B.Sc. MATHEMATICS (2017 - 2018)

S. No.	Semester	Category	Paper Code	Title of the Paper	Maximum Marks			Minimum Marks for Pass			Hours/ Week	Credits
					CIA	EE	Total	CIA	EE	Total		
1.	I	Part – I	17U1MAT1/H1	Tamil – I / Hindi – I	25	75	100	10	30	40	6	3
2.		English	17U1MAE1	English – I	25	75	100	10	30	40	6	3
3.		Core	17U1MAC1	Differential Calculus and Trigonometry	25	75	100	10	30	40	5	4
4.		Core	17U1MAC2	Analytical Geometry 3-D and Integral Calculus	25	75	100	10	30	40	5	4
5.		Allied	17U1MAPHA1	Allied Physics – I	25	75	100	10	30	40	5	4
		Allied	17U2MAPHAPL	Allied Physics Practical (N.S)	-	-	-	-	-	-	3	-
6.		ES	17U1MAES	Environmental Studies	-	100	100	-	40	40	SS	1
7.	II	Part – I	17U2MAT2/H2	Tamil – II / Hindi – II	25	75	100	10	30	40	6	3
8.		English	17U2MAE2	English – II	25	75	100	10	30	40	6	3
9.		Core	17U2MAC3	Classical Algebra	25	75	100	10	30	40	4	5
10.		Core	17U2MAC4	Sequence and Series	25	75	100	10	30	40	5	5
11.		Allied	17U2MAPHA2	Allied Physics – II	25	75	100	10	30	40	5	4
12.		Allied	17U2MAPHAPL	Allied Physics Practical (N.S)	40	60	100	16	24	40	3	2
13.		Skill Based Education	17U2MAS1	Skill Based Education- I (Non-Verbal Reasoning)	25	75	100	10	30	40	1	1
14.		VBE	17U2MAVE	Value based Education	25	75	100	10	30	40	SS	-
15.	III	Part – I	17U3MAT3/H3	Tamil – III / Hindi – III	25	75	100	10	30	40	6	3
16.		English	17U3MAE3	English – III	25	75	100	10	30	40	6	3
17.		Core	17U3MAC5	Differential Equations and Laplace transform	25	75	100	10	30	40	5	5
18.		Core	17U3MAC6	Statics	25	75	100	10	30	40	5	5
19.		Allied	17U3MAMSA1	Allied Mathematical Statistics - I	25	75	100	10	30	40	5	4
		Allied (NS)	17U4MAMSAPL	Allied Mathematical Statistics - I Practicals (N.S)	-	-	-	-	-	-	3	-
20.		GS	17U3MAGS	Gender Studies	-	100	100	-	40	40	SS	-

S. No.	Semester	Category	Paper Code	Title of the Paper	Maximum Marks			Minimum Marks for Pass			Hours/ Week	Credits
					CIA	EE	Total	CIA	EE	Total		
21.	IV	Part – I	17U4MAT4/H4	Tamil-IV / Hindi-IV	25	75	100	10	30	40	6	3
22.		English	17U4MAE4	English – IV	25	75	100	10	30	40	6	3
23.		Core	17U4MAC7	Vector Calculus, Fourier Series and Fourier Transforms	25	75	100	10	30	40	4	5
24.		Core	17U4MAC8	Dynamics	25	75	100	10	30	40	5	5
25.		Allied	17U4MAMSA2	Allied Mathematical Statistics - II	25	75	100	10	30	40	5	4
26.		Allied (NS)	17U4MAMSAPL	Allied Mathematical Statistics - Practical (N.S)	25	75	100	10	30	40	3	2
27.		Skill Based Education	17U4MAS2	Skill Based Education–II (Arithmetic Ability)	25	75	100	10	30	40	1	1
28.	V	Core	17U5MAC9	Abstract Algebra	25	75	100	10	30	40	5	6
29.		Core	17U5MAC10	Real Analysis	25	75	100	10	30	40	5	6
30.		Core	17U5MAC11	Number Theory	25	75	100	10	30	40	5	5
31.		Core	17U5MAC12	Discrete Mathematics	25	75	100	10	30	40	4	4
32.		Major Elective	17U5MAEL1A 17U5MAEL1B	Numerical Methods (or) Special Functions	25	75	100	10	30	40	4	3
33.		Major Elective	17U5MAEL2A 17U5MAEL2B	Graph Theory (or) Mathematical Modeling	25	75	100	10	30	40	4	3
34.		NME	17U5MANME	Non-Major Elective: Mathematical Finance	25	75	100	10	30	40	2	1
35.		SSD	17U6MASSD	Soft Skill Development	-	100	100	-	40	40	1	-
36.	VI	Core	17U6MAC13	Complex Analysis	25	75	100	10	30	40	5	5
37.		Core	17U6MAC14	Operations Research	25	75	100	10	30	40	4	4
38.		Core	17U6MAC15	Programming in C	25	75	100	10	30	40	4	5
39.		Core – PL	17U6MACPL	Programming in C Practical	40	60	100	16	24	40	5	3
40.		Major Elective	17U6MAEL3A 17U6MAEL3B	Fuzzy sets and its applications (or) Formal Languages and Automata Theory	25	75	100	10	30	40	5	4
41.		Major Elective	17U6MAEL4A 17U6MAEL4B	Astronomy (or) Stochastic processes	25	75	100	10	30	40	5	4
42.		CN	17U6MACN	Comprehensive test	-	100	100	-	40	40	1	1
43.		GK	17U6MAGK	General Knowledge	-	100	100	-	40	40	1	-
				Extension Activities	-	-	-	-	-	-	-	1
				Total			**4300**				**180**	**140**

B.Sc., MATHEMATICS (2017 - 2018)

Paper Code	Total No. Of Papers	Total Marks	Total Credits	Classification
Part - I	**04**	**400**	**12**	√
Part – II	**04**	**400**	**12**	√
Part – III Core Allied Major Elective	16 06 04 **26**	1600 600 400 **2600**	76 20 14 **110**	√
Part – IV Environmental Studies Value based education Skill Based Elective Gender studies Non Major Elective Soft skill development G.K Comprehensive Test	1 1 2 1 1 1 1 1 **9**	100 100 200 100 100 100 100 100 **900**	1 -- 2 -- 1 -- -- 1 **05**	√
Part – V	**Extension Activity**		**1**	X
Total	**43**	**4300**	**140**	√

B.Sc. Mathematics

A.VEERIYA VANDAYAR MEMORIAL SRI PUSHPAM COLLEGE (AUTONOMOUS), POONDI, THANJAVUR DIST.

Question Pattern for UG and PG Programmes for students to be admitted during 2017 – 2018 and afterwards

Total Marks: 75

QUESTION PATTERN

SECTION – A
(Question 1 to 10)

10 x 2 = 20 Marks

1.   Short Answer Questions

2.   Two Questions from each units (All are answerable)

SECTION – B
(Question 11 to 15)

5 x 5 = 25 Marks

1.   5 Paragraph type questions with "either / or" type choice.

2.   One question from each unit of the Syllabus.

3.   Answer all the questions.

SECTION – C
(Question 16 to 20)

3 x 10 = 30 Marks

1.   5 Essay type questions – any three are answerable.

2.   One questions from each unit of the Syllabus.

B.Sc. Mathematics

Semester	Subject Code	Title Of The Paper	Hours Of Teaching / Week	No. of Credits
I	**17U1MAT1**	**இக்கால இலக்கியம்** (செய்யுள் , உரைநடை, சிறுகதை, புதினம், நாடகம்)	**6**	**3**

கூறு: 1   செய்யுள் **நேரம்: 18**

1. இராமலிங்க அடிகளார் - திருவருட்பா - இறைத் திருக்காட்சி —1—10

2. பாரதியார் - தேசியகீதம் : பாரத தேசம் — எங்கள் நாடு,

3. பாரதிதாசன் - புதிய உலகம்: உலக ஒற்றுமை —பேரிகை, தளைஅறு, மானுட சக்தி

4. பட்டுக்கோட்டை கல்யாண சுந்தரம் -காடு வெளையட்டும் பெண்ணெ ,

5. நாமக்கல் கவிஞர் - என்றுமுளதென்றமிழ் ,

6. கவிமணி : ஒற்றுமையே ,உயர்வு நிலை—நாட்டுக்குழைப்போம்

கூறு: 2   உரைநடை **நேரம்: 18**

1. கேட்டிவி - இராகபாவம் (1 முதல் 15 வரை)

2. கேட்டிவி - பயணங்கள் தொடரும்

கூறு: 3   சிறுகதை **நேரம்: 18**

1. கேட்டிவி - குரல் கொடுக்கும் வானம்பாடி (1 முதல் 10 வரை)

2. கேட்டிவி - மனோரஞ்சிதம் முழுவதும்

கூறு: 4   புதினம் **நேரம்: 18**

கு.வெ. பாலசுப்பிரமணியன் - காளவாய்

கூறு: 5   நாடகம் , இலக்கிய வரலாறு **நேரம்: 18**

1. கலைவாணன் — கு.சா.கிருஷ்ணமுர்த்தி(NCBH வெளியீடு)

2. சிறுகதை, புதினம், நாடகம், கவிதை, உரைநடை

Semester	Subject Code	Title Of The Paper	Hours Of Teaching/ Week	No. of Credits
I	17U1MAE1	**PART – II ENGLISH PROSE, POETRY AND COMMUNICATION SKILLS**	**6**	**3**

Objective
  ➢ To initiate the Students to understand English through Prose, Poetry and Basic Communicative Grammar.

Unit – I

Shakespeare - Shall I compare thee to a Summer's Day?

John Milton – On His Blindness.

William Wordsworth – The Solitary Reaper

P.B.Shelley – Song to the Men of England.

Robert Frost – The Road not Taken

Nissim Ezekiel - Night of the Scorpion

Unit – II

1) The Running Rivulets of Man,   2) Parliament is Marking Time,

3) The Lady in Silver Coat,   4) Mr. Applebaum at Play.

Unit – III

1) The Feigning Brawl of an Imposter, 2) Thy Life Is My Lesson,

3) Solve The Gamble,   4) The Stoic Penalty.

Unit – IV

1) Nobility In Reasoning,   2) Malu the Frivolous Freak,

3) Bharath! Gird Up Your Loins!   4) Honesty is the Cream of Chastity

Unit – V

Parts of Speech, Nouns, Pronouns, Conjunctions, Adjectives, Articles, Verbs, Adverbs, Interjection – sentence.

References Book:

A Melodious Harmony – Sri.KTV, Rajendra Publishing House, Poondi, 2017.

Flying Colours – Prof. K.Natarajan, New Century Book House (P) LTD., 2017.

Semester	Subject Code	Titles of the Paper	Hours of Teaching / Week	No. of Credits
I	17U1MAC1	**DIFFERENTIAL CALCULUS AND TRIGONOMETRY**	5	4

Unit I: 15 Hrs
    Successive Differentiation and Meaning of the Derivative: Successive Differentiation – The nth derivative – Standard results – Trigonometrical transformation – Formation of equations involving derivatives – Leibnitz formula for the nth derivative of a product – Proof – Meaning of the derivative – Geometrical interpretation – Meaning of the sign of the differential coefficient – Rate of change of variables – Velocity and Acceleration.

Unit II: 15 Hrs
    Partial Differentiation, Maxima and minima of functions of two variables: Successive partial derivatives – Function of function rule – Total differential coefficient – Implicit functions – Homogeneous functions – Partial derivatives of a function of two functions – Taylor's expansion of $f(x,y)$ - Maxima and minima of functions of two variables – Lagrange's method of undetermined multipliers.

