

PG & RESERACH DEPARTMENT OF MATHEMATICS
B.Sc. Mathematics Programme
SCHEME OF EXAMINATIONS (2015-2016 onwards)

Part No.	Subject Code	Subject Title	Lecture + Practical Hours/Week	Duration of Exam Hrs	Max. Marks			Credit points
					CIA	ESE	TOTAL	
SEMESTER – I								
I	15UTL101	Tamil / Hindi Paper- I	6	3	25	75	100	3
II	15UEN101	English Paper –I	5	3	25	75	100	3
III	15UMS101	CORE I: Classical Algebra	5	3	25	75	100	4
III	15UMS102	CORE II: Calculus	6	3	25	75	100	5
III	15UMS1A1	ALLIED I:Mathematical Statistics I	6	3	25	75	100	5
IV	15UHR101	Human Rights in India	1	2	--	50	50	2
IV	15UEC101	Human Excellence: Personal values and sky yoga practice -I	1	2	25	25	50	1
V	15UNC401 15UNS402 15USG403	Extension Activities NCC/NSS/Sports and Games	--	--	--	--	--	--
		Total					600	23
SEMESTER – II								
I	15UTL202	Tamil / Hindi Paper- II	6	3	25	75	100	3
II	15UEN202	English Paper –II	5	3	25	75	100	3
III	15UMS203	CORE III: Trigonometry ,Vector Calculus and Fourier Series	5	3	25	75	100	4
III	15UMS204	CORE IV: Analytical Geometry 2D and 3D	5	3	25	75	100	4
III	15UMS2A2	ALLIEDII:Mathematical Statistics II	6	3	25	75	100	5
IV	15EVS201	Environmental Studies	1	2	--	50	50	2
IV	15HEC202	Human Excellence: Family values and sky yoga practice-II	2	2	25	25	50	1
V	15UNC401/ 15UNS402/ 15USG403	Extension Activities NCC/NSS/Sports and Games	--	--	--	--	--	--
		Total					600	22

SEMESTER – III								
I	15UTL303	Tamil / Hindi Paper- III	5	3	25	75	100	3
II	15UEN303	English Paper –III	6	3	25	75	100	3
III	15UMS305	CORE V: Dynamics	5	3	25	75	100	4
III	15UMS306	CORE VI: Numerical Methods	4	3	25	75	100	3
III	15UMS3A1	ALLIED III: Physics for Mathematics and Chemistry-I	8	3	25	75	100	4
IV	15UMS3N1/ 15UMS3N2	NME - Quantitative Aptitude - I /Astronomy-I	1	2	--	50	50	2
IV	15HEC303	Human Excellence: Professional values and sky yoga practice-III	1	2	25	25	50	1
V	15UNC401/ 15UNS402/ 15USG403	Extension Activities NCC/NSS/Sports and Games	--	--	--	--	--	--
		Total					600	20
SEMESTER – IV								
I	15UTL404	Tamil / Hindi Paper- IV	5	3	25	75	100	3
II	15UEN404	English Paper –IV	6	3	25	75	100	3
III	15UMS407	CORE VII: Statics	4	3	25	75	100	4
III	15UMS408	CORE VIII: Operation Research – I	5	3	25	75	100	4
III	15UMS4A2	ALLIED IV: -Physics for Mathematics and Chemistry-II	8	3	25	75	100	4
III	15UMS4A3	ALLIED PRACTICAL: Physics lab for Mathematics and Chemistry	--	3	40	60	100	2
IV	15UMS4N3/ 15UMS4N4	NME - Quantitative Aptitude – II/Astronomy-II	1	2	--	50	50	2
IV	15HEC404	Human Excellence: Social values and sky yoga practice-IV	1	2	25	25	50	1
V	15UNC401/ 15UNS402/ 15USG403	Extension Activities NCC/NSS/Sports and Games	--	--	--	50	50	1
		Total					750	24

SEMESTER-V								
III	15UMS509	CORE IX: Modern Algebra	6	3	25	75	100	4
III	15UMS510	CORE X: Real Analysis – I	6	3	25	75	100	4
III	15UMS511	CORE XI: Operation Research – II	5	3	25	75	100	4
III	15UMS512	CORE XII: Theory of Numbers	5	3	25	75	100	4
III	15UMS513	ELECTIVE-I- Programming in C	4	3	25	75	100	3
III	15UMS514	ELECTIVE PRACTICAL- Programming lab in C	2	3	20	30	50	2
IV	15UMS5S1/ 15UMS5C2	SBE: Mathematics for finance-I/ Actuarial Mathematics-I	1	2	--	50	50	2
IV	15GKL501	General Knowledge and General Awareness	SS	2	--	50	50	2
IV	15HEC505	Human Excellence: National values and sky yoga practice :V	1	2	25	25	50	1
		Total					700	26
SEMESTER – VI								
III	15UMS615	CORE XIII: Linear Algebra	6	3	25	75	100	4
III	15UMS616	CORE XIV: Real Analysis – II	6	3	25	75	100	4
III	15UMS617	CORE XV: Complex Analysis	5	3	25	75	100	4
III	15UMS618	ELECTIVE-II- Discrete Mathematics	5	3	25	75	100	5
III	15UMS619	ELECTIVEIII- OOP with C++	4	3	25	75	100	3
III	15UMS620	ELECTIVE PRACTICAL- Programming lab in OOP with C++	2	3	20	30	50	2
IV	15UMS6S2/ 15UMS6C2	SBE – Mathematics for Finance -II /Actuarial Mathematics-II	1	2	--	50	50	2
IV	15HEC606	Human Excellence: Global values and sky yoga practice-IV	1	2	25	25	50	1
		Total					650	25
		Grand Total					3900	140

SBE- Skill Based Elective, SS - Self Study, L-Lecture, T-Tutorial and P-Practical, NME – Non Major Elective.

