# SADAKATHULLAH APPA COLLEGE
## (AUTONOMOUS)

**(Reaccredited by NAAC with 'A' GRADE and ISO 9001: 2008 certified)**

**Rahmath Nagar, Tirunelveli – 627 011**

## DEPT. OF MATHEMATICS

# B.SC. - MATHEMATICS

## UNITIZED SYLLABUS (CBCS)

## FOR

## (2011 - 2014)

**(Applicable for students admitted in June 2011 and onwards)**

## (Updated as per the resolutions passed in the Academic Council Meeting held on 14-03-2013)

# COURSE STRUCTURE UNDER CBCS (2011 - 2014)

## B.Sc. MATHEMATICS SYLLABUS APPLICABLE FOR THOSE WHO JOINED IN JUNE 2013 AND AFTERWARDS

| I SEMESTER | | | |
|---|---|---|---|
| **P** | **COURSE** | **H/W** | **C** |
| **I** | Tamil / Arabic | 6 | 3 |
| **II** | English | 6 | 3 |
| **III** | Core - 1 | 6 | 5 |
| | Allied I -1 | 6 | 5 |
| **IV** | Skill Based Elective - 1 | 3 | 2 |
| | SVE | 3 | 2 |
| **TOTAL** | | **30** | **20** |

| II SEMESTER | | | |
|---|---|---|---|
| **P** | **COURSE** | **H/W** | **C** |
| **I** | Tamil / Arabic | 6 | 3 |
| **II** | English | 6 | 3 |
| **III** | Core - 2 | 6 | 5 |
| | Allied I - 2 | 6 | 5 |
| **IV** | Skill Based Elective - 2 | 3 | 2 |
| | EVS | 3 | 2 |
| | **TOTAL** | **30** | **20** |

| III SEMESTER | | | |
|---|---|---|---|
| **I** | Tamil / Arabic | 6 | 3 |
| **II** | English | 6 | 3 |
| **III** | Core - 3 | 6 | 5 |
| | Allied II - 1 | 4 | 4 |
| | Allied Practical - II | 2 | -- |
| **IV** | Skill Based Elective - 3 | 3 | 2 |
| | Non-major Elective - 1 | 3 | 2 |
| **TOTAL** | | **30** | **19** |

| IV SEMESTER | | | |
|---|---|---|---|
| **I** | Tamil / Arabic | 6 | 3 |
| **II** | English | 6 | 3 |
| **III** | Core - 4 | 6 | 5 |
| | Allied II - 2 | 4 | 4 |
| | Allied Practical - II | 2 | 2 |
| **IV** | Skill Based Elective - 4 | 3 | 2 |
| | Non Major Elective - 2 | 3 | 2 |
| | **TOTAL** | **30** | **21** |

| V SEMESTER | | | |
|---|---|---|---|
| **III** | Core - 5 | 5 | 5 |
| | Core - 6 | 5 | 5 |
| | Core - 7 | 5 | 5 |
| | Core – 8 | 6 | 5 |
| | (CE1) Core Elective - 1 | 4 | 3 |
| | CE1 Practical* | 2 | -- |
| | - | - | - |
| **IV** | Skill Based Elective – 5 | 3 | 2 |
| **TOTAL** | | **30** | **25** |

| VI SEMESTER | | | |
|---|---|---|---|
| **III** | Core – 9 | 4 | 5 |
| | Core – 10 | 4 | 5 |
| | Core – 11 | 4 | 5 |
| | Core – 12 | 4 | 5 |
| | (CE2) Core Elective - 2 | 6 | 5 |
| | CE1 Practical | -- | 2 |
| | Project | 5 | 5 |
| **IV** | Skill Based Elective - 6 | 3 | 2 |
| | **TOTAL** | **30** | **34** |

* Practical Examinations in the even semester

## DISTRIBUTION OF HOURS, CREDITS, NO. OF PAPERS & MARKS

| PART | COURSE | SEMESTER | HOURS | CREDITS | | PAPERS | MARKS |
|---|---|---|---|---|---|---|---|
| **I** | Tamil / Arabic | I to IV | 24 | 12 | 24 | 4 | 400 |
| **II** | English | I to IV | 24 | 12 | | 4 | 400 |
| **III** | Core + Practical | I to VI | 61 | 60 | 95 | 9+4 | 1300 |
| | C. Elective + Pract.+ Project | V & VI | 17 | 15 | | 2+1+1 | 400 |
| | Allied I + Allied II + Practical | I to IV | 24 | 20 | | 2+2+1 | 500 |
| **IV** | Skilled Based Elective | I to VI | 18 | 12 | 20 | 6 | 600 |
| | Non Major Elective | III & IV | 6 | 4 | | 2 | 200 |
| | Social Value Education | I | 3 | 2 | | 1 | 100 |
| | Environmental Studies | II | 3 | 2 | | 1 | 100 |
| **V** | Extension Activities | I to IV | -- | 1 | 1 | 1 | 100 |
| **TOTAL** | | | **180** | **140** | **140** | **41** | **4100** |

| SEMESTER WISE DISTRIBUTION OF HOURS | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **PART** | **I** | **II** | **III** | | | | **IV** | | | **TOTAL** |
| **SEM** | **T/A** | **ENG** | **CORE** | **CE** | **PRO** | **AL** | **SBE** | **NME** | **SVE/ES** | |
| **I** | 6 | 6 | 3+3 | - | - | 6 | 3 | - | 3 | **30** |
| **II** | 6 | 6 | 3+3 | - | - | 6 | 3 | - | 3 | **30** |
| **III** | 6 | 6 | 4+2 | - | - | 4+2 | 3 | 3 | - | **30** |
| **IV** | 6 | 6 | 4+2 | - | - | 4+2 | 3 | 3 | - | **30** |
| **V** | - | - | 15+6 | 4+2 | - | - | 3 | - | - | **30** |
| **VI** | - | - | 10+6 | 6 | 5 | - | 3 | - | - | **30** |
| **TOT** | **24** | **24** | **61** | **12** | **5** | **24** | **18** | **6** | **6** | **180** |

| DEPT. OF MATHEMATICS<br>CBCS SYLLABUS (2011 – 2014) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **B.Sc. - MATHEMATICS SYLLABUS FOR THOSE WHO JOINED IN JUNE 2011 AND AFTERWARDS** | | | | | | | | |
| **I SEMESTER** | | | | | | | | |
| **P** | **SUB** | **TITLE OF THE PAPER** | **S.CODE** | **H/W** | **C** | **MARKS** | | |
| | | | | | | **I** | **E** | **T** |
| **I** | TA 1 | இக்காலத் தமிழ் **OR** | 11ULTA11 | 6 | 3 | 25 | 75 | 100 |
| | AR 1 | Applied Grammar and Translation | 11ULAR11 | | | | | |
| **II** | EN 1 | Prose, Poetry and functional Grammar - I | 11ULEN11 | 6 | 3 | 25 | 75 | 100 |
| **III** | C1 | Calculus | 11UCMA11 | 6 | 5 | 25 | 75 | 100 |
| | AI – 1 | Statistics | 11UAST11 | 6 | 5 | 25 | 75 | 100 |
| **IV** | SBE 1 | Office Automation | 11SEMA11 | 3 | 2 | 25 | 75 | 100 |
| | SVE | Social Value Education | 11USVE11 | 3 | 2 | 25 | 75 | 100 |
| | | | **TOTAL** | **30** | **20** | **150** | **450** | **600** |
| **II SEMESTER** | | | | | | | | |
| **I** | TA 2 | சமயத் தமிழ் | 11ULTA21 | 6 | 3 | 25 | 75 | 100 |
| | AR 2 | Functional Arabic & Translation | 11ULAR21 | | | | | |
| **II** | EN 2 | Prose, Poetry and functional Grammar - II | 11ULEN21 | 6 | 3 | 25 | 75 | 100 |
| **III** | C2 | Set theory & Theory of Equations | 11UCMA21 | 6 | 5 | 25 | 75 | 100 |
| | AI – 2 | Probability Theory | 11UAST21 | 6 | 5 | 40 | 60 | 100 |
| **IV** | SBE 2 | Internet | 11SEMA21 | 3 | 2 | 25 | 75 | 100 |
| | ES | Environmental Studies | 11UENS21 | 3 | 2 | 25 | 75 | 100 |
| | | | **TOTAL** | **30** | **20** | **230** | **570** | **800** |
| **III SEMESTER** | | | | | | | | |
| **I** | TA 3 | பயன்பாட்டுத் தமிழ் | 11ULTA31 | 6 | 3 | 25 | 75 | 100 |
| | AR 3 | Conversational Arabic | 11ULAR31 | | | | | |
| **II** | EN 3 | One Act Plays and Word Power | 11ULEN31 | 6 | 3 | 25 | 75 | 100 |
| **III** | C3 | Sequences, Series & Trigonometry | 11UCMA31 | 6 | 5 | 25 | 75 | 100 |
| | A II - 1 | Properties of Matter, Thermal Physics & optics | 11UAPH31 | 4 | 4 | 25 | 75 | 100 |
| | A II P | Allied II Practical | - | 2 | - | Exam. IV SEM. | | |
| **IV** | SBE 3 | Programming in C -I | 11SEMA31 | 3 | 2 | 25 | 75 | 100 |
| | NME 1 | Choose any one from the list | -- | 3 | 2 | 25 | 75 | 100 |
| | | | **TOTAL** | **30** | **19** | **150** | **450** | **600** |