Unit III: 15 Hrs
    Envelopes, Curvature of Plane curve: Envelopes – Method of finding envelope – Curvature – Cartesian formula for radius of curvature – The coordinates of centre of curvature – Evolute and involute – Radius of curvature when the curve is given in polar co-ordinates – p-r equation; pedal equation of a curve – Chord of curvature.

Unit IV: 15 Hrs
    Expansions: Expansions of $\cos n\theta$ and $\sin n\theta$ - Expansion of $\tan n\theta$ in powers of $\tan \theta$ - Expansion of $\tan A + B + C + \cdots$ - Examples on formation of equations – Expansions of $\cos^n \theta$ and $\sin^n \theta$ in terms of functions of multiples of θ - Expansion of $\cos \theta$ and $\sin \theta$ in a series of ascending powers of θ.

Unit V: 15 Hrs
    Hyperbolic Functions and Logarithms of Complex quantities: Hyperbolic functions – Relations between hyperbolic functions – Relations between hyperbolic functions and circular functions – Inverse hyperbolic functions – Separation into real and imaginary parts – Logarithms of complex quantities – logarithm of $x + iy$ - General value of logarithm of $x + iy$.

Text Book:
1. **Calculus Volume I**, S. Narayanan and T.K. Manicavachagom Pillay, S. Viswanathan pvt. Ltd., 2014.
        Unit I : Chapter III & IV (All sections)
        Unit II: Chapter VIII (Sections 1,3,4 & 5)
        Unit III: Chapter X (All sections)
2. **Trigonometry**, Narayanan and T.K. Manicavachagom Pillay, S. Viswanathan pvt. Ltd., 2014.
        Unit IV: Chapter III
        Unit V: Chapter IV (All sections) & Chapter V (Section 5)

Semester	Subject Code	Title of the Paper	Hours of Teaching / Week	No.of Credits
I	**17U1MAC2**	**ANALYTICAL GEOMETRY 3D AND INTEGRAL CALCULUS**	**5**	**4**

Unit I 15 Hrs

Analytical Geometry 3D – The plane – The straight line – Coplanar lines - skew lines S.D.

Unit II 15 Hrs

Sphere- Tangent plane- intersection of two spheres – Equation of tangent plane to a sphere.

Unit III 15 Hrs

Properties of definite integrals - Reduction formulae of the types: $\int x^n e^{ax} dx, \int x^n \cos ax \ dx, \int \sin^n x \ dx, \int \cos^n x \ dx, \int \sin^m x \cos^n x \ dx, \int \tan^n x \ dx$.

Unit IV 15 Hrs

Beta and Gamma Functions: Definitions – Convergence of $\Gamma(n)$ – Recurrence formula of gamma function – Properties of beta function – relation between beta and gamma functions.

Unit V 15 Hrs

Multiple integral: Double integral – Evaluation of double integral - change of order of integration – Polar coordinates - Triple integrals - Application of multiple integrals.

Text Book:

1. ***Analytical geometry :*** *T.K. M. Pillai, 2015 (for Unit I & II)*

2. ***Calculus Vol II :*** *T.K. M. Pillai, 2015 (for Unit III, IV & V)*

Unit I   :   Chapter 2 (Sec: 1 – 7), Chapter 3 (Sec: 1 - 8)
Unit II   :   Chapter 4 (Sec: 1 – 8)
Unit III   :   Chapter 1 (Sec: 11, 13.1 – 13.6)
Unit IV   :   Chapter 7 (Sec: 2 – 5)
Unit V   :   Chapter 5 (Sec: 2 – 5.4)

Semester	Subject Code	Title of the Paper	Hours of Teaching / Week	No.of Credits
I	17U1MAPHA1	**Allied Physics - I**	5	4

Unit I – Gravitation

Newtons law of gravitation – determination "G"- Boys method – density of earth – gravitational potential and field intensity due to a solid sphere at a point inside the sphere – outside the sphere – Elasticity: Twisting couple on a cylinder – determination of coefficient of Rigidity modulus –Static Torsion method –Bending of beams – Bending moment –Uniform bending-experimental method for the determination of Young's modulus – I section of girders.

Unit – II Sound

Composition of two simple harmonic motions (1) along a straight line and (2) at right angles – Lissajous figures and applications – Acoustic of buildings – Reverberation – intensity measurement by hotwire microphone method.

Unit – III Thermal Physics

Low temperature Physics – Production of low temperature – liquefaction of gases – liquefaction of helium – adiabatic demagnetization (qualitative)only – super conductivity –.Newton's law of cooling –verification-specific heat capacity of a liquid by cooling – Bomb calorimeter – Conduction: Coefficient of thermal conductivity – good and bad conductors – Searle's method for good conductors – Lees disc method for bad conductors – Stefan's law of radiation – Solar constant – Angstroms pyroheliometer.

Unit – IV Optics

Interference – thin film – reflection air wedge – Diffraction – Fresnel's and Fraunhofer diffraction – Transmission grating – theory – Polarization – Elliptically and Circularly polarized light – Quarter wave plate – Half wave plate – Babinet compensator – Optical activity – Laurent's half shade polarimeter.

Unit – V Relativity

Frames of reference – Galilean transformation – inertial and non-inertial frames – Michelson-Morley experiment – negative result – postulates of special theory of relativity -Lorentz transformation equations – time dilation – length contraction – Wave mechanics – De Broglie's concept of matter waves – Davisson and Gemmer experiment - G.P. Thomson experiment – Uncertainty principle.

Books for study
1. Allied physics – A. Sundaravelusamy, Priya publications, Karur-2.
2. Allied physics - R. Sabesan and others, Popular Book Depot, Madras-15.

Semester	Subject Code	Title of the Paper	Hours of Teaching/ week	No. of Credits
I & II	**17U2MAPHAPL**	**Allied Physics Practical (NS)**	**3+3**	**-**

List of Experiments

1. Young's modulus – non uniform bending.

2. Rigidity modulus –Static Torsion

3. Coefficient of viscosity – Graduated burette method.

4. Specific heat capacity of liquid – Newton's law of cooling

5. Newton's rings – Radius of curvature.

6. Air wedge – Thickness of wire

7. Spectrometer prism – A and D

8. Spectrometer grating – normal incidence

9. Field along the axis of the coil

10. Carey Fosters Bridge – specific resistance

11. P.O Box – Specific Resistance

12. Potentiometer – ammeter calibration

13. Figure of merit of a galvanometer – Half deflection method – B.G

14. Diode – characteristics

15. S.T and interfacial – drop weight method

16. Logic gates – using Discrete Components.

Semester	Subject Code	Title Of The Paper	Hours Of Teaching / Week	No. of Credits
II	17U2MAT2	இடைக்கால இலக்கியம் – பயன்முறைத் தமிழ் –இலக்கண வரலாறு	6	3

கூறு: 1 **நேரம்: 18**

1. திருஞானசம்பந்தர் - தேவாரம் - கோளறு திருப்பதிகம்
2. திருநாவுக்கரசர் -தேவாரம் -தனித்திருக் குறுந்தொகை - மாசில்வீணையும் - 1—10 பதிகம்
3. சுந்தரர் -தேவாரம் - திருநொடித்தான்மலைப் பதிகம் —தானெனை முன்படைத்தான்
4. மாணிக்கவாசகர் - திருவாசகம் - திருப்பொன்னூசல்

கூறு: 2 **நேரம்: 18**

1. குலசேகராழ்வார்: திருவித்துவக்கோட்டடம்மான் : 1—10 பாடல்கள்
2. நம்மாழ்வார் - திருவாய் மொழி -இரண்டாம்பத்து —1—10 பாடல்கள்
3. ஆண்டாள் -நாச்சியார் திருமொழி —வாரணமாயிரம் 1—10 பாடல்கள்
4. திருமங்கையாழ்வார் - சிறிய திருமொழி —1—10 பாடல்கள்

கூறு: 3 **நேரம்: 18**

1. திருமூலர் - திருமந்திரம் - அட்டாங்க யோகம் —1—10 பாடல்கள்
2. குமரகுருபரர் - மீனாட்சியம்மை பிள்ளைத் தமிழ்: வருகைபருவம்
3. திரிகூடராசப்பக் கவிராயர் - குற்றாலக் குறவஞ்சி - நாட்டு வளம்
4. வீரமாமுனிவர் - திருக்காவலூர்க் கலம்பகம் — முதல் 5 பாடல்கள்
5. குணங்குடி மஸ்தான் சாகிபு - ஆனந்தக் களிப்பு —முழுதும்

கூறு: 4 பயன்முறைத் தமிழ் **நேரம்: 18**

வாக்கிய அமைப்பு - புணர்ச்சி வகைகள் - வலிமிகும், வலி மிகா இடங்கள் - எழுத்துப்பிழை நீக்கம் லகர, எகர, ழகர வேறுபாடுகள் - சொற்களைப் பிரித்துப் பொருள் காணும் முறை - நிறுத்தற் குறியீடுகள் - சரியான தமிழ் வடிவம் அறிதல்.

சொல்லியல் - சொல் வகை - இலக்கண வகை - இலக்கிய வகை - பெயர்ச்சொல் - இடுகுறி - காரணம் - அறுபொருட் பெயர் (பொருள், இடம், காலம், சினை, குணம், தொழில்) - வினைச்சொல் - இடைச் சொல் - உரிச்சொல் - முற்று - எச்சம் - விகுதிகள் - இடைநிலை - தன்வினை - பிறவினை - தெரிநிலை வினை - குறிப்பு வினை-வழுவமைதி.

கூறு: 5 இலக்கண வரலாறு **நேரம்: 18**

இலக்கண வரலாறு - தமிழ்த் துறை வெளியீடு.

Semester	Subject Code	Title Of The Paper	Hours Of Teaching/ Week	No. of Credits
II	**17U2MAE2**	**PART – II ENGLISH EXTENSIVE READERS AND COMMUNICATIVE SKILLS**	**6**	**3**

Objective
➢ To impart language and communicative skills through short stories, one act plays and communicative grammar

Unit – I

Shakespeare – The Seven Stages of Man

Long Fellow – A Psalm of Life

Nissim Ezakiel - Enterprise

William Wordsworth – The world is too much with us

Unit – II

Anton Chekov – The Proposal

J.B.Priestly - Mother's Day

Unit - III

William Faulkner - A Rose for Emily

P. Lankesh - Bread

Katherine Mansfield - The Doll's House

Unit – IV

Tense, Question Tag, Dialogue Writing, Paragraph Writing, Adjectives, Adverb

Unit – V

Voices, Degrees of Comparison, Direct and Indirect

Book Prescribed:

Unit I , II, III , Voices of vision in English (Vol. I & II), Board of Editors, Pavai Printers (P) Ltd., Chennai, 2016.

Unit IV & V – Communicative grammar by the Department of English, Poondi, 2017.

B.Sc. Mathematics

Semester	Subject Code	Title of the Paper	Hours of Teaching / Week	No. of Credits
II	17U2MAC3	**CLASSICAL ALGEBRA**	**4**	**5**

Unit I   **12 Hrs**
        Matrices: Characteristic roots and characteristic vectors - Linear transformation – the characteristic equation of transformation – Cayley-Hamilton theorem – Diagonalisation of a matrix – orthogonal matrices.

Unit II   **12 Hrs**
        Theory of equations: Relation between roots and coefficients- symmetric functions of the roots in terms of the coefficients- imaginary roots and irrational roots- sum of the powers of the roots of an equation.

Unit III   **12 Hrs**
        Transformation of equations: Reciprocal equations- standard forms to increase and decrease the roots of a given equation by a given quantity- Removal of terms- Descartes' rule of sign.