General Question Papers Pattern

Max Marks: 100	Internal : 25	External 75	
Section	Pattern	Mark	Total
Part A	Short answer(5) & Multiple choice(5) (10 Questions)	10 * 1	10
Part B	Either (or) choice (5 Questions)	5 * 5	25
Part C	Either (or) choice (5 Questions)	5 * 8	40
		Total :	
75			

Question Pattern for Skill Based (Elective)

Max Marks: 50	Internal :	External 50	
Section	Pattern	Mark	Total
Part A	Multiple choice (10 Questions)	10 * 1	10
Part B	Either (or) choice (5 Questions)	5 * 3	15
Part C	open choice (5 out of 8 Questions)	5 * 5	25
		Total :	
50			

Question Pattern for EVS

Max Marks: 50		External : 50	
Section	Pattern	Mark	Total
Part A	Short answer/multiple choice (10 Questions)	10 * 1	10
Part B	Open choice (5 out of 8 Questions)	5 * 8	40
		Total :	
50			

List of Electives

1. Astronomy
2. Special Functions
3. Mathematical Modeling
4. Programming in C
5. Fuzzy Set Theory
6. Discrete Mathematics
7. Graph Theory
8. OOP with C++

List of Non Major Elective

1. Astronomy – I
2. Astronomy – II
3. Quantitative Aptitude – I
4. Quantitative Aptitude - II

Department	Mathematics	
Course	B.Sc	Effective From the Year :2015
Subject code : 15UMS101		
Title : CLASSICAL ALGEBRA		
Hrs/ Week	5	Credits : 4
Objectives	<p>This paper provides the learners a wide spectrum of basic mathematical concepts. This paper enables the learners to</p> <ul style="list-style-type: none"> (i) develop skills in solving algebraic equation (ii) Expand their knowledge in matrices. 	
Unit	Contents	Hrs
Unit-I	Binomial theorem for rational index (Statement only) – Application of Binomial theorem to summation of series – Exponential theorem (Statement only) – Summation of series - The logarithmic series – Summation	14 hours
Unit-II	Theory of equations – Roots of an equation (Simple problems and Results only) – Relation between roots and coefficients – Symmetric functions of the roots of an equation.	13 hours
Unit-III	Newton's theorem on sum of the powers of the roots (Statements and problems only) – Transformation of equations – Reciprocal equations.	13 hours
Unit-IV	To increase or decrease the roots of a given equation by a given quantity – Removal of terms – Descartes rule of signs.	12 hours
Unit-V	Matrices – Special types of Matrices – Characteristic roots, Characteristic vectors – Diagonalization of a matrix.	13 hours

Text Books	1. Manicavachagom pillay T.K, Natarajan T. and Ganapathy K.S. (2010), <i>Algebra Volume I</i> , First edition S. Viswanathan Pvt. Ltd. (For UNIT I,II ,III & IV). 2. Kandasamy P. and Thilagavathi K. (2004), <i>Mathematics for B. Sc. Branch – I, Volume II</i> , First Edition, (For UNIT V).
Reference Books	1. Thakur B.R., Sinha H.C, Agarwal B.L. and Johri V. B. (1970). <i>A text book of Algebra</i> . Ram Prasad & sons. 2. Ray M and Sharma H. S. (1988). <i>A text book of Higher Algebra</i> . S. Chand & Company.

Contents:

- Unit I - Chapter 3: Sections 5 & 10
Chapter 4: Sections 2, 3, 5&8.
- Unit II - Chapter 6: Sections 10, 11 & 12
- Unit III - Chapter 6: Sections 14, 15 & 16.
- Unit IV - Chapter 6: Sections 17, 18, 19 & 24.
- Unit V - Chapter 1: Sections 1 & 4.

Department	Mathematics	
Course	B.Sc	Effective From the Year : 2015
Subject code : 15UMS102		
Title : CALCULUS		
Hrs/ Week	6	Credits :5
Objectives	This paper enables the learners to (i) understand the concepts of multiple integrals, Beta and Gamma functions (ii) learn about various types of differential equations and methods to solve them (iii) Gain basic knowledge of Laplace transforms.	
Unit	Contents	Hrs
Unit-I	Linear differential equations with constant coefficients – Special methods of finding particular integral – Linear equations with variable coefficients.	15 hours
Unit-II	Derivation of partial differential equations by elimination of arbitrary constants and arbitrary functions – Different integrals of partial differential equations – Standard types of first order equations – Lagrange's equation.	16 hours
Unit-III	Multiple integrals–Definition of double integral – Evaluation of double integral – Double integral in polar co-ordinates – Triple integrals.	15 hours
Unit-IV	Change of variables – Jacobian – Transformation from Cartesian to polar co-ordinates– Transformation from Cartesian to spherical polar co-ordinates- Beta and Gamma functions – Applications of Gamma functions to multiple integrals.	16 hours
Unit-V	Laplace Transforms - Definition – Transform of $f(t)$, e^{at} , $\cos at$, $\sin at$ and t^n when n is an integer – Laplace transforms to solve ordinary differential equation with constant coefficients – Inverse Laplace transforms.	16 hours

