CURRICULUM AND SYLLABUS FOR
B.Sc. (Mathematics) - BACHELOR OF SCIENCE
(THREE YEAR - FULL TIME)
REGULATION - 2018
(Applicable to the students admitted from the academic year 2018-2019 onwards)

SEMESTER I								
Type	**Course Code**	**Course Name**	**L**	**T**	**P**	**SS**	**H**	**C**
AECC 1	XGL101	Communication Skills in English	2	0	0	0	2	2
LAN	XGL102A/ XGL102B	Ariviyal Tamil /Comprehensive English	3	0	0	0	3	3
CC 1	XPG103	Fundamental Physics	3	1	0	0	4	4
CC 2 (DSC 2A)	XMT104	Foundation Course in Mathematics	4	1	0	0	5	5
CC 3 (DSC 3A)	XMT105	Differential Calculus & Integral Calculus	4	1	0	0	5	5
UMAN 1	XUM106	Human Ethics, Values, Rights and Gender Equality	2	0	0	1*	2	0
CC 1 lab	XPG107	Fundamental Physics Lab	0	1	2	0	3	2
		Total	**18**	**4**	**2**	**1***	**24**	**21**

SEMESTER II								
Type	**Course Code**	**Course Name**	**L**	**T**	**P**	**SS**	**H**	**C**
AECC 2	XGL201	English for Effective Communication	2	0	0	0	2	2
AECC 3	XES202	Environmental Studies	2	0	0	1	3	2
CC 4	XPG 203	Modern Physics	3	1	0	0	4	4
CC 5 (DSC 2B)	XMT204	Differential Equations & Laplace Transforms	4	1	0	0	5	5
CC 6 (DSC 3B)	XMT205	Sequences and Series	4	1	0	0	5	5
CC 4 Lab	XPG206	Modern Physics Lab	0	1	2	0	3	2
		Total	**15**	**4**	**2**	**1**	**22**	**20**

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

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

COURSE CODE	XGL101	L	T	P	SS	H	C
COURSE NAME	COMMUNICATION SKILLS IN ENGLISH	2	0	0	0	2	2
C:P:A - 3:0:0							

COURSE OUTCOMES:		Domain	Level
CO1	***Explain*** the process of communication and its types	Cognitive	Understanding
CO2	***Recall*** various sounds and use it in proper context	Cognitive	Remembering
CO3	***Organise*** meeting events and recording it constructively	Cognitive	Applying
CO4	***Adapt*** methods of framing questions and using punctuations	Cognitive	Creating
CO5	***Demonstrate*** the basic skills at the time of interview and presentations	Cognitive	Understanding

SYLLABUS		HOURS
UNIT I	**The Process of Communication**	
Communication- the process of communication - barriers of communication - different types of communication		9
UNIT II	**Phonetics**	
Pronunciation – Vowels – Consonants – Transcription of Words and Sentences		9
UNIT III	**Report Writing**	
Organizing successful meeting, One to one meeting, editing, criteria for successful meetings, memo, e mails		9
UNIT IV	**Grammar**	
Articles – Question Tag –Punctuation – Types of Sentences – Types of Questions, Cause and Effect.		9
UNIT V	**Presentation Skills**	
Presentation skills, Importance of body language in presentations, Verbal and Non Verbal communication		9
	Total Hours	**45**

Text books

1. Sanghita Sen. Communication and Language Skills.Cambridge Press, Chennai, 2015
2. Sumant. *Technical English.*Vijay Nicole Imprints, Chennai, 2011
3. Dorathy adams. Everyday English. Cengage Learning, New Delhi, 2009