Unit IV   **12 Hrs**
        Binomial theorem: Binomial theorem – positive integral index – the greatest coefficient in the expansion of $(1 + x)^n$ – Binomial theorem for a rational index – particular cases of the Binomial expansions – Numerically greatest terms – summation of a series

Unit V   **12 Hrs**
        Exponential and Logarithmic series: Exponential limit – the exponential theorem – summation – Logarithmic series - modification of the logarithmic series - summation

Text Book:
1. **Engineering Mathematics,** Vol.I. P. Kandasamy, K. Thilagavathi, K. Gunavathi, S.Chand & sons, second edition,1996
        Unit – I: Matrices : Chapter 5

2. **Algebra Volume I,** T.K.M. Pillay, T. Natarajan and K.S.Ganapathy, S. Viswanathan (Printers & Publishers) Pvt. Ltd., 2015.
        Unit II : Chapter 6 (Sections 1 - 12)
        Unit III: Chapter 6 (Sections 15 – 20, 24)
        Unit IV: Chapter 3 (Sections 1, 5, 6, 8, 9, 10)
        Unit V: Chapter 4 (Sections 1, 2, 3, 5, 6, 9)

General References:
1. S. Arumugam and A. Thangapandi issac, Theory of equations and Trigonometry
2. A. Singravelu, Engineering Maths Volume I

Semester	Subject Code	Title of the Paper	House of Teaching / Week	No.of Credits
II	**17U2MAC4**	**SEQUENCE AND SERIES**	**5**	**5**

Unit I   15 Hrs

Sets – Sequence – Aggregate – Upper and lower bounds – Bounded sequences - monotonic sequence always tends to a limit, finite or infinite- Limit superior and Limit inferior.

Unit II   15 Hrs

Some general theorems concerning infinite series – series of positive terms – comparison tests – Cauchy's condensation test – D-Alembert's ratio test - Definition of convergence, Divergence and Oscillation- Necessary condition for convergence- convergence of $\sum \dfrac{1}{n^p}$ and Geometric series. Comparison test.

Unit III   15 Hrs

Raabe's test - Cauchy's root test and their simple problems- Alternative series with simple problems.

Unit IV   15 Hrs

Summation by different series and recurring series.

Unit V   15 Hrs

Inequalities- Geometric and Arithmetic means- Weirstrass inequalities- Cauchy's inequality.

Text Book:

Algebra Volume I & II *T.K.M. Pillai. (Relavant problem only)*

Unit I	:	Chapter 2 (4 – 10)
Unit II	:	Chapter 2 (11 – 16)
Unit III	:	Chapter 2 (17 – 24)
Unit IV	:	Chapter 5
Unit V	:	Chapter 4

General Reference

Sequence and series: Arumugam and Isaac

Semester	Subject Code	Title of the Paper	Hours of Teaching/ week	No. of Credits
II	**17U2MAPHA2**	**Allied Physics –II**	**5**	**4**

Unit – I Magnetism

Poles and dipoles – Gauss's law for magnetism – Paramagnetism – Diamagnetism - Ferromagnetism. Electromagnetism: Biot-Savart's law – Magnetic field due to a straight conductor – circular conductor – field along the axis of a coil – solenoid – Ampere's theorem.

Unit – II Electricity

Kirchhoff's law and their applications – Kirchhoff's law – Whetstone's Bridge – Carey Foster's Bridge. Electromagnetic induction: Laws of electromagnetic induction – expression for induced e.m.f – self inductance of a solenoid – Rayleigh's method – Mutual inductance of solenoid – Determination of coefficient of coupling – Eddy currents and its applications.

Unit – III Atomic Physics

Vector atom model – quantum numbers in vector atom model – Pauli's exclusion principle – Periodic classification of elements – Photoelectric effect – Einstein's photo electric equation – experimental verification – Photomultiplier tube.
X – rays : continuous and characteristic X-rays – Mosley's law and its importance –Bragg's Law – Bragg 's spectrometer – crystal structure.

Unit – IV Nuclear Physics

Nuclear size – mass – charge – spin magnetic moment – packing fraction – stability and binding energy – Liquid drop model – shell model – nuclear fission – multiplication factor – critical size – chain reaction – nuclear fusion – stellar energy – Thermonuclear reaction – controlled thermonuclear reaction – nuclear reactor.

Unit – V Electronics

Necessity of modulation – Different types of modulation – junction Diode Detector – Ionosphere and propagation of radio waves – AND,OR,NOT,NOR,NAND GATES – Laws of Boolean algebra Demorgan's theorems – Universal building block.

Books for study

1. Allied physics – A. Sundaravelusamy, Priya publications , Karur-2.
2. Allied physics - R. Sabesan and others, Popular Book Depot, Madras-15.

B.Sc. Mathematics

Semester	Subject Code	Title of the Paper	Hours of Teaching /Week	No.of Credits
I	**17U2MAS1**	**Skill Based Education – I** **Non- Verbal Reasoning**	**1**	**1**

Unit – I   **15 Hrs**

Classification and Analytical Reasoning, Mirror images, Figure Matrix and Paper folding. Paper cutting, Problems on cubes and dice, Dot situation.

Unit – II   **15 Hrs**

Paper cutting, problems on cubes and dice, Dot situation, construction of squares and triangles.

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Text Book:

"A modern approach to non verbal reasoning"- R.S. Aggarwal, S.Chand and Company Ltd., New Delhi- 55 (2007)

Unit - I   Chapters 3 (206-212) Cha 4(241-250), Cha5 267-270) Cha9 (313-318)

Cha10(321-326)

Unit – II Chapter 11 – (327 – 337) Chapter 14 (351-361)

Chapter 15 (395-400) Chapter 16 (404 – 412).

B.Sc. Mathematics

Semester	Subject Code	Title Of The Paper	Hours Of Teaching / Week	No. of Credits
III	**17U3MAT3**	காப்பியங்கள், கட்டுரைகள், இலக்கிய வரலாறு	**6**	**3**

கூறு: 1   காப்பியங்கள் 1   **நேரம்: 18**

1. சிலப்பதிகாரம் - புகார்க் காண்டம்—மனையறம்படுத்த காதை

2. மணிமேகலை - ஆதிரை பிச்சையிட்ட காதை

3. சீவக சிந்தாமணி - மண்மகள் இலம்பகம்

4. கம்பராமாயணம் - மிதிலைக் காட்சிப் படலம்

கூறு: 2   காப்பியங்கள் 2   **நேரம்: 18**

1. பெரிய புராணம் -மெய்ப்பொருள் நாயனார் புராணம் —முழுதும்

2. அரிசந்திரபுராணம் —மயான காண்டம்

3. தேம்பாவணி - திருமணப் படலம்—1—10 பாடல்கள்

4. சீறாப்புராணம் -நபி அவதாரப் படலம் —1—10 பாடல்கள்

கூறு: 3   கட்டுரைத் தொகுப்பு   **நேரம்: 18**

கட்டுரைத் தொகுப்பு - தமிழ்த்துறை வெளியீடு

கூறு: 4   பொதுக்கட்டுரை, மொழிபெயர்ப்புப் பயிற்சி   **நேரம்: 18**

பயிற்சிக் கட்டுரைகளும் கடிதங்களும் -பாவை வெளியீடு

கட்டுரைப் பயிற்சி - 10 மதிப்பெண்

மொழிபெயர்ப்புப் பயிற்சி - 5 மதிப்பெண்

கலைச்சொல்லாக்கம்

கூறு: 5   **நேரம்: 18**

அ. இலக்கிய வரலாறு

பக்தி இலக்கியங்கள் - காப்பிய இலக்கியங்கள் - சிற்றிலக்கியங்கள்

Semester	Subject Code	Title Of The Paper	Hours Of Teaching / Week	No. of Credits
III	**17U3MAE3**	**PART – II ENGLISH SHAKESPEARE, EXTENSIVE READERS AND COMMUNICATIVE SKILLS**	**6**	**3**

Objective
➢ To introduce the language of the world renowned dramatist and novelist to enhance the vocabulary and communicative skills of the learners.

Unit – I

Funeral Oration – Julius Caesar

Trial for a Pound of Flesh – The Merchant of Venice

Unit – II

He Kills Sleep – Macbeth

The gulling scene of malvalio – Twelfth Night

Unit – III

Romeo and Juliet

In Love is a "Midsummer Madness" – Tempest

Unit – IV

R.L. Stevenson – Treasure Island

Unit – V

Note making, Hints Developing, Expansion of Ideas and Proverbs, Clauses and sentence, Structure simple, Compound and Complex.

Book Prescribed:

Unit – I, II & III: Selected scenes from Shakespeare, Prof.K.Natarajan, Pavai Printers (p) Ltd., 2017.

Unit IV: Treasure Island Abridged by E.F. Dodd

Unit V: Communicative Grammar by Department of English, Poondi, 2017.

Semester	Subject Code	Title of the Paper	House of Teaching / Week	No.of Credits
III	**17U3MAC5**	**DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORMS**	**5**	**5**

Unit I   **15 Hrs**

Formation of differential equation – equation of the first order and the first degree - exact differential equation – rules for finding integrating factors – Equation of first order, but of higher degree - Clairaut's form.

Unit II   **15 Hrs**

Linear differential equations with constant coefficients : Particular Integral – methods for finding P.I. - linear equations with variable coefficients.

Unit III   **15 Hrs**

Variation of parameters- Total differential equation Pdx + Qdy + Rdz = 0   – rules for integrating Pdx + Qdy + Rdz = 0

Unit IV   **15 Hrs**

Partial differential equation- Four standard types- Lagrange's method for solving Pq + Qq = R

Unit V   **15 Hrs**

Laplace transform – Laplace transform of periodic functions – some general theorems - Inverse transforms - Solving second order differential equations using Laplace transform - problems.

Text Book
    Calculus volume III, *T.K.M. Pillai, 2014.*

Unit I	:	Chapter 1 (sec: 1 – 6)
Unit II	:	Chapter 2 (sec: 1 – 4, 8)
Unit III	:	Chapter 2 (sec: 10), Chapter 3 (section: 5, 6, 7)
Unit IV	:	Chapter 4 (sec: 1 – 6)
Unit V	:	Chapter 5 (sec: 1 – 8)

Reference Books
1. *Engineering Mathematics- A. Singaravelu.*
2. *Ordinary and partial differential equations- M.D. Raisinghania and R.S. Aggarwal S.Chand & Company Ltd, New Delhi.*

B.Sc. Mathematics

Semester	Subject Code	Title of the Paper	Hours of Teaching /Week	No.of Credits
III	**17U3MAC6**	**STATICS**	**5**	**5**

Unit I   **15 Hrs**

Forces acting at a point: Definitions:- Resultant and Components- Parallelogram of forces- Analytic expression for the resultant of the forces acting at a point- Triangle of forces- Perpendicular Triangle of forces- Converse- The polygon of forces- Lemi's theorem- Extended form of the parallelogram law of forces.

Unit II   **15 Hrs**

Parallel forces and Moments:- Resultant of two like parallel forces- Resultant of two unlike and unequal parallel forces- Resultant of number of parallel forces- conditions of equilibrium of three coplanar forces- Moment of a force- Varignons's theorem of moment- principle of moments. – Moment of a force about an axis.

Unit III   **15 Hrs**

Couples:- Definition- Equilibrium of two couples- Equivalence of two couples- couples in parallel planes- Resultant of Coplanar forces- Resultant of a couple and a force and related theorems.

Unit IV   **15 Hrs**

Friction:- Definition- Laws of frictions- co-efficient of friction- Angle of friction- Cone 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 force.