Text Books	1. Narayanan S. and Manicavachagom Pillay T.K. (2007). <i>Calculus Volume – II</i> . S. Viswanathan Pvt. Ltd. [For Units III & IV]. 2. Narayanan S. and Manicavachagom Pillay T.K. (2007). <i>Calculus Volume–III</i> . S. Viswanathan Pvt. Ltd. [For Units I, II & V].
Reference Books	1. Dass H.K. (2006). <i>Advanced Engineering Mathematics (Sixteenth Edition)</i> , S.Chand and Company Ltd, New Delhi. 2. Kandasamy P. and Thilagavathi K (2004). <i>Allied Mathematics (Paper-II)</i> , S.Chand and Company Ltd, New Delhi. 3. Kandasamy P. and Thilagavathi K (2009). <i>Mathematics (Volume-III)</i> , S.Chand and Company Ltd, New Delhi.

Contents:

- Unit I - Chapter 2: Sections 1 to 4 & 8, 8.1, 8.2
- Unit II - Chapter 4: Sections 1 to 6.
- Unit III - Chapter 5: Sections 1 to 4.
- Unit IV - Chapter 6: Sections 1.1, 1.2, 2.1 to 2.4.
Chapter 7: Sections 2.1 to 6.
- Unit V - Chapter 5: Sections 1, 2, 6 &8.

Department	Mathematics	
Course	B.Sc	Effective From the Year : 2015
Subject code : 15UMS1A1		
Title : MATHEMATICAL STATISTICS – I		
Hrs/ Week	6	Credits : 5
Objectives	On successful completion of the course the students should have understood the concepts of random variable, discrete, continuous probability functions, expectations, covariance, Moment generating functions, Cumulants, characteristic functions and some discrete and continuous distributions and should have developed skills to apply them to various real life situations.	
Unit	Contents	Hrs
Unit-I	Mathematical Expectation - Properties - Addition and Multiplication Theorem - Simple problems. Definition of Covariance- Chebychev's inequality- Simple problems.	16 hours
Unit-II	Moment Generating Function (MGF)- Definition- Properties - Cumulants - Relation between Cumulant and central moment - Characteristic Function - Definition - Properties - Simple problems.	15 hours
Unit-III	MGF of Binomial distribution - Finding mean and variance - Additive property -Recurrence relation - MGF of Poisson distribution - Finding mean and variance - Additive property -Recurrence relation - Simple problems.	16 hours
Unit-IV	Normal distribution: Properties - Uses - MGF of Normal distribution about its origin and about arithmetic mean - Recurrence relation - Additive property - Rectangular distribution- Definition - MGF - Finding mean and variance - Simple problems.	15 hours

Unit-V	Gamma Distribution: MGF of Gamma distribution and finding the central moments - Additive property of Gamma varieties. Beta distributions of first and second kind: Definition - Finding mean and variance Exponential distribution: -Definition - MGF- Finding mean and variance.	16 hours
Text Book	Gupta S.C. and Kapoor V.K. (2009). <i>Fundamentals of Mathematical Statistics</i> . S. Chand & Sons.	
Reference Books	1. Vital P.R. (2004). <i>Mathematical Statistics</i> . Margham publications. 2. Hogg R.V. and Craigh A.G. (2004). <i>Introduction to Mathematical Statistics</i> . Pearson Education publications.	

Department	Mathematics	
Course	B.Sc	Effective From the Year : 2015
Subject code : 15UCY1A1		
Title : ANCILLARY MATHEMATICS FOR CHEMISTRY-I		
Hrs/ Week	8	Credits : 4
Objectives	<p>One aim of this paper is to train the students and to impart basic knowledge of mathematics relevant to their major subjects. This syllabus enables students to</p> <ul style="list-style-type: none"> (i) Explore matrix theory (ii) Expand their in solving Algebraic equations and learn (iii) Develop their knowledge in Fourier series, Beta and Gamma functions. 	
Unit	Contents	Hrs
Unit-I	<p>Symmetric and Skew-Symmetric matrices- Hermitian and Skew - Hermitian matrices-Orthogonal and unitary matrices - Characteristic Equation of a matrix- Cayley-Hamilton's theorem (without proof) - Simple Problems.</p> <p>(Pg.No : 5.8 to 5.23 and 5.50 to 5.67)</p>	22 hours
Unit-II	<p>Fundamental theorem in the theory of Equations – Relation between the roots and co-efficient of an Equation - Imaginary and Irrational roots</p> <p>(Pg. No : 6.1 to 6.17 and 6.19 to 6.25)</p>	22 hours
Unit-III	<p>Reciprocal Equation – Diminishing the roots of an Equation – Removal of term – Simple Problems.</p> <p>(Pg. No : 6.30 to 6.36 and 6.49 to 6.55)</p>	21 hours
Unit-IV	<p>Summation of Binomial Series – Exponential series - Simple Problems.</p> <p>(Pg. No : 2.4 to 2.10 and 3.1 to 3.9)</p>	19 hours

Unit-V	Beta, Gamma Functions – Simple Problems. (Pg. No : 30.1 to 30.23)	20 hours
Text Book	Dr. Vittal P. R. (2010). <i>Allied Mathematics</i> . Fourth Edition. Markham Publications, Chennai.	
Reference Books	Frank Ayres, <i>Shaum's outline of theory and problem of matrices</i>	