Course Code	XGL102A	L	T	P	C
Course	mwptpay; jkpo;	3	0	0	3

Name					
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; Jiwrhu;e;jEl;gq;fs;>fiyr; nrhy;yhf;fcj;jpfs; Nghd;wtw;iwj; jkpo;nkhop %yk; mwpe;Jnfhs;sy;.	Cognitive	Remember
CO2	***Choose (njupTnra;jy;)***tlnkhopNtu;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;Jiwrhu;e;jgpupTfs;>gy;NtWfy;tpj; Jiwrhu;e;jgpupTfs; Fwpj;JnjspTngwy;.	Cognitive	Apply
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; - tlnkhopNtu;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;NtWfiyfspy; 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;> ,Utifehlfq;fs; - gbg;gjw;Fupaehlfk; - ebg;gjw;Fupaehlfk; - rupj;jpuehlfk;>r%fehlfk; - eifr;Ritehlfq;fs; - mnkr;#u; ehlfq;fs; - njhopy;Kiwehlfq;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	**XPG103**	**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 Poiseuelle'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**
XMT 104			**Foundation Course in Mathematics**	**4**	**1**	**0**	**5**
C	**P**	**A**		**L**	**T**	**P**	**H**
5	**0**	**0**		**4**	**1**	**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**
XMT 105			**Differential Calculus & Integral Calculus**	**4**	**1**	**0**	**5**
C	**P**	**A**		**L**	**T**	**P**	**H**
5	**0**	**0**		**4**	**1**	**0**	**5**

PREREQUISITE: Differentiation and Integration

COURSE OUTCOMES:

Course outcomes:	**Domain**	**Level**
CO1: Apply the basics of differentiation.	Cognitive	Remembering Applying

CO2: Find Evolutes in Cartesian Coordinates.	Cognitive	Understanding Applying
CO3: State Rolle's theorem, Mean Value theorems, Taylor's theorem with Lagrange's and Cauchy's forms of remainder, Taylor's series and to find Maxima and Minima.	Cognitive	Understanding Applying
CO4: Find the definite integrals using integration by parts and reduction formula.	Cognitive	Remembering Applying
CO5: Find integration by changing order of integration using double integrals.	Cognitive	Remembering Applying

UNIT I	**15**
Limit and Continuity (ε and δ definition), Types of discontinuities, Differentiability of functions, Successive differentiation, Leibnitz's theorem, Partial differentiation, Euler's theorem on homogeneous functions.	
UNIT II	**15**
Tangents and normals, Curvature, Asymptotes, Singular points, Tracing of curves. Parametric representation of curves and tracing of parametric curves, Polar coordinates.	
UNIT III	**15**
Rolle's theorem, Mean Value theorems, Taylor's theorem with Lagrange's and Cauchy's forms of remainder, Taylor's series(Statement only) Maclaurin's series of sin x, cos x, e^x, log(l+x), $(l+x)^m$, Maxima and Minima, Indeterminate forms.	
UNIT IV	**15**
Definite integrals - Integration by parts & reduction formula	
UNIT V	**15**
Double integrals – changing the order of Integration – Triple Integrals.	

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

Text Books

1.S.Narayanan and T.K.Manicavachagom Pillai, "Calculus Volume I", S.Viswanathan (Printers&Publishers) Pvt Limited, Chennai -2011.

2.S.Narayanan and T.K.Manicavachagom Pillai, "Calculus Volume II", S.Viswanathan (Printers & Publishers) Pvt Limited, Chennai – 2011.

UNIT IV: Chapter 1 section 11, 12 & 13

UNIT V: Chapter 5 section 2.1, 2.2 & 4

Reference

1.S.Arumugam and Isaac, "Calculus, Volume1", New Gamma Publishing House, 1991.

COURSE CODE	XUM 106	L	T	P		C
COURSE NAME	Human Ethics, Values, Rights and Gender Equality	3	0	0		0
PREREQUISITES	Not Required	L	T	P	SS	H
C:P:A	3:0:0.0	3	0	0	0	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 CODE	**XPG107**	**L**	**T**	**P**	**C**
COURSE NAME	**Fundamental Physics Lab**	**0**	**1**	**2**	**2**
C:P:A	**0.4:1:0.6**	**L**	**T**	**P**	**H**
PREREQUISITE: Nil		**0**	**1**	**2**	**3**