Unit V   **15 Hrs**

Equilibrium of Strings: Equation of a common catenary- important formulae- Geometrical properties of common catenary - Approximations to the shape of catenary- the parabolic catenary- suspension bridges.

Text Book:
    "Statics", *Dr. M.K. Venkatraman: Agasthiar Publication, Trichy.2014.*
    Unit I   :   Chapter 2   (Sec 1 to Sec 10)
    Unit II   :   Chapter 3   (Sec 1 to Sec 14)
    Unit III   :   Chapter 4
    Unit IV   :   Chapter 7   (Sec 1 to Sec 12)
    Unit V   :   Chapter 11

Semester	Subject Code	Title of the Paper	Hours of Teaching /Week	No. of Credits
III	**17U3MAMSA1**	**Allied - MATHEMATICAL STATISTICS - I**	**5**	**4**

Objective:
> ➢ To make the student to gain wide knowledge in probability since probability plays a main role in solving real life problems.
> ➢ To apply these techniques to real life problem.

Unit I   **15 Hrs**
Random variables- distribution function- discrete random variable – Probability mass function - Discrete distribution function - continuous random variable- Probability density function – Continuous distribution function.

Unit II   **15 Hrs**
Two dimensional random variables: joint probability mass function – continuous probability function - Marginal Distribution Function – Stochastic independence - Mathematical Expectations - Properties of expectation – Properties of variance – covariance - variance of a linear combination of random variable

Unit III   **15 Hrs**
M.G.F – Cumulants - Characteristic Functions - Binomial, Poisson, Geometric Distributions – Moments, mode and MGF only.

Unit IV   **15 Hrs**
Normal, Rectangular, Gamma, Exponential - distributions

Unit V   **15 Hrs**
Correlation: Karl pearson coefficient of correlation – Rank correlation – Regression: Linear regression – Regression coefficient – properties of regression coefficients – related problems

Text book
     "Fundamentals of Mathematical statistics", *S.C. GUPTA, V.K. KAPOOR Sultan Chand & Sons, 2014 (11th revised edition)*
Unit I   : Chapter 5 (Sec. 5.1 - 5.4)
Unit II   : Chapter 5 (Sec. 5.5 - 5.5.6) Chapter 6 (Sec. 6.1 - 6.6.1)
Unit III : Chapter 7(Sec.7.1-7.3.1) Chapter 8(8.4–8.4.1, 8.4.5, 8.4.6, 8.5, 8.5.2, 8.5.3, 8.5.5, 8.7–8.7.3)
Unit IV : Chapter 9 (9.2, 9.2.1-9.2.3, 9.2.5, 9.2.11, 9.3 9.5, 9.8)
Unit V   : Chapter 10 (10.2-10.4 & 10.7)   Chapter 11 (11.1-11.2.2)

General Reference:
     Dr. P.R. Vittal "Mathematical Statistics" Margham Publications Chennai.

B.Sc. Mathematics

Semester	Subject Code	Title of the Paper	Horse of Teaching /Week	No.of Credits
III& IV	**17U4MAMSAPL**	**Allied - Mathematical Statistics Practical (NS)**	**3 + 3**	**-**

1. Measures of Central Tendencies & Measures of dispersions   **- 90 Hrs**

2. Moments, Skewness and kurtosis

3. Fitting of Binomial distribution

4. Fitting of Poisson distribution

5. Fitting of Normal distribution

6. Correlation and Regression

7. Goodness of fit

8. Large sample tests

9. T- test

10. Variance tests confidence intervals

Semester	Subject Code	Title Of The Paper	Hours Of Teaching / Week	No. of Credits
IV	**17U4MAT4**	சங்க இலக்கியம் – அற இலக்கியம் – செம்மொழி – இலக்கிய வரலாறு	**6**	**3**

கூறு: 1 நேரம்: 18

குறுந்தொகை
1. குறிஞ்சி - (பா.எ.:3) 2. முல்லை - (பா.எ.94)
3. மருதம் - (பா.எ.45) 4. நெய்தல் - (பா.எ.:49)
5. பாலை - (பா.எ.:41)

நற்றிணை
1. குறிஞ்சி - (பா.எ. 32) 2. முல்லை - (பா.எ. 81) 3. மருதம் - (பா.எ. 210)
4. நெய்தல் - (பா.எ. 226) 5. பாலை - (பா.எ.229)

கலித்தொகை
1. பாலை - (பா.எ. 6) 2. குறிஞ்சி - (பா.எ. 38)

அகநானூறு
1. குறிஞ்சி : - (பா.எ. 68) 2. மருதம் - (பா.எ. 86)

கூறு: 2 நேரம்: 18

ஐங்குறுநூறு
குறிஞ்சி - தோழிக்கு உரைத்த பத்து: பாடல் எண்கள் —111—120

புறநானூறு
பாடல் எண்கள் 8,17,20,95,141,159,184,186,188,206

பதிற்றுப்பத்து
ஏழாம் பத்து —பாடல் எண். 1

பரிபாடல்
எட்டாம் பாடல் : செவ்வேள்

கூறு: 3 நேரம்: 18

நெடுநல்வாடை முழுவதும்
திருக்குறள் : வான்சிறப்பு, பெருமை, காதற் சிறப்புரைத்தல்

கூறு: 4 நேரம்: 18

செம்மொழி வரலாறு
மொழி - விளக்கம் - மொழிக்குடும்பங்கள் - உலகச் செம்மொழிகள் - இந்தியச் செம்மொழிகள் - செம்மொழித் தகுதிகள் - வரையறைகள் - வாழும் தமிழ்ச்செம்மொழி - தொன்மை - தமிழின் சிறப்புகள் - தமிழ்ச் செம்மொழி நூல்கள்.

கூறு: 5 நேரம்: 18

அ. இலக்கிய வரலாறு
சங்க இலக்கியங்கள், பதினெண்கீழ்க்கணக்கு நூல்கள்

Semester	Subject Code	Title of The Paper	Hours of Teaching/ Week	No. of Credits
IV	**17U4MAE4**	**PART – II ENGLISH ENGLISH FOR COMPETITIVE EXAMINATIONS**	**6**	**3**

Objective

➢ To prepare the learners for competitive examinations and to know the fundamentals of practical communication.

Unit – I

    Grammar – Number, Subject, Verb, Agreement, Articles, Sequence of Tenses, Common Errors.

Unit – II

    Word Power - Idioms & Phrases, one word substitutes, Synonyms, Antonyms, Words we often confuse, foreign words & phrases, spelling.

Unit – III

    Reading & Reasoning – Comprehension, Jumbled Sentences.

Unit - IV

    Writing Skills – Paragraph, Precis Writing, Expansion of an idea, Report Writing, Essay, Letters, Reviews (Film & Book)

Unit – V

    Speaking- Public speaking, Group Discussion, Interview, Spoken English.

Prescribed Text:

    English for Competitive Examinations, by Ayothi, Trichy, 2017.

Semester	Subject Code	Title of the Paper	House of Teaching / Week	No.of Credits
IV	**17U4MAC7**	**VECTOR CALCULUS, FOURIER SERIES AND FOURIER TRANSFORMS**	**4**	**5**

Unit I   **12 Hrs**

     Vector differentiation: Differentiation of vectors – Gradient, Divergence and Curl

Unit II   **12 Hrs**

     Vector integration: Integration as inverse of differentiation – The line integral – Surface integral – Gauss's Divergence Theorem.

Unit III   **12 Hrs**

     Fourier Series: Periodic functions – Fourier Series – Dirichlet's Conditions – Even and odd functions.

Unit IV   **12 Hrs**

     Half Range series: Half range sine series – Half range cosine series – Change of interval – Parseval's Theorem.

Unit V   **12 Hrs**

     Fourier Transforms: Definition – Integral Transforms – Properties of Fourier Transforms – Parseval's identity – Infinite Fourier cosine and sine transform.

Text Book:

     Mathematics Volume IV: Vector Calculus, Fourier Series and Fourier Transforms, P.Kandasamy and K.Thilagavathy, S.Chand & Company Ltd, New Delhi.

          Unit I : Vector Calculus: Pages 1 – 23.
          Unit II : Vector Calculus: Pages 24 - 38
          Unit III: Fourier Series: Pages 93 - 134
          Unit IV: Fourier Series: Pages 135 - 174
          Unit V : Fourier Transforms: Pages 196 - 226

Reference Books:

1. Vector Algebra and Analysis- T.K.M. Pillai.
2. Calculus Volume III- T.K.M. Pillai.
3. Engineering Mathematics- A. Singaravelu.

Semester	Subject Code	Title of the Paper	Hours of Teaching / Week	No.of Credits
V	**17U4MAC8**	**DYNAMICS**	**5**	**5**

Unit I   **15 Hrs**
        Projectiles: The path of projectiles characteristics of the motion- range- the velocity- direction of the projectiles- Given the magnitude of the velocity of projection there are two directions of projection for the particle so as to reach a given Range on an inclined plane.

Unit II   **15 Hrs**
        Collision of Elastic bodies: Definitions- Fundamental laws of impact- impact of a smooth sphere on fixed smooth plane- Direct impact of two smooth spheres- Loss of K.E. due to direct impact of smooth spheres-Dissipation of energy due to impact-compression and Restitution.

Unit III   **15 Hrs**
        Simple Harmonic Motion (SHM): SHM in straight line- General solution of SHM equation- Geometrical representation of a SHM- Composition of two SHMS of the same period and in the same straight line- composition of two SHM's of the same period in two perpendicular directions- motion of a particle suspended by a spiral spring- Horizontal oscillations of a particle tied to an elastic spring.

Unit IV   **15 Hrs**
        Motion under the action of central forces: Velocity and acceleration in polar Coordinates. Differential equation of Central orbits- Perpendicular from the pole in the tangent- Formulae in polar coordinates- Pedal equation of the central orbits- velocities in a central orbit- Given the law of force to the pole find the orbit.

Unit V   **15 Hrs**
        Moment of Inertia and motion of a rigid body about a fixed axis: Definitions- Theorem of parallel axes- theorem of perpendicular axes- M.I in some particular cases- motion of a rigid body about a fixed axis- Introduction- K.E of a rigid body rotating about a fixed axis- Angular momentum of a rigid body about the axis of rotation- motion of a rigid body about a axis of rotation- conservation of angular momentum.

Text Book
        Dynamics**, Dr. M. K. Venkatraman, Agasthiar Publication, Trichy, 2014 (Twelfth Edition)**
                Unit I   : Chapter 6   (Sec 6.1 to 6.15)
                Unit II   : Chapter 8   (Sec 8.1 to 8.10)
                Unit III : Chapter 10 (Sec 10.1 to 10.10)
                Unit IV : Chapter 11 (Sec 11.1 to 11.13)
                Unit V   : Chapter 12 (Sec 12.1 to 12.5),Chapter 13(Sec.13.1 to 13.6)

General References:

        Dynamics - Dr. K.Viswanath Naik and Dr. M.S.Kasi.

Semester	Subject Code	Title of the Paper	House of Teaching / Week	No. of Credits
IV	**17U4MAMSA2**	**Allied- MATHEMATICAL STATISTICS- II**	**5**	**4**

Objective:
  ➢ To study about some distributions which are useful in testing of different hypothesis.
  ➢ To study types of sampling and Estimators.

Unit I   **15 Hrs**
       Large sampling theory: Types of sampling- test of significance- null hypothesis- error in sampling- Critical regions and level of significance- test of significance for large- samples- sampling of attributes- unbiased estimates from mean variance- standard error of sample mean- test of significance for single mean.

