GOVERNMENT ARTS COLLEGE (AUTONOMOUS)

KUMBAKONAM 612 002

Re - accredited With 'A' Grade by NAAC & Affiliated to Bharathidasan University

DEPARTMENT OF MATHEMATICS

(Effective for those admitted from 2017-2018 onwards)

SYLLABI

B.Sc., MATHEMATICS

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KUMBAKONAM.

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B.Sc., MATHEMATICS

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SEMESTER - I

CC 1 - ALGEBRA, TRIGONOMETRY AND DIFFERENTIAL CALCULUS

Subject Code: 17U1M1	Credits: 5	External Marks: 75	Hours: 6

UNIT I: **Theory of Equations:** Relation between roots and coefficients – Complex roots – Irrational roots – Related roots Transformations of equations – Reciprocal equations .

UNIT II: Binomial, Exponential, Logarithmic Series (No proof) - Applications to Approximations and Summation.

UNIT III: **MATRICES :** Rank of a Matrix – Consistency - Eigen values and Eigen ectors – Cayley Hamilton Theorem (statement only) – Symmetric, Skew Symmetric , Orthogonal, Hermitian , Skew Hermitian, and Unitary Matrices – Properties of Eigen values and vectors of these matrices - Simple problems only.

UNIT IV: **TRIGONOMETRY :** Expansion of $\cos n\theta$, $\sin n\theta$, $\tan n\theta$, $\cos^n\theta$, $\sin^n\theta$ - Series for $\sin \theta$, $\cos \theta$, $\tan \theta$ (derivations included) in powers of θ - Hyperbolic functions – Relations between hyperbolic and circular functions.

UNIT V: **DIFFERENTIAL CALCULUS:** Curvature in Cartesian, polar and parametric forms - Derivation of formulae and problems – Jacobians.

Books for Reference:

1. Algebra…….. T.K.M. Pillai
2. Algebra volume II …….. T.K.M. Pillai, T.Natarajan & K.S.Ganapathy
3. Trigonometry…….S. Narayanan & T.K.M.Pillai
4. Calculus Volume I ……T.K.M. Pillai & S.Narayanan.
5. Engineering Mathematics……A. Singaravelu.
6. Algebra & trigonometry – I……A.Singaravelu & R.Ramaa
7. Differential calculus & Trigonometry… A.Singaravelu & R.Ramaa
8. Trigonometry…….P.Duraipandian

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SEMESTER - I
AC 1 - STATISTICS FOR MATHEMATICS I

Subject Code: 17U1MST1	Credits: 4	External Marks: 75	Hours: 4

Objective: *To study in detail about various types of classification and tabulation. To understand the structure of forming frequency tabulation.To know the problem in the Descriptive Measures, the basic concepts of probability and random variable.*

Unit I: Classification – Meaning, Objectives and Types. Formation –Discrete and Continuous distribution. Tabulation – Parts, General Rules and Types, Forming frequency tabulation (simple problem). Difference between Classification and Tabulation.

Unit II: Measures of central tendency – Mean, Median, Mode, Harmonic mean and Geometric mean and its Merits and demerits (Simple problems). Measures of Dispersion -Range, Quartile Deviation, Mean Deviation, Standard Deviation and Co – efficient of Variation and its Merits and demerits (Simple problems).

Unit III: Skewness, Kurtosis and Moments – Definitions, Co - efficient of Skewness, Bowley's and Karl Pearson's Skewness – simple problems.

Unit IV: Probability – Statistical and Mathematical Probability, Axiomatic Probability.Addition, Multiplication and Baye's theorem. (Simple problems) Boole's Inequality.

Unit V: Random Variables - Discrete and Continuous random variables (simple problems).Distribution function and its properties (no proof). Mathematical Expectation - Definition- properties.Joint distribution - Marginal and Conditional distributions, Moments, Moment generating functions (MGF) –Definition and its properties, Characteristics function definition and its properties.(Without derivation).

Reference Text Books:

1. Fundamentals of Mathematical Statistics - Gupta S.C. and Kapoor V.K, Sultan & Sons, New Delhi.
2. Statistics -R.S.N. Pillai and V. Bagavathi, Chand& company LTD, New Delhi.
3. Probability, Statistics and random Process - T. Veerarajan. Tata McGraw-Hill Publishing Company limited. New Delhi.
4. Statistical methods- S.P.Gupta, Sultan &Sons, New Delhi.

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SEMESTER - II

CC 2 - DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORMS

Subject Code: 17U2M2	Credits: 4	External Marks: 75	Hours: 6

UNIT I: **ORDINARY DIFFERENTIAL EQUATIONS:** Exact Differential Equations - Necessary and Sufficient condition for integrability – Integrating factors – First order Higher degree Equations – Solvable for p,x,y - Clairaut's form.

UNIT II: **DIFFERENTIAL EQUATIONS OF II ORDER:** Second Order Differential Equations with constant coefficients: Particular Integral of functions of type x^m, e^{ax}, Cos ax, Sin ax, $x^m f(x)$ - Second order Differential Equations with variable coefficients –Homogeneous Equations – Reduction to θ form .

UNIT III: **PARTIAL DIFFERENTIAL EQUATIONS:** Formations of partial Differential Equations by eliminating arbitrary constants and arbitrary functions - First order partial Differential Equations - Lagrange's Equations.

UNIT IV: Four Standard Forms - Charpit's Method.

UNIT V: **LAPLACE TRANSFORMS:**Properties – First Shifting Theorem – Inverse Laplace Transform – Applications to solve Second order Differential Equations with Constant Coefficients.

BOOKS FOR REFERENCE:

1. DIFFERENTIAL EQUATIONS AND ITS APPLICATIONS…..S. NARAYANAN & T.K.M.PILLAI
2. PARTIAL DIFFERENTIAL EQUATIONS…..I.N. SNEDDON
3. ENGINEERING MATHEMATICS……A. SINGARAVELU.
4. ALLIED MATHEMATICS VOLUME II….A.SINGARAVELU
5. CALCULUS VOLUME II …… T.K.M.PILLAI

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SEMESTER - II

CC 3 - INTEGRAL CALCULUS, FOURIER SERIES AND VECTOR ANALYSIS

Subject Code: 17U2M3	Credits: 5	External Marks: 75	Hours: 6

UNIT I: **INTEGRAL CALCULUS:-**Properties of Definite integrals – Integration - Reduction formulae for $\int x^m(\log x)^n dx$, $\int x^n e^{ax} dx$, $\int \sin^n x\, dx$, $\int \cos^n x\, dx$, $\int \tan^n x\, dx$, $\int \sec^n x\, dx$, $\int \operatorname{cosec}^n x\, dx$, $\int \sin^m x \cos^n x\, dx$, and $\int \cot^n x\, dx$.

UNIT II: Multiple Integrals – Change the order of Integration - Definition and properties of beta and gamma functions.

UNIT III: **FOURIER SERIES**: Definition – Expansions of periodic functions with periods π and 2π - Use of odd and even functions - Half range series– Simple problems.

UNIT IV: **Vector Analysis:** Scalars and vector fields - Directional derivatives – Divergence and curl- problems.

UNIT V: **Vector integration:** Line integral – surface integral – volume integral – Gauss divergence theorem – Green's theorem – Stoke's theorem (Statements only) – Problems.

BOOKS FOR REFERENCE

1. CALCULUS VOLUME II ……T.K.M. PILLAI.
2. ENGINEERING MATHEMATICS……A. SINGARAVELU.
3. ALLIED MATHEMATICS VOLUME II….A.SINGARAVELU
4. ALLIED MATHEMATICS PAPER III…….A.SINGARAVELU

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SEMESTER - II

AC 2 - STATISTICS FOR MATHEMATICS II

Subject Code: 17U2MST2	Credits: 3	External Marks: 75	Hours: 4

Objective: *To know the basic special discrete and continuous probability distribution.To understand the problem in correlation, regression and Test of significance for large and small samples.*

Unit I: Discrete distributions –Binomial, Poisson, Geometric and Negative Binomial distributions-Definitions, mean, variance, mgf and characteristic function.(Derivation only)

Unit II: Continuous distributions –Normal, Uniform and Exponential distribution.Beta and Gamma distribution - Definitions, mean, variance, mgf and characteristic function (Derivation only).