Department	Mathematics	
Course	B.Sc	Effective From the Year : 2015
Subject code : 15UPS1A1		
Title : ANCILLARY MATHEMATICS FOR PHYSICS – I		
Hrs/ Week	8	Credits : 4
Objectives	<p>One aim of this paper is to train the students and to import basic knowledge of mathematics relevant to their major subjects. This syllabus enables students to</p> <ul style="list-style-type: none"> (iv) Explore matrix theory (v) Expand their in solving Algebraic equations and learn (vi) Develop their knowledge in Fourier series, Beta and Gamma functions. 	
Unit	Contents	Hrs
Unit-I	<p>Symmetric and Skew-Symmetric matrices- Hermitian and Skew - Hermitian matrices-Orthogonal and unitary matrices - Characteristic Equation of a matrix- Cayley-Hamilton's theorem (without proof)-Simple Problems.</p> <p>(Pg. No : 5.8 to 5.23 and 5.50 to 5.67)</p>	23 hours
Unit-II	<p>Fundamental theorem in the theory of Equations – Relation between the roots and co-efficient of an Equation - Imaginary and Irrational roots</p> <p>(Pg. No : 6.1 to 6.17 and 6.19 to 6.25)</p>	22 hours
Unit-III	<p>Reciprocal Equation – Diminishing the roots of an Equation – Removal of term – Simple Problems.</p> <p>(Pg. No : 6.30 to 6.36 and 6.49 to 6.55)</p>	21 hours
Unit-IV	<p>Logarithmic series — Binomial series - Simple Problems</p> <p>(Pg. No: 4.1 to 4.11 and 2.4 to 2.10)</p>	19 hours

Unit-V	Beta, Gamma Functions – Simple Problems. (Pg. No : 30.1 to 30.23)	19 hours
Text Book	Dr. Vittal P. R. (2010). <i>Allied Mathematics</i> . Fourth Edition. Margham Publications, Chennai.	
Reference Books	Frank Ayres, <i>Shaum's outline of theory and problem of matrices</i>	

Department	Mathematics	
Course	B.Sc	Effective From the Year : 2015
Subject code : 15UMS203 Title : TRIGNOMETRY, VECTOR CALCULUS AND FOURIER SERIES		
Hrs/ Week	5	Credits : 4
Objectives	This paper enables the students to (i) learn about the properties of circle, sphere and cone (ii) provide basic knowledge of vector calculus (iii) learn about applications of integration.	
Unit	Contents	Hrs
Unit-I	Expansions of $\cos n\theta$, $\sin n\theta$ and $\tan n\theta$ —Examples on formation of equations – Expansions of $\cos^n \theta$ and $\sin^n \theta$ – Expansions of $\sin \theta$ and $\cos \theta$ in a series of ascending powers of θ .	14 hours
Unit-II	Hyperbolic functions – Inverse hyperbolic functions – Separation of real and imaginary parts of $\sin(\alpha+i\beta)$, $\cos(\alpha+i\beta)$, $\tan(\alpha+i\beta)$, $\sinh(\alpha+i\beta)$, $\cosh(\alpha+i\beta)$, $\tanh(\alpha+i\beta)$ and $\tan^{-1}(\alpha+i\beta)$.	13 hours
Unit-III	Fourier Series: Definition-Finding Fourier co-efficient for given periodic functions with period 2π - Even and odd functions - Half range series.	13 hours
Unit-IV	Scalar and vector point functions – Differentiation of vectors – Differential operators – Directional derivative - gradient, divergence and curl.	12 hours

Unit-V	Integration of vectors – line integral, surface integral and volume integral – Green’s theorem, Gauss theorem and Stoke’s theorem (statement only) – Verification by simple problems.	13 hour
Text Books	1. Narayanan S and Manicavachagom pillay T.K (2012), <i>Trigonometry</i> , Viswanathan S Pvt Ltd. (For units I, II) 2. S. Narayanan, T. K. Manicavachagom Pillay, S. Viswanathan (2010), <i>Calculus</i> , Volume III, (Printers & Publishers), Pvt., Ltd., (For unit III) 3. Narayanan S and Manicavachagom pillay T.K (1997), <i>Vector Calculus</i> , Viswanathan S Pvt Ltd. (For units IV,V)	
Reference Books	1. Mittal S.C, Pragathi prakasan (1969), <i>Trigonometry</i> . 2. Gupta R, <i>Vector Calculus</i> , Firewall media.	

Contents:

- Unit I - Chapter 3: Sections 1 to 5
- Unit II - Chapter 4: Sections 1 to 2
- Unit III - Chapter 6: Sections 1 to 5.2
- Unit IV - Chapter 4: Sections 1 to 3, 7 to 11.
- Unit V - Chapter 6: Sections 1 to 10.