**B.Sc. - MATHEMATICS SYLLABUS FOR THOSE WHO JOINED IN JUNE 2011 AND AFTERWARDS**

| IV SEMESTER | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **P** | **SUB** | **TITLE OF THE PAPER** | **S.CODE** | **H/W** | | **MARKS** | | |
| | | | | | | **I** | **E** | **T** |
| **I** | TA 4 | அறிவியல் தமிழ் | 11ULTA41 | 6 | 3 | 25 | 75 | 100 |
| | AR 4 | Quran , Hadeeth and Grammar | 11ULAR41 | | | | | |
| **II** | EN 4 | A Course in Spoken English | 11ULEN41 | 6 | 3 | 40 | 60 | 100 |
| **III** | C4 | Abstract Algebra | 11UCMA41 | 6 | 5 | 25 | 75 | 100 |
| | A II – 2 | Modern Physics , Electro Magnetism & Electronics | 11UAPH41 | 4 | 4 | 40 | 60 | 100 |
| | AII P | Allied II Practical | 11UAPH4P | 2 | 2 | 25 | 75 | 100 |
| **IV** | SBE 4 | Programming in C -II | 11SEMA41 | 3 | 2 | 25 | 75 | 100 |
| | NME 2 | Choose any one from the list | -- | 3 | 2 | 25 | 75 | 100 |
| | | | **TOTAL** | **30** | **21** | **245** | **555** | **800** |
| **V SEMESTER** | | | | | | | | |
| **III** | C5 | Linear Algebra | 11UCMA51 | 5 | 5 | 25 | 75 | 100 |
| | C6 | Real Analysis | 11UCMA52 | 5 | 5 | 25 | 75 | 100 |
| | C7 | Analytical Geometry of 3D | 11UCMA53 | 5 | 5 | 25 | 75 | 100 |
| | C8 | Combinatorial Mathematics | 11UCMA54 | 6 | 5 | 25 | 75 | 100 |
| | CE 1 | A) Programming in C++ & | 11UEMA5A | 4 | 3 | 25 | 75 | 100 |
| | | Programming in C++ Practical* | -- | 2 | - | EXAM VI SEM | | |
| | | B)Discrete mathematics | 11UEMA5B | 6 | 5 | 25 | 75 | 100 |
| **IV** | SBE 5 | Linear Programming | 11SEMA51 | 3 | 2 | 25 | 75 | 100 |
| | | | **TOTAL** | **30** | **25** | **125** | **375** | **500** |
| **VI SEMESTER** | | | | | | | | |
| **III** | C9 | Complex Analysis | 11UCMA61 | 4 | 5 | 25 | 75 | 100 |
| | C10 | Differential Equations & Vector Calculus | 11UCMA62 | 4 | 5 | 25 | 75 | 100 |
| | C11 | Mechanics | 11UCMA63 | 4 | 5 | 25 | 75 | 100 |
| | C12 | Graph Theory | 11UCMA64 | 4 | 5 | 25 | 75 | 100 |
| | CE 2 | (A)Numerical methods | 11UEMA6A | 6 | 5 | 25 | 75 | 100 |
| | | (B)Astronomy | 11UEMA6B | 6 | 5 | 25 | 75 | 100 |
| | | CE 1 P - Programming in C++ Practical* | 11UEMA5P | - | 2 | 40 | 60 | 100 |
| | P | Project | 11UPMA61 | 5 | 5 | 40 | 60 | 100 |
| **IV** | SBE 6 | Operations Research | 11SEMA61 | 3 | 2 | 25 | 75 | 100 |
| | | | **TOTAL** | **30** | **34** | **220** | **580** | **800** |

* Practical Exam at the end of the even semester

| TWO YEARS LANGUAGE COURSES (B.A. - HIS., ENG.LIT., B.Sc. - MATHEMATICS, PHYSICS, CHEMISTRY, ZOOLOGY & MICROBIOLOGY) | | | | | | | |
|---|---|---|---|---|---|---|---|
| **PART I - TAMIL** | | | | | | | |
| **I** | இக்காலத் தமிழ் | 11ULTA11 | 6 | 3 | 25 | 75 | 100 |
| **II** | சமயத் தமிழ் | 11ULTA21 | 6 | 3 | 25 | 75 | 100 |
| **III** | பயன்பாட்டுத் தமிழ் | 11ULTA31 | 6 | 3 | 25 | 75 | 100 |
| **IV** | அறிவியல் தமிழ் | 11ULTA41 | 6 | 3 | 25 | 75 | 100 |
| | | **TOTAL** | **24** | **12** | **100** | **300** | **400** |
| **PART I - ARABIC** | | | | | | | |
| **I** | Applied Grammar and Translation | 11ULAR11 | 6 | 3 | 25 | 75 | 100 |
| **II** | Functional Arabic and Translation | 11ULAR21 | 6 | 3 | 25 | 75 | 100 |
| **III** | Conversational Arabic | 11ULAR31 | 6 | 3 | 25 | 75 | 100 |
| **IV** | Quran , Hadeeth and Grammar | 11ULAR41 | 6 | 3 | 25 | 75 | 100 |
| | | **TOTAL** | **24** | **12** | **100** | **300** | **400** |
| **PART II - ENGLISH** | | | | | | | |
| **I** | Prose, Poetry and Functional Grammar I | 11ULEN11 | 6 | 3 | 25 | 75 | 100 |
| **II** | Prose, Poetry and Functional Grammar II | 11ULEN21 | 6 | 3 | 25 | 75 | 100 |
| **III** | One act plays and word power | 11ULEN31 | 6 | 3 | 25 | 75 | 100 |
| **IV** | A Course in Spoken English | 11ULEN41 | 6 | 3 | 40 | 60 | 100 |
| | | **TOTAL** | **24** | **12** | **115** | **285** | **400** |

| DEPT. OF MATHEMATICS CBCS SYLLABUS (2011 - 2014) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **PART III - ALLIED I - STATISTICS (FOR B.Sc. - MATHEMATICS MAJOR)** | | | | | | | | |
| **SEM** | **P** | **TITLE OF THE PAPER** | **S.CODE** | **H/W** | **C** | **MARKS** | | |
| | | | | | | **I** | **E** | **T** |
| **I** | 1 | Statistics | 11UAST11 | 6 | 5 | 25 | 75 | 100 |
| **II** | 2 | Probability Theory | 11UAST21 | 6 | 5 | 25 | 75 | 100 |
| **TOTAL** | | | | **12** | **10** | **50** | **150** | **200** |
| **PART III - ALLIED I - MATHEMATICS (FOR B.Sc. - PHYSICS & CHEMISTRY MAJORS)** | | | | | | | | |
| **I** | 1 | Statistics, Differential Equations and Vector Calculus | 11UAMA11 | 6 | 5 | 25 | 75 | 100 |
| **II** | 2 | Algebra & Calculus | 11UAMA21 | 6 | 5 | 25 | 75 | 100 |
| | | **TOTAL** | | **12** | **10** | **50** | **150** | **200** |