Unit III: Correlation –Definition, Types, methods-scatter diagram, Karl – Pearson's co – efficient of correlation, Rank correlation –Properties and uses. (Simple problems)

Unit IV: Regression –Definition, properties of Regression co-efficient, Regression equations (two variables- Simple problems). Difference between Correlation and Regression.

Unit V: Test of Significance for large Samples – Single mean, difference between means, single proportion and difference between double proportions. Test of Significance for Small Samples –'t' test for Single mean, Difference between two means, Chi – Squaretest Goodness of fit- simple problems.

Reference Text Books:

1. Fundamentals of Mathematical Statistics, Gupta S.C. and V.K. Kapoor Sultan & Sons, New Delhi.
2. Mathematical Statistics, Kapoor and Saxena – Chand& Co, New Delhi.
3. Statistics (Theory and Practice) R.S.N. Pillai and V. Bagavathi - Chand& company LTD, New Delhi.

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SEMESTER - II

AP 1 - STATISTICS FOR MATHEMATICS - PRACTICALS

Subject Code: 17U2MSTP1	Credits: 3	External Marks: 60	Hours: 4

Objective: *To know the problem in the Descriptive Measures, Skewness, kurtosis, moments.To understand the problem in correlation, regression and Test of significance for large and small samples.*

Unit I: Measures of central tendency - Arithmetic Mean, Median, Mode, Geometric Mean, Harmonic Mean. (Numerical problems only).

Unit II: Measures of Dispersion -Quartile Deviation, Mean Deviation, Standard Deviation and Co-efficient of variation. (Numerical problems only)

Unit III: Karl Pearson's and Bowley's Co-efficient of Skewness, kurtosis and moments (Numerical problems only)

Unit IV: Fitting of Binomial and Poisson distributions. Fitting of Normal distribution (Area method only)

Unit V: Karl Pearson's co-efficient of correlation, Spearman's rank correlation co-efficient, Regression lines (Numerical problems only) Test of significance based on Normal Distribution for mean and proportions. Student's t – test for mean - Chi-square test Goodness of fit.

NOTE: First THREE Units to be covered in Semester –I and remaining THREE Units in Semester – II

Reference Text Books

Practical statistics -R.S.N. Pillai and V. Bagavathi - -Chand& Co

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SEMESTER - III
CC 4 - ANALYTICAL GEOMETRY

Subject Code: 17U3M4	Credits:5	External Marks: 75	Hours: 6

UNIT I: **POLAR CO-ORDINATES:** 2D Polar co-ordinates ,points, straight line,circle,conics,$1/r=1+e\cos\theta$.

UNIT II: **THE PLANE :** Standard equation of a Plane – Intercept Form - Normal form– Planes passing through given points – Plane through the line of intersection of
two planes– angle between planes .

UNIT III: **THE STRAIGHT LINE:** Equation of a Straight line passing through two given points –Angle between the plane and the line - Coplanar lines - The shortest distance between two given lines.

UNIT IV: **THE SPHERE :** The equation of a sphere – The length of the tangent from a given point to sphere– Intersection of a plane and a sphere – Equation of a sphere passing through a given circle - The equation of the tangent plane to the sphere.

UNIT V: **THE CONE :** The equation of a surface – Intersection of a straight line and a quadric cone – Tangent plane and normal

TEXT BOOKS:

For Unit-I (2D (PART I) "ANALYTICAL GEOMETRY" BY T.K.M PILLAI AND T.NATARAJAN
For Unit-II,III,IV,V "ANALYTICAL GEOMETRY" BY T.K.M. PILLAI AND T.NATARAJAN
Unit I: Chapter 9: Sec 1 to 14
Unit II: Chapter 2: Sec 1 to 9
Unit III: Chapter 3: Sec1 to 8 (omit 8.1 & 8.2)
Unit IV: Chapter 4:
Unit V: Chapter 5: Sec 1 to 4

Books for References:

1.Engineering Mathematics ..... A.Singaravalu.
2.Engineering Mathematics.....M.K.Venkatraman.

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SEMESTER – III

AC 1 - PHYSICS I

இயற்பியல் I

Subject Code: 17U3MP1 /17U3CP1	Credits: 4	External Marks: 75	Hours: 2

Objectives:

- *To give the students an overview of different important branches of physics particulary to make the students to understand the basic concepts in mechanics, sound, thermal physics and liquid properties.*

Unit I: SIMPLE HARMONIC MOTION AND GRAVITATION

Simple Harmonic motion – equation of SHM – Period – Velocity – energy – Composition of two SHMs along the same straight line and at right angles – Special cases.

Kepler's laws of planetary motion – Newton's law of gravitation – determination of 'G' by Boy's method – Variation of 'g' with altitude and depth.

அலகு I: எளிய சீரிசை இயக்கம் மற்றும் ஈர்ப்பு

எளிய சீரிசை இயக்கம் – எளிய சீரிசை இயக்கத்தின் சமன்பாடு – கால அளவு – திசைவேகம் – ஆற்றல் – ஒரு நேர் கோடு மற்றும் ஒன்றிற்கொன்று செங்குத்துத் திசையில் செயற்படும் சீரிசை இயக்கங்களின் தொகுப்பு – சிறப்புமுறைகள்.

கோள்களின் இயக்கத்திற்கான கெப்ளரின் விதிகள் – நியூட்டனின் ஈர்ப்பியல் விதிகள் – பாய்ஸ் முறையில் ஈர்ப்பு மாறிலி 'G' காணல் –ஆழம் மற்றும் குத்துயரத்தை பொறுத்து 'g' ன் மாறுபாடு காணல்.

Unit II: SOUND

Characteristics of sound waves – Intensity and Loudness – Decibel – Vibrations in strings – Melde's Experiment – Sonometer – Determination of a frequency of a tuning fork –Reverberation – Acoustics of an auditorium – Requisites of a good auditorium.

அலகு II: ஒலி

ஒலி அலைகளின் தனிச்சிறப்புகள் – செறிவு மற்றும் ஒலி உரப்பு – டெசிபெல் – கம்பியின் அதிர்வு – மெல்டி சோதனை – சுரமானி – இசைக்கவையின் அதிர்வெண் கண்டுபிடித்தல் – எதிர்முழக்கம் –கலையரங்கில் ஒலியியல் – நல்ல கலையரங்கிற்கு தேவையானவை.

Unit III: ELASTICITY

Young's modulus – Bending of beams – Bending moment – determination of Young's modulus by uniform and non-uniform bending method – Rigidity modulus – Definition – Torsional pendulum – Experiment only.

Osmosis and Diffusion

Osmosis – Laws of Osmotic pressure – Experimental determination of osmotic pressure – Laws of diffusion – Experimental determination of coefficient of diffusion.

அலகு III: மீள்தன்மை

யங் குணகம் – சட்டங்கள் வளைதல் – வளைவு திருப்புத் திறன் – சீர் அற்ற மற்றும் சீரான வளைவு முறையில் யங் குணகம் கண்டுபிடித்தல் – விறைப்புக் குணகம் – வரையறை – முறுக்கு ஊசல் – (சோதனை மட்டும்).

சவ்வூடு பரவல் மற்றும் விரவல்

சவ்வூடு பரவல் – சவ்வூடு பரவுகை அழுத்த விதிகள் – சோதனை முறையில் சவ்வூடுபரவுகை அழுத்தம் காணல் – விரவல் விதிகள் – விரவல் எண்ணை சோதனை முறையில் காணல்.

Unit IV: **VISCOSITY**

Coefficient of Viscosity – streamline and turbulent flow – Comparison of viscosities – Burette method – Ostwald's viscometer – Stoke's formula for high viscous liquids – Terminal velocity.

Surface Tension

Molecular theory of surface tension – excess of pressure inside a water drop and soap bubble – surface tension by drop weight method – interfacial surface tension.

அலகு IV: **பாகியல்**

பாகியல் எண் – வரிச்சீர் மற்றும் வரிச்சீரற்ற ஓட்டம் – பாகியல் எண்ணை ஒப்பிடுதல் – பியூரெட் முறை – ஆசவால்டு பாகுநிலைமானி – உயர் பாகுநிலை கொண்ட திரவங்களின் பாகியல் எண் கண்டுபிடிப்பதற்கான ஸ்டோக்ஸ் வாய்பாடு – முற்று திசைவேகம்.

