**DEPARTMENT OF MATHEMATICS**

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# Curriculum & Syllabus
# B.Sc Mathematics

# REGULATION 2017

# CURRICULUM AND SYLLABUS BEFORE REVISION

## REGULATIONS – 2017

(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 | 2 | 3 | 1 |
| UMAN 2 | XUM106 | Human Ethics, Values, Rights and Gender Equality | 1 | 0 | 0 | 2 | 3 | 1 |
| CC - 1 lab | - | Fundamental Physics(Practical -1) | 0 | 0 | 0 | - | 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 | XMT203 | 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** | **3** | **0** | **28** | **24** |

## SEMESTER III

| Type | Sub. Code | Name of the Course | L | T | P | H | C |
|---|---|---|---|---|---|---|---|
| CC 7 | XMT301 | Introduction to Computers and Office Automation (Theory) | 2 | 2 | 0 | 4 | 3 |
| SEC1 | XMT302 | General Intelligence – I | 2 | 2 | 0 | 4 | 3 |
| CC 8 (DSC 2C) | XMT303 | Differential Equations and Laplace Transforms | 4 | 2 | 0 | 6 | 5 |
| CC 9 (DSC 3C) | XMT304 | Analytical Geometry 3D | 4 | 2 | 0 | 6 | 5 |
| GE 2 | - | *Open Elective - To be chosen by student | 3 | 0 | 0 | 3 | 3 |
| CC 7 lab | XMT305 | Introduction to Computers and Office Automation (Practical) | 0 | 0 | 2 | 2 | 1 |
| | | **TOTAL** | **15** | **8** | **2** | **25** | **20** |

## SEMESTER IV

| Type | Sub. Code | Name of the Course | L | T | P | H | C |
|---|---|---|---|---|---|---|---|
| CC – 10 | XMT401 | Object Oriented Programming with C++ (Theory) | 3 | 0 | 0 | 3 | 3 |
| SEC-2 | XMT402 | General Intelligence – II | 2 | 2 | 0 | 4 | 3 |
| CC- 11 (DSC 2D) | XMT403 | Vector Calculus & Fourier Series | 4 | 2 | 0 | 6 | 5 |
| CC -12 (DSC 3D) | XMT404 | Mechanics | 4 | 2 | 0 | 6 | 5 |
| GE 3 | - | *Open Elective - To be chosen by student | 3 | 0 | 0 | 3 | 3 |
| CC -10 Lab | XMT405 | Object Oriented Programming with C++ (Practical) | 0 | 0 | 3 | 3 | 3 |
| | | **TOTAL** | **16** | **6** | **3** | **25** | **22** |

## SEMESTER V

| Type | Sub. Code | Name of the Course | L | T | P | H | C |
|---|---|---|---|---|---|---|---|
| SEC 3 | XMT501 | Numerical Methods with C Programming (Theory) | 3 | 2 | 0 | 5 | 4 |
| DSE 1A | XMT502A | Mathematical Statistics | 4 | 2 | 0 | 6 | 5 |
|  | XMT502B | Stochastic Processes |  |  |  |  |  |
| DSE 2A | XMT503A | Abstract Algebra | 4 | 2 | 0 | 6 | 5 |
|  | XMT503B | Discrete Mathematics |  |  |  |  |  |
| DSE 3A | XMT504A | Modern Analysis | 4 | 2 | 0 | 6 | 5 |
|  | XMT504B | Graph Theory |  |  |  |  |  |
| GE 4 | - | *Open Elective - To be chosen by student | 3 | 0 | 0 | 3 | 3 |
| SEC3 (Lab) | XMT505 | Numerical Methods with C Programming (Practical) | 0 | 0 | 2 | 2 | 2 |
| *Extra Credit |  | IPT(21 days) |  |  |  |  | 2* |
|  |  | **TOTAL** | 18 | 8 | 2 | 28 | 24 +2* |

## SEMESTER VI

| Type | Sub. Code | Name of the Course | L | T | P | H | C |
|---|---|---|---|---|---|---|---|
| DSE1B | XMT601A | Linear Algebra | 4 | 2 | 0 | 6 | 5 |
|  | XMT601B | Number Theory |  |  |  |  |  |
| DSE2B | XMT602A | Complex Analysis | 4 | 2 | 0 | 6 | 5 |
|  | XMT602B | Mathematical  Modelling |  |  |  |  |  |
| DSE3B | XMT603A | Linear Programming | 4 | 2 | 0 | 6 | 5 |
|  | XMT603B | Financial Accounting |  |  |  |  |  |
| DSE4B | XMT604 | Project | 0 | 0 | 0 | 8 | 6 |
| *Extra Credit |  | NSS/NCC/NSO |  |  |  |  | 1* |
|  |  | **TOTAL** | 12 | 6 | 0 | 26 | 21 + 1* |

**Semester I**

| Subject Name | Classical Algebra | | | |
|---|---|---|---|---|
| Subject Code | XMT101 | | | |
| **L –T –P –C** <br> **3 - 1 – 0 - 4** | | **C:P:A** <br> **4:0:0** | | **L –T –P –H** <br> **3 - 2 – 0 - 5** |
| **Course Outcome:** | | | | **Domain/Level** <br> **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 – CartesianProduct 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

**Table 1 :Mapping of CO with GA's**

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|---|---|---|---|---|---|---|---|---|---|
| **CO 1** | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| **CO 2** | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| **CO 3** | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| **CO 4** | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| **CO 5** | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| **Total** | 15 | 10 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| **Scaled Value** | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

$1 - 5 \rightarrow 1$,        $6 - 10 \rightarrow 2$,       $11 - 15 \rightarrow 3$

0 - No Relation, 1 - Low Relation, 2- Medium Relation, 3- High Relation

| 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; 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;rpepyehlfq;fspd; gq;FFwpj;JnjspTngWjy;. | Cognitive | Analyze |
| myF– 1 | **mwptpay;jkpo; mwpKfk;** | | 9 |

mwptpay;jkpo; - nghwpapapay;>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 |

**CO Versus PO Mapping**

| | PO | | | | | | | PSO | |
|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **1** | **2** |
| **CO1** | | 1 | | | | | | | |
| **CO2** | | 1 | | | | | | | |
| **CO3** | | 1 | | | | | 1 | | |
| **CO4** | 1 | 2 | 2 | 1 | | 1 | 2 | | |
| **CO5** | 2 | 2 | 2 | 2 | | 1 | 2 | | |
| **Total** | 3 | 7 | 4 | 3 | | 2 | 5 | | |
| **Scaled Value** | 1 | 1 | 1 | 1 | | 1 | 1 | | |

1 – 5 -> 1   6 – 10 ->2  11 – 15 -> 3
3–Strong Correlation,  2–Medium Correlation, 1–Low Correlation, 0–No Correlation

| 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 ISimple 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 IISoundUniform 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 IIIProperties 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 IVThermal 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.

**Mapping of COs with POs**

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|---|---|---|---|---|---|---|---|---|---|
| **CO 1** | 3 | 2 | 1 | 1 | 1 | 1 | 1 | | 1 |
| **CO 2** | 3 | 2 | 1 | 1 | 1 | 1 | 1 | | 1 |
| **CO 3** | 3 | 2 | 1 | 1 | 1 | 1 | 1 | | 1 |
| **CO 4** | 3 | 2 | 1 | 1 | 1 | 1 | 1 | | 1 |
| **CO 5** | 3 | 2 | 1 | 1 | 1 | 1 | 1 | | 1 |
| **Total** | 15 | 10 | 5 | 5 | 5 | 5 | 5 | | 5 |
| **Scaled Value** | 3 | 2 | 1 | 1 | 1 | 1 | 1 | | 1 |

1 – 5 -> 1   6 – 10 ->2  11 – 15 -> 3
3–Strong Correlation,  2–Medium Correlation, 1–Low Correlation, 0–No Correlation

| 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, 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.

**Mapping of COs with POs**

|        | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| **CO 1** | 3 | 2 | 1 | 1 | 1 | 1 | 1 |  | 1 |
| **CO 2** | 3 | 2 | 1 | 1 | 1 | 1 | 1 |  | 1 |
| **CO 3** | 3 | 2 | 1 | 1 | 1 | 1 | 1 |  | 1 |
| **CO 4** | 3 | 2 | 1 | 1 | 1 | 1 | 1 |  | 1 |
| **CO 5** | 3 | 2 | 1 | 1 | 1 | 1 | 1 |  | 1 |
| **Total** | 15 | 10 | 5 | 5 | 5 | 5 | 5 |  | 5 |
| **Scaled Value** | 3 | 2 | 1 | 1 | 1 | 1 | 1 |  | 1 |

1 – 5 -> 1   6 – 10 ->2  11 – 15 -> 3
3–Strong Correlation,  2–Medium Correlation, 1–Low Correlation, 0–No Correlation

| COURSE NAME | STUDY SKILLS | | |
|---|---|---|---|
| COURSE CODE | XGE105 | | |
| **L –T –P –C**<br>**1 - 0 – 0 - 1** | **C:P:A**<br>**0.6:0.2:0.2** | | **L –T –P –SS- H**<br>**1 - 0 – 0 – 2- 3** |
| **Course Outcome:** | | | **Domain/Level**<br>**C or P or A** |
| **Identif**y 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 novel, newspaper, poem, drama and other reading papers. | | | C(Apply) |
| **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", ChampaTickoo, Oxford University Press.2009
3. Freeman, Sarah,"*StudyStrategies",*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. KiranmaiDutt 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

**Table 1 : Mapping of CO with GA's**

|  | GA 1 | GA2 | GA3 | GA4 | GA5 | GA6 | GA7 | GA8 | GA9 | GA10 | GA11 | GA12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 0 | 0 |
| **CO2** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| **CO3** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| **CO4** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| **CO5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 |
| **Total** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 6 | 2 | 0 |
| **Scaled value** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 0 |

1-5= 1, 6-10 = 2, 11-15= 3

0-No Relation, 1- Low Relation, 2 – Medium Relation, 3- High Relation

| 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. Ambedkar, 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

**Mapping of COs with Pos**

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | | | | | | | | 2 | | | | |
| **CO2** | | | | | | | | 3 | 1 | | | |
| **CO3** | | | | | | | | 2 | | | | |
| **CO4** | | | | | | | | 3 | | 2 | | |
| **CO5** | | | | | | | | 3 | 2 | 2 | | 2 |
| **Total** | | 2 | | | | | | 13 | 3 | 4 | | 2 |
| **Scaled Value** | | 1 | | | | | | 3 | 1 | 1 | | 1 |

1 – 5 →1, 6-10 → 2, 11 – 15→ 3

0 – No relation, 1 – Low relation, 2 – Medium relation, 3 – High relation

| Course Name | SPEECH AND BUSINESS COMMUNICATION | |
|---|---|---|
| Course Code | XGE201 | |
| **L –T –P –C**<br>**3 – 0 – 0- 3** | **C:P:A** | **L –T –P-H**<br>**3-0-0-3** |
| **Course Outcome** | | **Domain**<br>**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, rememorized 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 <br> 2. Ghosh, R N;" A Course in written English", Oxford Press, New Delhi,     2000S <br> 3. Jaya Sasikumar and ChampaTickoo,"Writing With A Purpose"**,** Oxford  University Press , Paper Back 1995 <br> 4. Freeman, Sarah: "Study Strategies:, New Delhi: Oxford University       Press, 1979. 13. <br> 5. Paul Gunashekar M.L. Tickoo, "Reading for Meaning", Ltd. Sultan Chand &Company, 2000 |

## Mapping of COs with POs

| | PO | | | | | | | | | | PSO | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **1** | **2** |
| **CO1** | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **CO2** | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **CO3** | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **CO4** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 |
| **CO5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| **Total** | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 2 | 0 | 2 | 0 | 0 |
| **Scaled value** | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |

1 – 5 →1,   6-10 → 2, 11 – 15→ 3

0 – No relation, 1 – Low relation, 2 – Medium relation, 3 – High relation

| Course Name | ENVIRONMENTAL STUDIES | | |
|---|---|---|---|
| Course Code | XES202 | | |
| **L –T –P –C**<br>**2 - 1 – 0– 2** | | **C:P:A** | **L –T –P –H**<br>**2 - 1 – 0- 3** |
| **Course Outcome** | | | **Domain**<br>**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)<br>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** |
| | 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 | |
| **UNIT III** | **ENVIRONMENTAL POLLUTION** | **10 hrs** |
| | 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. | |
| **UNIT IV** | **SOCIAL ISSUES AND THE ENVIRONMENT** | **10 hrs** |
| | 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 hrs** |
| | 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 | TOTAL |
|---|---|---|---|
| 30 | 15 | - | 45 |

**TEXT BOOKS**

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**

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**

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

**Mapping of CO's with PO's**

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|---|---|---|---|---|---|---|---|---|---|
| **CO1** | | | | | | | 2 | 3 | 3 |
| **CO2** | | | | | | | 1 | 2 | 2 |
| **CO3** | | | | | | | 2 | 3 | 3 |
| **CO4** | | | | | | | 3 | 3 | 3 |
| **CO5** | | | | | | | 2 | 2 | 3 |

1 – 5 →1,  6-10 → 2, 11 – 15→ 3
0 – No relation, 1 – Low relation, 2 – Medium relation, 3 – High relation

| Course Name | MODERN PHYSICS | | |
|---|---|---|---|
| Course Code | XMT203 | | |
| **L –T –P –C**<br>3- 1– 0– 4 | **C:P:A**<br>2.8:0.4:0.8 | | **L –T –P –H**<br>3– 1 – 0 – 4 |
| **Course Outcome** | | | **Domain/Level**<br>**C or P or A** |

| | 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, magnetic field, **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 - Somerfield 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 |
| | Kirchhoff'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** |

| Course Name | CALCULUS |
|---|---|

| | 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 - 8th edition, Wiley Eastern Ltd., 2005.
2. Electricity and Magnetism - Narayana Moorthy 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.

**Mapping of CO's with PO's**

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|---|---|---|---|---|---|---|---|---|---|
| **CO1** | | | | | | | 2 | 3 | 3 |
| **CO2** | | | | | | | 1 | 2 | 2 |
| **CO3** | | | | | | | 2 | 3 | 3 |
| **CO4** | | | | | | | 3 | 3 | 3 |
| **CO5** | | | | | | | 2 | 2 | 3 |
| **Total** | | | | | | | 10 | 13 | 14 |
| **Scaled Value** | | | | | | | 2 | 3 | 3 |

1 – 5 →1,   6-10 → 2, 11 – 15→ 3

0 – No relation, 1 – Low relation, 2 – Medium relation, 3 – High relation

| 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** theradius of curvature and centre of curvature, volutes 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 Involutes. | | |
| **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,<br>Narosa Publishing House, New Delhi, 1986. |
| 2. Arumugam & Isaac, Calculus, Vol.1&2, New Gamma Publishing House, 1999. |

**Table 1 : Mapping of COs with POs**

|        | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CO 1** | 3 | 2 |   | 1 | 1 |   | 1 | 1 | 1 |
| **CO 2** | 3 | 2 |   | 1 |   |   | 1 | 1 | 1 |
| **CO 3** | 3 | 2 |   | 1 |   |   | 1 | 1 | 1 |
| **CO 4** | 3 | 2 |   | 1 | 1 |   | 1 | 1 | 1 |
| **CO 5** | 3 | 2 |   | 1 | 1 |   | 1 | 1 | 1 |
| **Total** | 15 | 10 | 0 | 5 | 3 | 0 | 5 | 5 | 5 |
| **Scaled value** | 3 | 2 |   | 1 | 1 |   | 1 | 1 | 1 |

1 – 5 →1,   6-10 → 2, 11 – 15→ 3

0 – No relation, 1 – Low relation, 2 – Medium relation, 3 – High relation

| Course Name | SEQUENCES AND SERIES | | |
|---|---|---|---|
| Course Code | XMT205 | | |
| L –T –P –C <br> 4- 1 – 0– 5 | C:P:A <br> 4:0.5:0.5 | | L –T –P –H <br> 4 – 2 – 0- 6 |
| **Course Outcome** | | | **Domain** <br> **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) <br> 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) <br> 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 – NewGamma
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 & 5.2Page 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. |

**Mapping of COs with POs**

|  | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CO 1** | 3 | 2 |  | 1 | 1 |  | 1 | 1 | 1 |
| **CO 2** | 3 | 2 |  | 1 |  |  | 1 | 1 | 1 |
| **CO 3** | 3 | 2 |  | 1 |  |  | 1 | 1 | 1 |
| **CO 4** | 3 | 2 |  | 1 | 1 |  | 1 | 1 | 1 |
| **CO 5** | 3 | 2 |  | 1 | 1 |  | 1 | 1 | 1 |
| **Total** | 15 | 10 | 0 | 5 | 3 | 0 | 5 | 5 | 5 |
| **Scaled value** | 3 | 2 |  | 1 | 1 |  | 1 | 1 | 1 |

1 – 5 →1,  6-10 → 2, 11 – 15→ 3

0 – No relation, 1 – Low relation, 2 – Medium relation, 3 – High relation

| Course Name | FUNDAMENTAL PHYSICS (PRACTICAL - I) | | | |
|---|---|---|---|---|
| Course Code | XMT206 | | | |
| Prerequisite | | | | |
| **L –T –P –C**<br>0- 0 - 3- 2 | **C:P:A**<br> | | 0.4-1-0.6 | **L –T –P –H**<br>0- 0- 3- 3 |
| **Course Outcome:** | | | **Domain**<br>(C or P or A) | |

| | | | |
|---|---|---|---|
| **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 | 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.

**Mapping with Programme Outcomes**

| COs | PO$_1$ | PO$_2$ | PO$_3$ | PO$_4$ | PO$_5$ | PO$_6$ | PO$_7$ | PO$_8$ |
|---|---|---|---|---|---|---|---|---|
| CO$_1$ | 1 | 1 | 1 | | 2 | 1 | 1 | 1 |
| CO$_2$ | 2 | 3 | 2 | 1 | 2 | 2 | 1 | 2 |
| CO$_3$ | 1 | 3 | 2 | | 1 | 2 | 2 | 2 |
| CO$_4$ | 1 | 1 | 2 | | 1 | 2 | 1 | 1 |
| CO5 | 2 | 3 | 1 | | 2 | 2 | 2 | 1 |
| Total | 6 | 11 | 8 | 1 | 8 | 9 | 7 | 7 |
| Scaled Value | 2 | 3 | 2 | 1 | 2 | 2 | 2 | 2 |

1 – 5 →1, 6 – 10→ 2, 11 – 15→ 3

0-No Relation, 1- Low Relation, 2-Medium Relation, 3-High Relation

| COURSE CODE | | | COURSE NAME | | L | T | P | C |
|---|---|---|---|---|---|---|---|---|
| XMT301 | | | **INTRODUCTION TO COMPUTERS AND OFFICE AUTOMATION** | | 2 | 1 | 0 | 3 |
| C | P | A | | | | | | |
| 3 | 0 | 0 | | | L | T | P | H |
| | | | | | 2 | 2 | 0 | 4 |

**PREREQUISITE:** Nil

**COURSE OUTCOMES:**

| Course outcomes: | Domain | Level |
|---|---|---|
| **CO1:Define** and **Explain**Introduction to Computer, Windows, Windows properties, Word pad, Paint and Hard disk. | Cognitive | Remembering Understanding |
| **CO2: Define** and **Explain Word** Processing using MS Word. | Cognitive | Remembering Understanding |
| **CO3:Explain**Introduction to worksheet and Excel and **how** to **use**Excel sheet. | Cognitive | Understanding Remembering Applying |
| **CO4: Explain**Formatting the worksheet and **how** to take print inExcel sheet. | Cognitive | Understanding Remembering |
| **CO5: Explain**MS-POWER POINT and to know important govt. webpage's for various forms, formats, exams. | Cognitive | Understanding |

| **UNIT I** | 9 |
|---|---|
| Introduction to Computer: Block diagram, Memories, Devices, Operating System, Devices. Introduction to Windows: Starting Windows - Desktop - closing Windows - Start button - icons - Task bar - shortcut icons. Windows properties - Menu options, Minimize, Maximize, Close Active & Inactive Windows - Personal tools. Word pad: Creating &Saving a file, opening the saved file, word processing. Paint: creating & editing bitmaps - Multimedia tools - file system. Hard disk: Drive - folders - file - Exploring the files. My Computer - Explorer - moving files, deleting, cut, copy, paste - Exploring web. | |

| **UNIT II** | 9 |
|---|---|
| Word Processing using MS WORD: Word processing - Advantages – MS WORD – Definition. Document: Create - save - Printing - Resave – Close- Exiting word. Editing: Opening document – cursor movement - selecting text - deleting - undo redo - Moving text - Copying text. Formatting text: Font - paragraph formatting - bullets & numbering - getting help - find and replace text - spell checking and correction - grammar checking - auto correct - auto text - using thesaurus – using tabs - defining & changing page setup - page print options. Tables: creating &formatting, multiple columns. Math equations and type setting in MS Word. | |

| **UNIT III** | 9 |
|---|---|
| MS-EXCEL: Introduction to worksheet and Excel - Definitions - Advantages - Organization of worksheet area - entering information - number - Formula - save - data alignment - editing - range - definition - specifying - changing column width - row height - centering cell across column, hiding columns and rows - moving and copying data - inserting and deleting rows and columns. | |

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| UNIT IV | 9 |
|---|---|
| MS-EXCEL: Formatting the worksheet - printing - setting up page and margindefining header and footer - print options. Chart: creation - changing type - resize and move – controlling the appearance - modifying - deleting - printing - naming ranges - using statistical, Mathematical and financial functions - using drawing tool bar. | |
| UNIT V | 9 |
| MS-POWER POINT: Introduction - Menus - Toolbar - Navigating Power Point– Creating Slides, Presentation, Animation, etc - working with Power Point. Internet: Internet Browsing, creating mail ID, Using search engines etc. – To know important govt. webpage's for various forms, formats, exams. | |

| LECTURE | | TUTORIAL | TOTAL |
|---|---|---|---|
| **15** | | **30** | **45** |

**TEXT BOOK**

1. Sanjay Saxena, MS-Office -2000 for every one, Vikas Publishing House Pvt. Ltd., New Delhi, 2000. Unit 1: Part I, Unit 2:    Part II, III, Unit 3, 4: Part IV, Unit 5: Part V.