COURSE OUTCOMES		**Domain**	**Level**
CO1:	***Recall*** the ***usage*** of laboratory instruments and ***measure*** 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*** and ***measure*** 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	**4**
2	Torsional pendulum - Determination of rigidity modulus of a wire	**4**
3	Co-efficient of viscosity of Liquid using graduated burette	**4**
4	Spectrometer - Refractive index of solid prism (A, D and μ)	**4**
5	Post Office Box - Determination of Band gap of a semi-conductor	**4**
6	Air wedge - determination of thickness of thin wire	**4**
7	Potentiometer - Calibration of voltmeter	**4**
8	LASER grating - Determination of wavelength of LASER and size of the micro-particle	**4**

Text Books:

1. C. L. Arora, "BSc Practical Physics", S. Chand and Company Ltd, 2007.
2. D. Chattopadhyay and P. C. Rakshit, "An Advanced Course in Practical Physics", (New Central Book Agency), 2011.
3. S. Ghosh. A, "Text Book of Advanced Practical Physics", (New Central Book Agency) 7 Semester 1 - Physics (Honours) Theory Paper, 2008.
4. Shukla R. K. and Anchal Srivastava, "Practical Physics", New Age International (P) Ltd, Publishers, 2006.

Reference books :

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 Company, 2007.
4. Geeta Sanon, B. Sc., Practical Physics, 1st Edition, S. Chand and Company, 2007.
5. Benenson, Walter, and Horst Stocker, Handbook of Physics, Springer, 2002.

COURSE CODE	XGL201	L	T	P	SS	H	C
COURSE NAME	ENGLILSH FOR EFFECTIVE COMMUNICATION	2	0	0	0	2	2
C:P:A - 2:0:0							

COURSE OUTCOMES:		Domain	Level
CO1	***Explain*** the process of listening and its characteristics	Cognitive	Understanding
CO2	***Practicing*** the types of speeches	Cognitive	Apply
CO3	***Recognize*** the basic expressions and using it effectively	Cognitive	Understanding
CO4	***Construct*** the means of writing contents to media	Cognitive	Create
CO5	***Employing*** various techniques in preparing communication letters	Cognitive	Apply

SYLLABUS		HOURS
UNIT I	**LISTENING SKILLS**	
Academic Listening, Barriers to Listening, Listening to Announcements – News on Radio and Televisions – Casual Conversations		9
UNIT II	**TYPES OF SPEECH**	
Manuscript, Impromptu, Rememorized and Extemporaneous speeches		9
UNIT III	**COMMON EXPRESSIONS**	
Greeting and Introduction – Making Requests – Asking and Giving Permission – Offering Help – Giving Instructions		9
UNIT IV	**COMMUNICATION AND MEDIA**	
English for News Paper, Radio, TV, Film, Writing Stories, Drama		9
UNIT V	**CAREER SKILLS**	
Curriculum Vitae and Covering letters – facing an interview – Note taking and Note making		9
	Total Hours	**45**

Text books

1. Kiranmai Dutt,"A Course in Communication Skills", Foundation Books, Chennai. 2013
2. John Sealy,"Writing and Speaking", Oxford University Press, New Delhi, Third Edition 2009.

3.Sanjay Kumar, Pushp Lata, "Communication Skills", Oxford University Press, New Delhi

COURSE CODE	XES202	L	T	SS	P	C
COURSE NAME	ENVIRONMENTAL STUDIES	2	0	1	0	2
C:P:A	1.4: 0.3 : 0.3	L	T	SS	P	H
		2	0	1	0	3

COURSE OUTCOMES		DOMAIN	LEVEL
CO1	***Describe*** the significance of natural resources and ***explain*** anthropogenic impacts.	Cognitive	Remember Understand
CO2	***Illustrate*** the significance of ecosystem, biodiversity and natural geo bio chemical cycles for maintaining ecological balance.	Cognitive	Understand
CO3	***Identify*** the facts, consequences, preventive measures of major pollutions and ***recognize*** the disaster phenomenon	Cognitive Affective	Remember Receive
CO4	***Explain*** the socio-economic, policy dynamics and ***practice*** the control measures of global issues for sustainable development.	Cognitive	Understand Apply
CO5	***Recognize*** the impact of population and the concept of various welfare programs, and ***apply*** the modern technology towards environmental protection.	Cognitive	Understand Analysis