பரப்பு இழுவிசை

பரப்பு இழுவிசைக்கான மூலக்கூறு கொள்கை – துளி, குமிழ் ஆகியவற்றினுள் அழுத்த மிகுதிப்பாடு – துளி எடை முறைப்படி பரப்பு இழுவிசை காணல் – முகவிடைப் பரப்பு இழுவிசை.

Unit V: **THERMAL PHYSICS**

Vanderwaal's equation of state – Derivation – Critical constants – Joule-Kelvin effect – Temperature of inversion – Production of low temperature – liquefaction of gases – Linde's process – Coefficient of thermal conductivity – Lee's disc method for bad conductors.

அலகு V: **வெப்ப இயற்பியல்**

வாண்டர் வால்ஸ் நிலையமைவுச் சமன்பாடு – நிறுவுதல் – மாறுநிலை மாறிலி – ஜூல் கெல்வின் விளைவு – புரட்டு வெப்பநிலை – தாழ் வெப்பநிலை உருவாக்கல் – வாயுக்களை நீர்மமாக்கல் – லின்டே செயல்முறை – வெப்பக்கடத்து எண் –அரிதிற்கடத்திக்கான லீ வட்டு முறை.

Books for study:

1. Advanced Level Physics by M.Nelkon, P.Parker, Heinemann Educational Books Ltd.,
2. Ancillary Physics Vol 1 and 2 by Kamalakkannan and others
3. Ancillary Physics by Dr. Sabesan and others
4. Ancillary Physics Vol 1 & 2 by Einstein's Publication
5. Allied Physics I by Sundaravelusamy, Priya Publications, Karur.

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SEMESTER - III

AC 3 - COMPUTER SCIENCE I

Subject Code: 17U3MCS1	Credits: 4	External Marks: 75	Hours: 4

UNIT I: **THE DIGITAL AGE :** From the analog to the digital age, the new story of computers communications – overview of computer & communication system : system elements. People & procedures – data / Information, Hardware, Software communications – Developments in computer technology

UNIT II: Overview of developments in communication technology – computer & communication technology combined : connectivity & interactivity – The Ethics of Information technology – How to think about software – common features of software – word processing - spreadsheets.

UNIT III: Data base & financial software – software for cyberspace : communication E_Mail, web browsers – Integrated software & suites – specialty software software – when software causes problems.

UNIT IV: System Software : Three components of System Software – The Operating system Common Microcomputer Operating system.

UNIT V : PROCESSORS: Microchips, Miniaturization & Mobility – The CPU & Main memory – How data & programs are represented in the computer –The Microcomputer System unit.

TEXT BOOK :

Using Information Technology (Brief version), by Stacey C. Sawyer Brian K. Williams Sarah E.Hutchinson

UNIT – I - Chapter 1: 1.1 to 1.7
UNIT – II - Chapter 1: 1.8 to 1.10 Chapter 2: 2.1 to 2.4
UNIT – III - Chapter 2: 2.5 to 2.10
UNIT –IV - Chapter 3 : 3.1 to 3.3.
UNIT – V - Chapter 4: 4.1 to 4.4

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SEMESTER - III

NME 1 - MATLAB

Subject Code: 17U3MNE1	Credits: 2	External Marks: 75	Hours: 2

UNIT I: Introduction – Basics of MATLAB, Input-Output, File types- Platform dependence-General commands.

UNIT II: Interactive Computation: Matrices and Vectors – Matrix and Array operations-creating and Using Inline functions-Using Built-in Functions and On-line Help-Saving and loading data- Plotting simple graphs.

UNIT III: Programming in MATLAB:Scripts and Functions-Script files-Functions files-Language Specific features –Advanced Data objects.

UNIT IV: Applications-Linear Algebra-Curve fitting and Interpolation-Data analysis and Statistics- Numerical Integration-Ordinary differential equations-Nonlinear Algebraic Equations.

UNIT V: Graphics:Basic 2-D plots-Using subplot to Layout multiple graphs – 3 -D plots – Handle Graphics – Saving and printing Graphs – Errors

TEXT BOOK:

RUDRA PRATAP, Getting started with MATLAB – A quick Introduction for Scientists and Engineers,Oxford University Press,2003

Unit I: Chapter 1: Sec 1.6.1 to 1.6.6
Unit II: Chapter 1: Sec 3.1, 3.2, 3.5 to 3.8 (omit 3.3 & 3.4)
Unit III: Chapter 1: Sec 4.1 to 4.4
Unit IV: Chapter 1: Sec 5.1 to 5.5
Unit V: Chapter 1: Sec 6.1 to 6.3 & 6.6 (omit 6.4 & 6.5)

Reference Books:

1. William john Palm, Introduction to Matlab 7 for Engineers, McGraw – Hill Professional,2005.
2. Dolores M.Etter,David C.Kuncicky,Introduction to MATLAB 7,Prentice Hall,2004.

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SEMESTER - IV
CC 5 - NUMERICAL METHODS

Subject Code: 17U4M5	Credits: 4	External Marks: 75	Hours: 6

UNIT I: **Solutions of Algebraic and Transcendental Equations:** Introduction – The Bisection Method - Iteration method - Method of False position – Newton-Raphson Method – Ramanujan's method- Secant method.

UNIT II: **Interpolation**: Finite Differences – Forward Differences - Backward Differences - Central Differences - Symbolic Relations – Newton's Formulae for interpolation - Interpolation with Unevenly Spaced points – Lagrange's Interpolation formula.

UNIT III: **Numerical Differentiation and Integration:** Introduction - Numerical Differentiation – Numerical Integration – Trapezoidal Rule - Simpson's 1/3 Rule - Simpson's 3/8 Rule.

UNIT IV: **Solutions of Linear System -Direct Methods:** Gauss elimination - Gauss Jordan method – Modification of the Gauss method to compute the Inverse – Number of Arithmetic operations- LU decomposition- Jacobi and Gauss-Seidel methods.

UNIT V: **Numerical Solution of Ordinary Differential Equations:** Solution by Taylor's Series - Picard 's method of successive approximations - Euler's Method - Modified Euler's method - Runge-Kutta Methods – Predictor-Corrector methods: Adams Moulton method – Milne's method.

TEXT BOOK: "INTRODUCTORY METHODS OF NUMERICAL ANALYSIS"
BY S.S. SASTRY (FOURTH EDITION) - 2009

Unit I: Chapter 2: 2.1 to 2.7
Unit II: Chapter 3: 3.3 , 3.6 & 3.9 (3.9.1 only)
Unit III: Chapter 5: 5.1, 5.2 (omit 5.2.1 &5.2.2) & 5.4 (5.4.1,5.4.2 & 5.4.3 only)
Unit IV: Chapter 6: 6.3.2 - 6.3.6 & 6.4 only
Unit V: Chapter 7: 7.1 to 7.6 (omit 7.4.1)

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B.Sc., MATHEMATICS

(Effective for those admitted from 2017-2018 onwards)

SEMESTER - IV
CC 6 - SEQUENCES AND SERIES

Subject Code: 17U4M6	Credits: 5	External Marks: 75	Hours: 4

UNIT I: Introduction - Sequences – Bounded Sequences – Monotonic Sequences – Convergent Sequence – Divergent Sequences – Oscillating sequences.

UNIT II: The Algebra of Limits – Behavior of Monotonic sequences - Some theorems on limits

UNIT III: Subsequences – limit points - Cauchy sequences – The upper and lower limits of a sequence.

UNIT IV: Series – infinite series – Cauchy's general principal of convergence – Comparison test - Kummer'stest – D' Alembert's ratio test – Raabe's test.eorem and test of convergence using comparison test

UNIT V: Root test and condensation test – Alternating Series – Absolute Convergence – Tests for convergence of series of arbitrary terms.

TEXT BOOK:

Sequences and Series by Dr. S.Arumugam & Mr.A.Thangapandi Isaac – New Gamma Publishing House.

Unit I: Chapter 3 : Sec. 3.0 to 3.5
Unit II: Chapter 3 : Sec. 3.6 to 3.8
Unit III: Chapter 3 : Sec. 3.9 to 3.12
Unit IV: Chapter 4 : Sec. 4.1 to 4.3
Unit V: Chapter 4 : Sec. 4.4 and Chapter 5: Sec. 5.1 to 5.3

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SEMESTER – IV

AC 2 - PHYSICS II

இயற்பியல் II

Subject Code: 17U4MP2/ 17U4CP2 / 17U4ZP2	Credits: 4	External Marks: 75	Hours: 4

Objectives:

- *To give the students an overview of different important branches of physics particulary to make the students to understand the basic concepts in optics, electricity, atom and digital electronics.*

Unit I: OPTICS

Air wedge – Expression for fringe width – determination of thickness of a wire –Fresnel's explanation for Rectilinear propagation of light – Diffraction – Diffraction grating – Theory of plane transmission grating – Normal incidence – determination of wavelength.