**REFERENCE**

1. R.X. Taxali, P.C. Software for Windows 98 Made simple, TATA McGraw-Hill Publishing Company Ltd., New Delhi, 2001.

 **COs VS POs Mapping**

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|---|---|---|---|---|---|---|---|---|---|
| **CO 1** | 3 | 2 | | | 1 | | | | 1 |
| **CO 2** | 3 | 2 | | | 1 | | | | 1 |
| **CO 3** | 3 | 2 | | | 1 | | | | 1 |
| **CO 4** | 3 | 2 | | | 1 | | | | 1 |
| **CO 5** | 3 | 2 | | | 1 | | | | 1 |
| **Total** | 15 | 10 | | | 5 | | | | 5 |
| **Scaled value** | 3 | 2 | | | 1 | | | | 1 |

1 – 5 →1, 6 – 10→ 2, 11 – 15→ 3
0-No Relation, 1- Low Relation, 2-Medium Relation, 3-High Relation

| COURSE CODE | XMT302 | L | T | P | C |
|---|---|---|---|---|---|
| COURSE NAME | **GENERAL INTELLIGENCE - I** | 2 | 1 | 0 | 3 |
| PREREQUISITE | **BASIC PROPERTIES OF NUMBERS** | L | T | P | H |
| C:P:A | 3:0:0 | 2 | 2 | 0 | 4 |

**COURSE OUTCOMES:**

| Course outcomes | Domain | Level |
|---|---|---|
| **CO1: Explain** the basic concepts of numbers, H.C.F. & L.C.M of numbers and to **solve** the problems. | Cognitive | Remembering Understanding |
| **CO2: Explain** the basic concepts of Decimal Fractions, Simplification and to **solve** the problems. | Cognitive | Remembering Understanding |
| **CO3: Explain** the basic concepts of Square Roots &Cube Roots, Average and to **solve** the problems | Cognitive | Remembering Understanding |
| **CO4: Explain** the basic concepts of Problems on Numbers, Problems on Ages and to solve the problems. | Cognitive | Remembering Understanding |
| **CO5: Explain** the basic concepts of Surds & Indices, Percentage and to solve the problems. | Cognitive | Remembering Understanding |

| UNIT I | 9 |
|---|---|
| Numbers, H.C.F. & L.C.M of Numbers. | |

| UNIT II | 9 |
|---|---|
| Decimal Fractions, Simplification. | |

| UNIT III | 9 |
|---|---|
| Square Roots & Cube Roots, Average. | |

| UNIT IV | 9 |
|---|---|
| Problems on Numbers, Problems on Ages. | |

| UNIT V | 9 |
|---|---|
| Surds & Indices, Percentage. | |

| | LECTURE | TUTORIAL | TOTAL |
|---|---|---|---|
| | 15 | 30 | 45 |

**TEXTBOOK**

1. R.S. Aggarwal, Quantitative Aptitude for Competitive Examinations , S Chand; 20th edition (2013)

**REFERENCES**

| | | |
|---|---|
| 1. Banking awareness by Sangram Keshari Rout and Soumya Ranjan Behera, B.K. Publications Pvt. Ltd.; Second edition (2014).<br>2. UGC-CSIR NET/SET by Dr. Pawan Sharma and Anshuman, Arihant Publication.<br>3. Fast Track Objective Arithmetic by Rajesh Verma, Arihant Publication , Edition 2012. |
| **E-REFERENCES** |
| 1. www.careerbless.com<br>2. www.jagranjosh.com<br>3. www.bestguru.com |

**Table 1: Mapping of CO's with PO's:**

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 3 | 1 | | | | | | | 1 |
| **CO2** | 3 | 1 | | | | | | | 1 |
| **CO3** | 3 | 1 | | | | | 1 | | 1 |
| **CO4** | 3 | 1 | | 1 | | | 1 | | 1 |
| **CO5** | 3 | 1 | | 1 | | | 1 | | 1 |
| **Total** | 15 | 5 | | 2 | | | 3 | | 5 |
| **Scaled value** | 3 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 |

1 – 5 →1, 6 – 10→ 2, 11 – 15→ 3

0-No Relation, 1- Low Relation, 2-Medium Relation, 3-High Relation

| COURSE CODE | | | COURSE NAME | L | T | P | C |
|---|---|---|---|---|---|---|---|
| XMT303 | | | DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORMS | 4 | 1 | 0 | 5 |
| **C** | **P** | **A** | | | | | |
| 5 | 0 | 0 | | L | T | P | H |
| | | | | 4 | 2 | 0 | 6 |

**PREREQUISITE:** Nil

**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, Clairaut's form – Conditions of integrability of M dx + Ndy = 0. | Cognitive | Applying |
| **CO2: Solve** second order differential equations with constant coefficients - Linear equations with variable coefficients – Method of Variation of Parameters. | Cognitive | Applying |
| **CO3:** Formation of Partial Differential Equation, **Solve**PDE of the standard forms - Lagrange's method - Solving of Charpit's method | Cognitive | Applying |
| **CO4: Solve**PDE of second order homogeneous equation with Constant coefficients – Particular integrals of the forms eax+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 Transforms of using Standard formulae, Basic theorems & simple applications. Use of Laplace Transforms in solving ODE with constant coefficients. | Cognitive | Remembering Applying |
| **UNIT I** | | 18 |
| First order, higher degree differential equations solvable for x, solvable for y, solvable for dy/dx, Clairaut's form – Conditions of integrability of M dx + N dy = 0 – simple problems. | | |
| **UNIT II** | | 18 |
| Particular integrals of second order differential equations with constant coefficients - Linear equations with variable coefficients – Method of Variation of Parameters ( Omit third & higher order equations). | | |
| **UNIT III** | | 18 |
| 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** | **18** |
| PDE of second order homogeneous equation with Constant coefficients – Particular integrals of the forms eax+by, Sin(ax+by), Cos(ax+by), $x^r y^s$ and $e^{ax+by}.f(x,y)$. | |
| **UNIT V** | **18** |
| 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** | **30** | **90** |

**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

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

**Mapping of COs with POs**

| | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** |
|---|---|---|---|---|---|---|---|---|---|
| **CO 1** | 3 | 2 | | 1 | 1 | | 1 | 1 | 1 |
| **CO 2** | 3 | 2 | | 1 | | | 1 | 1 | 1 |
| **CO 3** | 3 | 2 | | 1 | | | 1 | 1 | 1 |
| **CO 4** | 3 | 2 | | 1 | 1 | | 1 | 1 | 1 |
| **CO 5** | 3 | 2 | | 1 | 1 | | 1 | 1 | 1 |
| **Total** | 15 | 10 | 0 | 5 | 3 | 0 | 5 | 5 | 5 |
| **Scaled value** | 3 | 2 | | 1 | 1 | | 1 | 1 | 1 |

1 – 5 →1, 6 – 10→ 2, 11 – 15→ 3
0-No Relation, 1- Low Relation, 2-Medium Relation, 3-High Relation

| 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 | 2 | 0 | 6 |

**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 c**ondition 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 | 18 |
|---|---|

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 | 18 |
|---|---|

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 | 18 |
|---|---|

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 | 18 |
|---|---|

The equation of surface – cone – intersection of straight line and quadric cone – tangent plane and normal.

| UNIT V | 18 |
|---|---|

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 | 30 | 90 |

**TEXTBOOK**

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.

## COs VS POs Mapping

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|---|---|---|---|---|---|---|---|---|---|
| **CO 1** | 3 | 2 | | 1 | 1 | | 1 | 1 | 1 |
| **CO 2** | 3 | 2 | | 1 | | | 1 | 1 | 1 |
| **CO 3** | 3 | 2 | | 1 | | | 1 | 1 | 1 |
| **CO 4** | 3 | 2 | | 1 | 1 | | 1 | 1 | 1 |
| **CO 5** | 3 | 2 | | 1 | 1 | | 1 | 1 | 1 |
| **Total** | 15 | 10 | 0 | 5 | 3 | 0 | 5 | 5 | 5 |
| **Scaled value** | 3 | 2 | | 1 | 1 | | 1 | 1 | 1 |

1 – 5 →1, 6 – 10→ 2, 11 – 15→ 3
0-No Relation, 1- Low Relation, 2-Medium Relation, 3-High Relation

| COURSE CODE | | | COURSE NAME | L | T | P | C |
|---|---|---|---|---|---|---|---|
| **XMT305** | | | **INTRODUCTION TO COMPUTERS AND OFFICE AUTOMATION (Practical)** | **0** | **0** | **2** | **1** |
| **C** | **P** | **A** | | | | | |
| **1** | **0** | **0** | | **L** | **T** | **P** | **H** |
| | | | | **0** | **0** | **2** | **2** |

**PREREQUISITE:XMT301**

**COURSE OUTCOMES:**

| Course outcomes: | Domain | Level |
|---|---|---|
| **CO1:Define and Apply**Windows properties, Note pad Applications | Cognitive | Remembering Applying |
| **CO2: Define and Apply** Control Panel Setup ,Designing Advertisement and Document creation with special features like header, footer, tables, etc. | Cognitive | Remembering Applying |
| **CO3:Apply** typing practices on Algebraic & Transcendental Equations, System of Equations, Matrices, Equations, etc. in MS Word. | Cognitive | Remembering Applying |
| **CO4: Explain**Table creation and Table editing, Table to Text / Text to Table conversion in MS Word, Electricity Bill creation, Mark sheet creation and Charts in Work Sheet. | Cognitive | Understanding Applying |
| **CO5: Apply** Power Point presentation on various conceptsRegression Equation Worksheet. | Cognitive | Applying |

**LIST OF PRACTICALS**

1. Note pad Applications
2. Control Panel Setup
3. Designing Advertisement and Document creation with special features like header, footer, tables, etc.
4. Typing practices on Algebraic & Transcendental Equations, System of Equations, Matrices, Integral Equations, Differential Equations, etc. in MS Word
5. Table creation and Table editing, Table to Text / Text to Table conversion in MS Word
6. Electricity Bill creation, Mark sheet creation and Charts in Work Sheet
7. Power Point presentation on various concepts
8. Regression Equation Worksheet

| COURSE CODE | | | COURSE NAME | L | T | P | C |
|---|---|---|---|---|---|---|---|
| **XMT401** | | | **OBJECT ORIENTED PROGRAMMING WITH C++ THEORY** | **3** | **0** | **0** | **3** |
| **C** | **P** | **A** | | | | | |
| **3** | **0** | **0** | | **L** | **T** | **P** | **H** |
| | | | | **3** | **0** | **0** | **3** |

| PREREQUISITE: |
|---|

| COURSE OUTCOMES: |
|---|

| Course outcomes: | Domain | Level |
|---|---|---|
| **CO1:Define and Apply**keywords, Identifiers and constants, basic, user defined, derived data types symbolic constants, type compatibility - declaration of variables - dynamic initialization of variables. | Cognitive | Remembering Applying |
| **CO2: Define and Apply** the main function - function prototyping – call by reference - return by reference - inline functions - default, constant arguments – function overloading - math library functions. | Cognitive | Remembering Applying |
| **CO3:Define and Apply**nesting of member function - private member function - array within class - static data members - static member functions - array of objects - objects as function arguments - friendly functions. | Cognitive | Remembering Applying |
| **CO4: Define and Apply**dynamic initialization of objects - copy constructor -dynamic constructors – destructors - defining operator overloading - overloading unary, binary operators. | Cognitive | Remembering Applying |
| **CO5: Define and Apply**multilevel inheritance – multiple inheritance-hierarchical inheritance -hybrid inheritance - virtual base class - abstract classes - constructors in derived classes. | Cognitive | Remembering Applying |

| UNIT I | 9 |
|---|---|
| What is C++ - Applications of C++ - A simple C++ program - An example with class - tokens - keywords - Identifiers and constants - basic, user defined, derived data types symbolic  constants - type compatibility - declaration of variables - dynamic initialization of variables. | |

| UNIT II | 9 |
|---|---|
| Operator in C++ - scope resolution, member differencing, memory management | |

operators - manipulators - type cast operator - the main function - function prototyping – call by reference - return by reference - inline functions - default, constant arguments – function overloading - math library functions.

| UNIT III | 9 |
|---|---|

C structure - specifying a class - defining member function - a C++ program with class making an outside function inline - nesting of member function - private member function - array within class - static data members - static member functions - array of objects -objects as function arguments - friendly functions.