Unit II   **15 Hrs**
       χ^2 **distribution**: χ^2- variates- derivation of the χ^2 distribution (Method of M.G.F only)- M.G.F, C.G.F- mode and skewness - additive property - χ^2 probability curve - Theorems on χ^2 distribution - Application of χ^2- distribution: Inference about a population variance – goodness of fit test.

Unit III   **15 Hrs**
       Student's t-distribution: Derivation of t-distribution - constants of t- distribution- limiting of t-distribution- application of t-distribution - test of single mean, difference of mean - observed sample correlation coefficient.

Unit IV   **15 Hrs**
       F-distribution: Derivation of F-distribution- constant of F-distribution- mode of F-distribution- application of F-distribution - test for equality of two population variance (only simple problems of F- distribution). – relation between t and F and relation between F and χ^2 tests.

Unit V   **15 Hrs**
       Analysis of variance: Introduction - one way, two way classifications – Experimental designs: Randomized block design - Latin squares

Text Books:
  1. ***Fundamentals of mathematical statistics,*** S.C Gupta, V. K. Kapoor (11th edition)- Sultan Chand & Sons 2002.
     Unit I   :   Chapter: 14 (Sec. 14.1 – 14.8.3)
     Unit II   :   Chapter: 15 (Sec. 15.1- 15.4, 15.6(15.6.1-15.6.2))
     Unit III   :   Chapter: 16 (16.2,16.3(16.3.1, 16.3.2, 16.3.4))
     Unit IV   :   Chapter: 16 (16.5- 16.8)
  2. ***'Statistical Methods'*** Vol. II , Dr. S.P. Gupta, Sultan Chand & Sons 2008.
     Unit V   :   Chapter: 5, 6

General Reference
       Dr. P.R. Vittal "Mathematical Statistics" Margham Publications Chennai.

B.Sc. Mathematics

Semester	Subject Code	Title of the Paper	Horse of Teaching / Week	No.of Credits
III & IV	**17U4MAMSAPL**	**Allied - Mathematical Statistics Practical (NS)**	**3+3**	**2**

1. Measures of Central Tendencies & Measures of dispersions   **- 90 Hrs**

2. Moments, Skewness and kurtosis

3. Fitting of Binomial distribution

4. Fitting of Poisson distribution

5. Fitting of Normal distribution

6. Correlation and Regression

7. Goodness of fit

8. Large sample tests

9. T- test

10. Variance tests confidence intervals

Semester	Subject Code	Title of the Paper	Hours of Teaching /Week	No.of Credits
II	**17U4MAS2**	**Skill Based Education-II Arithmetic Ability**	**1**	**1**

Unit I   **15 Hrs**

    H.C.F and L.C.M of numbers, Simplifications

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Unit II   **15 Hrs**

    Average, Problems on Ages and Percentage

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Text Book:

    Quantitative Aptitude - R.S. Aggarawal, S.Chand and company Ltd. New Delhi- 55

Unit I   :   Chapter 2(Page 30-36) and Chapter 4 (Page 67 to 75)

Unit II   :   Chapters 6 (Page 139 to 155),

                                Chapter 8 (Page 182 to 189), Chapters 10 (Page 208 to 217)

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Semester	Subject Code	Title of the Paper	House of Teaching / Week	No.of Credits
V	**17U5MAC9**	**ABSTRACT ALGEBRA**	**5**	**6**

Objective
- ❖ To give an introductory knowledge of the basic abstract system of Mathematics
- ❖ To develop analytical thinking

Unit I   **19 Hrs**

Sub Groups- counting principle- Normal subgroups and Quotient groups.

Unit II   **19 Hrs**

Homomorphism- Automorphism

Unit III   **19 Hrs**

Cayley's Theorem- Permutation group- Another Counting principle- applications.

Unit IV   **18 Hrs**

Ring Theory: Definition and Examples of Rings- Some special classes of Rings- Homomorphisms- ideals and Quotient Rings- More ideals and Quotient Rings- Euclidean Rings.

Unit V

Vector Space: Elementary Basic concepts- Linear independence and Bases, Dual spaces- Inner product spaces.

Text Book:
    Topic in Algebra *By I.N.Herstin, Wiley,2014. (Second edition)*
Unit I	:	Chapter 2 (2.4 to 2.6)
Unit II	:	Chapter 2 (2.7 to 2.8)
Unit III	:	Chapter 2 (2.9 to 2.11)
Unit IV	:	Chapter 3 (3.1 to 3.5 & 3.7)
Unit V	:	Chapter 4 (4.1 to 4.4)

General References:
    1. Modern Algebra -   A.R.Vasistha
    2. Modern Algebra -   Dr. S.Arumugam

Semester	Subject code	Title of the paper	Hours of Teaching / Week	No.of Credits
V	**17U5MAC10**	**REAL ANALYSIS**	**5**	**6**

> **Objective**
> ❖ To study basic topological concepts and about limits and continuity.
> ❖ To study the theoretical concepts of differentiability and integration.

Unit I   **19 Hrs**

    Real Numbers: Introduction – The Field axioms – Field Properties – Order in R- Absolute value – Completeness – Some important subsets of R – Representation of real numbers as a points on a straight line –Intervals – Countable and Uncountable sets.

Unit II   **19 Hrs**

    Neighbourhoods and Limit points: Introduction – Neighbourhoods – Open sets – Closed sets – Limit points of a set – Closure of a set – Interior of a set – Compactness – Connectedness.

Unit III   **19 Hrs**

    Limits and Continuity: Limits – Continuous functions – Types of discontinuities – Algebra of continuous functions – boundedness of continuous functions – Intermediate value theorem – Inverse function theorem – Uniform continuity.

Unit IV   **18 Hrs**

    Derivaties: Introduction – Derivability and continuity – Algebra of derivaties – Inverse function theorem for derivaties – Darboux's theorem.

Unit V

    Cauchy's mean value theorem – Taylor's theorem – Taylor's series – Power series expansions of some standard functions.

Text Book
"A First course in REAL ANALYSIS", **M.K.Singal and Asha Rani Singal, R. Chand & Co, 2014.**

Unit I	:	Chapter 1
Unit II	:	Chapter 2
Unit III	:	Chapter 5
Unit IV	:	Chapter 6 (Sec 1 to 5)
Unit V	:	Chapter 7 (Sec 1 to 6)

General References
    1. Real Analysis   -   Albert smith E.E.
    2 Real Analysis   -   Walter Rudin.

Semester	Subject	Title of the paper	Hours of Teaching /Week	No. of Credits
IV	**17U5MAC11**	**NUMBER THEORY**	**5**	**5**

Objectives:
> * To introduce the theortical concepts of Number theory.
> * To enlightten the students with the famous theory on number theory.

Unit I: **19 Hrs**
The Fundamental Theorem of Arithmetic: Introduction- Divisibility- Greatest Common divisor- Prime numbers- The fundamental theorem of arithmetic- The series of reciprocals of the primes- The Euclidean algorithm- The greatest Common divisor of more than two numbers.

Unit II: **19 Hrs**
Arithmetical Functions and Dirichlet multiplication: - The motions function $\mu(n)$- The Euler totient function- A relation connecting φ and μ- A product formula for $\mu(n)$- the Dirichlet product of arithmetical functions- Dirichlet inverses and the Mobius inversion formula- the Mangold t function $\Lambda(n)$- multiplicative functions-

Unit III: **19 Hrs**
Multiplicative function and Dirichlet multiplication- The inverse of a completely multiplicative function- Liovilles function A (n)- the divisor functions $\sigma_\alpha(n)$- Generalized convolutions- formal power series- the Bell series of an arithmetical function- Bell series and Dirichlet multiplication- Derivatives of arithmetical functions.

Unit IV: **18 Hrs**
Averages of Arithmetical Functions: - The big oh notation Asymptotic equality of functions- Eulers summation formula- some elementary asymptotic formulas- the average order of d (n)- the average order of the divisor functions $\sigma_\alpha(n)$- the average order of $\varphi(n)$.

Unit V:
Congruences: Definition and basic properties of congruence's- Residue classes complete residue systems- Linear congruence's Reduced revised systems- Ruler Fermat's Theorem- Polynomial congruence's module Lagranges theorem.

Text Book: **Analytic Number Theory by Tom. M.Apostal.**
Unit I   Chapter 1 (1.1- 1.8)
Unit II   Chapter 2 (2.1- 2.9)
Unit III   Chapter 2 (2.10- 2.18)
Unit IV   Chapter 3 (3.1- 3.7)
Unit V   Chapter 5 (5.1- 5.5)
General References:
1. Number Theory   -   George E.Andrews
2. Introduction to theory of Number-   G.H.Hardy and E.M.Wright.
3. Basic Number Theory   -   S.B.Malilk
4. Elements of Number Theory -   S.Kumaravelu and Susheela Kumaravelu.

Semester	Subject code	Title of the paper	Hours of Teaching/ Week	No. of Credits
VI	**17U5MAC12**	**DISCRETE MATHEMATICS**	**4**	**4**

Objective
➢ To introduce logical Concepts to students.
➢ To study the concepts of lattice and Boolean algebra, generating functions.

Unit I   **15 Hrs**
Recurrence relations and generating function: Recurrence-an introduction- polynomials and their evaluations- Recurrence relations- solution of finite order Homogeneous (linear) Relations- Solution of Non-Homogeneous relations**.**

Unit II   **15 Hrs**
Logic: If- statements: connectives- atomic and compound statements-well formed (statements) Formulae.

Unit III   **15 Hrs**
Logic: Truth table of a formula- Tautology- Tautological Implications and Equivalence of Formulae. Replacement process- Functional Complete set of connectives and Duality law.

Unit IV   **15 Hrs**
Lattices and Boolean Algebra: lattices- some properties of lattices- New lattices- Modular and distributive lattices.

Unit V
Finite Automata - Deterministic and Non-deterministic finite automata.

Text Book:
   "Discrete   Mathematics"   by   Dr.   M.K.Venkatraman   Dr.N.Sridharan, N.Chandrasekeran.

Unit I	:	Chapter: 5	Sec 1-5 (Pages 5.01- 5.19)
Unit II	:	Chapter: 9	Sec 1- 5 (Pages 9.1- 9.20)
Unit III	:	Chapter: 9	Sec 6- 10 (Pages 9.21- 9.42)
Unit IV	:	Chapter: 10	Sec 1- 4 (Pages 10.1- 10.32)
Unit V	:	Chapter: 12	Sec 1 –7 (Pages 12.1- 12.16)

General References:
1. Koleman and Bushy- Discrete mathematical structures, prentice Hall of India, New Delhi- 2009
2. J.P.Tremblay and R.Manohar, Discrete Mathematical Structures withApplications to Computer Science, Tata McGraw Hill, Thirty-Ninth Reprint (2011).
3. RakeshDube, AdeshPandey and Ritu Gupta, Discrete Structures and Automata Theory, Narosa Publishing House (2000).

Semester	Subject code	Title of the paper	Hours of Teaching/ Week	No.of Credits
V	**17U5MAEL1A**	**Major Elective - I NUMERICAL METHODS**	**4**	**3**

Objective
- ❖ To introduce popular numerical methods to students.
- ❖ To introduce Numerical differentiation, integration and solution of Ordinary differential equations.

Unit I   **15 Hrs**
The solution of numerical algebraic and Transcendental Equations. The Bisection Method- iteration method- Order of convergence- Regula False method- Newton Raphson Method- order of convergence.

Unit II   **15 Hrs**
Solution of simultaneous linear algebraic equation. Gauss elimination method- Gauss Jordan method- inversion of a matrix using Gauss elimination method- Gauss Jacobi method- Gauss- Seidel method.