Fibre Optics

Optical fibre – numerical aperture – Fibre optic communication system – advantages.

அலகு I: ஒளியியல்

காற்று ஆப்பு – பட்டையின் அகலத்திற்கான கோவை – காற்று ஆப்பு முறையில் மெல்லிய கம்பியின் தடிமன் காணல் – ஒளியின் நேர்கோட்டுப் பரவலுக்கு ஃப்ரநெல் விளக்கம் – விளிம்பு விளைவு – விளிம்பு விளைவுக் கீற்றணி – சமதள விளிம்பு விளைவுக் கீற்றணி கோட்பாடு – நேர்குத்துப் படுகை – அலைநீளத்தை கணக்கிடல்.

ஒளியியல் இழை

ஒளியிழை – எண் துறவு – ஒளியியல் இழை செய்தி தொடர்பு முறை மற்றும் அதன் நன்மைகள்.

Unit II: ELECTRICITY

Electric potential – Potential and Field due to point charge – Principle of condenser - Energy of a charged capacitor – Loss of energy due to sharing of charges – Parallel plate condenser – Types of condensers.

அலகு II: மின்னாற்றல்

மின் அழுத்தம் – புள்ளி மின்னூட்டத்தினால் உண்டாகும் உள்ளாற்றல் மற்றும் புலம் – மின்தேக்கியின் கொள்கை – மின்னூட்ட மின்தேக்கியின் ஆற்றல் – மின்னூட்ட பகிர்தலினால் உண்டாகும் ஆற்றல் இழப்பு – இணைத் தட்டு மின்தேக்கி – மின்தேக்கியின் வகைகள்.

Unit III: ELECTRO MAGNETISM

Faradays Laws – Explanation for induced emf – Flemings Left Hand Rule and Right Hand Rule – Self induction – Definition by Rayleigh's method – Mutual inductance – Determination – Eddy currents – Induction coils.

அலகு III: மின்காந்தவியல்

ஃபாரடே விதி – தூண்டிய மின்னியக்கு விசைக்கான விளக்கம் – ஃபிளமிங் வலது மற்றம் இடது கை விதிகள் – தன் மின்தூண்டல் – ராலே முறையில் வரையறை – பரிமாற்றத் தூண்டல் – தீர்மானித்தல் – சுழிப்பு மின்னோட்டம் – தூண்டு மின்சுருள்.

Unit IV: **ATOMIC PHYSICS**

Photoelectric effect – Einstein's theory and equation – Millikan's experimental determination of Planck's constant – Photo multipliers – Artificial radioactivity – Radio isotopes and their uses – Particle detectors – Ionisation chamber – Geiger Muller counter – Nuclear fusion – C – N cycle and P – P cycle.

அலகு IV: **அணு இயற்பியல்**

ஒளிமின் விளைவு – ஐன்ஸ்டீன் கோட்பாடு மற்றும் சமன்பாடு – பிளாங்க் மாறிலி கண்டுபிடிப்பதற்க்கான மில்லிகன் சோதனை – ஒளிபெருக்கிகள் – செயற்கைக் கதிரியக்கம் – ரேடியோ ஓரகத்தனிமங்கள் மற்றம் அதன் பயன்கள் – துகள் கண்டுணரி – அயனியாக்கக் கலம் – கைகர் முல்லர் எண்ணி – அணுக்கருப் பிணைவு – C–N சுழற்சி மற்றம் P–P சுழற்சி.

Unit V: **ELECTRONICS**

Semiconductors – Junction diodes and Zener diodes and their characteristics – Transistor – CE – Characteristics – Transistor as an amplifier and oscillator – RC Coupled amplifier – Hartley Oscillator.

Digital Electronics

Decimal, binary, octal and hexadecimal number systems and their mutual conversions – Basic logic gates – AND, OR, EX-OR, NAND, NOR & NOT gates – Boolean algebra – De-Morgan's theorems and verification.

அலகு V: **மின்னணுவியல்**

குறை கடத்திகள் – சந்தி டையோடு மற்றம் ஜெனர் டையோடுகள் மற்றும் அதன் பண்புகள் – திரிதடையம் – CE பண்புகள் – திரிதடையம் பெருக்கியாக மற்றும் அலையியற்றியாக – RC இணைவு பெருக்கி – ஹார்ட்லி அலையியற்றி.

இலக்கமுறை மின்னணுவியல்

பதின்மம், இரட்டை, எண்ம மற்றும் பதினாறடிமான எண்முறைகள் – ஒரு முறையிலிருந்து மற்றொரு முறைக்கு மாற்றம் செய்தல் – AND, OR, NOT, EXOR, NAND, NOR ஏரண வாயில்கள் – பூலியக் கோவை – டி மார்கன் தேற்றங்கள் மற்றம் அதனை சரிபார்த்தல்.

BOOKS FOR STUDY:

1. Ancillary Physics Vol. I & II by Kamalakkannan and others
2. Ancillary Physics by Dr. Sabesan and others
3. Physics Vol. I & II by Haliday and Resnick
4. Electronics by V.K. Mehta, S. Chand Publishers.
5. Allied Physics Vol. I & II by Sundaravelusamy, Priya Publications, Karur.

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SEMESTER - IV
AC 4 - COMPUTER SCIENCE II

Subject Code: 17U4MCS2	Credits: 4	External Marks: 75	Hours: 4

UNIT I : INPUT & OUTPUT HARDWARE

UNIT II: More output devices: Audio, Video, Virtual reality & Robots – In & out devices that Do both – Input & Output Technology & Quality Of Life: Health & Ergonomics – storage & databases; foundations for interactivity & knowledge – Storage Fundamentals, Diskettes, Hard disks, optical disks.

UNIT III: Compression & Decompression – Organizing data in secondary storage : databases, File Management: Basic Concepts, File Management Systems Versus database Management Systems, Types of Database Organization, Features of a DBMS.

UNIT IV: Telecommunications: the uses of online and the internet.

UNIT V : Communications technology: Hardware, channels & networks.

TEXT BOOK :

Using Information Technology (Brief version), by Stacey C . Sawyer Brian K. Williams Sarah E.Hutchinson

UNIT – I - Chapter 5: 5.1 to 5.8
UNIT – II – Chapter 5: 5.9 to 5.11 Chapter 6: 6.1 to 6.4
UNIT – III - Chapter 6: 6.9 to 6.13
UNIT –IV - Chapter 7 : 7.1 to 7.6
UNIT – V - Chapter 8: 8.1 to 8.5

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SEMESTER – IV

AP 1 - PHYSICS PRACTICAL
இயற்பியல் செய்முறைகள்

Subject Code: 17U4MPP1/17U4CPP1	Credits: 4	External Marks: 75	Hours: 6

A. Properties of matter:
பொருட்பண்பியல்:

1. Young's Modulus - Non-Uniform bending-pin and microscope.
   யங் குணகம் – சீரற்ற வளைவு முறை – குண்டூசி மற்றும் நுண்ணோக்கி.
2. Young's Modulus - Uniform bending-pin and microscope.
   யங் குணகம் – சீரான வளைவு முறை – குண்டூசி மற்றும் நுண்ணோக்கி.
3. Rigidity Modulus - Static Torsion- Scale and Telescope.
   விறைப்புக் குணகம் – நிலை முறுக்கம் – அளவுகோல் மற்றம் நுண்ணோக்கி.
4. Rigidity Modulus -Torsional Pendulum.
   விறைப்புக் குணகம் – முறுக்கு ஊசல்.
5. Surface Tension-Drop weight method.
   பரப்பு இழுவிசை – துளி எடை முறை.
6. Interfacial Surface Tension between two liquids- Drop weight method.
   இரண்டு திரவங்களுக்கிடையே உள்ள முகப்பிடை பரப்பு இழுவிசை – துளி எடை முறை.
7. Viscosity of a liquid-Capillary flow method.
   திரவத்தின் பாகியல் எண் – நுண்குழல் பாய்வு முறை.
8. Comparison of viscosities-Capillary flow method.
   பாகியல் எண்கள் ஒப்பிடுதல் – நுண்குழல் பாய்வு முறை.
9. Surface Tension - Capillary rise method.
   பரப்பு இழுவிசை – நுண்புழை நீர் உயர்வு.