| UNIT IV | 9 |
|---|---|

Constructors – parameterized constructors - multiple constructors in a class -constructors with default arguments - dynamic initialization of objects - copy constructor -dynamic constructors – destructors - defining operator overloading - overloading unary, binary operators.

| UNIT V | 9 |
|---|---|

Defining derived classes - single inheritance - multilevel inheritance – multiple inheritance-hierarchical inheritance -hybrid inheritance - virtual base class - abstract classes -constructors in derived classes.

| LECTURE | TUTORIAL | TOTAL |
|---|---|---|
| 45 | 0 | 45 |

| TEXTBOOK |
|---|
| 1. E. Balagurusamy, Object Oriented Programming with C++, Third edition, Tata McGrawHill    publication, New Delhi, 2006.Unit 1: Chapters: 2.1 - 2.5, 3.1- 3.11, Unit 2: 3.13-3.18, 4.1-4.9 & 4.11.Unit 3: 5.1- 5.9, 5.11-5.15. Unit 4: 6.1-6.8, 6.11, 7.2-7.5.Unit 5: 8.1-8.11. |

| REFERENCES |
|---|
| 1. V. Ravichandran, Programming with C++, Second Edition Tata McGraw - Hill, New Delhi, 2006. 2. H. Schildt, The complete Reference of C++, Tata-McGraw-Hill publishing Company Ltd.New Delhi, 2003. |

**Table 1: COs VS POs Mapping**

|  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|---|---|---|---|---|---|---|---|---|---|
| **CO 1** | 3 | 2 | | | 1 | | | | 1 |
| **CO 2** | 3 | 2 | | | 1 | | | | 1 |
| **CO 3** | 3 | 2 | | | 1 | | | | 1 |
| **CO 4** | 3 | 2 | | | 1 | | | | 1 |
| **CO 5** | 3 | 2 | | | 1 | | | | 1 |
| **Total** | 15 | 10 | | | 5 | | | | 5 |
| **Scaled value** | 3 | 2 | | | 1 | | | | 1 |

$1 – 5 \rightarrow 1, 6 – 10 \rightarrow 2, 11 – 15 \rightarrow 3$

0-No Relation, 1- Low Relation, 2-Medium Relation, 3-High Relation

| COURSE CODE | XMT402 | | L | T | P | C |
|---|---|---|---|---|---|---|
| COURSE NAME | GENERAL INTELLIGENCE- II | | 2 | 1 | 0 | 3 |
| PREREQUISITE | BASIC PROPERTIES OF NUMBERS | | L | T | P | H |
| C:P:A | 3:0:0 | | 2 | 2 | 0 | 4 |

**COURSE OUTCOMES:**

| Course outcomes | Domain | Level |
|---|---|---|
| **CO1: Explain** the basic concepts of profit and loss, ratio & proportion and to **solve** the problems | Cognitive | Remembering Understanding |
| **CO2: Explain** the basic concepts of partnership, chain Rule and to **solve** the problems | Cognitive | Remembering Understanding |
| **CO3: Explain** the basic concepts of time & work, pipes & cisterns and to **solve** the problems | Cognitive | Remembering Understanding |
| **CO4: Explain** the basic concepts of time & distance and problems on trains and to **solve** the problems | Cognitive | Remembering Understanding |
| **CO5: Explain** the basic concepts of boats and streams and allegation or mixture and to **solve** the problems | Cognitive | Remembering Understanding |

| UNIT I | | 9 |
|---|---|---|
| Profit & Loss, Ratio & Proportion. | | |
| **UNIT II** | | **9** |
| Partnership, Chain Rule. | | |
| **UNIT III** | | **9** |
| Time & work, Pipes& Cisterns. | | |
| **UNIT IV** | | **9** |
| Times & Distance, Problems on Trains. | | |
| **UNIT V** | | **9** |
| Boats & Streams, Allegation or Mixture. | | |

| | LECTURE | TUTORIAL | TOTAL |
|---|---|---|---|
| | 15 | 30 | 45 |

**TEXT BOOK**

1.R.S. Aggarwal, Quantitative Aptitude for Competitive Examinations , S Chand; 20th edition (2013)

**REFERENCES**

1. Banking awareness by Sangram Keshari Rout and Soumya Ranjan Behera, B.K. Publications Pvt. Ltd.; Second edition (2014).
2. UGC-CSIR NET/SET by Dr. Pawan Sharma and Anshuman, Arihant Publication.
3. Fast Track Objective Arithmetic by Rajesh Verma, Arihant Publication, Edition 2012.

**E-REFERENCES**

1.www.careerbless.com
2.www.jagranjosh.com
3.www.bestguru.com

**Table 1: Mapping of CO's with PO's:**

|  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 1 |  |  |  |  |  |  | 1 |
| CO2 | 3 | 1 |  |  |  |  |  |  | 1 |
| CO3 | 3 | 1 |  |  |  |  | 1 |  | 1 |
| CO4 | 3 | 1 |  | 1 |  |  | 1 |  | 1 |
| CO5 | 3 | 1 |  | 1 |  |  | 1 |  | 1 |
| Total | 15 | 5 |  | 2 |  |  | 3 |  | 5 |
| Scaled value | 3 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 |

1 – 5 →1, 6 – 10→ 2, 11 – 15→ 3
0-No Relation, 1- Low Relation, 2-Medium Relation, 3-High Relation

44

| COURSE CODE | COURSE NAME | L | T | P | C |
|---|---|---|---|---|---|
| XMT403 | **VECTOR CALCULUS & OTHER SERIES** | **4** | **1** | **0** | **5** |

| C | P | A | | | | | |
|---|---|---|---|---|---|---|---|
| **5** | **0** | **0** | | **L** | **T** | **P** | **H** |
| | | | | **4** | **2** | **0** | **6** |

**PREREQUISITE:** Algebra, vectors

**COURSE OUTCOMES:**

| Course outcomes: | Domain | Level |
|---|---|---|
| **CO1:Find** Gradient of a vector, Directional derivative, divergence & curl of a vector, solenoidal & irrotational vector functions, Laplacian double operator and to **solve** simple problems. | Cognitive | Remembering Applying |
| **CO2: Find** vectorintegration ,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 thetheorems for simple problems. | Cognitive | Remembering Applying |
| **CO4: Explain** Fourier Series expansion of periodic functions with Period $2\pi$ Make **Use** of odd & even functions in Fourier Series. | Cognitive | Understanding Applying |
| **CO5: Explain** Half-range Fourier cosine Series & sine series, Change of interval & Combination of series. | Cognitive | Understanding |

| UNIT I | 18 |
|---|---|

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 | 18 |
|---|---|

Vector integration –Tangential line integral –Conservative force field –scalar potential- Work done by a force - Normal surface integral- Volume integral – simple problems.

| UNIT III | 18 |
|---|---|

Gauss Divergence Theorem – Stoke's Theorem- Green's Theorem – Simple problems

| | |
|---|---|
| &Verification of the theorems for simple problems. | |
| **UNIT IV** | **18** |
| Fourier series- definition - Fourier Series expansion of periodic functions with period $2\pi$ – Use of odd & even functions in Fourier Series. | |
| **UNIT V:** | **18** |
| Half-range Fourier Series – definition- Development in Cosine series & in Sine series - change of interval – Combination of series. | |

| | LECTURE | TUTORIAL | TOTAL |
|---|---|---|---|
| | 60 | 30 | 90 |

**TEXT BOOK**

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.ThangapandiIssac, Fourier series, New Gamma publishing house    (Nov12).

**Table 1: COs VS POs Mapping**

|  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|---|---|---|---|---|---|---|---|---|---|
| **CO 1** | 3 | 2 |  | 1 | 1 |  | 1 | 1 | 1 |
| **CO 2** | 3 | 2 |  | 1 |  |  | 1 | 1 | 1 |
| **CO 3** | 3 | 2 |  | 1 |  |  | 1 | 1 | 1 |
| **CO 4** | 3 | 2 |  | 1 | 1 |  | 1 | 1 | 1 |
| **CO 5** | 3 | 2 |  | 1 | 1 |  | 1 | 1 | 1 |
| **Total** | 15 | 10 | 0 | 5 | 3 | 0 | 5 | 5 | 5 |
| **Scaled value** | 3 | 2 |  | 1 | 1 |  | 1 | 1 | 1 |

$1 – 5 \rightarrow 1, 6 – 10 \rightarrow 2, 11 – 15 \rightarrow 3$

0-No Relation, 1- Low Relation, 2-Medium Relation, 3-High Relation

| COURSE CODE | | | COURSE NAME | | L | T | P | C |
|---|---|---|---|---|---|---|---|---|
| XMT404 | | | **MECHANICS** | | 4 | 1 | 0 | 5 |
| C | P | A | | | | | | |
| 5 | 0 | 0 | | | L | T | P | H |
| | | | | | 4 | 2 | 0 | 6 |

**PREREQUISITE:** Algebra

**COURSE OUTCOMES:**

| Course outcomes: | Domain | Level |
|---|---|---|
| **CO1:Define**Basic Concepts and Principles - Forces acting at a Point and **Explain**Lami's Theorem and Applications - Parallel Forces - Like and Unlike Parallel Forces - Moment of a force – Couples – Related problems. | Cognitive | Remembering Understanding |
| **CO2: Explain**Equilibrium of Three Forces acting on a rigid body - Friction - Laws of Friction - Angle of Friction - Cone of Friction - Properties and related problems.. | Cognitive | Understanding |
| **CO3:Define and Explain**Motion in a Straight line under uniform acceleration, Newton's Laws of motion, Projectiles, Path of Projectile and Range on an Inclined Plane. | Cognitive | Remembering Understanding |
| **CO4: Explain**Collision of Elastic Bodies, Direct and Oblique Impact, Loss of Kinetic Energy, Related Properties and Simple Problems. | Cognitive | Understanding |
| **CO5: Explain**Motion under the action of Central Forces, Properties, Differential Equation of Central Orbit, Pedal Equation of Central Orbit, Velocities in a Central Orbit, Law of Forces, Properties and Related Problems. | Cognitive | Understanding |

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

Central Orbits: Motion under the action of Central Forces - Properties and Related Problems - Differential Equation of Central Orbit - Pedal Equation of Central Orbit -Velocities in a Central Orbit - Law of Forces - Properties and Related Problems.

| LECTURE | TUTORIAL | TOTAL |
|---|---|---|
| 60 | 30 | 90 |

| TEXT BOOKS |
|---|
| 1. M. K. Venkataraman, Statics, Agasthiar Publications, Trichy, 2004.<br>Unit 1: Chapters 2, 3, 4Unit 2: Chapters 5, 7<br>2. M. K. Venkataraman, Dynamics, Agasthiar Publications, Trichy, 2004.<br>Unit 3: Chapters 3: section 3.22, Chapter 4: Section 4.3, Chapter 6<br>Unit 4: Chapter 8Unit 5: Chapter 11 |

| REFERENCES |
|---|
| 1. T. K. ManickavasagamPillai, Statics, S. Viswanathan& Co., Chennai, 1980.<br>2. S. Narayanan, Dynamics, S. Chand & Co., New Delhi, 1980. |

### Table 1: COs VS POs Mapping

|  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|---|---|---|---|---|---|---|---|---|---|
| CO 1 | 3 | 2 |  | 1 | 1 |  | 1 | 1 | 1 |
| CO 2 | 3 | 2 |  | 1 |  |  | 1 | 1 | 1 |
| CO 3 | 3 | 2 |  | 1 |  |  | 1 | 1 | 1 |
| CO 4 | 3 | 2 |  | 1 | 1 |  | 1 | 1 | 1 |
| CO 5 | 3 | 2 |  | 1 | 1 |  | 1 | 1 | 1 |
| Total | 15 | 10 | 0 | 5 | 3 | 0 | 5 | 5 | 5 |
| Scaled value | 3 | 2 |  | 1 | 1 |  | 1 | 1 | 1 |