| PART III - ALLIED II - PHYSICS (FOR B.Sc. – MATHEMATICS & CHEMISTRY MAJORS) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **SEM** | **P** | **TITLE OF THE PAPER** | **S.CODE** | **H/W** | **C** | **MARKS** | | |
| | | | | | | **I** | **E** | **T** |
| **III** | 1 | Properties of Matter, Thermal Physics & optics | 11UAPH31 | 4 | 4 | 25 | 75 | 100 |
| | P | Allied II Practical | - | 2 | - | **EXAM IV SEMESTER** | | |
| **IV** | 2 | Modern Physics , Electro Magnetism & Electronics | 11UAPH41 | 4 | 4 | 25 | 75 | 100 |
| | P | Allied II Practical | 11UAPH4P | 2 | 2 | 40 | 60 | 100 |
| | | | **TOTAL** | **12** | **10** | **90** | **210** | **300** |

| PART IV - SKILL BASED ELECTIVE ( FOR B.Sc. - MATHEMATICS MAJOR ) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **I** | 1 | Office Automation | 11SEMA11 | 3 | 2 | 25 | 75 | 100 |
| **II** | 2 | Internet | 11SEMA21 | 3 | 2 | 25 | 75 | 100 |
| **III** | 3 | Programming in C -I | 11SEMA31 | 3 | 2 | 25 | 75 | 100 |
| **IV** | 4 | Programming in C -II | 11SEMA41 | 3 | 2 | 25 | 75 | 100 |
| **V** | 5 | Linear Programming | 11SEMA51 | 3 | 2 | 25 | 75 | 100 |
| **VI** | 6 | Operations Research | 11SEMA61 | 3 | 2 | 25 | 75 | 100 |
| | | | **TOTAL** | **18** | **12** | **150** | **450** | **600** |
| **PART IV - NON MAJOR ELECTIVE ( FOR OTHER MAJORS )** | | | | | | | | |
| **III** | 1 | Mathematics for Competitive Exams. - I | 11NEMA31 | 3 | 2 | 25 | 75 | 100 |
| **IV** | 2 | Mathematics for Competitive Exams. - II | 11NEMA41 | 3 | 2 | 25 | 75 | 100 |
| | | | **TOTAL** | **6** | **4** | **50** | **150** | **200** |
| **PART IV - SVE & ES ( FOR ALL MAJORS )** | | | | | | | | |
| **I** | 1 | Social Value Education | 11USVE11 | 3 | 2 | 25 | 75 | 100 |
| **II** | 2 | Environmental Studies | 11UENS21 | 3 | 2 | 25 | 75 | 100 |
| | | | **TOTAL** | **6** | **4** | **50** | **150** | **200** |
| **PART - V** | | | | | | | | |
| **I to IV** | | Extension Activities | | **-** | **1** | **100** | **-** | **100** |

| I SEMESTER | | | |
|---|---|---|---|
| **Core 1** | **CALCULUS** | | **11UCMA11** |
| **Hrs/Week: 6** | **Hrs/Sem: 6 x 15 = 90** | **Hrs./ Unit : 18** | **Credits: 5** |

**UNIT I**

Polar curves – pedal equation of a curve – asymptotes.

**UNIT II**

Curvature – radius of curvature in Cartesian, parametric and polar co-ordinates – Evolute - circle and centre of curvature

**UNIT III**

Evaluation of definite integrals- integration by parts – Jacobian

**UNIT IV**

Double and Triple integrals – Evaluation of Double and Triple Integrals - change of variables

**UNIT V**

Evaluation of integrals using Beta and Gamma functions- Fourier series – half range Fourier sine and cosine series

**TEXT BOOK:**

Calculus by Dr. S. Arumugam & Issac, New Gamma Publications - Edition 2005

Unit I : Part I - Chapter III : Sec 3.2, 3.3, 3.11 Page No.219 -250

Unit II : Part I - Chapter III : Sec 3.4, 3.5

Unit III : Part II - Chapter II : Sec 2.6, 2.7& Part I-3.9(Page no: 195-203)

Unit IV : Part II - Chapter III : Sec 3.1, 3.2, 3.3,3.4

Unit V : Part II - Chapter IV & Chapter V

**REFERENCE BOOK:**

**Calculus Volume I & II** By S. Narayanan & T.K. Manicavachagom Pillay, S. Viswanathan (Printers & Publishers) Pvt., Ltd.,

| II SEMESTER | | | |
|---|---|---|---|
| **Core 2** | **THEORY OF EQUATIONS** | | **11UCMA21** |
| **Hrs/Week: 6** | **Hrs/Sem: 6 x 15 = 90** | **Hrs./ Unit : 18** | **Credits : 5** |

**UNIT I**

Every equation f(x) = 0 of degree n has n roots - Relation between roots and coefficients

**UNIT II**

Symmetric functions of roots in terms of coefficients - Sum of the $r^{th}$ powers of the roots – Newton's theorem - Descarte's rule of signs - Rolle's theorem.

**UNIT III**

Reciprocal equations - Transformation of equations.

**UNIT IV**

Approximate solutions of Equations – Newton's method – Horner's method- Solution of cubic and biquadratic equations - Cardon's method - Ferrari's method

**UNIT V**

Numerical solution of Algebraic and Transcendental Equations - Iteration method – Bisection method and Regula – falsi method.

**TEXT BOOK:**

1. Algebra and Sequences and Series by Joseph A. Mangaladoss, Presi – Persi Publications –Edition 2004.
2. Numerical method by Dr. Arumugam and Issc, New Gamma Publishing House, Edition: 2003.

   Unit I : Chapter I TB 1 : Sec 1.1, 1.2.

   Unit II : Chapter I TB 1 : Sec 1.3 & Chapter II : Sec 2.1, 2.2, 2.3.

   Unit II: Chapter I TB 1 : Sec 1.4 & Chapter III : Sec 3.1 - 3.4

   Unit IV:Chapter IV TB 1 : Sec 4.1., 4.2 and Chapter V : Sec 5.1, 5.2

   Unit V: Chapter I TB 2 : Sec 1.2, 1.4, 1.5

| III SEMESTER | | | |
|---|---|---|---|
| **Core 3** | **SEQUENCES, SERIES & TRIGONOMETRY** | | **11UCMA31** |
| **Hrs/Week: 6** | **Hrs/Sem: 6 x 15 = 90** | **Hrs./ Unit : 18** | **Credits : 5** |

**UNIT I**

Sequences – limit, bounded, monotonic, convergent, divergent and Oscillatory sequences – Algebra of limits - Subsequences.

**UNIT II**

Cauchy sequences in R - Cauchy's General principle of Convergence – Series - convergence, divergence and oscillatory.

**UNIT III**

Convergence of Geometric, Harmonic series - Cauchy's General principles of convergence - Comparison test.

**UNIT IV**

Test of convergence of positive term series- Kummer's test - ratio test - Raabe's test - Cauchy's root test - Cauchy's condensation test (without proof).

**UNIT V**

Trigonometry - Hyperbolic function - logarithm of a complex number - Gregory's series – summation of series - C+ iS method

**TEXT BOOK:**

**Sequences Series and Trigonometry** by Joseph A. Mangaladoss Presi-Persi Publications, 2001 edition.

Unit I : Chapter I - SEC 1.1 to 1.13.
Unit II : Chapter I - SEC 1.14 and Chapter II – SEC 2.1, 2.2, 2.3
Unit III : Chapter II - SEC 2.4 to 2.8
Unit IV : Chapter III
Unit V : Chapter V

**REFERENCE BOOKS:**

1. Sequences & Series by Dr. S Arumugam & Issac New Gamma Publishing House

2. Trigonometry by Narayanan & Others S.Viswanathan (Printers & Publishers)
Pvt Ltd., 2007 edition

| IV SEMESTER | | | |
|---|---|---|---|
| **Core 4** | **ABSTRACT ALGEBRA** | | **11UCMA41** |
| **Hrs/Week: 6** | **Hrs/Sem: 6 x 15 = 90** | **Hrs./ Unit : 18** | **Credits : 5** |

**UNIT I**

Funtions - Groups - Permutation groups – sub groups – Cyclic groups

.

**UNIT II**

Order of element – Cosets and Legrange's theorem - Normal subgroups – quotient groups – Isomorphism - Cayley's theorem

**UNIT III**

Homomorphisms - Fundamental theorem of homomorphism of groups – Rings -elementary properties of rings - Isomorphism.