B. Sound:
ஒலி :

10. Melde's string - frequency of a vibrator.
    மெல்டீஸ் கம்பி – அதிர்வியின் அதிர்வெண்.
11. Verification of laws -Sonometer.
    விதிகளை சரிபார்த்தல் – சோனாமீட்டர்.

C. Heat:
வெப்பம் :

12. Specific heat capacity of a liquid- Newton's law of cooling.
    திரவத்தின் தன்வெப்பத் திறன் – நியூட்டன் குளிர்வித்தல் விதி.
13. Specific heat capacity of a liquid- Joule's calorimeter-Half time correction.
    திரவத்தின் தன்வெப்பத் திறன் – ஜூல் கலோரிமானி – அரை நேர திருத்தம்.
14. Thermal conductivity-Lee's disc.
    வெப்பம் கடத்தும் திறன் – லீ வட்டு முறை.

D. Electricity:
மின்சாரம்:

15. Metre bridge - Specific resistance.
மீட்டர் சமனச்சுற்று – மின் தடை எண்.

16. Metre bridge - Temperature coefficient of resistance.
மீட்டர் சமனச்சுற்று – வெப்ப மின்தடை எண்.

17. Potentiometer- Calibration of low range voltmeter.
மின்னழுத்தமானி – குறை அளவு வோல்ட்மீட்டர் அளவு திருத்தம்.

18. Potentiometer - Calibration of ammeter.
மின்னழுத்தமானி – மின்னோட்டமானி அளவு திருத்தம்.

E. Optics:
ஒளியியல்:

19. Air Wedge – Thickness of a thin wire.
காற்று ஆப்பு – மெல்லிய கம்பியின் தடிமன்.

20. Spectrometer- Refractive index of glass prism.
நிறமாலைமானி – திண்ம முப்பட்டகத்தின் ஒளிவிலகல் எண்.

21. Spectrometer- Refractive index of liquid prism.
நிறமாலைமானி – திரவ முப்பட்டகத்தின் ஒளிவிலகல் எண்.

22. Newton's rings- Radius of curvature.
நீயூட்டன் வளையங்கள் – வளைவு ஆரம்.

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SEMESTER - IV
AP 1 - COMPUTER SCIENCE PRACTICAL

Subject Code: 17U4MCSP1	Credits: 3	External Marks: 60	Hours: 6

SI.NO	NAME OF PROGRAM
I	**MS Word**
1.	Formatting a text with left right central header footer
2.	Mathematical operations
3.	Clipart format
4.	Mail merge
II	**MS Excel**
1.	Pay Roll
2.	EB Bill
3.	Chart Wizard
4.	Algebraic manipulation with table
III	**MS Power Point**
1.	Slide show for a company
2.	Create slide show using with template
3.	Insert a picture with Animations
4.	Project presentation

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SEMESTER - IV
NME 2 - ENGLISH FOR COMPETITIVE EXAMINATIONS

Subject Code: 17U4MNE2	Credits: 2	External Marks: 75	Hours: 2

UNIT I: Basics of English

UNIT II: Spotting Errors

UNIT III: Reading Comprehension

UNIT IV: Letter Writing

UNIT V: Composition

Prescribed Text

Bhatnagar, R P and Rajul Bhargava. English for Competitive Examinations, Macmillan India Limited: Chennai.

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SEMESTER - IV
SBE 1 - MATHEMATICS FOR COMPETITIVE EXAMINATION I

Subject Code: 17U4MSE1	Credits: 2	External Marks: 75	Hours: 2

UNIT I: Numbers – H.C.F. & L.C.M. of Numbers – Decimal fractions.

UNIT II: Simplification – Square Roots & Cube Roots – Average.

UNIT III: Problems on Numbers – Problems on Ages – Surds & Indices.

UNIT IV: Percentage – Profit & Loss – Ratio & Proportion.

UNIT V: Partnership – Chain Rule – Time & Work.

TEXT BOOK:

Aggarwal R.S., Quantitative Aptitude, S. Chand & Company Ltd., 1989.

Unit I: Chapters 1 to 3
Unit II: Chapters 4 to 6
Unit III: Chapters 7 to 9
Unit IV: Chapters 10 to 12
Unit V: Chapters 13 to 15

REFERENCE BOOKS:

1. Guha Abhijit, Quantitative Aptitude For Competitive Examinations, Standard Book Distributing House, Third Edition, 2005.
2. Serre J.P., Course in Arithmetic.
3. Dinesh Khattar, The Peareson Guide to Quantitative Aptitude, Pearson Education (Singapore), 2005.

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SEMESTER - V
CC 7 - ALGEBRA

Subject Code: 17U5M7	Credits: 5	External Marks: 75	Hours: 5

UNIT I: **GROUPS:** Definition and examples - Some examples of a group- Some preliminary lemmas- Subgroups – A counting principle

UNIT II: Normal subgroups and quotient groups – Homomorphisms – Automorphisms – Cayley's theorem – Permutation groups.

UNIT III: **RINGS:** Definition and examples of rings – Some special classes of rings – Homomorphisms – Ideals and quotient rings.

UNIT IV: **Vector Spaces:** Elementary basic concepts – Linear independence and bases.

UNIT V: Inner product spaces

TEXT BOOK: "TOPICS IN ALGEBRA" By I. N . HERSTEIN

Unit I: Chapters 2: 2.1 to 2.5
Unit II: Chapters 2: 2.6 to 2.10
Unit III: Chapters 3: 3.1 to 3.4
Unit IV: Chapters 4: 4.1 to 4.2
Unit V: Chapters 4: 4.4

References:

1. Modern algebra by Vasistha.A.R
2. Abstract algebra by Vijay K.Kanna

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SEMESTER - V
CC 8 - REAL ANALYSIS

Subject Code: 17U5M8	Credits: 5	External Marks: 75	Hours: 5

UNIT I: **Real numbers:** The field axioms – Field properties – Order in R – Absolute value – Completeness- Representation of Real numbers on a straight line – Intervals – Countable and Uncountable sets.

UNIT II: **Neighbourhoods and limit points**: Introduction - Neighbourhoods – Open sets - Closed sets – Limit points of a set – Closure of a set.

UNIT III: **Limits and Continuity**: Limits – Continuous functions – Types of discontinuities - Algebra of Continuous functions – Boundedness of continuous functions.

UNIT IV: **Derivatives**: Introduction – Derivability and Continuity – Algebra of derivatives – Inverse function theorem for derivatives – Darboux's theorem.

UNIT V: Riemann integration –definition – Daurboux's theorem –conditions for integrability –Properties of Integrable functions - Continuity and derivability of integral functions – Mean value theorems -The Fundamental Theorem of Calculus and the First Mean Value Theorem.

TEXT BOOKS:

1. M.K,Singhal & Asha Rani Singhal , A First Course in Real Analysis, R.Chand & Co., June 1997 Edition **(UNITS I TO IV)**
2. Shanthi Narayan, A Course of Mathematical Analysis, S. Chand & Co., 1995 (**UNIT V)**

Unit I: Chapter 1:Sec 1.1 to 1.10
Unit II: Chapter 2: Sec 2.1 to 2.6.
Unit III: Chapter 5: Sec 5.1 to 5.5
Unit IV: Chapter 6: Sec 6.1 to 6.5
Unit V: Chapter 6 : Sec 6.2, 6.3, 6.5, 6.7,6.8, 6.9 **of [2]**

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B.Sc., MATHEMATICS

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SEMESTER - V
CC 9 - MATHEMATICAL LOGIC

Subject Code: 17U5M9	Credits: 5	External Marks: 75	Hours: 5

UNIT I: **Logic** : statements and notations – connectives – statement formulas and truth tables – conditional and biconditional- well formed formulas – Equivalence of formulas – Normal Forms.

UNIT II: Theory of inference for a statement calculus – rules of inference – related problems – Indirect method of proof.

UNIT III: Predicate calculus – the statement function – variables and quantifiers– predicate formula – free and bounded variables – the universe of discourse.

UNIT IV: **Combinatorics:** The rule of sum and product –permutation-combinations binomial theorem – Multinomial theorem.