$1 – 5 \rightarrow 1, 6 – 10 \rightarrow 2, 11 – 15 \rightarrow 3$

0-No Relation, 1- Low Relation, 2-Medium Relation, 3-High Relation

| COURSE CODE | COURSE NAME | L | T | P | C |
|---|---|---|---|---|---|
| **XMT405** | **OBJECT ORIENTED PROGRAMMING WITH C++ (Practical)** | **0** | **0** | **3** | **3** |

| C | P | A | | | | | |
|---|---|---|---|---|---|---|---|
| **3** | **0** | **0** | | **L** | **T** | **P** | **H** |
| | | | | **0** | **0** | **3** | **3** |

**PREREQUISITE:**

**COURSE OUTCOMES:**

| Course outcomes: | Domain | Level |
|---|---|---|
| **CO1:** Apply identifiers and constants, user defined, derived data types | Cognitive | Applying |
| **CO2: Apply** the main function - function prototyping – call by reference - return by reference - inline functions - default, constant arguments – function overloading - math library functions. | Cognitive | Applying |
| **CO3:Apply** array within class - static data members - static member functions - array of objects -objects as function arguments - friendly functions. | Cognitive | Applying |
| **CO4:** Apply initialization of objects - copy constructor -dynamic constructors – destructors. | Cognitive | Applying |
| **CO5: Apply** hybrid inheritance - virtual base class - abstract classes - Constructors in derived classes. | Cognitive | Applying |

| LIST OF PRACTICALS |
|---|
| 1.List the prime numbers in a given range |
| 2. Display Fibonacci series |
| 3. Sorting given list of names in alphabetical order |
| 4. Sorting given list of numbers in ascending order |
| 5. Read and display for a given matrix of any order |
| 6. Compute simple and compound interest values |
| 7. Computer biggest among three numbers |
| 8. Compute biggest among N integers |
| 9. Compute factorial of a given number using recursive function |
| 10. Write a program to swap the values using functions |
| 11. Print perfect squares in a given range |
| 12. Write a program to solve a quadratic equation and test with three types of roots. |
| 13. Write a program to calculate the following functions to 0.0001% accuracy |
| $\quad$ a) $\sin x = x - \dfrac{x^3}{3!} + \dfrac{x^5}{5!} - \cdots$ |

b) $SUM = 1 + \left(\dfrac{1}{2}\right)^2 + \left(\dfrac{1}{3}\right)^3 + \left(\dfrac{1}{4}\right)^4 \cdots$

c) $\cos x = 1 - \dfrac{x^2}{2!} + \dfrac{x^4}{4!} - \cdots$

14. Write a program to calculate variance and SD of N numbers
15. Write a program to read two matrices and compute matrix multiplication using functions
16. Prepare employee details using class with array of objects
17. Program to illustrate objects as function arguments
18. Program to illustrate parameterized constructors
19. Program to illustrate multiple constructors in a class
20. Show by a suitable program: how the unary minus operator is overloaded?
21. Show by a suitable program: how the binary operator is overloaded?
22. Prepare student mark list by using multilevel inheritance
23. Program to illustrate multiple inheritance
24. Prepare student mark list by using hybrid inheritance
25. Prepare student mark list by using the concept of virtual base class

**Table 1: COs VS POs Mapping**

|        | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| **CO 1** | 3 | 2 |   | 1 | 1 |   | 1 | 1 | 1 |
| **CO 2** | 3 | 2 |   | 1 |   |   | 1 | 1 | 1 |
| **CO 3** | 3 | 2 |   | 1 |   |   | 1 | 1 | 1 |
| **CO 4** | 3 | 2 |   | 1 | 1 |   | 1 | 1 | 1 |
| **CO 5** | 3 | 2 |   | 1 | 1 |   | 1 | 1 | 1 |
| **Total** | 15 | 10 | 0 | 5 | 3 | 0 | 5 | 5 | 5 |
| **Scaled value** | 3 | 2 |   | 1 | 1 |   | 1 | 1 | 1 |

$1 - 5 \rightarrow 1, 6 - 10 \rightarrow 2, 11 - 15 \rightarrow 3$
0-No Relation, 1- Low Relation, 2-Medium Relation, 3-High Relation

| COURSE CODE | COURSE NAME | L | T | P | C |
|---|---|---|---|---|---|
| XMT501 | **NUMERICAL METHODS WITH 'C' PROGRAMMING** | 3 | 1 | 0 | 4 |

| C | P | A | | | | | |
|---|---|---|---|---|---|---|---|
| **4** | **0** | **0** | | L | T | P | H |
| | | | | 3 | 2 | 0 | 5 |

**PREREQUISITE:**

**COURSE OUTCOMES:**

| Course outcomes: | Domain | Level |
|---|---|---|
| **CO1:Apply** Variables and Data types, Operators and Expressions, Mathematical Functions-Input and output operators. | Cognitive | Applying |
| **CO2: Explain** Decision making and Branching using IF statements, GOTO statement, Decision making and looping - WHILE, DO, FOR statements and Arrays. | Cognitive | Understanding Applying |
| **CO3:Use**Handling of character strings, Arithmetic operations on characters, String handling functions and User defined functions. | Cognitive | Applying |
| **CO4:** Solving algebraic and transcendental equations. | Cognitive | Applying |
| **CO5: Find** Interpolation with equal and unequal intervals. | Cognitive | Remembering |

| **UNIT I** | **15** |
|---|---|

Structure of C programs-Constants, Variables and Data types-Operators and Expressions-Mathematical functions-Input and output operators.

| **UNIT II** | **15** |
|---|---|

Decision making and Branching-IF statements-GOTO statement-Decision making and looping - WHILE, DO, FOR statements-Arrays.

| **UNIT III** | **15** |
|---|---|

Handling of character strings - Arithmetic operations on characters - String handling functions - User defined functions - Recursion.

| **UNIT IV** | **15** |
|---|---|

Curve fitting-Linear and parabolic curves by the method of least squares principle - Solving algebraic and transcendental equations - Bisection method, false position method and Newton Raphson method - Solving simultaneous algebraic equations - Gauss-Seidel method

| | |
|---|---|
| - Gauss elimination method. | |
| **UNIT V:** | **15** |

Interpolation - Newton's forward and backward difference formulae - Lagrange's interpolation formula - Numerical integration using Trapezoidal and Simpson's one-third rules - solution of ODE's - Euler method and Runge-Kutta fourth order method.

| LECTURE | TUTORIAL | TOTAL |
|---|---|---|
| 45 | 30 | 75 |

**TEXT BOOKS**

1.  E. Balagurusamy, Programming in ANSI C, Sixth edition, Tata Mc-Graw Hill Publishing Co. Ltd., New Delhi, 2012. (For Units I, II and III).
2.  M.K.Venkatraman, Numerical methods in Science and Engineering, National Publisher Company, Fifth Edition, 2001. (For Units IV and V).

Unit 1: Chapters 1-4 of [1]
Unit 2: Chapters 5-7 of [1]
Unit 3: Chapters 8-9 of [1]
Unit 4: Chapter 1, Sections 1.7-1.8, Chapter 3, Sections 2, 4 and 5, Chapter 4, Sections 2, 6 of [2]
Unit 5:Chapter 6,Sec 3,4, Chapter 8, Sec 4, Chapter 9, Sec 8,10, Chapter 11, Sec10,16 of [2]

**REFERENCES**

1. Yashavant.P.Kanetkar, Let us 'C', BPB Publications, 2002.
2. Rajaraman, Computer oriented numerical methods, Prentice-Hall of India, 1971.

**COs VS POs Mapping**

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|---|---|---|---|---|---|---|---|---|---|
| **CO 1** | 3 | 2 | | | 1 | | | | 1 |
| **CO 2** | 3 | 2 | | | 1 | | | | 1 |
| **CO 3** | 3 | 2 | | | 1 | | | | 1 |
| **CO 4** | 3 | 2 | | | 1 | | | | 1 |
| **CO 5** | 3 | 2 | | | 1 | | | | 1 |
| **Total** | 15 | 10 | | | 5 | | | | 5 |
| **Scaled value** | 3 | 2 | | | 1 | | | | 1 |

1 – 5 →1, 6 – 10→ 2, 11 – 15→ 3

0-No Relation, 1- Low Relation, 2-Medium Relation, 3-High Relation

| COURSE CODE | | | COURSE NAME | L | T | P | C |
|---|---|---|---|---|---|---|---|
| XMT502A | | | MATHEMATICAL STATISTICS | 4 | 1 | 0 | 5 |
| C | P | A | | | | | |
| 4 | 0.5 | 0.5 | | L | T | P | H |
| | | | | 4 | 2 | 0 | 6 |

**PREREQUISITE:**

**COURSE OUTCOMES:**

| Course outcomes: | Domain | Level |
|---|---|---|
| **CO1:Find** Measures of Central Tendency – Measures of Dispersion – Moments, Skewness and Kurtosis, **Define**and **Explain** Axioms – Addition and Multiplication Theorems –Baye's Theorem on conditional probability and its applications. | Cognitive | Remembering Understanding |
| **CO2: Explain** Random variables – Discrete and Continuous, **Define**Probability Mass Function and Density Function – Distribution Functions – Properties – Mathematical Expectations – Mean, Variance and Moments – Moment Generating Functions – Simple properties | Cognitive  Psychom otor | Remembering Applying  Guided Response |
| **CO3:Explain** Discrete distributions Binomial Distribution and Poisson distribution – Continuous: Normal Distribution Properties and Applications. | Cognitive | Understanding |
| **CO4: Explain** Curve Fitting by the Method of Least Squares and to **find**Correlation, Regression, Equations of Regression Lines,Angle between Regression Lines – Properties and Applications. | Cognitive | Remembering Understanding |
| **CO5: Explain** Types of Sampling – Parameters and Statistical Tests of Significance – Null Hypothesis – Large Sample Tests – Sampling Distributions: t, Chi – Square and F distributions. | Cognitive  Affective | Understanding  Receiving |
| **UNIT I** | | **18** |
| Measures of Central Tendency – Measures of Dispersion – Moments, Skewness and Kurtosis – Theory of Probability: Definition – Axioms – Addition and Multiplication Theorems –Baye's Theorem on conditional probability and its applications. | | |
| **UNIT II** | | **18** |
| Random variables – Discrete and Continuous – Definition of Probability Mass Function and Density Function – Distribution Functions – Properties – Mathematical Expectations – Mean, Variance and Moments – Moment Generating Functions – Simple properties | | |
| **UNIT III** | | **18** |
| Theoretical distributions – Discrete: Binomial Distribution and Poisson distribution – Continuous: Normal Distribution Properties and Applications. | | |
| **UNIT IV** | | **18** |
| Curve Fitting by the Method of Least Squares – Correlation – Properties – Regression – Equations of Regression Lines – Angle between Regression Lines – Properties and Applications. | | |
| **UNIT V** | | **18** |

Sampling: Introduction – Types of Sampling – Parameters and Statistical Tests of Significance – Null Hypothesis – Large Sample Tests – Sampling Distributions: t, Chi – Square and F distributions.

| LECTURE | TUTORIAL | TOTAL |
|---------|----------|-------|
| 60 | 30 | 90 |

**TEXT BOOKS**

1. S. Arumugam& A. Thangapandi Isaac, Statistics, New Gamma Publishing House, 2006.
Unit 1: Chapter 1: Sections 1.0 -1.4; Chapter 2: Section 2.0-2.5; Chapter 3: Sections: 3.0-3.2; Chapter 4: Sections: 4.0 -4.2; Chapter 11: Sections: 11.0 -11.2.     Unit 2: Chapter 12: Sections 12.0 -12.5.Unit 3: Chapter 13: Sections 13.0-13.3.Unit 4: Chapter 5: Section 5.0, 5.1; Chapter 6: Section 6.0-6.3Unit 5: Chapter 14: Sections 14.0-14.5.