Department	Mathematics	
Course	B.Sc	Effective From the Year : 2015
Subject code :15UMS204		
Title : ANALYTICAL GEOMETRY 2D AND 3D		
Hrs/ Week	5	Credits : 4
Objectives	Objective: This paper enables the student to gain fundamental ideas about co-ordinate geometry and gives clear knowledge about regular geometrical aspects and their properties in two dimensional and three dimensional analytical geometry.	
Unit	Contents	Hrs
Unit-I	Polar Co-ordinates: Polar Co-ordinates-Relation between polar and rectangular Cartesian co-ordinates-Equation of a circle-Equation of a conic.	13 hours
Unit-II	Straight Lines: Coplanarity of two lines-Shortest distances between two skew lines-Feet of the common perpendicular.	13 hours
Unit-III	Sphere: Equation of a sphere-Results based on properties of a sphere- Tangent plane to a sphere-Equations of a circle.	13 hours
Unit-IV	Cone: Equation of a cone-Cone whose vertex is at the origin-quadratic cone with vertex at the origin-General quadratic cone-Intersection of a cone by a plane.	14 hours
Unit-V	Right circular cone - Enveloping cone. Cylinder: Equation of a cylinder-Right circular cylinder.	12 hours

Text Book	<p>Duraipandian P, Laxmi Duraipandian, Muhilan D, <i>Analytical Geometry 2 dimensional</i>, Emerald publishers, 2000 (For unit I).</p> <p>Duraipandian P, Laxmi Dur-aipandian, Muhilan D, <i>Analytical Geometry 3 dimensional</i>, Emerald publishers,2000 (For units II, III, IV,V).</p>
Reference Books	<p>1.. Manicavachagom Pillai T. K, Natarajan T (2010), <i>A text book of Analytical Geometry part-I two dimensions</i>, S. Viswanathan printers & publishers Pvt. Ltd.,.</p> <p>2. Manicavachagom Pillai T. K, Natarajan T. (2010), <i>A text book of Analytical Geometry part-I three dimensions</i>, S. Viswanathan printers & publishers, Pvt. Ltd.</p>

Contents:

- Unit I - Chapter 9: Sections 9.1 to 9.4& 9.6.
- Unit II - Chapter 4 : Sections 4.2(coplanarity of two lines), 4.6
- Unit III - Chapter 5: Sections 5.1, 5.3, 5.4, 5.6, 5.7.
- Unit IV - Chapter 6: Sections 6.1 to 6.5.
- Unit V - Chapter 6: Sections 6.6, 6.7, 6.11.

Department	Mathematics	
Course	B.Sc	Effective From the Year : 2015
Subject code : 15UMS2A2		
Title : MATHEMATICAL STATISTICS – II		
Hrs/ Week	6	Credits : 5
Objectives	On successful completion of the course the students should have understood the concepts of Two Dimensional Random Variable, Moments of Bivariate Probability Distributions, Linear Regressions and developed skills to apply Sampling procedures to different situations.	
Unit	Contents	Hrs
Unit-I	Two Dimensional Random Variables: Joint Probability Mass Function – Two Dimensional Distribution function - Marginal Distribution functions- Joint Density function- Marginal Density Function - The conditional Distribution Function and Conditional Probability Density function. Moments of Bivariate Probability Distributions - Conditional Expectation and Conditional Variance - Simple problems.	15 hours
Unit-II	Karl Pearson's coefficient of Correlation: Limits for Correlation Coefficient - Calculation of the Correlation Coefficient for a Bivariate Frequency Distribution. Rank Correlation: Spearman's Rank Correlation Coefficient - problems only (no derivations). Linear Regression: Regression Coefficients - Properties of Regression Coefficients- Angle between two Lines of Regression - Simple Problems.	16 hours

Unit-III	<p>Parameter and Statistic: Sampling Distribution of a Statistic - Standard Error. Tests of Significance: Null and alternative Hypothesis - Errors in sampling - Critical Region and Level of Significance - One-tailed and Two-tailed tests - Critical Values or Significant Values. Procedure for Testing of Hypothesis. Tests of Significance for Large Samples. Sampling of Attributes: Test of significance for</p> <ol style="list-style-type: none"> 1. Single Proportion 2. Difference of Proportions - Simple Problems – <p>Sampling of Variables: Test of significance for</p> <ol style="list-style-type: none"> 1. Single Mean 2. Difference of Means - Simple Problems 	16 hours
Unit-IV	<p>Applications of χ^2 Distribution: Inferences about a Population Variance - Goodness of Fit Test - Test of Independence of Attributes - 2x2 Contingency Table only - Simple Problems.</p>	15 hours
Unit-V	<p>Applications of t- Distribution: t-test for Single Mean - t-test for Difference of Means - t-test for Testing the Significance of an Observed Sample Correlation Coefficient. Applications of F-Distribution: F-test for Equality of Two Population Variances - Simple Problems.</p>	16 hours
Text Book	Gupta S.C and Kapoor V.K. (2009). <i>Fundamentals of Mathematical Statistics</i> . S. Chand & Sons.	
Reference Books	<ol style="list-style-type: none"> 1. Vital P.R. (2004), <i>Mathematical Statistics</i>. Margham publications. 2. Hogg R.V and Craigh A.G. (2004), <i>Introduction to Mathematical Statistics</i>, Pearson Education publications. 	

Department	Mathematics	
Course	B.Sc	Effective From the Year : 2015
Subject code : 15UCY2A2 Title : ANCILLARY MATHEMATICS FOR CHEMISTRY-II		
Hrs/ Week	8	Credits : 4
Objectives	On completion of the course the learners are expected to (i) have a good understanding, application ability of Hyperbolic functions and Laplace functions (ii) have a very good understanding of vector calculus	
Unit	Contents	Hrs
Unit-I	Hyperbolic functions: Relations between circular and hyperbolic functions – Addition formula for hyperbolic functions - Problems. (Pg.No:14.31 to14.37 and 14.40 to 14.55)	21 hours
Unit-II	Laplace Transforms: Definition- Laplace transform of elementary function – Linear Property – Shifting Property– Change of scale property- Laplace transform of derivatives – Laplace transform of integrals – Multiplication by t - problems. (Pg.No: 27.1 to27.19)	22 hours
Unit-III	Vector Differentiation: Gradient, Curl and Divergence – Problems. (Pg.No:28.7 to 28.51, 28.23 , 28.26 to 28.33 and 28.36 to 28.43)	21 hours
Unit-IV	Line Integral – Surface Integral – Volume Integral – Problems. (Pg.No:29.59 to 29.72 and 29.75 to 29. 87)	20 hours
Unit-V	Green's theorem (without proof) – Simple Problems. (Pg.No: 29.129 to 29.140)	20 hours