Unit III   **15 Hrs**
Finite differences. First and higher order differences- Forward difference and backward differences- Properties of operator- interpolation- Gregory- Newton forward interpolation formula, Backward interpolation formula- Equidistant terms with one or more missing values- Newton's divided difference interpolation formula, Lagrange and Interpolation formula and Inverse Lagrange interpolation formula.

Unit IV   **15 Hrs**
Numerical Differentiation and integration- Newton's forward and backward difference method to compute derivatives- the trapezoidal- Ramberg's method- Simpson's one third rule- Simpson's 3/8 rule- weddle's rule.

Unit V
Numerical Solution of ordinary Differential Equations-Power series approximation- solution by Taylor's series- Picard's method of successive approximations- Euler method- modified Euler method- Runge- Kutta method- orders 2 and 4.

Text Book:
"Numerical methods" (2001), P.Kandasamy, K.Thilagavathy K.Gunavathy, S.Chand & Company Ltd., New Delhi.

Unit I	:	Chapter: 3 (3.1.1 to 3.4.3).
Unit II	:	Chapter: 4 (4.1- 4.3 and 4.7 - 4.9).
Unit III	:	Chapter: 5 (5.1 only) & Chapter (6.1-6.7), Chapter: 8 (8.1- 8.8).
Unit IV	:	Chapter: 9 (9.1- 9.3, 9.6- 9.15))
Unit V	:	Chapter: 11 (11.1- 11.15)

General References:
1. S.Sastri   - Introduction methods of Numerical Analysis
2. M.K.Ventataraman- Numerical methods in science and Engineering- Third Editor.
3. A.Singaravelu   - Numerical methods.

Semester	Subject Code	Title of the Paper	Hours of Teaching / Week	No. of Credits
V	**17U5MAEL1B**	**Major Elective – I SPECIAL FUNCTIONS**	**4**	**3**

Unit I   15 Hrs
IMPROPER INTEGRALS AND SERIES SOLUTIONS - Improper integrals-Gamma and Beta functions, Series solutions-Ordinary point, regular singular point of second order linear ordinary differential equation, series solution to a second order linear ordinary differential equation about an ordinary point and a regular singular point.

Unit II   15 Hrs
BESSEL FUNCTIONS - Bessel's equation, Bessel functions, Recurrence relations, Orthogonality property, Generating function, Equations reducible to Bessel's equation, Modified Bessel functions.

Unit III   15 Hrs
LEGENDRE POLYNOMIALS - Legendre's equation, Legendre Polynomials, Rodrigue's formula generating function, recurrence relations, orthogonality property.

Unit IV   15 Hrs
HERMITE AND LAGUERRE POLYNOMIALS - Hermite and Leguerre equations and their solutions-Polynomials, Rodrigue's formula, generating functions, recurrence relations, orthogonality property.

Unit V
BOUNDARY VALUE PROBLEMS - Solution of Boundary Value Problems involving Bessel functions & Legendre polynomials

Text Book:
> **"Higher Mathematics for Engineering and Sciences",** Venkatraman. M. K., The National Publishing Company, Fourth Edition, 2006.

Reference Books:
1. Andrews.L.A., "Special Function for Scientist and Engineers", McGraw-Hill, 1992.
2. Narayanan, S. Manicavachagam Pillay and Ramanaiah.G, "Advanced Mathematics for Engineering Students", Vol. II S.Viswanathan Printers Private Limited, Madras, 1985
3. Grewal, B.S., "Higher Engineering Mathematics", Khanna Publishers, Delhi, 2005.
4. Jain R.K & Iyengar, S.R.K. "Advanced Engineering Mathematics", Narosa Publishing House, New Delhi, 2002.

Semester	Subject code	Title of the paper	Hours of Teaching / Week	No. of Credits
V	**17U5MAEL2A**	**Major Elective - II GRAPH THEORY**	**4**	**3**

Objectives:
- ❖ To give a rigorous introduction to the basic concepts of graph Theory.
- ❖ To give applications of graph Theory in other disciplines.

Unit I   *15 Hrs*
Introduction- Application of graphs:-Finite and infinite graphs-Incidence and Degree-Isolated vertex, pendent vertex and Null graph - Path and circuits- Isomorphism-Subgraphs- Walks, paths and circuits- connected graphs, Disconnected graphs and components-Euler graphs- operation on graphs-More on Euler graphs-Hamiltonian paths and circuits.

Unit II   *15 Hrs*
Tress and fundamental circuits: Trees-some properties of trees-pendent vertices in a Tree- Distance and centers in a Tree-Rooted and Binary Trees-On counting trees- spanning trees

Unit III   *15 Hrs*
Cut –Sets and cut –vertices: Cut-sets-some properties of a cut set-All cut sets in a graph- Fundamental circuits and cut-sets.

Unit IV   **15 Hrs**
Planar and Dual graphs: Combinatorial vs. Geometric graphs- planar graphs-Kuratowsk's two graphs – Different representations of a Planar graph.

Unit V
Coloring: chromatic number- Chromatic Partitioning- Chromatic Polynomial.

Text Book:
Graphs Theory with Applications to Engineering and computer science By Narsingh Deo, Printice- Hall of India Private Ltd, 2014.

Unit I	:	Chapter 1.1 to 1.5 and 2.1, 2.2, 2.4 - 2.9
Unit II	:	Chapter 3.1 to 3.7
Unit III	:	Chapter 4.1 to 4.4
Unit IV	:	Chapter 5.1 to 5.4
Unit V	:	Chapter 8.1 to 8.3

General References:

1. *Graph Theory – Dr.S.A. Choudam, Macmillan.*
2. *Graph Theory- F.Harary, Narosa.*
3. **An invitation to Graph theory- Dr.S. Arumugam & S. Ramachandran**
4. V.R.Kulli,CollegeGraphTheory,VishwaInternationalPublications,Gulbarga,2012.
5. S. Kumaravelu&SusheelaKumaravelu, Graph Theory, JankiCalender Corporation, Sivakasi, 1999.

Semester	Subject code	Title of the paper	Hours of Teaching/ Week	No.of Credits
V	**17U5MAEL2B**	**Major Elective – II MATHEMATICAL MODELING**	**4**	**3**

Objectives:
➢ To introduce the basic concepts of Mathematical Modelling.
➢ To learn the real life models.

Unit I   **15 Hrs**

Simple situation requiring Mathematical modeling and technique-Classification of mathematical models-some characteristics of mathematical models-Modelling through Geometry-Modelling through Algebra-Modelling through Trigonometry-Modelling through Calculus-Limitations of Mathematical modeling.

Unit II   **15 Hrs**

Mathematical Modelling through differential Equations-Linear Growth and Decay Models-Non-Linear Growth and Decay models-Compartment models-Modelling in Dynamics through Ordinary differentatil equations of first order- Mathematical modeling of Geometrical problems through ordinary differential equations of first order.

Unit III   **15 Hrs**

Mathematical Modelling in Population Dynamics-Modelling of Epidemics through systems of Ordinary differential equations of first order-Compartment models through systems of ordinary differential equations-Modelling in Economics through systems of ordinary differential equations of first order**.**

Unit IV   **15 Hrs**

Mathematical models in Medicine, Arms Race, Battles and International Trade in terms of systems of ordinary differential equations-Modelling in Dynamics through systems of Ordinary Differential equations of first order.

Unit V

Mathematical modeling of Planetary motions – Modelling of Circular motion and motion of Satellites.

Text Book:

"Mathematical Modelling' *by J.N.Kapur*
Unit I   :   Chapter 1.1-1.9
Unit II   :   Chapter 2.1-2.6
Unit III   :   Chapter 3.1-3.4
Unit IV   :   Chapter 3.5-3.6
Unit V   :   Chapter 4.1-4.2

Books for Reference:
1. Michael D Alder, An Introduction to Mathematical Modelling, HeavenForBooks.com, 2001.

Semester	Subject Code	Title of the Paper	Hours of Teaching / Week	No. of Credits
V	**17U5MANME**	**Non – Major Elective - Mathematics for Finance**	**2**	**1**

Objective:
- To enable other department student to know some basic ideas on algebra and numerical interpolation.
- To give some commercial oriented mathematical ideas.

Unit I   **15 Hrs**

Arithmetic progression and geometric progression and Determinants- Cramer's rule.

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Unit II   **15 Hrs**

Simple interest- Compound interest and Depreciation- present value- Discounting- Annuity.

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Text Book:

Business Mathematics and Statistics, P. Navaneetham, Jai Publication , June-2010

     Unit I :   Chapter 1, 4 Part I and Chapter 3, 4 Part I

     Unit II :   Chapter 2 Part I and Chapter 2 Part II

General Reference:

Business Mathematics: D.C. Sanchetic, V.K. Kapoor Sultan Chand & Sons, New Delhi.

Semester	Subject Code	Title Of The Paper	Hours Of Teaching/ Week	No. of Credits
V	**14U5MASSD**	**SOFT SKILLS DEVELOPMENT**	**1**	**-**

Unit : I

Proficiency in English – Group Discussion - Interview – Presentation Skills – Percentage and its application – Error Correction.

Unit : II

Communication Skills – Art of Listening, Art of Reading, Art of Writing. Corporate Skill – Time Management, Stress Management.

Text Books

1. Meena K and Ayothi (2013) A Book on Development of Soft Skills (Soft. Skills: A Road Map to Success) P.R. Publishers & Distributors, No. B -20 & 21 V.M.M. Complex, Chatiram Bus Stand, Tiruchirappalli – 620002.

2. Hariharan S, Sundararajan N and Shanmugapriya S.P. (2010) Soft Skills, MJP Pubglishers, Chennai – 600 005.

References

1. Alex K (2012) Soft Skills – Know yourself & Know the world, S.Chand & Company LTD. Ram Nagar, New Delhi – 110 055.

2. Martin Avis, Effective Time Management Skills for everyone, Avis Consultancy, London.

Semester	Subject code	Title of the paper	Hours of Teaching/ Week	No.of Credits
V	**17U6MAC13**	**COMPLEX ANALYSIS**	**5**	**5**

Objective:
- ➢ To study the nature of complex number system.
- ➢ To learn the properties of function defined on the complex systems.
- ➢ To study the related famous theorems on complex theory.

Unit I   **19 Hrs**
Complex numbers: Complex numbers – conjugation and modulus - **Analytic functions:** Functions of a complex variable – The Cauchy-Riemann equations – Analytic functions – harmonic functions – Milne-Thompson method.

Unit II   **19 Hrs**
Conformal mapping – **Bilinear transformation:** Introduction – Elementary transformation – Bilinear transformation – cross ratio – fixed points of bilinear transformation – some special bilinear transformations.

Unit III   **19 Hrs**
Complex integration: Introduction – definite integral – Cauchy's Theorem – Cauchy's integral formula – Maximum modulus theorem – Higher derivatives – Cauchy's inequality – Liouville's theorem – Fundamental theorem of algebra – Morera's theorem.

Unit IV   **18 Hrs**
Series Expansions: Introduction – Taylor's series – Laurent's series – Zeros of an analytic function – singularities and poles – Riemann's theorem - meromorphic function.

Unit V
Calculus of residues: Residues – Cauchy's Residue theorem – Argument theorem – Rouche's theorem - Evaluation of definite integral –Contour integration types.

Text Book:
"Complex Analysis" by S. Arumugam, A. Thangapandi Isaac, A. Somasundaram, Scitech Publications, 2014.