**UNIT IV**

Types of rings - characteristic of a ring – subrings – Ideals – Quotient rings – Maximal and prime ideals.

**UNIT V**

Homomorphism of rings - fundamental theorem of homomorphism - field of quotients of an Integral domain – Ordered integral domain

**TEXT BOOK:**

Modern Algebra by Dr.S. Arumugam & Issac –SCITECH Publications(India) Pvt Ltd --- 2007 Edition

Unit I : Chapter III : Sec 2.4, 3.1 - 3.6.
Unit II : Chapter III : Sec 3.7, 3.8, 3.9, 3.10
Unit III : Chapter III : Sec 3.11 & Chapter IV Sec 4.1 to 4.3
Unit IV : Chapter IV : Sec 4.4 to 4.9
Unit V : Chapter IV : Sec 4.10 to 4.12

**REFERENCE BOOK:**

University Algebra by N.S.Gopalakrishnan.

| V SEMESTER | | | |
|---|---|---|---|
| **Core 5** | **LINEAR ALGEBRA** | | **11UCMA51** |
| **Hrs/Week: 5** | **Hrs/Sem: 5 x 15 = 75** | **Hrs./ Unit : 15** | **Credits : 4** |

**UNIT I**

Vector Spaces - Definition and examples – Subspaces - Linear Transformation.

**UNIT II**

Linear Span of a set - Linear dependence and independence - Basis and dimension – Finite dimension.

**UNIT III**

Theorems on dimension – Rank and Nullity – Matrix of a linear transformation.

**UNIT IV**

Matrices – Characteristic equations of a matrix – Eigen values & Eigen vectors – Cayley Hamilton theorem and application.

**UNIT V**

Inner product Spaces – Definition and examples - Orthogonality – Gram Schmidt Orthogonalisation process – Orthogonal complement.

**TEXT BOOK:**

Modern Algebra by Dr. S.Arumugam and Issac - SCITECH Publications (India) Pvt Ltd – Edition 2007

Unit I : Chapter V : Sec 5.1, 5.2 , 5.3
Unit II : Chapter V : Sec 5.4, 5.5, 5.6( upto theorem 5.22 )
Unit III : Chapter V : Sec 5.6 ( theorem 5.22 – 5.28 ), 5.7, 5.8
Unit IV : Chapter VII : Sec 7.1, 7.2, 7.7, 7.8
Unit V : Chapter VI : Sec 6.1, 6.2, 6.3

**REFERENCE BOOK:**

Modern Algebra by T.K.Manickavachagom Pillay & Narayanan

| V SEMESTER | | | |
|---|---|---|---|
| **Core 6** | **REAL ANALYSIS** | | **11UCMA52** |
| **Hrs/Week: 5** | **Hrs/Sem: 5 x 15 = 75** | **Hrs./ Unit : 15** | **Credits : 4** |

**UNIT I**

Countable & Uncountable sets-Metric spaces - Bounded sets - Open Balls - Open sets - Subspaces.

**UNIT II**

Interior of a set - closed set – Closure - Limit point - Dense sets - Complete metric space - Cantor's intersection theorem

**UNIT III**

Continuity of functions - continuity of composition of functions - equivalent conditions for continuity – Algebra of continuous functions - homeomorphism - uniform continuity.

**UNIT IV**

Connectedness - equivalent conditions - Connected subsets of R - Connectedness and continuity - Intermediate Value theorem.

**UNIT V**

Compactness – Open Cover - Compact Metric space - Heine Borel theorem - Compactness and Continuity - uniform continuity – Contraction mapping theorem.

**TEXT BOOK:**

Modern Analysis by Dr S . Arumugam & Issac, New Gamma Publishing House 2007 Edition

Unit I : Chapter I: - SEC 1.2, 1.3 Chapter II SEC 2.1, to 2.5
Unit II : Chapter II - SEC 2.6 to 2.10 Chapter III SEC 3.1
Unit III : Chapter IV - SEC 4.1 to 4.3
Unit IV : Chapter V - SEC 5.1 to 5.3
Unit V : Chapter VI - SEC 6.1, 6.2, 6.4 Chapter 8 SEC 8.1 (up to Contraction mapping theorem)

**REFERENCE BOOK:**

Introduction to Modern Analysis by Simmons

| V SEMESTER | | | |
|---|---|---|---|
| **Core 7** | **ANALYTICAL GEOMETRY OF 3D** | | **11UCMA53** |
| **Hrs/Week:5** | **Hrs/Sem: 5 x 15 = 75** | **Hrs./ Unit : 12** | **Credits : 4** |

**UNIT I**

Direction cosines - Direction ratios - Angle between two lines.

**UNIT II**

Planes – Standard forms – Angle between planes – Lenth of perpendicular - Bisectors of two planes – Parallel planes.

**UNIT III**

Lines – Symmetrical form – Plane and straight line - Image of a point – Image of a line.

**UNIT IV**

Coplanar lines – Skew lines – Length & equations of shortest distance between two lines.

**UNIT V**

Sphere – Plane section of sphere – Tangent plane – Touching spheres – Intersection of spheres.

**TEXT BOOKS :**

1. Analytical Geometry of three dimension, T. K. Manickavachagom pillay & Narayanan, S.Vishwanathan (Printers and Publisheres) Pvt Ltd -- Edition 2007

Unit I : Chapter I - Section 1 - 4,7,8,10,11

Unit II : Chapter II - Section 1 - 11

Unit III : Chapter III - Section 1 to 6

Unit IV : Chapter III - Section 7,8

Unit V : Chapter IV - Section 1 - 8

**REFERENCE BOOK:**

Analytical Geometry 3–D & Trigonometry by Dr. S. Arumugam and Issac

New Gamma Publication House, 2006 Edition

| V SEMESTER | | | |
|---|---|---|---|
| **Core 8** | **COMBINATORIAL MATHEMATICS** | | **11UCMA54** |
| **Hrs/Week: 6** | **Hrs/Sem: 6 x 15 = 90** | **Hrs./ Unit : 18** | **Credits : 5** |

**UNIT I**

Selections & Binominal Coefficients - Permutations - ordered Selections - unordered selections – Binomial Theory

**UNIT II**

Parings Problems - Parings within a set - paring between sets – An optimal assignment problem.

**UNIT III**

Recurrence - Fibonacci type relation using generating functions - miscellaneous methods.

**UNIT IV**

The Inclusion – Exclusion Principle - The Principle - Rook polynomials.

**UNIT V**

Block Design and Error correcting codes - Block designs - Square Block Designs.

**TEXT BOOK:**

A first course in Combinatorial Mathematics by Ian Anderson .

(Oxford Applied Mathematics & Computing Science Series.)

**REFERENCE BOOK:**

Introduction to Combinatorics – C.L.Liu

| V SEMESTER | | | |
|---|---|---|---|
| **CE 1(A)** | **PROGRAMMING IN C++** | | **11UEMA5A** |
| **Hrs/Week:4 + 2** | **Hrs/Sem: 4x 15 = 60** | **Hrs./ Unit : 12** | **Credits: 5** |

**UNIT I**

What is C++? – Applications of C++ - A simple C++ program – More C++ statements – Examples with class – Structure of C++ program – Creating the Source – Compiling and Linking.

**UNIT II**

Tokens – Keywords – Identifiers and Constants – Basic Data types – Derived Data types – User defined data types – Symbolic constants – Type Compatibility – Declaration of variables – Dynamic initialization of variables – Reference variables

**UNIT III**

Operator in C++, Scope Resolution operator, Manipulators – Type cast operator – Expressions and their types – Special Assignment Expressions – Implicit conversions – Operator overloading – Operator precedence – Control structure

**UNIT IV**

Functions in C++ - The main function prototyping – Call by reference – Return by Reference, inline functions – Default Arguments – Constant Arguments – Function overloading – Math library functions.

**UNIT V**

Class and Objects – Specifying a class – Defining member function – A C++ program with class – member functions – Private member function – Arrays within a class – Memory Allocation for objects – Static data members – Static member functions – Returning object.

**TEXT BOOK:**

Object oriented programming with C++ by E. Balagurusamy, Fourth edition, Tata Mc Graw – hill publishing company Ltd, New Delhi.