Text Book	Vittal P. R. (2010). <i>Allied Mathematics</i> . Fourth Edition. Margham Publications, Chennai.
Reference Books	<ol style="list-style-type: none"> 1. Murray R. Spiegel, <i>Shaum's outline of theory and problem of vector analysis</i> 2. Murray R. Spiegel, <i>Shaum's outline of theory and problem of Laplace transform</i>

Department	Mathematics	
Course	B.Sc	Effective From the Year :2015
Subject code :	15UPS2A2	
Title	: ANCILLARY MATHEMATICS FOR PHYSICS -II	
Hrs/ Week	8	Credits : 4
Objectives	On completion of the course the learners are expected to (ii) have a good understanding, application ability of Hyperbolic functions and Laplace functions (ii) have a very good understanding of vector calculus	
Unit	Contents	Hrs
Unit-I	Hyperbolic functions: Relations between circular and hyperbolic functions – Addition formula for hyperbolic functions - Problems. (Pg.No:14.31 to14.37 and 14.40 to 14.57)	21 hours
Unit-II	Laplace Transforms: Definition- Laplace transform of elementary function – Linear Property – Shifting Property– Change of scale property- Laplace transform of derivatives – Laplace transform of integrals – Multiplication by t - Problems. .(Pg.No: 27.1 to 27.19)	22 hours
Unit-III	Vector Differentiation: Gradient, Curl and Divergence – Simple Problems.(Pg.No:28.8 to 28.51)	21 hours
Unit-IV	Line Integral – Surface Integral – Volume Integral – Simple Problems.(Pg.No: 29.59 to 29.72 and 29.75 to 29.87)	20 hours
Unit-V	Logarithm of complex number – Simple Problems. (Pg.No : 14.61 to 14.72)	20 hours

Text Book	Vittal P. R. (2010), <i>Allied Mathematics</i> , Fourth Edition, Margham Publications, Chennai.
Reference Books	<ol style="list-style-type: none"> 1. Murray R. Spiegel, <i>Shaum's outline of theory and problem of vector analysis</i> 2. Murray R. Spiegel, <i>Shaum's outline of theory and problem of Laplace transform</i>

Department	Mathematics	
Course	B.Sc	Effective From the Year : 2015
Subject code :15UMS305		
Title : DYNAMICS		
Hrs/ Week	5	Credits : 4
Objectives	To enable the students to apply laws, principles and postulates governing the dynamics in physical reality. At the end of this course, the student will be able to comprehend the notion of impulsive and coplanar forces, and will have a sound knowledge in rigid body motion and able to realize the reason for dynamic changes in the body.	
Unit	Contents	Hrs
Unit-I	Projectiles – Simple problems.	13 hours
Unit-II	Simple Harmonic Motion – Simple problems.	12 hours
Unit-III	Motion under the action of central forces – Simple problems.	14 hours
Unit-IV	Impulsive forces - Simple problems.	13 hours
Unit-V	Collision of elastic bodies – Simple problems.	13 hours
Text Book	Venkataraman M. K. (2009). <i>Dynamics</i> . Thirteenth Edition. Agasthiar publications.	
Reference Books	1. Dharmapadam A. V (1998), <i>Dynamics</i> . S. Viswanathan Printers and Publishers Pvt. Ltd. Chennai. 2. Viswanath Naik K and Kasi M. S. (1992), <i>Dynamics</i> , Emerald Publishers.	

Contents:

Unit I	- Chapter VI: Sections 6.1 to 6.15
Unit II	- Chapter X: Sections 10.1 to 10.7
Unit III	- Chapter XI: Sections 11.1 to 11.13
Unit IV	- Chapter VII: Sections 7.1 to 7.6
Unit V	- Chapter VIII: Sections 8.1 to 8.8

Department	Mathematics	
Course	B.Sc	Effective From the Year : 2015
Subject code : 15UMS306		
Title : NUMERICAL METHODS		
Hrs/ Week	4	Credits : 3
Objectives	To enable the students to learn and use numerical techniques to get numerical solutions to equations like transcendental and non linear differential equations when ordinary analytical methods fail.	
Unit	Contents	Hrs
Unit-I	The solution of Numerical Algebraic and Transcendental Equations: Introduction-The Bisection method-The iteration method-The method of false position (Regula Falsi Method) – Newton Raphson method.	11 hours
Unit-II	Interpolation: Introduction - Linear interpolation - Gregory Newton Forward and Backward interpolation Formula - Equidistant terms with one or more missing values.	10 hours
Unit-III	Numerical Differentiation: Introduction - Newton's forward difference formula to compute the derivatives - Newton's backward difference formula to compute the derivatives - Derivatives using Stirling's formula – Remarks on numerical differentiation – Maxima and minima of a tabulated function.	11 hours
Unit-IV	Numerical Integration: The Trapezoidal rule – Romberg's method - Simpson's one third - Practical applications of Simpson's rule.	10 hours
Unit-V	Numerical Solution of Ordinary Differential Equations: Euler's method – improved Euler's method - Modified Euler method – Runge Kutta method - Second order Runge Kutta Method – Higher order Runge Kutta methods.	10 hours

Text Book	Venkataraman M.K. (2006). <i>Numerical Methods in Science and Engineering</i> , The National Publishing Company, Madras.
Reference Book	Kandasamy P. Thilagavathy K. & Gunavathi K. (2012). <i>Numerical Methods</i> , S. Chand company Ltd.