UNIT - I INTRODUCTION TO ENVIRONMENTAL STUDIES AND ENERGY **12**

Definition, scope and importance – Need for public awareness – Forest resources: Use and over-exploitation, deforestation, case studies – Water resources: Use and over-utilization of surface and ground water, conflicts over water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies – Energy resources: renewable and non-renewable energy sources – Land resources: Land as a resource, land degradation, 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**

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 – Introduction to Biodiversity – Definition: genetic, species and ecosystem diversity - Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT – III ENVIRONMENTAL POLLUTION **10**

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 – Role of an individual in prevention of pollution – Pollution case studies – Disaster management: flood, earthquake, cyclone and landslide.

UNIT –IV SOCIAL ISSUES AND THE ENVIRONMENT **10**

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.

UNIT –V HUMAN POPULATION AND THE ENVIRONMENT | **6**

Population growth, variation among nations – Population explosion– Environment and human health – HIV / AIDS– Role of Information Technology in Environment and human health. 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.

	LECTURE	TUTORIAL	PRACTICAL	SELF STUDY	TOTAL
HOURS	**30**	**0**	**0**	**15**	**45**

TEXT BOOKS

1. Miller T.G. Jr., "Environmental Science", Wadsworth Publishing Co, USA, 2000.
1. Townsend C., Harper J and Michael Begon, "Essentials of Ecology", Blackwell Science, UK, 2003
2. Trivedi R.K and P.K.Goel, "Introduction to Air pollution", Techno Science Publications, India, 2003.
3. Disaster mitigation, Preparedness, Recovery and Response, SBS Publishers & Distributors Pvt. Ltd, New Delhi, 2006.
4. Butterworth Heinemann, "Introduction to International disaster management", 2006.
5. Gilbert M.Masters, "Introduction to Environmental Engineering and Science", Pearson Education Pvt., Ltd., Second Edition, New Delhi, 2004.

REFERENCE BOOKS

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 RESOURCES

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
6. http://www.e-booksdirectory.com/details.php?ebook=8557
7. http://www.e-booksdirectory.com/details.php?ebook=6804
8. http://bookboon.com/en/atmospheric-pollution-ebook
9. http://www.e-booksdirectory.com/details.php?ebook=3749
10. http://www.e-booksdirectory.com/details.php?ebook=2604
11. http://www.e-booksdirectory.com/details.php?ebook=2116
12. http://www.e-booksdirectory.com/details.php?ebook=1026
13. http://www.faadooengineers.com/threads/7894-Environmental-Science

COURSE CODE	XPH203	L	T	P	C
COURSE NAME	MODERN PHYSICS	3	1	0	4
C:P:A	2.8:0.4:0.8	L	T	P	H
PREREQUISITE:	Basic Physics at School level	3	1	0	4

COURSE OUTCOMES *On the successful completion of the course, students will be able to*		DOMAIN	LEVEL
CO1	***Define, explain and demonstrate*** and ***Relate*** knowledge of the basics of digital computer.	Cognitive: Psychomotor:	Remember, Understand Mechanism
CO2	Acquire the knowledge of INTEL 8085; ***Analyze*** Immediate and implicit addressing and Instruction set	Cognitive:	Analyze, Apply
CO3	***Understand*** Fundamentals of assembly language programming	Cognitive: Affective:	Understand Receive
CO4	***Identify*** Structure of 'C', ***explain*** I/O function.	Cognitive:	Remember
CO5	***Understand*** the Data input and output and ***describe*** Basic functions and ***Compare*** automatic variables, External Variables, Static Variables.	Cognitive: Affective:	Understand Receive

UNIT - I **7+3**

Planck's quantum, Planck's constant and light as a collection of photons; Photoelectric effect and Compton scattering. De Broglie wavelength and matter waves; Davisson-Germer experiment. Problems with Rutherford model- instability of atoms and observation of discrete atomic spectra; Bohr's quantization rule and atomic stability.

UNIT –II **8 + 3**

Position measurement- gamma ray microscope thought experiment; Wave-particle duality, Heisenberg uncertainty principle- impossibility of a particle following a trajectory; Estimating minimum energy of a confined particle using uncertainty principle; Energy-time uncertainty principle.

