hrs
	Various types of Speeches: manuscript, impromptu, memorized and extemporaneous speeches; analyzing the audience and occasion; Developing ideas; finding and using supporting materials; Developing speech out line; Organization of Speech; introduction, development and conclusion; language used in various types of speeches; Adapting the speech structures to the Audience; paralinguistic features:	

	tone, accent, rhythm, pause and volume etc	
UNIT III	BUSINESS COMMUNICATION	9 hrs
	Introduction to business communication; modern developments in the style of writing letters, memos and reports: block letters, semi block letters, full block letters, simplified letters etc.	
UNIT IV	WRITING SKILLS	9 hrs
	The language/tone used in memos/minutes/telephone memos/ letters/assignments; art of writing E-mail etc.	
UNIT V	GRAMMAR USAGE & REPORT WRITING	9 hrs
	The use of language: active and passive voice; the use of structures; discourse features, propriety, accuracy , exactness, & other elements of language used in these writings; the format of various types of Reports/ projects etc.	
L - 45 T-0 Total - 45 hrs		
TEXT BOOKS		
1. Narayanaswamy V.R.,”Strengthen Your Writing”, Orient Longman, NewDelhi, 1992 2. Ghosh, R N;” A Course in written English”, Oxford Press, New Delhi, 2000S 3. Jaya Sasikumar and Champa Tickoo,”Writing With A Purpose”, Oxford University Press , Paper Back 1995 4. Freeman, Sarah: “Study Strategies:, New Delhi: Oxford University Press, 1979. 13. 5. Paul Gunashekar M.L. Tickoo, “Reading for Meaning”, Ltd. Sultan Chand &Company, 2000		

Course Name	ENVIRONMENTAL STUDIES		
Course Code	XES202		
L –T –P –C 2 - 1 – 0– 2	C:P:A	L –T –P –H 2 - 1 – 0- 3	
Course Outcome			Domain

		C or P or A
CO1	Describe the significance of natural resources and explain anthropogenic impacts.	C(Remember, Understand)
CO2	Illustrate the significance of ecosystem, biodiversity and natural geo bio chemical cycles for maintaining ecological balance.	C(Understand)
CO3	Identify the facts, consequences, preventive measures of major pollutions and recognize the disaster phenomenon	C(Remember) A(Receiving)
CO4	Explain the socio-economic, policy dynamics and practice the control measures of global issues for sustainable development	C(Understand, Analyse)
CO5	Recognize the impact of population and the concept of various welfare programs, and apply the modern technology towards environmental protection	C(Understand, Apply)
COURSE CONTENT		
UNIT I	INTRODUCTION TO ENVIRONMENTAL STUDIES AND ENERGY	12hrs
	Definition, scope and importance – Need for public awareness – Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people – Water resources: Use and over-utilization of surface and ground water, flood, drought, conflicts over water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies – Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification – Role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles.	

UNIT II	ECOSYSTEMS AND BIODIVERSITY	7 hrs
	<p>Concept of an ecosystem – Structure and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological succession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the (a) Forest ecosystem (b) Grassland ecosystem (c) Desert ecosystem (d) Aquatic ecosystem (ponds, streams, lakes, rivers, oceans, estuaries) – Introduction to Biodiversity – Definition: genetic, species and ecosystem diversity - Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity</p>	
UNIT III	ENVIRONMENTAL POLLUTION	10 hrs
	<p>Definition – Causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards – Solid waste management: Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution – Pollution case studies – Disaster management: flood, earthquake, cyclone and landslide.</p>	
UNIT IV	SOCIAL ISSUES AND THE ENVIRONMENT	10 hrs
	<p>Urban problems related to energy – Water conservation, rain water harvesting, watershed management – Resettlement and rehabilitation of people; its problems and concerns, climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, Wasteland reclamation – Consumerism and waste products – Environment Protection Act – Air (Prevention and Control of Pollution) Act – Water (Prevention and control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.</p>	
UNIT V	HUMAN POPULATION AND THE ENVIRONMENT	6 hrs
	<p>Population growth, variation among nations – Population explosion – Family welfare programme – Environment and human health – Human rights – Value education - HIV / AIDS – Women and Child welfare programme– Role of Information Technology in Environment and human health – Case studies.</p>	