Contents:

- Unit I - Chapter 3: Sections 1 to 5.
- Unit II - Chapter 6: Sections 1 to 5
- Unit III - Chapter 9: Sections 1 to 6.
- Unit IV - Chapter 9: Sections 8 to10 & 12.
- Unit V - Chapter 11: Sections 10 to 15.

Department	Mathematics	
Course	B.Sc	Effective From the Year : 2015
Subject code : 15UMS3N1		
Title : NME QUANTITATIVE APTITUDE - I		
Hrs/ Week	1	Credits : 2
Unit	Contents	Hrs
Unit-I	Operation on numbers: Introduction – Face value – Place value – Various types of numbers – Simple problems.	3 hours
Unit-II	HCF and LCM of numbers: Factors and multiples – HCF and GCD -: Factorization method – Division method – Simple problems.	3hours
Unit-III	Ratio and Proportion: Ratio – Proportion- Simple problems.	3 hours
Unit-IV	Profit and loss: Introduction – Cost price – Selling price – Profit and loss – Simple Problems.	2 hours
Unit-V	Odd man out and Series: Directions for odd man out and series.	2 hours
Text Book	Aggarwal R. S, <i>Quantitative Aptitude (2013)</i> , S. Chand & Company Ltd, Ram Nagar, New Delhi.	

Contents:

- Unit 1: Chapter 1 Sections: 1-6
- Unit 2: Chapter 2 Sections: 1&2
- Unit 3: Chapter 12 Sections: 1&2
- Unit 4: Chapter 11 Sections fully.
- Unit 5: Chapter 35 Sections fully

Department	Mathematics	
Course	B. Sc.	Effective From the Year : 2015
Subject code : 15UMS3N2		
Title : NME ASTRONOMY- I		
Hrs/ Week	1	Credits : 2
Units	Contents	Hrs
Unit-I	The Solar System: Introduction - The Sun - Mercury - Venus - Mars - Asteriods - Jupiter - Saturn - Uranus - Neptune. Chapter 16 Sections : 316 - 326.	3 hours
Unit-II	The Solar System: Comets - Meteors - Zodiacal light. Chapter 16 Sections : 327 - 329.	3hours
Unit-III	Double And Multiple Stars: Introduction - Variables stars - Eclipsing Variables capheid variables - Long period variables - Irregular variables - Novae - Star clusters Nebulae - Constellations - Zodiacal Constellations. Chapter 17 Sections : 339 - 345.	3 hours
Unit-IV	The Milky Way: Introduction - Seasonal changes in the night sky - The winter Constellations - The spring Consellations. Chapter 17 Sections : 346 - 347.	2 hours
Unit-V	Constellations: Introduction - The summer Constellations - The autumn Constellations. Chapter 17 Section : 347.	2 hours
Text Book	Kumaravelu S and Susheela Kumaravelu, <i>Astronomy for degree classes</i> , 7 th edition 1986.	

Department	Mathematics	
Course	B.Sc	Effective From the Year : 2015
Subject code : 15UMS407		
Title : STATICS		
Hrs/ Week	4	Credits : 4
Objectives	The prime objective of this paper is to introduce the concepts about the forces, resultant force of more than one forces acting on a surface, friction and center of gravity and simple related problems. At the end of the course, learner will be well trained in handling these concepts.	
Unit	Contents	Hrs
Unit-I	Forces acting at a point – Simple problems	11 hours
Unit-II	Parallel forces and Moments – Simple problems	11 hours
Unit-III	Couples - Simple problems	10 hours
Unit-IV	Equilibrium of three forces acting on a rigid body, coplanar forces – Simple Problems.	10 hours
Unit-V	Friction and Centre of gravity – Simple problems.	10 hours
Text Book	Venkatraman M. K. (2007), <i>Statics</i> , Sixth Edition. Agasthiar publications.	
Reference Books	1. Dharmapadam A. V. (1993), <i>Statics</i> , Chennai, S. Viswanathan printers And Publishers Pvt. Ltd. 2. Duraipandian P and Laxmi Duraipandian. (1985). <i>Mechanics</i> . Ram Nagar, New Delhi, S. Chand & Co. Pvt. Ltd.	

Department	Mathematics	
Course	B.Sc	Effective From the Year : 2015
Subject code : 15UMS408		
Title : OPERATIONS RESEARCH -I		
Hrs/ Week	5	Credits : 4
Objectives	The prime objective of this paper is to introduce certain OR techniques such as LPP, Transportation problems, Assignment problems, sequencing and Replacing models to help the students to develop logical reasoning for applying mathematical tools to managerial and other life oriented problems.	
Unit	Contents	Hrs
Unit-I	Linear Programming Problem: Introduction - Mathematical Formulation of the Problem - Graphical Solution Method - General Linear Programming Problem - Canonical and Standard Forms of L.P.P.	14 hours
Unit-II	Linear Programming Problem: Simplex Method Introduction - The Computational Procedure - Use of Artificial Variables - Big M-method - Degeneracy in Linear Programming - Applications of Simplex Method	13 hours
Unit-III	Transportation Problem LP formulation of the Transportation Problem - Existence of Solution in TP - The Transportation Table - Loops in Transportation Tables - Finding an initial basic feasible solution - North West corner rule - Vogel's approximation Method -Test for Optimality - Determining the Net evaluations (The uv method) - Transportation algorithm	13 hours