**REFERENCES**

1. J.N. Kapoor& H.C. Saxena, Mathematical Statistics, S. Chand & Co Pvt. Ltd., New Delhi,1994.
2. S. C. Gupta & V. K. Kapoor, Fundamentals of Mathematical Statistics, S. Chand & Co Pvt. Ltd., New Delhi,

## COs VS POs Mapping

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| **CO 1** | 3 | 2 | | 1 | 1 | | 1 | 1 | 1 |
| **CO 2** | 3 | 2 | | 1 | | | 1 | 1 | 1 |
| **CO 3** | 3 | 2 | | 1 | | | 1 | 1 | 1 |
| **CO 4** | 3 | 2 | | 1 | 1 | | 1 | 1 | 1 |
| **CO 5** | 3 | 2 | | 1 | 1 | | 1 | 1 | 1 |
| **Total** | 15 | 10 | 0 | 5 | 3 | 0 | 5 | 5 | 5 |
| **Scaled value** | 3 | 2 | | 1 | 1 | | 1 | 1 | 1 |

1 – 5 →1, 6 – 10→ 2, 11 – 15→ 3
0-No Relation, 1- Low Relation, 2-Medium Relation, 3-High Relation

| COURSE CODE | | | COURSE NAME | | L | T | P | C |
|---|---|---|---|---|---|---|---|---|
| **XMT502B** | | | **STOCHASTIC PROCESSES** | | 4 | 1 | 0 | 5 |
| **C** | **P** | **A** | | | | | | |
| **5** | **0** | **0** | | | L | T | P | H |
| | | | | | **4** | **2** | **0** | **6** |

**PREREQUISITE:**

**COURSE OUTCOMES:**

| Course outcomes: | Domain | Level |
|---|---|---|
| **CO1:Explain** Generating function - Laplace transforms – Laplace transforms of a probability distribution function - Difference equations – Differential difference equations and Matrix analysis. | Cognitive | Understanding |
| **CO2: Explain**Stationary Process and **solve**problems inMarkov Chains –Higher transition probabilities. | Cognitive | Understanding Applying |
| **CO3:Find** Classification of states and chains – Determination of higher transition probabilities – Stability of Markov system – Limiting behaviour. | Cognitive | Remembering |
| **CO4: Explain**Poisson Process and related distributions – Generalization of Poisson Process – Birth and death process. | Cognitive | Understanding |
| **CO5: Explain** Stochastic Process in queuing and reliability and **solve** problems in M/M/1 models - Multi channel models – Bulk Queues. | Cognitive | Understanding Applying |

| 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 BOOKS**

1. J.Medhi, Stochastic Processes, Chapters 1,2,3 (Omitting 3.6,3.7,3.8), Chapter 4 (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. First Course in Stochastic Processes by Samuel Karlin.
2. Stochastic Processes by Srinivasan and Metha (TATA McGraw Hill).
3. Elements of Applied Stochastic Processes by V.Narayan.

COs VS POs Mapping

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|---|---|---|---|---|---|---|---|---|---|
| **CO 1** | 3 | 2 | | 1 | 1 | | 1 | 1 | 1 |
| **CO 2** | 3 | 2 | | 1 | | | 1 | 1 | 1 |
| **CO 3** | 3 | 2 | | 1 | | | 1 | 1 | 1 |
| **CO 4** | 3 | 2 | | 1 | 1 | | 1 | 1 | 1 |
| **CO 5** | 3 | 2 | | 1 | 1 | | 1 | 1 | 1 |
| **Total** | 15 | 10 | 0 | 5 | 3 | 0 | 5 | 5 | 5 |
| **Scaled value** | 3 | 2 | | 1 | 1 | | 1 | 1 | 1 |

$1 – 5 \rightarrow 1, 6 – 10 \rightarrow 2, 11 – 15 \rightarrow 3$

0-No Relation, 1- Low Relation, 2-Medium Relation, 3-High Relation

| COURSE CODE | | | COURSE NAME | L | T | P | C |
|---|---|---|---|---|---|---|---|
| XMT503A | | | ABSTRACT ALGEBRA | 4 | 1 | 0 | 5 |
| C | P | A | | | | | |
| 5 | 0 | 0 | | L | T | P | H |
| | | | | 4 | 2 | 0 | 6 |

| PREREQUISITE: | | |
|---|---|---|
| COURSE OUTCOMES: | | |
| Course outcomes: | Domain | Level |
| CO1:Define and ExplainProperties of Group with examples | Cognitive | Remembering Understanding |
| CO2: ExplainSubgroups - Cyclic Groups-Order of an Element – Cosets and Lagrange's Theorem. | Cognitive | Understanding |
| CO3: Define and ExplainNormal Subgroups and Quotient Groups - Isomorphism –Homomorphism. | Cognitive | Remembering Understanding |
| CO4: Define ring and to Explainproperties of rings, Types of rings, Characteristic of a ring – subrings – Ideals - Quotient rings. | Cognitive | Remembering Understanding |
| CO5: ExplainHomomorphism of rings – Field of quotient of an integral domain – unique factorization domain-Euclidean domain. | Cognitive | Understanding |

| UNIT I | 18 |
|---|---|
| Groups : Definition and Examples – Elementary Properties of a Group – Equivalent Definitions of a Group.-Permutation Groups. | |
| UNIT II | 18 |
| Subgroups - Cyclic Groups-Order of an Element – Cosets and Lagrange's Theorem . | |
| UNIT III | 18 |
| Normal Subgroups and Quotient Groups - Isomorphism –Homomorphism. | |
| UNIT IV | 18 |
| Rings: Definitions and Examples - Elementary properties of rings –Isomorphism - Types of rings.-Characteristic of a ring – subrings – Ideals - Quotient rings. | |
| UNIT V | 18 |
| Maxi mal and Prime Ideals.-Homomorphism of rings – Field of quotient of an integral domain – unique factorization domain-Euclidean domain. | |

| LECTURE | TUTORIAL | TOTAL |
|---|---|---|
| 60 | 30 | 90 |
| TEXT BOOKS | | |

1. S Arumugam and A Thangapandi Isaac, Modern Algebra, SciTech Publications, Chennai, 2003.
Unit 1: Chapter 3 Sections 3.1-3.4
Unit 2: Chapter 3 Sections3.5-3.8
Unit 3: Chapter 3 Sections 3.9-3.11
Unit 4: Chapter 4 Sections 4.1-4.8
Unit 5: Chapter 4 Sections 4.9- 4.11, 4.13-14

**REFERENCES**

1. N. Herstein, Topics in Algebra, John Wiley & Sons, Student 2nd edition, 1975.
2. Vijay, K. Khanna and S.K. Bhambri, A Course in Abstract Algebra, VikasPublishing House Pvt.Ltd.

**COs VS POs Mapping**

|  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|---|---|---|---|---|---|---|---|---|---|
| **CO 1** | 3 | 2 |  | 1 | 1 |  | 1 | 1 | 1 |
| **CO 2** | 3 | 2 |  | 1 |  |  | 1 | 1 | 1 |
| **CO 3** | 3 | 2 |  | 1 |  |  | 1 | 1 | 1 |
| **CO 4** | 3 | 2 |  | 1 | 1 |  | 1 | 1 | 1 |
| **CO 5** | 3 | 2 |  | 1 | 1 |  | 1 | 1 | 1 |
| **Total** | 15 | 10 | 0 | 5 | 3 | 0 | 5 | 5 | 5 |
| **Scaled value** | 3 | 2 |  | 1 | 1 |  | 1 | 1 | 1 |

$1 – 5 \rightarrow 1$, $6 – 10 \rightarrow 2$, $11 – 15 \rightarrow 3$
0-No Relation, 1- Low Relation, 2-Medium Relation, 3-High Relation

| COURSE CODE | COURSE NAME | L | T | P | C |
|---|---|---|---|---|---|
| **XMT503B** | **DISCRETE MATHEMATICS** | 4 | 1 | 0 | 5 |

| C | P | A | | L | T | P | H |
|---|---|---|---|---|---|---|---|
| **5** | **0** | **0** | | **4** | **2** | **0** | **6** |

**PREREQUISITE:** Algebra

**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.

**COs VS POs Mapping**

|  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|---|---|---|---|---|---|---|---|---|---|
| **CO 1** | 3 | 2 | 1 | 1 | 1 |  | 1 | 1 | 1 |
| **CO 2** | 3 | 2 | 1 | 1 |  |  | 1 | 1 | 1 |
| **CO 3** | 3 | 2 | 1 | 1 |  |  | 1 | 1 | 1 |
| **CO 4** | 3 | 2 | 1 | 1 | 1 |  | 1 | 1 | 1 |
| **CO 5** | 3 | 2 | 1 | 1 | 1 |  | 1 | 1 | 1 |
| **Total** | 15 | 10 | 5 | 5 | 3 | 0 | 5 | 5 | 5 |
| **Scaled value** | 3 | 2 | 1 | 1 | 1 |  | 1 | 1 | 1 |

1 – 5 →1, 6 – 10→ 2, 11 – 15→ 3

0-No Relation, 1- Low Relation, 2-Medium Relation, 3-High Relation

| COURSE CODE | | | COURSE NAME | | L | T | P | C |
|---|---|---|---|---|---|---|---|---|
| XMT504A | | | MODERN ANALYSIS | | 4 | 1 | 0 | 5 |
| C | P | A | | | | | | |
| 5 | 0 | 0 | | | L | T | P | H |
| | | | | | 4 | 2 | 0 | 6 |

**PREREQUISITE:**

**COURSE OUTCOMES:**

| Course outcomes: | Domain | Level |
|---|---|---|
| **CO1:Define and Explain**Metric Spaces. | Cognitive | Remembering Understanding |
| **CO2:  Define and Explain** Subspaces- Interior of a set- Closed sets – Closure- Limit point-Dense sets. | Cognitive | Remembering Understanding |
| **CO3: Define and Explain**Complete metric space: Completeness- Cantor's intersection theorem-Baire's Category theorem. | Cognitive | Remembering Understanding |
| **CO4: Explain**Continuity: Continuity – Homeomorphism-Uniform continuity-Discontinuous functions on R. | Cognitive | Remembering |
| **CO5: Define and Explain**Connectednessand  Compact space | Cognitive | Remembering Understanding |

| UNIT I | 18 |
|---|---|
| Metric Spaces: Definitions and examples-Bounded sets in a metric space-Open ball in a   metric space-Open sets-equivalent metrics. | |

| UNIT II | 18 |
|---|---|
| Subspaces- Interior of a set- Closed sets –Closure- Limit point-Dense sets. | |

| UNIT  III | 18 |
|---|---|
| Complete metric space: Completeness- Cantor's intersection theorem-Baire's Category theorem. | |

| UNIT IV | 18 |
|---|---|
| Continuity: Continuity – Homeomorphism-Uniform continuity-Discontinuous functions on R. | |

| UNIT V | 18 |
|---|---|
| Connectedness: Definition and examples, Connected subsets of R- Connectedness and      continuity; Compact space: Compact subsets of R-Equivalent characterization for compactness- Compactness and continuity. | |

| | LECTURE | TUTORIAL | | TOTAL |
|---|---|---|---|---|
| | 60 | 30 | | 90 |

**TEXT BOOKS**

| | | |
|---|---|---|
| 1. | S.Arumugam& A. Thangapandi Isaac, Modern Analysis, New Gamma Publishing House, Palayamkottai, 2002.Unit 1-Secs 2.1-2.4. Unit 2-Secs 2.5-2.10. Unit 3-Secs 3.1-3.2. Unit 4-Secs 4.1-4.4. Unit 5-Secs 5.1-5.3, 6.1-6.4. | |

**REFERENCES**

1. N. P. Bali, Real Analysis, An imprint of Laxmi Publications Pvt. Ltd., New Delhi, 2005.
2. Sterling K. Berberian, A First Course In Real Analysis, Springer, New York, 2004.
3. Robert G. Bartle and Donald R. Sherbert, Introduction to Real Analysis, John Wiley and Sons, New Delhi, 1982.
4. Richard R. Goldberg, Methods of Real Analysis, Oxford & IBH Publishing CO. PVT. LTD., New Delhi, 1970.
5. S. C. Malik &SavitaArora, Mathematical Analysis, New Age International LTD., New Delhi, 1992.