UNIT V: Mathematical induction – The pigeon hole principle – The principle of inclusion and exclusion Derangements.

Text book :

Discrete mathematics by G.Ramesh and Dr.C.Ganesamoorthy.

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B.Sc., MATHEMATICS

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SEMESTER - V
CC 10 - STATICS

Subject Code: 17U5M10	Credits: 5	External Marks: 75	Hours: 4

Unit I: Force, Types of forces – equilibrium – Forces acting at a point – Triangle of forces – Converse of the triangle of forces – Lami's theorem – problems . $\lambda-\mu$ theorem – Parallel forces and moments – Resultant of two like parallel forces acting on a rigid body.-Resultant of two unlike parallel forces acting on a rigid body- Varigon's theorem.

UNIT II: Couples –equilibrium of two couples –Equivalence of two couples – Resultant of coplanar couples – Problems- Equilibrium of three forces acting on a rigid body – three coplanar forces – Two trigonometrical theorem – Problems – coplanar forces.

UNIT III: Friction – Laws of Friction – Equilibrium of a particle on a rough inclined plane – Equilibrium of a body on a rough inclined plane under a force parallel to the plane – Equilibrium of a body on a rough inclined plane under any forces – Problems of Friction.

UNIT IV: Virtual work – Principle of Virtual work for a system of Coplanar forces acting on a body – Forces which may be omitted in forming the equation of virtual work – work done by an extensible. Strings – problems.

UNIT V: Equilibrium of Strings – Equation of the common catenary – Tension at any points – Geometrical properties of the common catenary – Problems – The parabolic catenary.

TEXT BOOK:

Dr.M.K. Venkataraman – STATICS(8th edition) August 1996 – Agasthiar Publications, Trichy.

Unit I:	Chapter 2 and 3 (Page 6 to 65).
Unit II:	Chapter 4 and Chapter 5 (Page 84 to 128)
	Chapter 6 (Page 143 to 179)
Unit III:	Chapter 7 (Page 206 to 239)
Unit IV:	Chapter 9 (Page 326 to 353)
Unit V:	Chapter 11 (Page 375 to 399)

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B.Sc., MATHEMATICS

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SEMESTER - V
MBE 1 - C PROGRAMMING

Subject Code: 17U5MEC1	Credits: 4	External Marks: 75	Hours: 5

UNIT I: **Overview of C:**History of C – Programming style – Unix system. **Constants,Variables, and Data types:** Keywords and identifiers – constants – variables – Data types – Defining symbolic constants. **Operators and Expression:** Arithmetic operators – Conditional operator – Arithmetic expressions – Type conversions in expressions.

UNIT II: **Managing Input and Output Operators:**Reading and writing a charcter – Formatted input and output. **Decision making and Branching:** Decision making with if statement – The if …else statement – The switch statement. **Decision making and Looping:** The While statement – The do statement – The for statement.

UNIT III: **Arrays:**One dimensional array –Two dimensional arrays –Multidimensional arrays – Dynamic arrays. **Character arrays and Strings:** Declaring and initializing string variables – Arithmetic operations on characters – Comparison of two strings.

UNIT IV: **User-defined Functions:** Elements of user defined functions –Function calls – Function declaration – Arguments with return variables – Recursion – Multifile programs. Structures and Unions: Defining structure – Structure initialization – Arrays of structures – Structures and functions – Unions – Size of functions.

UNIT V: **Pointers:** Understanding pointers – Declaring pointer variables – Chain of pointers – Pointers and arrays – Array of pointers – Pointers to functions – Pointers and structures.

TEXT BOOK: " PROGRAMMING IN ANSI C " By E. BALAGURUSAMY (II – Edition 1992), Tata – McGraw – Hill Publishing Company.

Unit I: Chapters 1 to 3
Unit II: Chapters 4 to 6
Unit III: Chapters 7 & 8
Unit IV: Chapters 9 & 10
Unit V: Chapter 11

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B.Sc., MATHEMATICS

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SEMESTER - V
SBE 2 - MATHEMATICS FOR COMPETITIVE EXAMINATION II

Subject Code: 17U5MSE2	Credits: 2	External Marks: 75	Hours: 2

UNIT I: Pipes & Cistern – Time & Distance – Problems on Trains.

UNIT II: Boats & Streams – Alligation or Mixture – Simple Interest.

UNIT III: Compound Interest – Logarithms – Area.

UNIT IV: Volume & Surface Areas – Races & Games of Skill – Calendar.

UNIT V: Clocks – Stocks & Shares – Permutations & Combinations.

TEXT BOOK:

Quantitative Aptitude by R.S. Aggarwal.

Unit I: Chapters 16 to 18
Unit II: Chapters 19 to 21
Unit III: Chapters 22 to 24
Unit IV: Chapters 25 to 27
Unit V: Chapters 28 to 30

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SEMESTER - V
SBE 3 - HISTORY OF MATHEMATICS

Subject Code: 17U5MSE3	Credits: 2	External Marks: 75	Hours: 2

UNIT I: Foundation of Mathematics – Geometry according to Euclid – non- euclidean geometry – The formal axiomatic method – applied to arithmetic and geometry – description of the formal axiomatic method – analysis of the axiomatic method – analysis of the axiomatic method – consistency of an axiomatic system – completeness of an axiom system – categoricalness of an axiom system – advantages and disadvantages of the axiomatic method – the genetic method – the theory of sets – equivalent sets – cardinal numbers. **(Chapter 1: Page 1-25)**

UNIT II: Cantor's Diagonal procedure – The axiom of choice – objections to cantor's theory – paradoxes in set theory – cantor's paradox – Russell's paradox or Russell amtinomy-axiometic set theory – Zermelo –Fraenkel axioms for set theory – Logicism – Aristotels logic-symbolic logic – Basic symbols propositions and propositional function – The primitive propositions – propositionsl calculus – completeness – theory of types – Intuitionism – Formalism – The turing machine.**(Chapter 1:Page 25-54)**

UNIT III: History of Mathematics – The beginnings – The ancient and medieval period – Mesopotamia – Egypt, Greece; Thales and Pythagoras Pythagorean arithmetic and geometry – The Athenian school – Hellenistic mathematics – Alexandria Euclid Archimedes and Apoolonins – pappus and diophantus – The middle ages.**(Chapter 2: Page 55-74)**

UNIT IV: The modern period – The seventeenth century – The Eighteenth Century – The nineteenth century – The twentieth century.**(Chapter 2: Page 74-95)** History of Indian mathematics vedic period – vedanga, Jotisha –Sulbasutras – arithmetic – algebra – Geometry – Trignometry.**(Chapter 3: Page 97-111)**

UNIT V: History of algebra, Geometry and calculus:- Algebra – Analytical Geometry – calculus.**(Chapter 4: Page 112-126)** Men of mathematics – Archimedes – Aristotle – Aryabata I and II, Bhaskara I and II – Boole – Brahonagapta – Cantor – Euler – Gauss – Hillsert– Mahavira – Narayana pandita – Newton – Ramanujam – Riemann Bertrand Russen – Sridhara – Varahamihira**.** **(Chapter 5: Page 127-134)**

TEXT BOOK:

"HISTORY OF MATHEMATICS" by K.S. Narayanan & K. Narasimhan, Taj Printers, Tirunelveli.

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SEMESTER - VI
CC 11 - COMPLEX ANALYSIS

Subject Code: 17U6M11	Credits: 6	External Marks: 75	Hours: 6

UNIT I: **Analytic Functions :** Functions of complex Variable – Limits – theorems on Limits – continuous functions – Differentiability – C.R. Equations – Analytic functions – Harmonic functions .

UNIT II: **Bilinear Transformations :** Elementary transformation – Bilinear Transformations – cross ratio – fixed points of bilinear transformations – some special bilinear transformations.

UNIT III: **Complex Integration :** Definite integral- Cauchy's theorem – Cauchy's integral formula- Formula for Higher derivatives

UNIT IV: **Series expansions:** Taylor's Series – Laurent Series – Zeros of an analytic function - Singularities.

UNIT V: **CALCULUS OF RESIDUES:** Residues – Cauchy's Residue Theorem – Evaluation of definite integrals.

TEXT BOOK : " COMPLEX ANALYSIS "By Arumugam.