UNIT – III **10 + 3**

One dimensional infinitely rigid box- energy eigenvalues and eigenfunctions, normalization; Quantum dot as an example; Quantum mechanical scattering and tunneling in one dimension - across a step potential and across a rectangular potential barrier.

UNIT –IV **10 + 3**

Size and structure of atomic nucleus and its relation with atomic weight; Impossibility of an electron being in nucleus as a consequence of the uncertainty principle. Nature of nuclear force, NZ graph, semi-empirical mass formula and binding energy

UNIT –V	**10 + 3**
Radioactivity: stability of nucleus; Law of radioactive decay; Mean life and half-life; -rayγ decay - energy released, spectrum and Pauli's prediction of neutrino; β decay; α emission.	

TEXT BOOKS

1. J.R.Taylor, C.D.Zafiratos, M.A.Dubson,"Concepts of Modern Physics", Arthur Beiser, 2009, McGraw-Hill Modern Physics, 2009, PHI Learning

REFERENCE BOOKS

1. Thomas A. Moore,Six," Ideas that Shaped Physics: Particle Behave like Waves", 2003,
2. E.H. Wichman, " Quantum Physics, Berkeley Physics",Vol.4. 2008, Tata McGraw- Hill Co.
3. R.A. Serway, C.J. Moses, and C.A.Moyer,"Modern Physics", 2005, Cengage Learning

E RESOURCES

NPTEL , Prof. M. K. Srivastava, Department of Physics, IIT, Roorkee.

	LECTURE	**TUTORIAL**	**PRACTICAL**	**TOTAL HOURS**
Hours	**45**	**15**	**-**	**60**

COURSE CODE			**COURSE NAME**	**L**	**T**	**P**	**C**
XMT204			**Differential Equations & Laplace Transforms**	**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: Solve simple problems related to first order, higher degree differential equations solvable for x, solvable for y, solvable for dy/dx, Clairauts form – Conditions of integrability of M dx + N dy = 0.	Cognitive	Applying
CO2: Solve second order linear differential equations with constant coefficients, variable coefficients, and solving the equation using method of Variation of Parameters.	Cognitive	Applying
CO3: Formation of Partial Differential Equation, **Solve** PDE of the standard forms using Lagrange's method ,Charpit's method and a few standard forms.	Cognitive	Applying
CO4: Solve PDE of second order homogeneous equation with constant coefficients, particular integrals of the forms e^{ax+by}, sin(ax+by), cos(ax+by), $x^r y^s$ and e^{ax+by}. f(x,y).	Cognitive	Applying

CO5: Find Laplace Transforms and inverse Laplace transform of function using standard formulae , Basic theorems & simple applications **Use** of Laplace Transforms in solving ODE with constant coefficients.	Cognitive	Remembering Applying

UNIT I	**15**
First order, higher degree differential equations solvable for x, solvable for y, solvable for dy/dx, Clairauts form – Conditions of integrability of M dx + N dy = 0 – simple problems.	
UNIT II	**15**
Particular integrals of second order differential equations with constant coefficients - Linear equations with variable coefficients – Method of Variation of Parameters (Second Order only)	
UNIT III	**15**
Formation of Partial Differential Equation – General, Particular & Complete integrals – Solution of PDE of the standard forms - Lagrange's method - Solving of Charpit's method and a few standard forms.	
UNIT IV	**15**
PDE of second order homogeneous equation with Constant coefficients – Particular integrals of the forms e^{ax+by}, Sin(ax+by), Cos(ax+by), $x^r y^s$ and e^{ax+by}. f(x,y).	
UNIT V	**15**
Laplace Transforms – Standard formulae – Basic theorems & simple applications – Inverse Laplace Transforms – Use of Laplace Transforms in solving ODE with constant coefficients.	