LECTURE	TUTORIAL	PRACTICAL	TOTAL
30	15	-	45
TEXT BOOKS			
<ol style="list-style-type: none"> 1. Miller T.G. Jr., “Environmental Science”, Wadsworth Publishing Co, USA, 2000. 2. Townsend C., Harper J and Michael Begon,”Essentials of Ecology”, Blackwell Science, UK, 2003 3. Trivedi R.K and P.K.Goel, “Introduction to Air pollution”, Techno Science Publications, India, 2003. 4. “Disaster mitigation, Preparedness, Recovery and Response”, SBS Publishers & Distributors Pvt. Ltd, New Delhi, 2006. 5. Butterworth Heinemann, “Introduction to International disaster management”,2006. 6. Gilbert M.Masters, “Introduction to Environmental Engineering and Science”, Pearson Education Pvt., Ltd., Second Edition, New Delhi, 2004. 			
REFERENCES			
<ol style="list-style-type: none"> 1. Trivedi R.K., “Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards:, Vol. I and II, Enviro Media, India, 2009. 2. Cunningham, W.P.Cooper, T.H.Gorhani, “Environmental Encyclopedia”, Jaico Publ., House, Mumbai, 2001. 3. S.K.Dhameja, “Environmental Engineering and Management”, S.K.Kataria and Sons, New Delhi, 2012. 4. Sahni, “Disaster Risk Reduction in South Asia”, PHI Learning, New Delhi, 2003. 5. Sundar, “Disaster Management”, Sarup & Sons, New Delhi, 2007. 6. G.K.Ghosh, “Disaster Management”, A.P.H.Publishers, New Delhi, 2006. 			
E-REFERENCES			
<ol style="list-style-type: none"> 1. http://www.e-booksdirectory.com/details.php?ebook=10526 2. https://www.free-ebooks.net/ebook/Introduction-to-Environmental-Science 3. https://www.free-ebooks.net/ebook/What-is-Biodiversity 4. https://www.learner.org/courses/envsci/unit/unit_vis.php?unit=4 5. http://bookboon.com/en/pollution-prevention-and-control-ebook 			

Course Name		MODERN PHYSICS	
Course Code		XMT203	
L –T –P –C 3- 1– 0– 4		C:P:A 2.8:0.4:0.8	L –T –P –H 3– 1 – 0 – 4
Course Outcome			Domain/Level C or P or A
CO1	Define, explain Atom models and demonstrate Franck and Hertz method; discuss the phenomenon of Excitation and ionization potentials.		C(Remember, Understand) P(Mechanism)
CO2	Acquire solid knowledge of crystal Analyze number of atoms,atomic radius coordination number in crystal structure and determine d spacing in cubic lattice using Miller indices.		C(Analyze, Apply)
CO3	Understand elementary particle, explain radioactive decay and fission, fusion.		C(Understand) A(Receive)
CO4	Identify the basics of electric field, magneticfield, explain Ampere’s circuital law and Faraday’s law.		C(Remember)
CO5	Understand the fundamental phenomena in electronics and describe the working principle and application of IC’s.		C(Understand) A(Receive)
COURSE CONTENT			
UNIT I	ATOMIC PHYSICS		7+3 hrs
	Atom models - Sommerfield and Vector atom models - Electron, spin quantum numbers - Pauli's exclusion principle - Excitation and ionization potentials - Experimental determination - Franck and Hertz method.		
UNIT II	CRYSTAL PHYSICS		8+3 hrs
	Lattice - Unit cell - Bravais lattice - Lattice planes - Miller indices - 'd' spacing in a cubic lattice - Calculation of number of atoms per unit cell - Atomic radius -		