Unit I : Chapter II – Sec 2.1 – 2.8
Unit II : Chapter III - Sec 3.2 – 3.12
Unit III : Chapter III - Sec 3.13, 3.14, 3.17 – 3.24
Unit IV : Chapter IV - Sec 4.2 – 4.9, 4.11
Unit V : Chapter V - Sec 5.3 – 5.10

**REFERENCE BOOK :**

OOPS in Microsoft C++ by Robert Lafore Galgotia publication.

| V SEMESTER | | | |
|---|---|---|---|
| **Prac PRACTICALS IN PROGRAMMING IN C++ AND CONM 11UEMA5P** | | | |
| **Hrs/Week: 2** | **Hrs/Sem: 4x 15 = 60** | **Hrs./ Unit : 12** | **Credits: 5** |

**(1) Programming in C++:**

1. Conversion of time in seconds into hours: minutes: seconds format.
2. Roots of quadratic equation.
3. Some function of calculator using switch.
4. Prime number checking.
5. Prime number between 1 and 500
6. Matrix Addition
7. Matrix Multiplication
8. Transpose of matrices.
9. Palindrome checking.
10. Sine Series and Cosine Series

**(2) Computer Oriented Numerical methods:**

1. Bisection method for solving system of Linear Algebraic equation.
2. Lagrangian method for interpolation
3. Trapezoidal method for evaluating an integral.
4. Eulers method for solving Ordinary differential equations.

| V SEMESTER | | | |
|---|---|---|---|
| **CE 1 ( B )** | **DISCRETE MATHEMATICS** | | **11UEMA5B** |
| **Hrs/Week: 6** | **Hrs/Sem: 6 x 15 = 90** | **Hrs./ Unit : 18** | **Credits : 5** |

**UNIT I**

Propositions and Compound propositions, Basic Logical operators – Propositions and Truth Table – Tautologies and Contradiction – Logical Equivalance - Algebra of Propositions – Conditional and biconditional statements.

**UNIT II**

Arguments - Propositional functions - Quantifiers – Negation of Quantified statements

**UNIT III**

Ordered sets – Hasse diagram of partially ordered set – Supremum and infimum – Isomorphic ordered sets.

**UNIT IV**

Well ordered sets – Lattices – Bounded Lattices – Distributive Lattices – Complements - Complemented lattices.

**UNIT V**

Boolean Algebra – Basic definitions – Duality – Logic Gates and circuits – Truth tables - Boolean functions

**TEXT BOOK:**

Discrete Mathematics SecondEdition, Segmour Lipschutz and Mare Lipson
Tata Mc Graw – Hill Publications Company, Limited, New Delhi

**Unit I** : Chapter 4 - Sections 4.1 – 4.8
**Unit II** **:** Chapter 4 - Section 4.9 – 4.12
**Unit III** : Chapter 14 - Section 14.1 – 14.3
**Unit IV** : Chapter 14 - Section 14.3 – 14.11
**Unit V** : Chapter 15 - Section 15.10 & 15.11

| VI SEMESTER | | | |
|---|---|---|---|
| **Core 9** | **COMPLEX ANALYSIS** | | **11UCMA61** |
| **Hrs/Week: 4** | **Hrs/Sem: 4 x 15 = 60** | **Hrs./ Unit : 12** | **Credits : 5** |

**UNIT I**

Differentiability - Analytic functions - Cauchy's Riemann equations - Harmonic functions

**UNIT II**

Bilinear Transformations - Cross Ratio - Fixed Points of Bilinear Transformation.

**UNIT III**

Complex Integration – Definite integral - Cauchy's theorem - Cauchy's integral Formula - Higher Derivatives

**UNIT IV**

Series expansion - Taylor's Series - Laurent's Series - Zeros of an Analytic functions - Singularities.

**UNIT V**

Residues - Cauchy's Residues theorem - Evaluation of Definite integrals – Type 1 and Type 2

**TEXT BOOK:**

Complex Analysis by S.Arumugam, A.Thangapandi Issac and A.Somasundaram, SCITECH Publications (India) Pvt Ltd., -- Edition 2007.

Unit I : Chapter II - Sec 2.5 to 2.8

Unit II : Chapter III - Sec 3.1 to 3.4

Unit III : Chapter VI - Sec 6.1 to 6.4

Unit IV : Chapter VII - Sec 7.1 to 7.4

Unit V : Chapter VIII - Sec 8.1 to 8.3

**REFEFRENCE BOOK:**

1. Complex Analysis by Narayanan and T.K.Manickavashagam Pillay.

2. Complex Analysis by P. Duraipandian, Laxmi Duraipandian and D. Muhilan

| VI SEMESTER | | | |
|---|---|---|---|
| **Core 10** | **DIFFERENTIAL EQUATIONS & VECTOR CALCULUS** | | **11UCMA62** |
| **Hrs/Week: 4** | **Hrs/Sem: 4 x 15 = 60** | **Hrs./ Unit : 15** | **Credits : 5** |

**UNIT I**

First order higher degree Differential equations - solvable for p, x and y - Clairaut's form – linear differential equations with constant coefficients - particular integrals of the form f(x) $e^{ax}$, $x^n$, $e^{ax}$ $x^n$

**UNIT II**

Homogenous equations- Linear differential equations with variable coefficients - equations reducible to homogenous equations.

**UNIT III**

Laplace transform – Inverse Laplace transform - solving linear differential equations & simultaneous equations of first order using Laplace transform.

**UNIT IV**

Vector differentiation – gradient – curl – divergent – solenoidal –I rritational - formulae involving gradient, curl and divergent.

**UNIT V**

Vector integration - line integral – surface integral - Gauss, Stoke's and Green's theorems (without proof) and problems.

**TEXT BOOK:**

1. Differential equation & Applications by Dr. S. Arumugam, New Gamma Publications - Edition 2008
2. Analytical Geometry of 3D, Vector Calculus & Trigonometry by Dr. S. Arumugam & Issac Edition 2004.
   - Unit I : TB 1 - Chapter I - SEC 1.7 & Chapter II SEC 2.3
   - Unit II : TB 1 - Chapter II - SEC 2.4 , 2.5
   - Unit III : TB 1 - Chapter III
   - Unit IV : TB 2 - Chapter V
   - Unit V : TB 2 - Chapter VII

**REFERENCE BOOK:**

Differential Equations & Application by Sankaranarayanan & others.

| VI SEMESTER | | | |
|---|---|---|---|
| **Core 11** | **MECHANICS** | | **11UCMA63** |
| **Hrs/Week: 4** | **Hrs/Sem: 4 x 15 = 60** | **Hrs./ Unit : 15** | **Credits : 4** |

**UNIT I**

Forces acting at a point - Resultant and Components - Parellelogram of forces - Analytical expressions - Triangle of Forces - Lami's Theorem - Extended form of parallelogram law of forces.

**UNIT II**

Resolution of a force - Components of a force - Resultant of coplanar forces - Condition of Equilibrium - Resultant of two like and unlike parallel forces - Moment of a force - Varigon's Theorem.

**UNIT III**

Projectiles – Equation of path - range – time of flight – greatest height – maximum range – range on an inclined plane.

**UNIT IV**

Simple Harmonic Motion in a straight line – geometrical representation – composition of SHM'S of the same period in the same line and along two perpendicular directions.

**UNIT V**

Motion under the action of central forces – Velocity and acceleration in polar coordinates – differential equation of central orbit – pedal equation of central orbit – velocities in a central orbit

**TEXT BOOK**

1. STATICS by Dr.M.K.Venkataraman, Agasthiar Publications, 12th Edition

2. DYNAMICS by Dr.M.K.Venkataraman, Agasthiar Publications, 12th Edition
   Unit I : TB 1 – Chapter II - Section 1 - 10
   Unit II : TB 1 – Chapter II - Section 11 -16 & Chapter III Section 1 - 12
   Unit III : TB 2 - Chapter VI - Section 6..1 – 6.8 & 6.12 – 6.15
   Unit IV : TB 2 - Chapter X - Section 10.1 to 10.7
   Unit V : TB 2 - Chapter XI - Section 11.1 to 11.11

**REFERENCE BOOK:**

MECHANICS by Durai Pandian

| VI SEMESTER | | | |
|---|---|---|---|
| **Core 12** | **GRAPH THEORY** | | **11UCMA64** |
| **Hrs/Week: 4** | **Hrs/Sem: 4 x 15 = 60** | **Hrs./ Unit : 12** | **Credits : 5** |

**UNIT I**

Graphs – degrees - subgraphs – isomorphism - independent sets & coverings - intersection graph and line graph – Matrices of a graph - operation on graphs.