Unit I	:	Chapter 1 (Sec:1.1, 1.2), Chapter 2 (Sec:2.1, 2.6 – 2.8)
Unit II	:	Chapter 2 (Sec:2.9), Chapter 3 (Sec:3.1 – 3.5)
Unit III	:	Chapter 6 (Sec:6.1 – 6.4)
Unit IV	:	Chapter 7 (Sec:7.1 – 7.4)
Unit V	:	Chapter 8 (Sec:8.1 – 8.3)

General References:
1. "Foundations of complex Analysis" by S.Ponnusamy- Narosa Publishing House- New Delhi Chennai.
2. "Functions of a complex variables with applications" by E.G. Phillis (1968)- Oliver & Boy D, Edinburg.

Semester	Subject Code	Title of the Paper	Hours of Teaching / Week	No.of Credits
VI	**17U6MAC14**	**OPERATIONS RESEARCH**	**4**	**4**

Unit I **15 Hrs**

Operations Research- An overviews: Nature and characteristic Features of OR- Models in OR- OR and Decision Making- Applications and Limitations of OR- Linear Programming Problem: Formulation and Graphical methods.

Unit II **15 Hrs**

Simplex Method – Big M method - Two phase- Simplex Method-Duality in Linear Programming: Formulation of Primal Dual Pairs – Mathematical formulation of duality - problems.

Unit III **15 Hrs**

Dual Simplex Method - Network Scheduling by PERT/ CPM: Critical path Method and PERT calculations.

Unit IV **15 Hrs**

Transportation Problem and Assignment Problem.

Unit V **15 Hrs**

Game Theory: Optimal solution of two person zero- sum games- games with mixed strategies - The graphical method- Dominance property- general solution of (m x n) rectangular games (LPP only)

Text Book:

Problems in operations Research: PK Gupta & ManMohan (Relevant portions only)
Unit I   :   Chapters 0 to 3
Unit II   :   Chapters 4,5,6,8.
Unit III   :   Chapters 9 and 27
Unit IV   :   Chapters 15 and 16
Unit V   :   Chapters 20

Reference:

Operations Research: Kantiswarup, PK. Gupta and ManMohan.

Semester	Subject code	Title of the paper	Hours of Teaching/ Week	No.of Credits
VI	**17U6MAC15**	**PROGRAMMING IN C**	**4**	**5**

Objectives:
 ➢ To introduce the techniques of C- Programming Language.
 ➢ To solve the numerical problems using C Language.

Unit I   **15 Hrs**

Constants, variables and Data Types- Operators and Expressions- Input and Output Operators.

Unit II   **15 Hrs**

Decision Making and Branching- Decision Making and Looping.

Unit III   **15 Hrs**

Arrays- Character Arrays and Strings.

Unit IV   **15 Hrs**

User- Defined functions.

Unit V

Structures and Unions.

Text Book:

Programming in Ansi C *by E.Balagurusamy; Second Edition, 1992, Tata Mc Graw- Hill Publishing Company Limited, New Delhi.*

Unit I	:	Chapters 2.1-2.14,,3.1-3.14 & 4.1-4.5.
Unit II	:	Chapter 5.1-5.9 & 6.1-6.6
Unit III	:	Chapter 7.1-7.7 & 8.1-8.
Unit IV	:	Chapter 9.1-.20
Unit V	:	Chapter 10.1-10.14

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Semester	Subject code	Title of the paper	Hours of Teaching/ Week	No. of Credits
VI	**17U6MACPL**	**PROGRAMMING IN C PRACTICAL**	**5**	**3**

Programs for the following problems only
(For both theory and practical)

Programs: **75 Hrs**

1. Employee Pay bill calculation

2. Students Mark List

3. Ascending and Descending orders

4. Test the string palindrome.

5. Standard deviation for raw data.

6. Coefficient of correlation and Regression Equations.

7. Matrix multiplication with order 3 x 3.

8. Lagrange's Interpolation.

9. Range- Kutta method (IV Order).

10. Trapezoidal rule and Simpson rule.

Semester	Subject code	Title of the paper	Hours of Teaching /Week	No.of Credits
VI	17U6MAEL3A	**Major Elective – III FUZZY SETS AND ITS APPLICATIONS**	5	4

Unit I   **19 Hrs**

Fuzzy sets: Basic Definitions – Basic set theoretic operations for Fuzzy sets – Extensions: Types of Fuzzy sets – algebraic operations - **Extension Principle**: operation for type 2 fuzzy sets – algebraic operations with fuzzy numbers – special extended operations – Extended operations for LR-representation of fuzzy sets.

Unit II   **19 Hrs**

Fuzzy relations and Fuzzy Graphs: Fuzzy relations and fuzzy sets – Composition of Fuzzy relations – Min-max composition and its properties – Fuzzy graphs – Special fuzzy relation - Possibility Theory – Possibility of fuzzy events – Possibility Vs Probability.

Unit III   **19 Hrs**

Fuzzy Logic: Classical logic: An overview – Multivalued logic – Fuzzy propositions – Fuzzy quantifiers – Linguistic hedges – Inference from conditional fuzzy propositions – **Approximate reasoning**: An overview of fuzzy expert system – Fuzzy implications and their selection – Multiconditional approximate reasoning – The role of fuzzy relation equation.

Unit IV   **18 Hrs**

Fuzzy Systems: Fuzzy controllers: An overview – Fuzzy rule base. Fuzzy inference engine. Fuzzification. Defuzzification and the various Defuzzification methods (the centre of area, the centre of maxima and the mean of maxima methods) – Fuzzy controllers: An example – Fuzzy systems and Neural Networks – Automata – Dynamical Systems.

Unit V

Decision making in Fuzzy environment: Individual decision making – Multiperson decision making – Multicriteria decision making – Multi stage decision making – Fuzzy ranking methods – Fuzzy linear programming – Applications in Civil Engineering, Mechanical Engineering, Industrial Engineering and Medicine.

Text Books:

1. **Fuzzy set theory and its applications Fourth edition,** H.J.Zimmermann. Springer, 2015.

      Unit – I: Chapters. 2, 3(Sec. 3.1 – 3.2.1), 5

      Unit – II: Chapters. 6, 8(Sec. 8.2 – 8.4)

2. **Fuzzy sets and Fuzzy Logic, Theory and Applications,** George J. Klir. and Bo Yuan, PHI, 2013.

      Unit – III: Chapters. 8(Sec. 8.1 – 8.6), 11(Sec. 11.1 – 11.5)

      Unit – IV: Chapters. 12

      Unit – IV: Chapters. 15, 16(Sec. 16.2, 16.3), 17(Sec. 17.2)

Books for Reference:

1. Dr.M.Ganesh, Introduction to Fuzzy Sets and Fuzzy Logic, Prentice Hall India Learning Private Limited (2006)

2. George. J.Klir and Tina A. Folger, "Fuzzy Sets Uncertainty and Information" Printice Hall of India Pvt. Ltd., New Delhi, 2006.

3. M. Amirthavalli, Fuzzy logic and Neural Networks, Scitech Publications Pvt. Ltd, Chennai and Hyderabad, 2007

4. Timothy J. Ross, Fuzzy Logic with Engineering Applications, McGraw-Hill INC, New York, 1996.

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Semester	Subject Code	Title of the Paper	Hours of Teaching /Week	No. of Credits
VI	**17U6MAEL3B**	**Major Elective – III FORMAL LANGUAGES AND AUTOMATA THEORY**	**5**	**4**

Unit I   19 Hrs

The theory of Automata- Definition of an Automaton- Description of a finite Automaton- Transition system- properties of transition functions- Acceptability of a string by a finite automaton- Non deterministic finite state Machine- The Equivalence of DFA and NDFA- Mealy and Moore Models- Minimisation of finite Automata.

Unit II   19 Hrs

Formal Language- Basic definition and examples- Chomsky classification of Languages- Language and their relation- Recursive and Recursively Enumerable sets- operations on Languages- Languages and Automata.

Unit III   19 Hrs

Regular Sets and Regular Grammars- Regular expression- Finite automaton and regular expressions- Pumping Lemma for Regular Sets- Application of Pumping Lemma.

Unit IV   18 Hrs

Context- free Languages- Context- free languages and derivation Trees- Ambiguity in context- free grammars- Simplification of context- free grammars- Normal forms for context- free Grammars.

Unit V

Push down Automata- Basic definitions- Acceptance by Pda- Push Down automata and context- free Languages- Parsing and Pushdown Automata.

Text Book:

"Theory of Computer Science" (Automata, Languages and Computation)

K.L.P Mishra and N. Chandrasekaran -Prentic Hall of India Private Limited- New Delhi.

Unit I	:	Chapter 2: (2.1 to 2.9)
Unit II	:	Chapter 3: (Section 3.1 to 3.6)
Unit III	:	Chapter 4: (Section 4.1 to 4.4)
Unit IV	:	Chapter 5: (Section 5.1 to 5.4)
Unit V	:	Chapter 6: (Section 6.1 to 6.4)

Semester	Subject code	Title of the paper	Hours of Teaching/ Week	No. of Credits
VI	**17U6MAEL4A**	**Major Elective – IV ASTRONOMY**	**5**	**4**

Objectives:
  ➢ To introduce the exciting world of astronomy to students.
  ➢ To help the students to know about the celestial objects.

Unit I   **19 Hrs**

   Celestial sphere – Diurnal motion

Unit II   **19 Hrs**

   The Earth: Zones of Earth – Terrestrial latitudes and longitudes – Radius of earth – Rotation of earth – Dip of horizon

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Unit III   **19 Hrs**

   Twilight – Refraction

Unit IV   **18 Hrs**

   Kepler's Laws

Unit V

   Time: Equation of time – seasons – calendar – conversion of time.

Text Book

   "Astronomy" by S.Kumaravelu and Susheela Kumaravelu, 2013.

   Unit I   :   Chapter II
   Unit II   :   Chapter III (Sec: 3.1 – 3.5)
   Unit III   :   Chapter III (sec: 3.6), Chapter IV
   Unit IV   :   Chapter VI
   Unit V   :   Chapter VII

General References:

   1.Astronomy by Dr.S.M. Sirajudeen

   2.Astronomy by G.V.Ramachandran.

   3.Textbook on Astronomy H.Subramani Aiyar 1970.

Semester	Subject code	Title of the paper	Hours of Teaching / Week	No.of Credits
VI	**17U6MAEL4B**	**Major Elective – IV STOCHASTIC PROCESSES**	**5**	**4**

Objectives:

Stochastic processes concern sequences of events governed by probabilistic.
Laws, many applications of Stochastic processes.
It is used in physics, Engineering, biology, medicine and other disciplines
The main aims is to bridge the gap between an elementary probability course and the many excellent advanced works on stochastic processes.

Unit I   **19 Hrs**

Elements of Stochastic Processes-Two simple examples of Stochastic processes-Classification of general Stochastic processes – Markov Chains- Definitions – Examples of Markov Chain-Transition probability matrices of a Markov chain - classification of states of a Markov chain-Recurrence;

Unit-II   **19 Hrs**

The basic limit theorem of Markov chains and applications-Discrete renewal equation-proof of theorem-Absorption probabilities - criteria for recurrence- A queuing Example.

Unit III   **19 Hrs**

Classical Examples of continuous time Markov chains-General pure birth processes and Poisson processes-more about Poisson processes- A counter model-birth and death processes-Differential equations of birth and death processes-Examples of birth and death processes.

Unit IV   **18 Hrs**

Renewal processes - Definition of Renewal process and related concepts – Some examples of Renewal Processes – More on some special Renewal processes – Renewal equations and elementary Renewal theorem - The Renewal Theorem – Applications of Renewal theorem.

Unit V

Martingales - Preliminary definitions and examples – Super martingales and Sub martingales- The optional sampling theorem.