	Coordination number - Packing factor for SC, BCC, FCC and HCP structures.	
UNIT III	NUCLEAR PHYSICS	10+3 hrs
	Nucleus - Nuclear size - Charge - Nuclear energy - Mass defect - Binding energy - Radioactivity - Alpha, Beta, Gamma radiation - Law of radioactive decay - Decay constant - Half life - Mean life - Fission and Fusion - Elementary particles and their classifications.	
UNIT IV	ELECTRICITY AND MAGNETISM	10+3 hrs
	Kirchoff's laws -Wheatstone network - Condition for bridge balance - potentiometer - internal resistance of a cell and thermo emf measurement - Magnetic field due to a current carrying conductor - Biot Savart's law - field along the axis of a coil - Force on a current carrying conductor in a magnetic field - Ampere's circuital law - Faraday's law - Maxwell equations in free space.	
UNIT V	ELECTRONICS	10+3 hrs
	Basic electronics - Junction diode - Voltage regulation - Zener diode - Junction transistor (PNP) - Digital electronics - AND, OR, NOT gates NAND and NOR universal gates – Boolean Algebra- De Morgan's theorem - verification - Elementary ideas of IC's.	
L - 45 T-15 Total - 60 hrs		
TEXT BOOKS		
1. Allied Physics I - A Sundaravelusamy, Priya Publications, 2009.		
2. I B.Sc. Ancillary Physics - R Murugesan, S. Chand & Co., 2010		
REFERENCES		
1. Introduction to Solid State Physics - C Kittel - 8 th edition, Wiley Eastern Ltd., 2005.		
2. Electricity and Magnetism - Narayanamoorthy and Nagarathinam		
3. Modern Physics by R Murugesan, S. Chand & Co., 2004		
4. Digital principles and their applications - Malvino and Leach, Tata Mc Graw Hill, 2010.		

Course Name		CALCULUS	
Course Code		XMT204	
L –T –P –C 4- 1– 0– 5		C:P:A 5:0:0	L –T –P –H 4 - 2– 0 – 6
Course Outcome			Domain C or P or A
CO1	Find the radius of curvature and centre of curvature, evolutes and to Apply Successive Differentiation and Leibnitz theorem		C(Remembering, Applying)
CO2	Explain Properties of definite integrals, Integration by parts, Reduction formulae and Bernoulli’s formula.		C(Understanding)
CO3	Evaluate double integral in both Cartesian and polar coordinates		C(Understanding, Applying)
CO4	Explain and evaluate Beta and Gamma integrals and their relations.		C(Understanding)
CO5	Find Jacobian, Change of variable in the case of two variables and three variables, - Transformation from Cartesian to polar coordinates.		C(Remembering)
COURSE CONTENT			
UNIT I			18 hrs
	Differential Calculus: Successive Differentiation - Leibnitz theorem and its applications - Curvature - Radius of Curvature and Centre of Curvature - Evolutes and Involute.		
UNIT II			18 hrs
	Integral Calculus: Properties of definite integrals - Integration by parts – Reduction formulae - Bernoulli’s formula.		
UNIT III			18 hrs
	Integration as limit of an infinite sum. Multiple Integrals: Definition of double integral- Evaluation of double integral - double integral in polar coordinates.		
UNIT IV			18hrs
	Triple integrals. Improper Integrals: Beta and Gamma integrals and their relations.		
UNIT V			18hrs

	Change of Variables: 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.
L =60 hrs T = 30 hrs Total = 90 hrs	
TEXT BOOKS	
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 Name		SEQUENCES AND SERIES	
Course Code		XMT205	
L –T –P –C		C:P:A	L –T –P –H
4- 1 – 0- 5		4:0.5:0.5	4 – 2 – 0- 6
Course Outcome			Domain C or P or A
CO1	Explain Bounded Sequences, Monotonic Sequences , Convergent Sequence , Divergent Sequences , Oscillating sequences	C(Understanding)	
CO2	Explain Behavior of Monotonic functions.	C(Understanding) P(Guided Response)	
CO3	Explain subsequences , limit points and Cauchy sequences	C(Understanding)	

CO4	Apply comparison test to infinite series to test the convergence and to Explain Cauchy's general principal of convergence.	C(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	C(Applying) A(Receiving)
COURSE CONTENT		
UNIT I	Sequences	18 hrs
	Bounded Sequences – Monotonic Sequences – Convergent Sequence – Divergent Sequences – Oscillating sequences	
UNIT II	Algebra of Limits	18 hrs
	Behavior of Monotonic functions.	
UNIT III	Some theorems on limits	18 hrs
	Subsequences – limit points : Cauchy sequences.	
UNIT IV	Series	18 hrs
	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	18 hrs
	Cauchy's root test – Alternating Series – Absolute Convergence (Statement only for all tests).	
LECTURE	TUTORIAL	TOTAL
60	30	90
TEXT BOOKS		
1.Dr. S.Arumugam & Mr.A.Thangapandi Isaac Sequences and Series – New Gamma Publishing House – 2002 Edition. 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.Prof. S.Surya Narayan Iyer, "Algebra", Margham publications, Chennai, 2002. 2. Prof. M.I.Francis Raj, "Algebra", Margham publications, Chennai, 2004.		