Unit I: Chapter 2: 2.1 to 2.8
Unit II: Chapter 3: 3.1 to 3.5
Unit III: Chapter 6: 6.1 to 6.4
Unit IV: Chapter 7: 7.1 to 7.4
Unit V: Chapter 8: 8.1 to 8.3

Books For Reference:

1. Complex Analysis by T.K. Manikavasakam Pillai and others Ananda Book Depot. Chennai.
2. Complex Variable by Dr. P.P. Gupta and Dr. R.K. Gupta Kendar Nath Ram Nath Meerut – Delhi.
3. Functions of a Complex Variable by J.N. Sharma Krishna Prakashan Mandir Meerut.

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SEMESTER - VI
CC 12 - DYNAMICS

Subject Code: 17U6M12	Credits: 6	External Marks: 75	Hours: 6

UNIT I: **DYNAMICS OF A PARTICLE**

Introduction – velocity – definition – resultant velocity – parallelogram law Angular velocity – Relative velocity– acceleration – Motion of a particle along a straight line under uniform acceleration – problems.

UNIT II: **PROJECTILES**

Introduction – Projectile, Trajectory, horizontal range, velocity of projection and angle of projection – definitions – The path of a projectile – Range on a horizontal plane – problems – Range on an inclined plane – problems. Simple Harmonic Motion – Definition – Equations of S.H.M. – Properties of S.H.M- Problems – Geometrical representation of S.H.M – Composition of two simple harmonic motions.

UNIT III: **IMPACTS**

Introduction – Impulse and impulsive forces – Principle of Conservation of linear momentum –Collision of elastic bodies - Newton's experimental law – Principle of conservation of momentum– Impact of a smooth sphere on a fixed smooth plane – problems – Direct and oblique impact of two smooth spheres – Problems.

UNIT IV: **CENTRAL ORBITS**

Velocity and acceleration in Polar coordinates - Definitions of Central Orbit, Central force and areal velocity – Differential equation of the central orbits in polar coordinates – p-r equation of the Central orbit – Given the Central orbit to find the law of force – Given the Law of Central force to find the orbit – problems.

UNIT V: **MOMENT OF INERTIA AND MOTION OF A RIGID BODY ABOUT A FIXED AXIX**

Definition – Parallel axes theorem and perpendicular axes theorem – motion of a rigid body about a fixed horizontal axis - K.E. – Angular Momentum – Equation of Motion – Compound Pendulum – Centre of suspension and centre of oscillation – Simple Equivalent Pendulum.

TEXT BOOK: DYNAMICS by Dr.M.K. Venkataraman Tenth Edition Agasthiarr book Depot, Trichy.

Unit I: Chapter 3 : Sec 3.1 to 3.28 (Pages 14 – 64)
Unit II:Chapter 6: Sec 6.1 to 6.16 Chapter 10 : Sec 10.1 to 10.7(Pages 139 – 182 &309 - 331)
Unit III:Chapter 7: Sec 7.1 to 7.6 Chapter 8:Sec 8.1 to 8.9 (Pages 201-257)
Unit IV:Chapter 11: Sec 11.1 to 11.13 (Pages 356 - 395)
Unit V:Chapter 12 and Chapter 13 (Pages 405 – 455)

REFERENCES :

1. Dynamics – S. Narayanan.
2. Dynamics – A.V.Dharmapadam
3. A text book of Dynamics – P. Chorlton.
4. P.Duraipandian – MECHANICS – Emerald Publishers,Chennai
5. S.Narayanan – DYNAMICS – S. Chand & Co. Chennai

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B.Sc., MATHEMATICS

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SEMESTER - VI
CC 13 - OPERATIONS RESEARCH

Subject Code: 17U6M13	Credits: 5	External Marks: 75	Hours: 5

UNIT I: Linear programming problems – Graphical solution - Simplex method – Optimality and Unboundedness - Use of Artificial Variables – The Two – Phase Method – Big M-Method.

UNIT II: The Transportation Problem – North West corner rule – Matrix Minima Method –Column minima and Row minima method – Vogel's approximation method - MODI Method – Unbalanced Transportation problem.

UNIT III: Assignment problem – The Hungarian assignment algorithm Unbalanced assignment problem – Sequencing problem – Basic terms used in sequencing- Processing n jobs through 2 machines and k machines – Processing 2 jobs through k machines.

UNIT IV: Network scheduling by PERT?CPM – Network basic components – Logical sequencing – Rules of network construction – Critical path analysis – Probability considerations in PERT – Distinction between PERT and CPM.

UNIT V: INVENTORY CONTROL -Inventory management – EOQ - Deterministic models.

TEXT BOOK: "OPERATIONS RESEARCH" BY KANTI SWARUP , P.K. GUPTA & MANMOHAN (Eleventh Edition).

Unit I: Chapter 2 : 2.1 , 2.2 Chapter 3 : 3.1 to 3.5 Chapter 4 : 4.1 to 4.4
Unit II: Chapter 10: 10.1 to 10.14
Unit III: Chapter 11: 11.1 to 11.4 Chapter 12.1 to 12.6
Unit IV: Chapter 21
Unit V: Chapter 19: 19.1 to 19.8

References :

1. Operations Research an Introduction – HAMDY A. TAHA. (McGRAW HILL i.e)
2. Principles of O.R with applications to MANAGERIAL Decisions.ER (PHI'64)

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B.Sc., MATHEMATICS

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SEMESTER - VI
MBE 2 - ASTRONOMY

Subject Code: 17U6MEC2	Credits: 4	External Marks: 75	Hours: 6

UNIT I: Relevant properties of sphere and formulae in spherical trigonometry (no proof, no problems) - Celestial sphere and diurnal motion - Celestial coordinates-sidereal time.

UNIT II: Morning and evening stars -circumpolar stars- diagram of the celestial sphere -zones of earth -perpetual day-dip of horizon-twilight.

UNIT III: Refraction - laws of refraction -tangent formula-Cassini's formula - horizontal refraction- geocentric parallax -horizontal parallax.

UNIT IV: Kepler's laws - verification of 1^{st} and 2^{nd} laws in the case of earth – Mean Anomaly - Seasons -causes of seasons – different kinds of years – Julian date.

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

TEXT BOOK:

Atronomy by Kumaravel, S. and Susheela Kumaravel, 8th Edition, SKV Publications, 2004.

Unit I: Sec: 39-79
Unit II: Sec: 80-90,106-116
Unit III: Sec: 117-145
Unit IV: Sec: 146-162,173-178
Unit V: Sec: 229-241,256-275

Book for Reference:

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

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B.Sc., MATHEMATICS

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SEMESTER - VI
MBE 3 - PRACTICALS IN C PROGRAMMING

Subject Code: 17U6MEC3	Credits: 4	External Marks: 60	Hours: 6

1. Arranging the numbers in Ascending / Descending order.
2. Arranging the Names in Alphabetical order.
3. Matrix Addition.
4. Matrix Multiplication.
5. Searching a number from the list.
6. Newton-Raphson Method.
7. Simpson's rule.
8. Runge-Kutta IV order Method.
9. Gauss- Seidal Method.
10. Standard deviation.
11. Powers of two for positive and negative integers.
12. Finding the value of nCr using factorial (Recursion).
13. Pay-Roll program.
14. Gauss elimination.
15. Value of Sin(x) using series method.

Text book: LET US C by YASWANT .KANETKAR.

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B.Sc., PHYSICS, CHEMISTRY, STATISTICS

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SEMESTER - I
AC 1 - MATHEMATICS I

Subject Code: 17U1PM1,17U1CM1, 17U1SM1	Credits: 4	External Marks: 75	Hours: 4

UNIT I: **THEORY OF EQUATIONS :** Nature of roots - Equations with real co-efficients, Imaginary roots occur in pairs – rational co-efficients, irrational roots occur in pairs – Relation between roots and coefficients – Transformations of equations – Reciprocal equations.

UNIT II: **SERIES:** Applications of the Binomial theorem to Binomial series - Summations and limits of Binomial, Exponential & Logarithmic series.

UNIT IV: **MATRICES:** Definitions and Algebraic operations – Rank of a Matrix – Simultaneous linear equations - Eigen values and Eigen Vectors – Cayley Hamilton Theorem.

UNIT III: **TRIGNOMETRY:** Expansion of cos nθ, sin nθ, tan nθ - Powers of sines and cosines of θ interms of functions of multiples of θ - Expansion of sin θ and cosθ in a series of ascending powers of θ.

UNIT V: **DIFFERENTIAL CALCULUS:** Curvature in Cartesian, polar and parametric form- p-r equation of curve.