Text Book:

A First course in Stochastic Processes - Second Edition by Samuel Karlin and M.Taylor, Academic Press New York.
    Unit I   : Chapter   (1.2 to 1.3)
    Unit II : Chapter   (2.1 to 2.5)
    Unit III : Chapter   (3.1 to 3.5)
    Unit IV : Chapter   (4.1 to 4.6)
    Unit V : Chapter   (6.1 to 6.3)

General References:

1. "Stochastic Processes" S.K.Srinivasan and K.M.Mehata, Tata Mcgraw -
        Hill Publishing Company Ltd., New Delhi.
2. "Stochastic Processes " Medhi, Second Edition Wiley Eastern Ltd., New Delhi.

Semester	Subject Code	Title of the Paper	Hours of Teaching / Week	No.of Credits
-	-	**Core Option - FUZZY MATHEMATICS - I**	5	5

Unit I   **15 Hrs**

Idea of fuzzy set and membership function, Definition of a fuzzy set, membership function, representation of membership function, General definitions and properties of fuzzy sets, Support, height, equality of two fuzzy sets, containment, examples.

Unit II   **15 Hrs**

Union and Intersection of two fuzzy sets, Complement of a fuzzy set, normal fuzzy set, α-cut set of a fuzzy set, strong α-cut, convex fuzzy set, a necessary and sufficient condition for convexity of a fuzzy set (Theorem 1), Decomposition of fuzzy sets, Degree of sub set hood, Level set of a fuzzy set, Cardinality, fuzzy cardinality, examples.

Unit III   **15 Hrs**

Other important operations on fuzzy sets, Product of two fuzzy sets, Product of a fuzzy set with a crisp number, Power of a fuzzy set, Difference of two fuzzy sets, Disjunctive sum of two fuzzy sets, example.

Unit IV   **15 Hrs**

General properties of operations on fuzzy sets, Commutativity, associativity, distributivity, Idempotent law, identities for operations, Transitivity, involution, Demorgans laws, proofs and examples, Some important theorems on fuzzy sets, set inclusion of fuzzy sets and corresponding α-cuts and strong α-cuts (Theorem 1).

Unit V   **15 Hrs**

Comparison of α-cut and strong α-cut, Order relation of scalars α is inversely preserved by set inclusion of corresponding α-cuts and strong α-cuts, α-cut of union and intersection of two fuzzy sets, α-cut of complement of a fuzzy set (Theorem 2), Examples, α-cuts and strong α-cuts of union and intersection of arbitrary collection of fuzzy sets.

Text Book:
1. Fuzzy Sets and their Applications by Pundir and Pundir, Pragati Prakashan (PP 30-76).

Reference Books:
1. Fuzzy sets and Fuzzy Logic by G.J. Klir and B. Yuan, Prentice Hall of India, New Delhi, 1995.
2. Fuzzy set Theory and its Applications by H.J. Zimmermann, Allied publishers Ltd, New Delhi 1991.

Semester	Subject Code	Title of the Paper	Hours of Teaching / Week	No.of Credits
-	-	**Core Option - FUZZY MATHEMATICS - II**	5	5

Unit I **15 Hrs**

Fuzzy sets: Basic Definitions, α-level sets, Convex fuzzy set, Basic operations on fuzzy sets, types of fuzzy sets, Extensions: Types of fuzzy sets, Further operations on fuzzy sets, Cartesian product, Algebraic products, Bounded sum and Difference, t-norm & t-conorm.

Unit II **15 Hrs**

Extension principle and applications, Zadeh extension principle, image and inverse image of fuzzy sets, fuzzy numbers, algebraic operations with fuzzy numbers, extended operation and its properties, Special extended operation, addition, subtraction, product and division of fuzzy numbers.

Unit III **15 Hrs**

Fuzzy relations on fuzzy sets, The union & intersection of fuzzy relations, Composition of fuzzy relations, max-* and max-product compositions, min-max composition and its properties, reflexivity, symmetry, transitivity, and their examples, special fuzzy relations, similarity relation.

Unit IV **15 Hrs**

Fuzzy graphs: Definition and Examples, Fuzzy sub-graph, Spanning sub-graph, path in a fuzzy graph, strength and length of a path, -length and -distances, connected nodes, fuzzy forest, fuzzy tree, Examples, Fuzzy Analysis: Fuzzy functions on fuzzy sets, classical function, fuzzy function, Examples.

Unit V **15 Hrs**

Fuzzy Logic; classical logic an overview, multi-valued logic, Fuzzy proposition unconditional and un qualified proposition, unconditional and qualified propositions conditional and unqualified proposition, conditional and qualified proposition, Fuzzy qualifiers, Linguistic hedges An overview of classical logic, Its connectives, Tautologies, Contradiction, Fuzzy .

Text Book:
1. Fuzzy set theory and its Applications by H.J. Zimmermann, Allied Publishers Ltd., New Delhi, 1991 (For Units I to IV).
2. Fuzzy sets and Fuzzy Logic Theory & Application by G.J. Klir and B. Yuan, Prentice Hall of India, New Delhi, (2000) (For Unit V).

Reference Books:

1. Fuzzy Logic with Engineering Applications by T.J. Ross, John Wiley & Sons, IInd Ed., 2005

Semester	Subject Code	Title of the Paper	Hours of Teaching / Week	No.of Credits
-	-	**Core Option - FINANCIAL MATHEMATICS**	**5**	**5**

Unit I   **15 Hrs**
Probability – Probabilities and Events – Conditional probability – Random Variables and Expected Values – Covariance and correlation – Continuous Random variables –Normal Random Variables – Properties of Normal Random Variables – The central limit Theorem – Simple Problems.

Unit II   **15 Hrs**
Geometric Brownian Motion – G.B.M. as a limit of simple models – Brownian Motion – Simple problems - Interest rates – Present value analysis – Rate of return – Continution of varying interest rates – An example of option pricing – other examples of pricing via arbitrage.

Unit III   **15 Hrs**
The Arbitage theorem – The multi period Binomial model – proof of the Arbitrage theorem - Black Scholes formula – properties of the Black Scholes option cost – Derivation of Black Scholes formula – simple problems.

Unit IV   **15 Hrs**
Additional results on options – Call options on Dividend paying Securities – Pricing American put options – Adding Jumps to Geometric Brownian Motion –Estimating the Volatility Parameter – Simple problems .

Unit V   **15 Hrs**
Valuing by Expected Utility – Limitation of Arbitrage pricing – valuing Investments by Expected utility – The portfolio selection problem – Value at risk and conditional value at risk The capital assets pricing model – Mean variance analysis of risk – Neutral priced Call options – Rates of return – Single period and Geometric Brownian Motion – simple problems .

Text Book:
"An Elementary Introduction to Mathematical Finance", 2nd Edition , Sheldon .M.Ross, Cambridge University press, 2005

Reference Books:

1. A first course in probability, S.M.Ross, Englewood cliffs Prentice Hall-NJ, 2002.
2. Options Market, J.Cox and M.Rubinstein, Englewood cliffs Prentice Hall-NJ, 1985.
3. Theory of financial decision making, J.E.Ingersill, Lanjarn MD Rowerman of Little fields, 1987.

Semester	Subject Code	Title of the Paper	Hours of Teaching / Week	No.of Credits
-	-	**Core Option - LATTICE THEORY**	**5**	**5**

Unit I **15 Hrs**

Partially ordered sets, Diagrams, Special subsets of a partially ordered set, Length, Lower and upper bounds, The minimum and maximum condition, The Jordan-Dedikend Chain condition and dimension functions.

Unit II **15 Hrs**

Lattices, The lattice theoretical duality principle, Semi lattices, Lattices as partially ordered sets, Diagrams of lattices, Sublattices, Ideals, Bound elements of a lattice, Atoms and dual atoms.

Unit III **15 Hrs**

Complements, Relative complements, Semi complements, Irreducible and prime elements of a lattice, The lattice homomorphism, Complete lattices, Compact elements, Compactly generated lattice, Sub algebra lattice of an algebra, Closure operations, Galois connections and Dedikend cuts.

Unit IV **15 Hrs**

Distributive lattices, Infinitely distributive and completely distributive lattice, Modular lattices, Characterization of modular and distributive lattices by their sublattices, Distributive sub lattices of modular lattices, The isomorphism theorem of modular lattices, Covering conditions, Meet representations in modular and distributive lattices

Unit V **15 Hrs**

Boolean algebras, De Morgan formulae, Complete Boolean algebras, Boolean algebras and Boolean rings, The algebra of relations, The lattice of propositions and valuations of Boolean algebras.

Text Book:
"Introduction to Lattice Theory" by G. Szasy, Academic Press, New York, 1963.

Reference Books:

1. B.A.Dallery and H.A.Pristley, "Introduction to lattices and order", Second edition, Cambridge
   University Press, 2002.
2. G. Gratzer, "General Lattice Theory", Academic Press, New York.

Semester	Subject Code	Title of the Paper	Hours of Teaching / Week	No. of Credits
-	-	**Core Option - MATLAB**	6	5

Unit – I   **18 Hrs**

Starting with Matlab - Creating arrays - Mathematical operations with arrays

Unit – II   **18 Hrs**

Script files - Functions and function files

Unit – III   **18 Hrs**

Two-dimensional plots - Three-dimensional plots

Unit – IV   **18 Hrs**

Programming in MATLAB

Unit – V   **18 Hrs**

Polynomials, Curve fitting and interpolation - Applications in numerical analysis

Text Book:
"MATLAB An Introduction with Application" by **A. Gilat,** John Wiley & Sons, Singapore, 2004.
> Unit – I : Chapter 1, Chapter 2, Chapter 3.
> Unit - II : Chapter 4, Chapter 6.
> Unit - III : Chapter 5, Chapter 9.
> Unit - IV : Chapter 7.
> Unit - V : Chapter 8, Chapter 10.

Reference Books:
1. *Getting Started with MATLAB – A Quick Introduction for Scientists and Engineers"* by **R. Pratap**, Oxford University Press, New Delhi, 2006.
2. *"Introduction to Matlab 7 for Engineers"* by **W.J. Palm,** McGraw-Hill Education, New York, 2005.
3. *"Introduction to MATLAB 7"* by **D. M. Etter, D. C. Kuncicky and H.Moore**, Prentice Hall, New Jersy, 2004.

Semester	Subject Code	Title of the Paper	Hours of Teaching / Week	No.of Credits
-	-	**Core Option – DIFFERENCE EQUATIONS**	6	5

Unit I   **18 Hrs**
      Difference Calculus: Difference operator - Summation – Generating function and Approximate Summation.

Unit II   **18 Hrs**
      Linear Difference Equations: First order equations - General results for linear equations - Solving Linear Equations.

Unit III   **18 Hrs**
      Linear Difference Equations (Contd.): Equations with Variable Coefficients – The z -Transform.

Unit IV   **18 Hrs**
      Stability Theory: Initial value problems for linear systems – Stability of linear systems.

Unit V   **18 Hrs**
      Asymptotic Methods: Introduction- Asymptotic analysis of sums - Linear equations.

Text Book:
      W.G. Kelley and A.C. Peterson, Difference Equations,2nd edition Academic Press, New York, 1991.
          Unit – I   : Sections 2.1 to 2.3
          Unit – II   : Sections 3.1 to 3.3
          Unit – III : Sections 3.5 and 3.7
          Unit – IV : Sections 4.1 and 4.2
          Unit – V   : Sections 5.1 to 5.3

Reference Books:

1. S.N. Elaydi, An Introduction to Difference Equations, Springer - Verlag, NewYork, 1995.
2. R. Mickens, Difference Equations, Van Nostrand Reinhold, New York, 1990.
3. R.P. Agarwal, Difference Equations and Inequalities, Marcel Dekker, New York, 1992.