Course Name		FUNDAMENTAL PHYSICS (PRACTICAL - I)			
Course Code		XMT206			
Prerequisite					
L –T –P –C 0- 0 - 3- 2		C:P:A 0.4-1-0.6		L –T –P –H 0- 0- 3- 3	
Course Outcome:				Domain (C or P or A)	
CO1	Recall the usage of laboratory instruments and <i>measure</i> the Young’s modulus of Non – uniform pending			Cognitive Psychomotor	Understand Mechanism
CO2	Explain and demonstrate the behavior of rigidity modulus of a wire			Psychomotor Affective	Set Valuing
CO3	Manipulate <i>and measure</i> the thickness of a thin wire using Air wedge			Cognitive Psychomotor	Apply Mechanism
CO4	Compare and explain the Calibration of voltmeter			Affective Psychomotor	Organization Set
CO5	Describe the Band gap of the semiconductor			Psychomotor Affective	Perception Organization
List of Experiments					Hours
1	Non-uniform Bending - Pin and Microscope Method				3
2	Torsional pendulum - Determination of rigidity modulus of a wire				3
3	Co-efficient of viscosity of Liquid using graduated burette				3
4	Spectrometer - Refractive index of solid prism (A, D and μ)				3

5	Post Office Box - Determination of Band gap of a semi-conductor	3
6	Air wedge - determination of thickness of thin wire	3
7	Potentiometer - Calibration of voltmeter	3
8	LASER grating - Determination of wavelength of LASER and size of the micro-particle	3
9	Air wedge- Determination of thickness of thin wire	3
10	AND, OR, and NOT logic gates – verification of truth table	3
11	Potentiometer – Calibration of voltmeter or ammeter	3
12	Laser grating – determination of wave length of laser and size of the micro particle	3
13	Semi conductor of diode – forward and reverse bias characteristics	3
14	Meterbridge – Determination of resistance and specific resistance of a wire	3
TEXT BOOKS		
1. BSc Practical Physics, C. L. Arora, (S. Chand) 2. An Advanced Course in Practical Physics, D. Chattopadhyay and P. C. Rakshit, (New Central Book Agency) 3. A Text Book of Advanced Practical Physics, S. Ghosh, (New Central Book Agency) 7 Semester 1 - Physics (Honours) Theory Paper. 4. Shukla R. K. and Anchal Srivastava, Practical Physics, New Age International (P) Ltd, Publishers, 2006. 5. Arora C. L., B.Sc Practical Physics, S. Chand and Company Ltd, 2007.		
REFERENCES		
1. Squires G. L., Practical Physics, 4 th Edition, Cambridge University Press, 2001. 2. Halliday D., Resnick R. and Walker J., Fundamentals of Physics, 6th Edition, John Wiley and Sons, 2001. 3. Jenkins F.A. and White H.E., Fundamentals of Optics, 4th Edition, Mc Graw Hill Book.		

Semester III

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								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								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.

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						Cognitive	Remembering Understanding		

functions, Mean value theorems, the fundamental theorem of Calculus and the first mean value theorem.		
UNIT I Real numbers:		15
The field axioms- Field properties-Order in R- Absolute value- Completeness – Representation of Real numbers on a straight line – 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. 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				Cognitive	Remembering		

between line and to explain angle between planes and distance of a plane from a point.		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 the 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
	60	15
TEXT BOOK		
1. Shanthi Narayanan and Mittal P.K,”Analytical Solid Geometry”” 16 th 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		Applying	
								Affective		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 Name	DISASTER MANAGEMENT	
Course Code	XUM306	
Prerequisite	NIL	L -T -P -C 3- 0 - 0- 0
C : P : A 2.64 : 0.24 :0.12		L -T - P- H 3 - 0 - 0 - 3
Course Outcome		Domain C or P or A
CO1	Understanding the concepts of application of types of disaster preparedness	C(Application)
CO2	Infer the end conditions & Discuss the failures due to disaster.	C(Analyze)
CO3	Understanding of importance of seismic waves occurring globally	C(Analyze)
CO4	Estimate Disaster and mitigation problems.	C(Application)
CO5	Keen knowledge on essentials of risk reduction	C(Application)
COURSE CONTENT		
UNIT I	INTRODUCTION	9 hrs
	Introduction – Disaster preparedness – Goals and objectives of ISDR Programme- Risk identification – Risk sharing – Disaster and development: Development plans and disaster management–Alternative to dominant approach – disaster – development linkages - Principle of risk partnership	
UNIT II	APPLICATION OF TECHNOLOGY IN DISASTER RISK REDUCTION	9 hrs
	Application of various technologies: Data bases – RDBMS – Management Information systems – Decision support system and other systems – Geographic information systems – Intranets and extranets – video conferencing. Trigger mechanism – Remote sensing-an insight – contribution of remote sensing and GIS - Case study.	
UNIT III	AWARENESS OF RISK REDUCTION	9 hrs
	Trigger mechanism – constitution of trigger mechanism – risk reduction by education – disaster information network – risk reduction by public awareness	
UNIT IV	DEVELOPMENT PLANNING ON DISASTER	9 hrs
	Implication of development planning – Financial arrangements – Areas of improvement – Disaster preparedness – Community based disaster management – Emergency response.	
UNIT V	SEISMICITY	9 hrs
	Seismic waves – Earthquakes and faults – measures of an earthquake, magnitude and intensity – ground damage – Tsunamis and earthquakes	
	L - 45 hrs Total-45 hrs	