Books for Reference:

1. Algebra…….. T.K.M. Pillai
2. Algebra volume II …….. T.K.M. Pillai, T.Natarajan & K.S.Ganapathy
3. Trigonometry…….S. Narayanan & T.K.M.Pillai
4. Calculus Volume I ……T.K.M. Pillai & S.Narayanan.
5. Engineering Mathematics……A. Singaravelu.
6. Algebra & trigonometry – I……A.Singaravelu & R.Ramaa
7. Differential calculus & Trigonometry… A.Singaravelu & R.Ramaa
8. Trigonometry……P.Duraipandian

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SEMESTER - II
AC 2 - MATHEMATICS II

Subject Code: 17U2PM2,17U2CM2,17U2SM2	Credits: 3	External Marks: 75	Hours: 3+3

UNIT I: **INTEGRAL CALCULUS:** Properties of Definite integrals – Integration Reduction formulae for $\int x^m (\log x)^n dx$, $\int x^n e^{ax} dx$, $\int \sin^n x\, dx$, $\int \cos^n x\, dx$, $\int \tan^n x\, dx$, $\int \sec^n x\, dx$, $\int \operatorname{cosec}^n x\, dx$, $\int \sin^m x \cos^n x\, dx$ and $\int \cot^n x\, dx$.

UNIT II: Multiple Integrals – Change the order of Integration - Definition and properties of beta and gamma functions.

UNIT III: **Fourier Series** :Full Range and Half Range Series with periods 2π and π

UNIT IV: **VECTOR ANALYSIS:** Vector differentiation – Gradient – Directional Derivative - Divergence and Curl of a vector – Problems.

UNIT V: Vector Integration – Line integrals – Surface integrals and volume integrals – Gauss Divergence theorem – Green's theorem – Stoke's theorem (proof not included) – Problems using the above theorems.

Books for reference:

1. CALCULUS VOLUME II ……T.K.M. PILLAI.
2. ENGINEERING MATHEMATICS……A. SINGARAVELU.
3. ALLIED MATHEMATICS VOLUME II….A.SINGARAVELU
4. VECTOR ANALYSIS……..T.K.M. PILLAY
5. VECTOR ANALYSIS…….LAKSHMINARASIMHAN.

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SEMESTER - II
AC 3 - MATHEMATICS III

Subject Code: 17U2PM3,17U2CM3, 17U2SM3	Credits: 3	External Marks: 75	Hours: 4

UNIT I: **FIRST ORDER DIFFERENTIAL EQUATIONS:** Exact Differential Equations, Necessary and Sufficient condition for integrability – Integrating factors – First order Higher degree Equations – Solvable for p,x,y - Clairaut's form.

UNIT II: **SECOND ORDER DIFFERENTIAL EQUATIONS :** Second Order Differential Equations with constant coefficients: Particular Integral of functions of types x^m, e^{ax}, Cos mx, Sin mx, $e^x f(x)$ and $x^m f(x)$ – Second order Differential Equations with variable coefficients.

UNIT III: **Partial Differential Equations:-**Formations of partial Differential Equations by eliminating arbitrary constants and arbitrary functions – First order partial Differential Equations - Lagrange's Equations.

UNIT IV: Four Standard Forms - Charpit's Method.

UNIT V : **LAPLACE TRANSFORMS:** Laplace Transform – Properties – First shifting theorem – Inverse Laplace Transforms – Applications to solve second order Differential equations with constant coefficients.

BOOKS FOR REFERENCE:

1. DIFFERENTIAL EQUATIONS AND ITS APPLICATIONS…..S. NARAYANAN & T.K.M.PILLAI
2. PARTIAL DIFFERENTIAL EQUATIONS…..I.N. SNEDDON
3. ENGINEERING MATHEMATICS……A. SINGARAVELU.
4. ALLIED MATHEMATICS VOLUME II….A.SINGARAVELU
5. CALCULUS VOLUME II ……T.K.M.PILLAI

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B.C.A.

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SEMESTER - I
AC 1 - MATHEMATICS I (ALGEBRA AND CALCULUS)

Subject Code: 17U1CAM1	Credits: 4	External Marks: 75	Hours: 6

UNIT I: Set theory: Basics concepts of set theory – The power set – Some operations on sets –Venn diagrams – Some basic set identities – ordered pairs and n-tuples – Cartesian products.

UNIT II: Matrices: Singular matrices – Inverse of a non-singular matrix using adjoint method – Rank of the matrix – Characteristic equation, Eigen values, Eigen vectors – Cayley Hamilton's theorem (proof not included)– Simple applications only.

UNIT III: Theory of equations: Relation between roots & coefficients – Transformations of equations – Diminishing, Increasing & Multiplying the roots by a constant – Forming equation with the given roots – ` Rolle's theorem – Simple problems.

UNIT IV: Differentiation:Partial differentiation – Euler's theorem–Total Differential coefficients (Proof not included) – Simple problems only.

UNIT V: Integration: Evaluation using integration by parts – properties of definite integral.

TEXT BOOKS:

1. J.P.Tremblay , R. Manohar, Discrete mathematical structures with applications to computer science , Tata McGraw-Hill publishing company limited, 2003, (Unit I)
2. T.K. Manickavasagam Pillai & Others, Algebra volume I & II, S.V. Publications, 1985 Revised editions (Unit II & III)
3. S. Narayanan & T.K. Manickavasagam Pillai, Calculus Volume II, S. Viswanathan Private limited, 2003 (Units IV & V)

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B.C.A.

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SEMESTER - II
AC 2 - MATHEMATICS II (OPERATIONAL RESEARCH)

Subject Code: 17U2CAM2	Credits: 4	External Marks: 75	Hours: 6

UNIT I: Operations Research : Introduction – Basics of OR – OR & Decision Making – Role of Computers in OR Linear Programming formulations& Graphical solution of two variables – Canonocal & Standard forms of LPP.

UNIT II: Simplex Method : Simplex Method for <, =, > constraints – Charne's method of penalities – two phrase simplex method.

UNIT III: Transporation problem : Transporation algorithm – Degeneracy algorithm – Degeneracy in Transportation problem, Unbalanced transportation problem –IBFS- NWCR, LCM/MMM, VAM's method and MODI method.

UNIT IV: Assignment Algorithm – Balanced and unbalanced assignment problem – Hungarian method.

UNIT V: Networks: Network – Fulkerson's rule Measure of activity – PERT computation – CPM Computation.

TEXT BOOK:

Manmohan & Gupta, Operations Research, sultan chand publishers, New Delhi.

References:

1. Prem Kumar Gupta and D.S. Hira Operations Research : An introduction, S. Chand and Co., Limited, New Delhi.
2. Hamdy A. Taha, Operations Research (7th Edition), Mc Millan Publishing Company, New Delhi, 1982.

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B.C.A. (COMPUTER APPLICATIONS)

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SEMESTER – I

AC 1 - ALGEBRA AND CALCULUS

Subject Code: 17U1CAM1	Credits: 4	External Marks: 75	Hours: 6

Unit I: Theory of equations: Relation between roots & coefficients – Transformations of equations – Diminishing, Increasing & Multiplying the roots by a constant – Forming equation with the given roots – Rolle's theorem – Simple problems.

Unit II: Matrices: Singular matrices – Inverse of a non-singular matrix using adjoint method – Rank of the matrix – Characteristic equation, Eigen values, Eigen vectors – Cayley Hamilton's theorem (proof not included) – Simple applications only.

Unit III: Differentiation: Partial differentiation – Euler's theorem – Total Differential coefficients (Proof not included) – Simple problems only. Integration: Evaluation using integration by parts – properties of definite integral.

Unit IV: Fourier Series in the range $(0,2\pi)$ – odd and even functions – Fourier half range sine & cosine series.

Unit V: Laplace transform – properties – inverse Laplace transforms – application to solve second order differential equations with constant coefficients.

Text Book:

1. T.K. Manickavasagam Pillai & Others, Algebra volume I, S.V. Publications, 1985 Revised editions (Unit I & II)
2. S. Narayanan & T.K. Manickavasagam Pillai, Calculus (Volume II), S. Viswanathan Private limited, 2003 (Units III & IV)
3. P. Kandasamy & K. Thilagavathy, Allied Mathematics (Volume /II), S-Chand & Company Ltd. 2004 (Unit V)