**UNIT II**

Degree sequences - Walks, Trials and Path connectedness - connectivity .

**UNIT III**

Eulerian Graphs - Hamiltonian Graphs - Characterization of Trees - Centre of a tree.

**UNIT IV**

Planar graphs – Properties.

**UNIT V**

Chromatic number - chromatic index.-The Five Colour theorem - Four Colour Problem. Chromatic polynomial of graphs

**TEXT BOOK:**

1. Invitation to Graph Theory by S.Arumugam & S.Ramachandran .
   Scitech Publications (India) Ltd., 2009 Edition
   Unit I : Chapter 2
   Unit II : Chapter 3 & 4
   Unit III : Chapter 5 & 6
   Unit IV : Chapter 8
   Unit V : Chapter 9

**REFERENCE BOOK:**

Graph Theory by S.Kumaravelu & Suseela Kumaravelu - Janaki Calendar Corporation, Sivakasi

| VISEMESTER | | | |
|---|---|---|---|
| **CE2(A)** | **COMPUTER ORIENTED NUMERICAL METHODS** | | **11UEMA6A** |
| **Hrs/ Week:4 + 2** | **Hrs/Sem : 6 x 15 = 90** | **Hrs./Unit : 18** | **Credits : 4** |

**UNIT I**

System of Linear Algebraic equations – Direct method – Iterative method – Eigen value problems.

**UNIT II**

Interpolation – Legrange's Interpolation – Interpolation for equally spaced points – interpolation using central differences.

**UNIT III**

Numerical derivatives – Derivatives for equally spaced data.

**UNIT IV**

Numerical integration – Newton- Cote's quadrature formula – Trapezoidal rule – Simpson's one third rule – Simpson's three eight rule.

**UNIT V**

Numerical solution of ordinary differential equations – Euler's method - Taylor's series method – Runge kutta methods – Predictor – corrector method.

**TEXT BOOK:**

Numerical methods with C++ Programming by RM. Somasundaram, & RM. Chandrasekaran, Prentice Hall of India pvt Ltd Delhi Edition 2005.

Unit I : Chapter II

Unit II : Chapter III

Unit III : Chapter VI

Unit IV : Chapter VII

Unit V : Chapter VIII

| VI SEMESTER | | | |
|---|---|---|---|
| **CE 2(B)** | **ASTRONOMY** | | **11UEMA6B** |
| **Hrs/Week: 6** | **Hrs/Sem: 6 x 15 = 90** | **Hrs./ Unit : 18** | **Credits : 5** |

**UNIT I**

Spherical Trigonometry (only formulae) - Celestial sphere - Four systems of coordinates - Diurnal motion

**UNIT II**

Zones of earth – perpetual day and perpetual night – Terrestrial latitude and longitude – International date Line (only definition) – Dip - Twilight – Shortest twilight.

**UNIT III**

Refraction – Tangent formulae – Cassini's formula – Effects – Horizontal refraction – Geocentric parallax.

**UNIT IV**

Kepler's laws – verification – Newton's deductions – Anomalies – planets— inferior and superior – Bode's law – elongation – sidereal period – synodic period – phase – direct and retrograde motion – stationary points – angle subtended at the sun when two planes are stationary

**UNIT V**

Time – Equation of time – Seasons calendar – Conversion of time .

**TEXT BOOK :**

Astronomy by S.Kumaravelu –Edition 2002

Unit I : Chapter I & Chapter II

Unit II : Chapter III Sec 1, 2, 5 & 6

Unit III: Chapter IV & V

Unit IV: Chapter VI & XIV

Unit V : Chapter VII

**REFERENCE BOOK:**

Astronomy by G.V.Ramachandran

| VI SEMESTER | | |
|---|---|---|
| **PROJECT** | | **11UPMA61** |
| **Hrs/Week:5** | **Hrs/Sem:5 x 15 = 75** | **Credits :5** |

**OBJETIVES**

At the end of the semester the student should be able to:

1. identify the potential areas of the research in his/her field
2. collect the data from various sources including the internet, analyse them, make new connections and link them to practical life
3. read and write originally and usefully

**GUIDELINES**

1. The project may be done either individually or in groups with a maximum of 5 students
2. The project should contain at least 30 pages in A4 size paper
3. Marks for the project report will be 100 with 65 for presentation of project and 35 for viva-voce

**PART III – ALLIED STATISTICS (FOR B.Sc. MATHEMATICS MAJOR) (2011 ONWARDS)**

| I SEMESTER | | | |
|---|---|---|---|
| **Paper- I** | **STATISTICS** | | **11UAST11** |
| **Hrs /Week : 6** | **Hrs/ Sem : 6 x 15 = 90** | **Hrs./ Unit : 18** | **Credits:5** |

**UNIT I**

Measures of Central Tendency – simple average – Mean, Median & Mode – Geometrical mean and Harmonic mean - Measures of dispersion – range - quartile deviation- standard deviation and mean deviation – coefficient of variation..

**UNIT II**

Correlation and regression: Scatter diagram – Karl Pearson's Coefficient of Correlation – properties – lines of regression - regression coefficient and properties - rank correlation.

**UNIT III**

Association of attributes - consistency of data – criterion of independence – Yule's coefficient of association

**UNIT IV**

Sampling distribution – testing of hypothesis – problems on large samples

**UNIT V**

Test of significance for small samples based on t-distribution and F – Distribution

**TEXT BOOK:**

Statistics by Dr S.Arumugam & Issac, New Gamma Publication house, Edition 2006

Unit I : Chapter 2 - Section 2.1 to 2.4, Chapter 3 - Section 3.1
Unit II : Chapter 6 - Section 6.1 to 6.3
Unit III : Chapter 8 - Section 8.1, 8.2
Unit IV : Chapter 14 - Section 14.2 to 14.5
Unit V : Chapter 15 - Section 15.1, 15.2

**REFERENCE BOOK:**

Probability and Statistics by Joseph A Mangaladoss Presi - Persi Publication

| II SEMESTER | | | |
|---|---|---|---|
| **Paper- 2** | **PROBABILITY THEORY** | | **11UAST21** |
| **Hrs /Week : 6** | **Hrs/ Sem : 6 x 15 = 90** | **Hrs./ Unit : 18** | **Credits : 5** |

**UNIT I**

Random Experiments – trials and events – mutually exclusive independent and equally likely events - probability - Definition - statistical & axiomatic – addition theorem – conditional probability – multiplication theorem - pair wise independent & mutually independent events – Baye's theorem.

**UNIT II**

Random variable – discrete & continuous-Probability Functions – mass & density distribution function, Expectations – moments - addition & multiplication theorems on expectations (without proof)

**UNIT III**

Moment generating functions & their properties - characteristic functions – cumulants - Discrete probability – distribution – Bernoulli's trials - Binomial distribution.

**UNIT IV**

Simple applications – derivation of moments - Beta 2 functions & continuous probability Distribution – exponent & Gamma distribution

**UNIT V**

Normal Distribution - Standard normal distribution – properties – simple problems – importance of normal distribution.