TEXT BOOKS				
1. Siddhartha Gautam and K Leelakrishna Rao, “Disaster Management Programmes and Policies”, Vista International Pub House, 2012				
2. Arun Kumar, “Global Disaster Management”, SBS Publishers, 2008				
REFERENCES				
1. Encyclopaedia Of Disaster Management, Neha Publishers & Distributors, 2008				
2. Pardeep Sahni, Madhavi malalgoda and ariyabandu, “Disaster risk reduction in south asia”, PHI, 2002				
3. Amita sinvhal, “Understanding earthquake disasters” TMH, 2010.				
4. Pardeep Sahni, Alka Dhameja and Uma medury, “Disaster mitigation: Experiences and reflections”, PHI, 2000				

Semester IV

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		Understanding 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 column 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				L	T	P	H
5	0	0				4	1	0	5
PREREQUISITE:			Differential Calculus and Integral Calculus						
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	
						Psychomotor		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 Affective	Understanding Receiving
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		
				Psychomotor	Guided Response		
CO2: Explain Cyclic groups from number systems, complex roots of unity, circle group, the general linear group $GL_n(n, R)$, 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, Z_n the ring of integers modulo n, rings of matrices, polynomial rings, and rings of continuous functions.				Cognitive Affective	Remembering Understanding Receiving		
UNIT I							15
Definition and examples of groups, examples of abelian and non-abelian groups, the group Z_n 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 $GL_n(n, R)$, 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							
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, \mathbb{Z}_n 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: \mathbb{Z}_p , \mathbb{Q} , \mathbb{R} , and \mathbb{C} . Field of rational functions.			
	LECTURE	TUTORIAL	TOTAL
	60	15	75
TEXT BOOKS			
<ol style="list-style-type: none"> 1. S. Narayanan & T. K. Manickavasagam Pillai, "Algebra", Vol. 1, S. Viswanathan Pvt. Ltd., Chennai, 2004. 2. S. Narayanan & T. K. Manickavasagam Pillai, "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			
<ol style="list-style-type: none"> 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		L	T	P	H
2	0	0		0	0	2	4
PREREQUISITE: Nil							
COURSE OUTCOMES:							
Course Outcome				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		Understanding Applying	
CO3: Apply Matlab Scripts, Input and Output, scripts with input and output, user defined functions in				Cognitive		Applying	

simple applications.		
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

Semester V

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: 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
TEXTBOOK		
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
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				L	T	P	H
6	0	0				4	2	0	6
PREREQUISITE:			Differential Calculus and Integral Calculus						
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						Cognitive	Understanding		

rule, and Euler's method.		
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-Seidel 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
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:							
				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.		

Semester VI

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 $\cos x$, $\sin x$ - Applications and problems relating to residues.			
LECTURE	TUTORIAL		TOTAL
60	30		90
TEXT BOOK			
1. S. Narayanan & T.K. Manickavasagam Pillai, "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", 2nd Edition, Narosa Publication, New Delhi, 2005. 3. R. V. Churchill & J.W. Brown, "Complex variables and applications", 5th Edition, 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., 2 nd 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				Cognitive	Remembering Understanding		

system, and Limiting behaviour.		
CO4: Define and Explain Poisson Process and related distributions, Generalization of Poisson Process, Birth and death process.	Cognitive	Remembering 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”, 3 rd 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” 2 nd 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. .		