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

TEXT BOOKS

1. T.K.Manicavachagom Pillay & S.Narayanan, "Differential Equations", S.Viswanathan Publishers Pvt. Ltd., 1996.

2. Arumugam & Isaac, "Differential Equations", New Gamma Publishing House, Palayamkottai, 2003.

Unit : 1 Chapter IV – Sections 1,2 & 3, Chapter II – Section 6 [1]

Unit : 2 Chapter V – Sections 1,2,3,4 & 5, Chapter VIII – Section 4 [1]

Unit : 3 Chapter XII – Sections 1 – 6 [1]

Unit : 4 Chapter V [2]

Unit : 5 Chapter IX – Sections 1 – 8 [1]

REFERENCES

1. M.D.Raisinghania , "Ordinary and Partial Differential Equations", S.Chand & Co, 2016.

2. M.K. Venkatraman, "Engineering Mathematics", S.V. Publications, Revised Edition. 1985.

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	1	0	5

PREREQUISITE: Nil

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	**18**
Bounded Sequences – Monotonic Sequences – Convergent Sequence – Divergent Sequences – Oscillating sequences	
UNIT II Algebra of Limits	**18**
Behavior of Monotonic functions.	
UNIT III Some theorems on limits	**18**
subsequences – limit points : Cauchy sequences	
UNIT IV Series	**18**
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**
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.

E REFERENCES

www.nptel.ac.in

Elementary Numerical Analysis Prof. Rekha P. Kulkarni. Department of Mathematics, Indian Institute Of Technology, Bombay.

COURSE CODE	**XPG206**	**L**	**T**	**P**	**C**
COURSE NAME	**MODERN PHYSICS LAB**	**0**	**1**	**2**	**2**
C:P:A	**0.4:1:0.6**	**L**	**T**	**P**	**H**
PREREQUISITE: Nil		**0**	**1**	**2**	**2**

COURSE OUTCOMES		**Domain**	**Level**
CO1	***Recall*** the ***usage*** of laboratory instruments and ***measure*** the Young's modulus of uniform pending	Cognitive Psychomotor	Understand Mechanism
CO2	***Explain*** and ***demonstrate*** the behavior of thermal conductivity of bad conductor	Psychomotor Affective	Set Valuing
CO3	***Manipulate*** and ***measure*** the normal incidence of grating	Cognitive Psychomotor	Apply Mechanism
CO4	***Compare*** and ***explain*** the Calibration of ammeter	Affective Psychomotor	Organization Set
CO5	***Describe*** the resistance and specific resistance of a wire	Psychomotor Affective	Perception Organization
List of Experiments			**Hours**

1	Uniform Bending - Pin and Microscope Method.	**3**
2	Lee's Disc - Thermal Conductivity of Bad Conductor.	**3**
3	Spectrometer - Grating- Normal incidence method.	**3**
4	Spectrometer - id curve.	**3**
5	AND, OR and NOT logic gates - verification of truth table.	**3**
6	Potentiometer - Calibration of ammeter.	**3**
7	Semiconductor Diode - Forward and Reverse bias characteristics.	**3**
8	Metre Bridge - Determination of resistance and specific resistance of a wire.	**3**

TEXTBOOKS:

1. C. L. Arora, "BSc Practical Physics", B.Sc Practical Physics, S. Chand and Company Ltd, 2007.
2. D. Chattopadhyay and P. C. Rakshit, "An Advanced Course in Practical Physics", New Central Book Agency, 2011.
3. S. Ghosh, "A Text Book of Advanced Practical Physics", 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.

REFERENCE BOOKS :

1. Squires G. L., "Practical Physics", 4th 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 Company, 2007.
4. Geeta Sanon, B. Sc., Practical Physics, 1st Edition, S. Chand and Company, 2007.
5. Benenson, Walter, and Horst Stocker, Handbook of Physics, Springer, 2002.

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 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 – 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 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 consines 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 BOOK

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 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 teleconferencing. 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 Leelakrisha 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 Psychomotor	Remembering Applying **Guided Response**
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	Cognitive	Understanding

functions with Period 2π Make **Use** of odd & even functions in Fourier Series.		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 Psychomotor	Remembering **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, 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: Z_p, 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**		**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 vetors , 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	

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 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-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 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	Cognitive	Applying

approximation method , **Solve** unbalanced Transportation Problems, Assignment Problems and Routing Problems.		
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, 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", 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. .