**TEXT BOOKS(**PART II)

1. Probability & Statistics by Joseph A. Mangaladoss. – Presi - Persi Publication.

UNIT 1 : Part II - Chapter I - SEC 1.1 to 1.6
UNIT II : Part II - Chapter II - SEC 2.1 to 2.4
UNIT III : Part II - Chapter II - SEC 2.5 to 2.7 and Chapter 3 - SEC 3.1
UNIT IV : Part II - Chapter III - SEC 3.2 and Chapter 4 - SEC 4.2, 4.3
UNIT V : Part II - Chapter IV - SEC 4.1

**REFERENCE BOOK:**

Statistics by Dr.S.Arumugam & Issac. New Gamma Publications, 2006 Edition

**PART III - ALLIED PHYSICS (FOR MATHS AND CHEMISTRY MAJORS)**

| III SEMESTER | | | |
|---|---|---|---|
| **A1** | **PROPERTIES OF MATTER,THERMAL PHYSICS & OPTICS** | | **11UAPH31** |
| **Hrs / Week:4** | **Hrs / Sem : 60** | **Hrs / Unit : 12** | **Credits : 4** |

**UNIT I – Elasticity - Bending of Beams**

Elastic modulii - Poisson's ratio relation between elastic constants - Expression for bending moment - cantilever expression for depression experiment to find young's modulus uniform bending - expression for elevation experiment to find young's modulus using microscope non uniform bending - expression for depression - experiment to find Young's modulus using scale and telescope

**UNIT II - Optics - Interference and Diffraction**

Young's Double slit experiment - Condition for interference - Colours of thin film- Air wedge - Thickness of wire - Fresnel and Fraunhofer diffraction-Plane transmission grating - Theory and experiment to find wave length by normal incidence method. Distinction between interference and diffraction bands.

**UNIT III – Polarisation**

Double refraction - Nicol prism - Brewster's law -Production and analysis of plane, circulary and elliptically polarised light, half wave and quarter wave plate - Optical activity – specific rotation (definition)

**UNIT IV - Thermal Physics - Transport Phenomena**

Mean free path – expression for mean free path (Zeroth order approximation) Transport phenomena – Viscosity, thermal conductivity, diffusion

**UNIT V - Transfer of Heat & Low Temperature**

Conduction – Coefficient of thermal conductivity – definition – Thermal conductivity of a bad conductor – Lee's Disc experiment – Newton's law of cooling – determination of specific heat capacity of liquid – Joule Kelvin effect – Theroy of porous plug experiment – adiabatic demagnetization – superconductivity – its properties

**TEXT BOOKS:**

1. College Physics Volume 1 - A.B. Gupta
2. Optics - Brijlal & Subramaniam

**REFERENCE BOOKS:**

1. Properties of matter - Brijlal & Subramaniam
2. Properties of matter - D.S. Mathur
3. Heat and Thermodynamics - Brijlal & Subramaniyam - S.Chand &Co..

| IV SEMESTER | | | |
|---|---|---|---|
| **A2** | **MODERN PHYSICS , ELECTRO MAGNETISM & ELECTRONICS** | | **11UAPH41** |
| **Hrs / Week:4** | **Hrs / Sem : 60** | **Hrs / Unit : 12** | **Credits : 4** |

**UNIT I - Relativity and Wave Mechanics**

Frame of reference - Galilean transformation - Postulates - Lorentz transformation de Broglie's theory of matter waves -Expression for de Broglie wavelength - Postulates of quantum mechanics

**UNIT II - Nuclear Physics**

Nuclear structure - Properties of nucleus - Packing fraction -Binding energy - BE/A - Nuclear forces - Nuclear stability - Liquid drop model.

**UNIT III - Electromagnetism**

Moving coil Ballistic galvanometer – theory –damping correction – experiment to find charge sensitivity and absolute capacity of a capacitor – Classification of magnetic materials – magnetic hysteresis – B.H curve – self induction of toroidal solenoid – determination of Rayleigh method – mutual induction between coils and co-efficient of coupling – determination of mutual induction using B.G.

**UNIT IV - Basic Electronics**

Superposition theorem – Thevenin's theorem – Norton's theorem – Zener diode characteristics Regulation with Zener diode – Bridge rectifier - Clipping and clamping circuits using diodes – Biasing of transistor – RC amplifier.

**UNIT V - Digital Electronics**

Basic logic gates – NOR, NAND gates – EX-OR gate – Boolean equations and logic circuit from table – NOR and NAND gates as universal building blocks – Binary adder – Half adder – Full adder.

**TEXT BOOKS:**

1. Modern Physics - R. Murugesan
2. Electricity & Magnetism - R. Murugesan
3. Principles of Electronics - V.K. Mehta

**REFERENCE BOOKS:**

1. Fundamentals of Electronics - B. Ghosh
2. Electricity & Magnetism - R. Murugesan

| III & IV SEMESTERS | | |
|---|---|---|
| ALLIED PRACTICAL (EXAM. END OF IV SEM.) | | 11UAPH4P |
| **Hrs / Week : 2** | **Hrs / Sem : 30** | **Credits : 2** |

1. Young's modulus - Uniform bending ( Pin and Microscope )
2. Young's modulus - Non Uniform bending ( scale and Telescope )
3. Young's modulus – Cantilever – depression
4. Lee's disc – K of card board
5. Verification of Newton's law of cooling
6. Spectrometer – Grating - Normal incidence
7. Newton's rings – Radius of curvature - μ
8. Air wedge – thickness of wire
9. Figure of merit – B.G
10. Characteristics of Zener diode
11. Basic logic gates OR, NOT & AND
12. Transistor Characteristics (CE mode)

# SKILL BASED ELECTIVE

| I SEMESTER | | | |
|---|---|---|---|
| **SBE 1** | **OFFICE AUTOMATION** | | **11SEMA1I** |
| **Hrs /Week:3** | **Hrs / Sem: 3 x 15 = 45** | **Hrs/Unit : 9** | **Credits: 2** |

**UNIT I**

Introduction to Microsoft word 2007 – creating and saving a word document – applying basic formatting – working with styles – applying bulleted and numbered lists – printing a word document

**UNIT II**

Working with graphics and Tables – editing graphical objects – adding and deleting columns and rows in a table in word document – setting paragraph indent and spacing – headers and footers – page setup options – applying themes – spelling and Grammer check – tracking changes within the document

**UNIT III**

Introduction to Excel 2007 – creating and saving an excel workbook – adding data using Auto fill – inserting and deleting cells – wrapping texts – adding borders to cells – formatting – e-naming a worksheet

**UNIT IV**

Working with tables and charts – formatting a table – working with charts – chart title – adding grid lines – adding axis titles – changing chart style, chart layout, chart type – working with formulas and functions

**UNIT V**

Introduction to power point 2007 – creating and saving a presentation – slide show – packaging the presentation on a CD – enhancing power point presentation – adding and removing animation effects & transition effects

**Text book:**

Office 2007 in simple steps by Kogent Solutions Inc. – published by Dreamtech Press.

UNIT I : Chapter 2
UNIT II : Chapter 3 & 4
UNIT III : Chapter 5
UNIT IV : Chapter 6 & 7
UNIT V : Chapter 8,9 and 10

**REFERENCE BOOK:**

Stephen L.Nelson – Office 2000 The complete reference, TATA McGraw Hill Publishing company limited.

| II SEMESTER | | | |
|---|---|---|---|
| **SBE 2** | **INTERNET** | | **11SEMA21** |
| **Hrs /Week:3** | **Hrs / Sem: 3 x 15 = 45** | **Hrs/Unit : 9** | **Credits: 2** |

**UNIT I**

Introduction – Web sites & services – Web Browsing – Basic Communication – Local Area Network – Importance of LAN Technology.

**UNIT II**

History of Internet – Early years – Incredible growth – Global Internet – Global Information Infrastructure.

**UNIT III**

A Network of networks – ISPs – Broadband and Wireless access – IP – Software to create Virtual Network – TCP – Software for reliable communication

**UNIT IV**

Electronic mail –Bulletin Board service – Browsing the World Wide Web.

**UNIT V**

World wide web Documents (HTML) – Faxes , File transfer and file sharing (FTP) – Remote Login and Remote Desktops (TELNET).

**TEXT BOOKS:**

The INTERNET BY Douglas E. Comer, Fourth edition (2009) – PHL Learning Private Limited.

Unit I : Chapter 2, 6, 7
Unit II : Chapter 8, 9, 10, 11
Unit III : Chapter 13, 14, 15, 16
Unit IV : Chapter 21, 22, 23
Unit V : Chapter 24, 29, 30

**REFERENCE BOOKS:**

1. Computer fundamentals and Windows with Internet Technology by N. Krishnan SCITECH Publications and pvt limited.
2. Mastering the Internet by G. Fee. Hannah C. day – Mavgraw BPB – SECOND edition

| III SEMESTER | | | |
|---|---|---|---|
| **SBE 3** | **PROGRAMMING IN C – PAPER I** | | **11SEMA31** |
| **Hrs /Week:3** | **Hrs / Sem: 3 x 15 = 45** | **Hrs/Unit : 9** | **Credits: 2** |

**UNIT I**

Constants – Variables and data types – Operations and expressions.