**Table 1: COs VS POs Mapping**

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|---|---|---|---|---|---|---|---|---|---|
| **CO 1** | 3 | 2 | | 1 | 1 | | 1 | 1 | 1 |
| **CO 2** | 3 | 2 | | 1 | | | 1 | 1 | 1 |
| **CO 3** | 3 | 2 | | 1 | | | 1 | 1 | 1 |
| **CO 4** | 3 | 2 | | 1 | 1 | | 1 | 1 | 1 |
| **CO 5** | 3 | 2 | | 1 | 1 | | 1 | 1 | 1 |
| **Total** | 15 | 10 | 0 | 5 | 3 | 0 | 5 | 5 | 5 |
| **Scaled value** | 3 | 2 | | 1 | 1 | | 1 | 1 | 1 |

1 – 5 →1, 6 – 10→ 2, 11 – 15→ 3
0-No Relation, 1- Low Relation, 2-Medium Relation, 3-High Relation

| COURSE CODE | | | COURSE NAME | L | T | P | C |
|---|---|---|---|---|---|---|---|
| XMT504B | | | GRAPH THEORY | 4 | 1 | 0 | 5 |
| C | P | A | | | | | |
| 5 | 0 | 0 | | L | T | P | H |
| | | | | 4 | 2 | 0 | 6 |

**PREREQUISITE:**

**COURSE OUTCOMES:**

| Course outcomes: | Domain | Level |
|---|---|---|
| **CO1:Define and Explain**Konigsberg Bridge Problem - Graphs and subgraphs, Degrees, Isomorphism of graphs, independent sets and coverings. | Cognitive | Remembering Understanding |
| **CO2:  Define and Explain**Walks, Trails and Paths – Connectedness and Components - Eulerian Graphs. | Cognitive | Remembering Understanding |
| **CO3:  Define  and  Explain**Hamiltonian  Graphs  (Omit Chavatal Theorem) - Characterization of Trees - Centre of a Tree. | Cognitive | Remembering Understanding |
| **CO4: Define and Explain**Planarity and Properties - Characterization of Planar Graphs. | Cognitive | Remembering Understanding |
| **CO5:  Define  and  Explain**Directed Graphs and its Properties, Kruskal's algorithm - Shortest Path Problem – Dijkstra's algorithm. | Cognitive | Remembering Understanding |

| **UNIT I** | **18** |
|---|---|

Introduction - The Konigsberg Bridge Problem - Graphs and subgraphs: Definition and Examples - Degrees - Subgraphs - Isomorphism. –independent sets and coverings.

| **UNIT II** | **18** |
|---|---|

Matrices - Operations on Graphs - Walks, Trails and Paths – Connectedness and Components - Eulerian Graphs.

| **UNIT III** | **18** |
|---|---|

Hamiltonian Graphs (Omit Chavatal Theorem) - Characterization of Trees - Centre of a Tree.

| **UNIT IV** | **18** |
|---|---|

Planarity: Introduction - Definition and Properties - Characterization of Planar Graphs.

| **UNIT V** | **18** |
|---|---|

Directed Graphs: Introduction - Definitions and Basic Properties – Some Applications: Connector Problem - Kruskal's algorithm - Shortest Path Problem – Dijkstra's algorithm.

| **LECTURE** | **TUTORIAL** | | **TOTAL** |
|---|---|---|---|
| 60 | 30 | | 90 |

**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
UNI-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.

**Table 1: COs VS POs Mapping**

|  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|---|---|---|---|---|---|---|---|---|---|
| **CO 1** | 3 | 2 |  | 1 | 1 |  | 1 | 1 | 1 |
| **CO 2** | 3 | 2 |  | 1 |  |  | 1 | 1 | 1 |
| **CO 3** | 3 | 2 |  | 1 |  |  | 1 | 1 | 1 |
| **CO 4** | 3 | 2 |  | 1 | 1 |  | 1 | 1 | 1 |
| **CO 5** | 3 | 2 |  | 1 | 1 |  | 1 | 1 | 1 |
| **Total** | 15 | 10 | 0 | 5 | 3 | 0 | 5 | 5 | 5 |
| **Scaled value** | 3 | 2 |  | 1 | 1 |  | 1 | 1 | 1 |

$1 - 5 \rightarrow 1, 6 - 10 \rightarrow 2, 11 - 15 \rightarrow 3$

0-No Relation, 1- Low Relation, 2-Medium Relation, 3-High Relation

| COURSE CODE | COURSE NAME | L | T | P | C |
|---|---|---|---|---|---|
| XMT505 | **NUMERICAL METHODS WITH 'C' PROGRAMMING(Practical)** | **0** | **0** | **2** | **2** |

| C | P | A | | | | | |
|---|---|---|---|---|---|---|---|
| **2** | **0** | **0** | | **L** | **T** | **P** | **H** |
| | | | | **0** | **0** | **2** | **2** |

**PREREQUISITE:**

**COURSE OUTCOMES:**

| Course outcomes: | Domain | Level |
|---|---|---|
| **CO1:Apply** Variables and Data types, Operators and Expressions, Mathematical Functions-Input and output operators. | Cognitive | Applying |
| **CO2:  Explain** Decision making and Branching using IF statements, GOTO statement, Decision making and looping - WHILE, DO, FOR statements and Arrays. | Cognitive | Understanding Applying |
| **CO3:Use**Handling of character strings, Arithmetic operations on characters, String handling functions and User defined functions. | Cognitive | Applying |
| **CO4:** Solving algebraic and transcendental equations. | Cognitive | Applying |
| **CO5:  Find** Interpolation with equal and unequal intervals. | Cognitive | Remembering |

**List of Practicals**

1. Solution of a Quadratic Equation (all cases)

2. Sorting of names in alphabetical order. 5. Matrix Operations (Addition, Subtraction, Multiplication – use functions).

3. String Manipulation without using String functions (String length, String Comparison,  String copy, Polidrome checking, counting words and lines in strings – use function pointers).

4. Bisection and Newton-Raphson method

5. Lagranges Interpolation formula.

6. Gauss Elimination Method.

7. Euler and Runge-Kutta (II order only) methods.

8. Trapezoidal and Simpson's 1/3rd Rule.

**COs VS POs Mapping**

|         | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| **CO 1** | 3 | 2 | | | 1 | | | | 1 |
| **CO 2** | 3 | 2 | | | 1 | | | | 1 |
| **CO 3** | 3 | 2 | | | 1 | | | | 1 |
| **CO 4** | 3 | 2 | | | 1 | | | | 1 |
| **CO 5** | 3 | 2 | | | 1 | | | | 1 |
| **Total** | 15 | 10 | | | 5 | | | | 5 |
| **Scaled value** | 3 | 2 | | | 1 | | | | 1 |

1 – 5 →1, 6 – 10→ 2, 11 – 15→ 3

0-No Relation, 1- Low Relation, 2-Medium Relation, 3-High Relation

| COURSE CODE | | COURSE NAME | | L | T | P | C |
|---|---|---|---|---|---|---|---|
| **XMT601A** | | **LINEAR ALGEBRA** | | **4** | **1** | **0** | **5** |
| **C** | **P** | **A** | | | | | |
| **5** | **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 Productspace and to **Define** with examples orthogonality, GramSchmidtorthogonalisation 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. | |

| **UNITIII  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.

**COs VS POs Mapping**

|  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|---|---|---|---|---|---|---|---|---|---|
| **CO 1** | 3 | 2 | | 1 | 1 | | 1 | 1 | 1 |
| **CO 2** | 3 | 2 | | 1 | | | 1 | 1 | 1 |
| **CO 3** | 3 | 2 | | 1 | | | 1 | 1 | 1 |
| **CO 4** | 3 | 2 | | 1 | 1 | | 1 | 1 | 1 |
| **CO 5** | 3 | 2 | | 1 | 1 | | 1 | 1 | 1 |
| **Total** | 15 | 10 | 0 | 5 | 3 | 0 | 5 | 5 | 5 |
| **Scaled value** | 3 | 2 | | 1 | 1 | | 1 | 1 | |

1 – 5 →1, 6 – 10→ 2, 11 – 15→ 3

0-No Relation, 1- Low Relation, 2-Medium Relation, 3-High Relation

| COURSE CODE | | | COURSE NAME | L | T | P | C |
|---|---|---|---|---|---|---|---|
| XMT601B | | | NUMBER THEORY | 4 | 1 | 0 | 5 |
| C | P | A | | | | | |
| 5 | 0 | 0 | | L | T | P | H |
| | | | | 4 | 2 | 0 | 6 |

**PREREQUISITE:**

**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. | Cognitive | Remembering Understanding |
| **CO4:Define** and**Explain**The Chinese Remainder Theorem – Polynomial Congruences – 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. Number Theory by George E.Andrews, Hindustan Publishing Corporation – 1984, Edition.

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. Basic Number Theory by S.B.Malik, Vikas Publishing House Pvt. Ltd.,
2. A First Course Theory of Numbers by K.C.Chowdhury. Asian Books Pvt. Ltd., I Edition, (2004).

**COs VS POs Mapping**

|  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|---|---|---|---|---|---|---|---|---|---|
| **CO 1** | 3 | 2 |  | 1 | 1 |  | 1 | 1 | 1 |
| **CO 2** | 3 | 2 |  | 1 |  |  | 1 | 1 | 1 |
| **CO 3** | 3 | 2 |  | 1 |  |  | 1 | 1 | 1 |
| **CO 4** | 3 | 2 |  | 1 | 1 |  | 1 | 1 | 1 |
| **CO 5** | 3 | 2 |  | 1 | 1 |  | 1 | 1 | 1 |
| **Total** | 15 | 10 | 0 | 5 | 3 | 0 | 5 | 5 | 5 |
| **Scaled value** | 3 | 2 |  | 1 | 1 |  | 1 | 1 | 1 |

$1 - 5 \rightarrow 1, 6 - 10 \rightarrow 2, 11 - 15 \rightarrow 3$

0-No Relation, 1- Low Relation, 2-Medium Relation, 3-High Relation

| COURSE CODE | | | COURSE NAME | L | T | P | C |
|---|---|---|---|---|---|---|---|
| **XMT602A** | | | **COMPLEX ANALYSIS** | **4** | **1** | **0** | **5** |
| **C** | **P** | **A** | | | | | |
| **5** | **0** | **0** | | **L** | **T** | **P** | **H** |
| | | | | **4** | **2** | **0** | **6** |

**PREREQUISITE:**

**COURSE OUTCOMES:**

| | Domain | Level |
|---|---|---|
| **CO1:Explain** CR equations to verify analytic functions and to **find** harmonic functions and harmonic conjugate. | Cognitive | Understanding Remembering |
| **CO2: Explain**Conformal mappings - Linear and Non-linear transformationsand to **find**Bilinear transformations | Cognitive | Understanding Remembering |
| **CO3:Explain** Cauchy's Integral theorem - Cauchy's Integral formulaand to **find**simple problems. | Cognitive | Remembering Understanding |
| **CO4: Explain**Types of singularities - Properties of singularitiesand to **find**Taylor's and Laurent's series – Expansion. | Cognitive | Understanding Remembering |
| **CO5: Explain**Residue theoremand to **find**Integration of functions of the type involving cosxsinx. | Cognitive | Understanding Remembering |

| **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 cosxsinx-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.