**UNIT II**

Managing input and output operations – Reading and writing a character – Formatted input and output.

**UNIT III**

Decision making and branching – if – then , if else, nested if else – switch statement – go to statement – The ?: operator.

**UNIT IV**

Decision making and looping – while, do, for statements – Jumps in loops.

**UNIT V**

Arrays – one, two and multi-dimensional arrays - handling of character strings

**TEXT BOOK:**

Programming in ANSI C by E.Balagurusamy

Unit I : Chapter 2 & 3

Unit II : Chapter 4

Unit III : Chapter 5

Unit IV : Chapter 6

Unit V : Chapter 7 & 8

| IV SEMESTER | | | |
|---|---|---|---|
| **SBE 4** | **PROGRAMMING IN C – PAPER II** | | **11SEMA41** |
| **Hrs /Week:3** | **Hrs / Sem: 3 x 15 = 45** | **Hrs/Unit : 9** | **Credits: 2** |

**UNIT I**

User defined functions – calling a function – category of a function – Argument with and without Return statement – Nesting of functions – functions with arrays.

**UNIT II**

Structures and union – definition - arrays of Structures – arrays within structures – structures within structures – size of structures.

**UNIT III**

Pointers – declaration and initialization – pointers expressions – pointers & arrays – pointers & structures – pointers on pointers.

**UNIT IV**

File management in C – Definitions – opening and closing a file – Random access to a file – Command line arguments.

**UNIT V**

Dynamic memory allocations & linked lists – concept, advantages, types – pointers revisited.

**TEXT BOOK:**

Programming in C - E.Balagurusamy

UNIT I : Chapter 9

UNIT II : Chapter 10

UNIT III : Chapter 11

UNIT IV : Chapter 12

Unit V : Chapter 13

| V SEMESTER | | | |
|---|---|---|---|
| **SBE 5** | **LINEAR PROGRAMMING** | | **11SBMA51** |
| **Hrs /Week:3** | **Hrs / Sem: 3 x 15 = 45** | **Hrs/Unit : 9** | **Credits: 2** |

**UNIT I**

Linear Programming problem – Mathematical Formulation – Illustration and simple problems – Graphical solution method.

**UNIT II**

General linear programming problem – Canonical and standard form of LPP – Simplex Method – Computational procedure – Simplex Algorithm – Sample problems.

**UNIT III**

Duality – General primal – Dual pair - Formulations a Dual problem – Primal – Dual pair in matrix form – Complementary Slackness Theorem – Duallity and Simplex Method.

**UNIT IV**

Transportation problem – LP formulation of Transportation problem – Existence of solution – Transportation Table – Loop – Solution of Transportation problem – Finding an Initial Basic feasible solution – Test for optimality – Transportation Algorithm (MODI Method )

**UNIT V**

Assignment problem –Mathematical formulation – Solution of Assignment problem – Hungarian Method..

**Text Book:**

Operation Research by Kanti Swarup, P. K. Gupta, Man Mohan -fourteenth edition 2008 – Sultan Chand& Sons, Educational Publisher, New Delhi.

Unit I : Chapter 2 - Section 2.1 – 2.4 & Chapter III Section 3.1, 3.2
Unit II : Chapter 3 - Section 3.4, 3.5 & Chapter IV Section 4.1 - 4.3
Unit III : Chapter 5 - Section 5.1 – 5.4 , 5.6, 5.7
Unit IV : Chapter 10 - Section 10.1 – 10.3, 10.5, 10.6, 10.8, 10.9, 10.10, 10.13
Unit V : Chapter XI - Section 11.1 – 11.3

**Reference Book:**

Operations Research by Dr. S. Arumugam – New Gamma Publications.

| VI SEMESTER | | | |
|---|---|---|---|
| **SBE 6** | **OPERATIONS RESEARCH** | | **11SEMA61** |
| **Hrs /Week:3** | **Hrs / Sem: 3 x 15 = 45** | **Hrs/Unit : 9** | **Credits: 2** |

**UNIT I**

Sequencing problem – introduction – n jobs and 2 machines, n jobs and three machines – graphical method

**UNIT II**

Inventory models: types of inventory models – Deterministic (without proof) Uniform rate of demand, infinite rate of production and no shortage

**UNIT III**

Two person Zero sum Games – Maximin - Minimax Principle – Games without saddle point Graphical solution of 2xn & m x 2 Games.

**UNIT IV**

Queuing theory; general concepts and definitions – classification of queues – Poisson process – Properties of Poisson process - Model I : (M/M/1) : (∞ /FIFO) - Model III ( M/M/1) : (N/FIFO)

**UNIT V**

Network analysis –drawing network diagram – critical path method – labeling method – concept of Slack and Float on network – PERT , algorithm for PERT.

**TEXT BOOK:**

Operations Research by Kanti Swarup , P. K. Gupta, Man Mohan _ Sultan Chand& Sons, Educational Publisher, New Delhi.

Unit I : Chapter 12
Unit II : Chapter 19 - Section 19.1 – 19.11
Unit III : Chapter 17 - Section 17.1 – 17.6
Unit IV : Chapter 21 - Section 21.7 – 21.9
Unit V : Chapter 25

**REFERENCE BOOKS:**

Operations Research By V.K.Kapoor.

# NON MAJOR ELECTIVE- MATHEMATICS

| III SEMESTER | | | |
|---|---|---|---|
| **NME 1** | **MATHEMATICS FOR COMPETIVE EXAMS. -I** | | **11NEMA31** |
| **Hrs /Week:3** | **Hrs / Sem: 3 x 15 = 45** | **Hrs/Unit : 9** | **Credits: 2** |

**UNIT I**

Number System - Decimal fractions – elementary arithmetic operations.

**UNIT II**

Test of Divisibility - Prime & composite numbers - HCF & LCM - Smallest and greatest fraction.

**UNIT III**

Square Root & cube root - Indices and Surds.

**UNIT IV**

Series Test ( Determination of wrong or missing term in the series) - BODMAS Rule - Mathematical reasoning.

**UNIT V**

Truth Table and its applications to statements - Logarithms - permutations and combinations.

**TEXT BOOK :**

Mathematics for Competitive Examinations , Published by Department of Mathematics, Sadakathullah Appa College.

**REFERENCE BOOKS:**

Arithmetic for Competitive Examinations by R.S. Aggarwal , S.Chand & Co., Ltd., New Delhi , 2004.

**QUESTION PATTERN**

| Internal Examination | | | | |
|---|---|---|---|---|
| **Section** | **No. Questions** | **Marks per question** | **Maximum Marks** | **Hours** |
| A | 25 | 1 | 25 | 1 hour |
| **External Examination** | | | | |
| A | 75 | 1 | 75 | 3 hours |

1. All the questions are multiple choice questions
2. No choice
3. Answer All the questions
4. Each Question carries 1 mark each

| IV SEMESTER | | | |
|---|---|---|---|
| **NME 2** | **MATHEMATICS FOR COMPETITIVE EXAMS. - II** | | **11NEMA41** |
| **Hrs /Week:3** | **Hrs / Sem: 3 x 15 = 45** | **Hrs/Unit : 9** | **Credits: 2** |

**UNIT I**

Percentage- Profit and loss-

**UNIT II**

Simple and Compound Interest – Calendar.

**UNIT III**

Ratio and Proportion- Variation - Partnership

**UNIT IV**

Average and age – Simultaneous equations

**UNIT V**

Chain Rule- Time and Work- Time and Distance.

**TEXT BOOK :**

Mathematics for Competitive Examinations, Published by Department of Mathematics, Sadakathullah Appa College.

**REFERENCE BOOKS:**

Arithmetic for Competitive Examinations by R.S. Aggarwal , S.Chand & Co., Ltd., New Delhi , 2004.

**QUESTION PATTERN**

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|---|---|---|---|---|
| **Section** | **No. Questions** | **Marks per question** | **Maximum Marks** | **Hours** |
| A | 25 | 1 | 25 | 1 hour |
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| A | 75 | 1 | 75 | 3 hours |

1. All the questions are multiple choice questions
2. No choice
3. Answer All the questions
4. Each Question carries 1 mark each