**COs VS POs Mapping**

|  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|---|---|---|---|---|---|---|---|---|---|
| **CO 1** | 3 | 2 |  | 1 | 1 |  | 1 | 1 | 1 |
| **CO 2** | 3 | 2 |  | 1 |  |  | 1 | 1 | 1 |
| **CO 3** | 3 | 2 |  | 1 |  |  | 1 | 1 | 1 |
| **CO 4** | 3 | 2 |  | 1 | 1 |  | 1 | 1 | 1 |
| **CO 5** | 3 | 2 |  | 1 | 1 |  | 1 | 1 | 1 |
| **Total** | 15 | 10 | 0 | 5 | 3 | 0 | 5 | 5 | 5 |
| **Scaled value** | 3 | 2 |  | 1 | 1 |  | 1 | 1 | 1 |

1 – 5 →1, 6 – 10→ 2, 11 – 15→ 3

0-No Relation, 1- Low Relation, 2-Medium Relation, 3-High Relation

| COURSE CODE | COURSE NAME | | L | T | P | C |
|---|---|---|---|---|---|---|
| **XMT602B** | **MATHEMATICAL MODELLING** | | **4** | **1** | **0** | **5** |

| C | P | A | | | | | |
|---|---|---|---|---|---|---|---|
| **5** | **0** | **0** | | **L** | **T** | **P** | **H** |
| | | | | **4** | **2** | **0** | **6** |

**PREREQUISITE:**

**COURSE OUTCOMES:**

| | Domain | Level |
|---|---|---|
| **CO1: Define** and **Explain** Linear Growth and Decay Models – Non-Linear Growth and Decay Models – Compartment Models – Dynamic problems – Geometrical problems. | Cognitive | Remembering Understanding |
| **CO2: Define** and **Explain** Population Dynamics – Epidemics – Compartment Models – Economics – Medicine, Arms Race, Battles and International Trade – Dynamics. | Cognitive | Remembering Understanding |
| **CO3: Define** and **Explain** Planetary Motions – Circular Motion and Motion of Satellites – Mathematical Modelling through Linear Differential Equations of Second Order. | Cognitive | Remembering Understanding |
| **CO4: Define** and **Explain** Basic Theory of Linear Difference Equations with Constant Coefficients – Economics and Finance – Population Dynamics and Genetics – Probability Theory. | Cognitive | Remembering Understanding |
| **CO5: Define** and **Explain** Solutions that can be Modelled Through Graphs – Mathematical Modelling in Terms of Directed Graphs, Signed Graphs, Weighted Digraphs and Unoriented Graphs. | Cognitive | Remembering Understanding |

| **UNIT I** | **18** |
|---|---|
| Mathematical Modelling through Ordinary Differential Equations of First order : Linear Growth and Decay Models – Non-Linear Growth and Decay Models – Compartment Models – Dynamic problems – Geometrical problems. | |
| **UNIT II** | **18** |
| Mathematical Modelling through Systems of Ordinary Differential Equations of First Order : Population Dynamics – Epidemics – Compartment Models – Economics – Medicine, Arms Race, Battles and International Trade – Dynamics. | |
| **UNIT III** | **18** |
| Mathematical Modelling through Ordinary Differential Equations of Second Order : Planetary Motions – Circular Motion and Motion of Satellites – Mathematical Modelling through Linear Differential Equations of Second Order – Miscellaneous Mathematical Models. | |
| **UNIT IV** | **18** |
| Mathematical Modelling through Difference Equations : Simple Models – Basic Theory of Linear Difference Equations with Constant Coefficients – Economics and Finance – Population Dynamics | |

| | | |
|---|---|---|
| and Genetics – Probability Theory. | | |

| UNIT V | | 18 |
|---|---|---|

Mathematical Modelling through Graphs : Solutions that can be Modelled Through Graphs – Mathematical Modelling in Terms of Directed Graphs, Signed Graphs, Weighted Digraphs and Unoriented Graphs.

| LECTURE | TUTORIAL | TOTAL |
|---|---|---|
| **60** | **30** | **90** |

**TEXT BOOK**

1. J.N. Kapur, Mathematical Modelling, Wiley Eastern Limited, New Delhi, 1988.

Unit 1: Chap 2, Sec 2.1 – 2.6,    Unit 2: Chap 3, Sec 3.1 – 3.6,    Unit 3: Chap 4, Sec 4.1 – 4.4

Unit 4: Chap 5, Sec 5.1 – 5.5,    Unit 5: Chap 7, Sec 7.1 – 7.5

**REFERENCES**

1. J.N. Kapur, Mathematical Models in biology and Medicine, EWP, New Delhi, 1985.

**COs VS POs Mapping**

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|---|---|---|---|---|---|---|---|---|---|
| **CO 1** | 3 | 2 | | 1 | 1 | | 1 | 1 | 1 |
| **CO 2** | 3 | 2 | | 1 | | | 1 | 1 | 1 |
| **CO 3** | 3 | 2 | | 1 | | | 1 | 1 | 1 |
| **CO 4** | 3 | 2 | | 1 | 1 | | 1 | 1 | 1 |
| **CO 5** | 3 | 2 | | 1 | 1 | | 1 | 1 | 1 |
| **Total** | 15 | 10 | 0 | 5 | 3 | 0 | 5 | 5 | 5 |
| **Scaled value** | 3 | 2 | | 1 | 1 | | 1 | 1 | 1 |

$1 – 5 \rightarrow 1, 6 – 10 \rightarrow 2, 11 – 15 \rightarrow 3$

0-No Relation, 1- Low Relation, 2-Medium Relation, 3-High Relation

| COURSE CODE | | | COURSE NAME | L | T | P | C |
|---|---|---|---|---|---|---|---|
| XMT603A | | | **LINEAR PROGRAMMING** | 4 | 1 | 0 | 5 |
| C | P | A | | | | | |
| 4.5 | 0.5 | 0.5 | | L | T | P | H |
| | | | | 4 | 2 | 0 | 6 |

**PREREQUISITE:** Linear Algebra

**COURSE OUTCOMES:**

| | Domain | Level |
|---|---|---|
| **CO1:Find** Graphical Solution, **Solve** LPP using Simplex Method, Big M Method and Two Phase Method. | Cognitive | Remembering Applying |
| **CO2: Find** Formulation of Primal - Dual Pairs and Solve dual Simplex Method. | Cognitive Psychomoter | Remembering Applying Guided Response |
| **CO3:Solve** Transportation Problems and Assignment Problems by using various methods. | Cognitive | Applying |
| **CO4:Solve** Sequencing 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. | Cognitive Affective | Applying Receiving |
| **CO5: Solve** Two persons Zero sum games - maximin and minimax principle - Games without saddle points - Mixed strategies - Graphical method - 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 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.

 **COs VS POs Mapping**

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|---|---|---|---|---|---|---|---|---|---|
| **CO 1** | 3 | 2 | | 1 | 1 | | | 1 | 1 |
| **CO 2** | 3 | 2 | | 1 | | | | 1 | 1 |
| **CO 3** | 3 | 2 | | 1 | | | | 1 | 1 |
| **CO 4** | 3 | 2 | | 1 | 1 | | | 1 | 1 |
| **CO 5** | 3 | 2 | | 1 | 1 | | | 1 | 1 |
| **Total** | 15 | 10 | 0 | 5 | 3 | 0 | 0 | 5 | 5 |
| **Scaled value** | 3 | 2 | | 1 | 1 | | | 1 | 1 |

1 – 5 →1, 6 – 10→ 2, 11 – 15→ 3

0-No Relation, 1- Low Relation, 2-Medium Relation, 3-High Relation

| COURSE CODE | COURSE NAME | L | T | P | C |
|---|---|---|---|---|---|
| **XMT603B** | **FINANCIAL ACCOUNTING** | **4** | **1** | **0** | **5** |

| C | P | A | | L | T | P | H |
|---|---|---|---|---|---|---|---|
| **5** | **0** | **0** | | **4** | **2** | **0** | **6** |

**PREREQUISITE:**

**COURSE OUTCOMES:**

| | Domain | Level |
|---|---|---|
| **CO1:Prepare** financial statements in accordance with Generally Accepted Accounting Principles. | Cognitive | Applying |
| **CO2: Prepare**Bank Reconciliation Statement and to **identify**and rectify errors. | Cognitive | Applying |
| **CO3:Compare and solve** single entry to double entry system. | Cognitive | Applying |
| **CO4:Calculate** account current, average due date and insurance claims | Cognitive | Applying |
| **CO5: Calculate** depreciation on fixed assets. | Cognitive | Applying |

| **UNIT I** | 18 |
|---|---|

Final Accounts - Introduction - Manufacturing Account -Trading Account - Distinction between Capital and Revenue expenditure - Profit and Loss Account - Balance Sheet - Various adjustments - Classification of Assets and Liabilities - Adjustments.

| **UNIT II** | **18** |
|---|---|

Rectification of errors - Bank Reconciliation Statement.

| **UNIT III** | **18** |
|---|---|

Single Entry - Objectives - Definition - Salient features - Limitations of Single Entry - Ascertainment of Profit - Statement of Affairs Method - Conversion Method - Difference between Statement and Affairs and Balance Sheet.

| **UNIT IV** | **18** |
|---|---|

Account current - Average Due Date - Insurance claim - Abnormal items - Loss of property and stock - Average clause - Loss of Profit.

| **UNIT V** | **18** |
|---|---|

Depreciation, Reserves and Provisions - Depreciation, Depletion and Amortization - Objectives of providing depreciation - causes of depreciation - methods of recording depreciation - straight line method - Diminishing Balance Method - Changes in method of depreciation - Machine Hour Rate Method - Depletion Method - Revaluation Method.

| LECTURE | TUTORIAL | TOTAL |
|---|---|---|
| **60** | **30** | **90** |

**TEXT BOOK**

1. T.S.Reddy&A.Murthy - Financial Accounting - recent edition, Marghan Publications, Chennai.
2. M.C.Shukla, T.S.Grewal. Advanced Accounts (volume I)  recent edition, S.Chand& Co., Ltd., New Delhi.

**REFERENCES**

1 R.S.N. Pillai, Bagawathi&S.Uma - Advanced Accounting (Financial Accounting) volume I, S.Chand& Co. Ltd., New Delhi.
2. R.L. Gupta & V.K. Gupta, Financial Accounting, recent edition,  Sultan Chand & Sons, New Delhi.
3. S.P. Jain & K.L. Naranj, Advanced Accountancy, Kalyani Publications, Ludhiana.

**COs VS POs Mapping**

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 3 | 3 | | | | 1 | 1 | | 1 |
| **CO2** | 2 | 2 | | | | | 2 | | 1 |
| **CO3** | 2 | 2 | | | | 1 | | | 1 |
| **CO4** | 2 | 2 | | | | 1 | | | |
| **CO5** | 2 | 2 | | | | | | | |
| **Total** | 11 | 11 | 0 | 0 | 0 | 3 | 3 | 0 | 3 |
| **Scaled value** | 3 | 3 | 0 | 0 | 0 | 1 | 1 | 0 | 1 |

1 – 5 →1, 6 – 10→ 2, 11 – 15→ 3

0-No Relation, 1- Low Relation, 2-Medium Relation, 3-High Relation