	(MODI Method) - Some exceptional cases- Unbalanced Transportation Problem	
Unit-IV	Assignment & Replacement Problem: Mathematical Formulation of the Assignment Problem - Solution of Assignment Problem – Hungarian Assignment method - Replacement of equipment / Asset that deteriorates gradually - Case (i) Value of money does not change with time - Case (ii) Value of money changes with time - Selection of best equipment amongst two - Simple problems.	13 hours
Unit-V	Queueing Theory: Queueing System –Elements of a Queueing System - Operating characteristics of a Queueing system - Poisson Queueing System Model I : (M/M/ 1): (∞ /FIFO) Model III : (M/M/ 1): (N/FIFO) Model V : (M/M/ C): (∞ /FIFO) Model VI : (M/M/ C): (N/FIFO) Simple Problems	12 hours
Text Book	Kanti Swarup, Gupta P.K. & Man Mohan (2014), <i>Operations Research</i> , Sultan Chand & Sons, New Delhi.	
Reference Books	1. Taha H.A (2006), <i>Operation Research – An introduction</i> , Prentice Hall of India Pvt Ltd, New Delhi. 2. Philips D, Ravindran Solberg A (1976), <i>Operation Research: Principles and Practice</i> , JOHN WILEY & SONS.	

Contents:

For Unit I: Chapter 2: Sections 2.1 – 2.4 and Chapter 3: Sections 3.1 - 3.5.

For Unit II: Chapter 4: Sections 4.1, 4.3 – 4.5, 4.8.

For Unit III: Chapter 10: Sections 10.2, 10.3, 10.5, 10.6, 10.9, 10.10, 10.13, 10.15.

For Unit IV: Chapter 11: Sections 11.1 - 11.3, Chapter 18: Sections 18.1-18.2.

For Unit V: Chapter 21: Sections 21.1 - 21.4, 21.9.

(MATHEMATICAL DERIVATIONS IN ALL UNITS MAY BE OMITTED).

Department	Mathematics	
Course	B.Sc	Effective From the Year :2015
Subject code : 15UMS4N3		
Title : NME QUANTITATIVE APTITUDE - II		
Hrs/ Week	1	Credits : 2
Unit	Contents	Hrs
Unit-I	Percentage: Introduction – Important facts and family – Concept of percentage – Simple problems.	3 hours
Unit-II	Simplification: Introduction – BODMAS rule – Modulus of a real number – Simple problem.	3 hours
Unit-III	Problems on ages: Problems on ages - Simple problems.	3 hours
Unit-IV	Time & work: Time & work- Simple problems.	2 hours
Unit-V	Problems on trains: Problems on trains with solved examples.	2 hours
Text Book	Aggarwal R. S, <i>Quantitative Aptitude (2013)</i> , S. Chand & Company Ltd, Ram Nagar, New Delhi.	

Contents:

- Unit 1: Chapter 10
- Unit 2: Chapter 4
- Unit 3: Chapter 8
- Unit 4: Chapter 15
- Unit 5: Chapter 18

Department	Mathematics	
Course	B. Sc.	Effective From the Year :2015
Subject code : 15UMS4N4		
Title : NME ASTRONOMY - II		
Hrs/ Week	1	Credits : 2
Units	Contents	Hrs
Unit-I	The Moon: Introduction - Sidereal month - Synodic month Elongation - Conjunction - Opposition - Quadratures Daily motion of the moon - Age of moon - Phase of moon. Chapter 12 Sections : 228 - 238	3 hours
Unit-II	The Moon: Moon exhibits the same side to the earth -Lunar Librations - Summer and winter full moons path of the moon with respect to the sun - Perturbations of lunar orbit. Chapter 12 Sections : 241 - 245	3 hours
Unit-III	Double And Multiple Stars: Introduction -Variables stars - Eclipsing Variables capheid variables - Long period variables - Irregular variables - Novae - Star clusters Nebulae - Constellations - Zodiacal Constellations. Chapter 13 Sections : 254 -257 and 264	3 hours
Unit-IV	The Milky Way: Introduction - Seasonal changes in the night sky - The winter constellations - The spring consellations. Chapter 14 Sections : 283,284 and 286 - 288	2 hours
Unit-V	Constellations: Introduction - The summer constellations - The autumn constellations. Chapter 15 Sections : 303,304,305,306 and 310	2 hours
Text Book	Kumaravelu S and Susheela Kumaravelu, <i>Astronomy for degree classes</i> , 7 th edition 1986.	

Department	Mathematics	
Course	B.Sc	Effective From the Year :2015
Subject code : 15UMS509 Title : MODERN ALGEBRA		
Hrs/ Week	6	Credits : 4
Objectives	Modern Algebra is a language of mathematics. Studying algebra develops confidence, improves logical thinking and enhances what is called mathematical maturity, all needed for developing and establishing mathematical facts and for solving problems. The major objective of this course is to provide the students an introduction to set theory, relations, functions, algebraic system of axioms, algebraic structures such as Groups, Rings and Fields. The course promotes a better understanding of algebra and provides an adequate foundation for further study in abstract algebra and its applications in various branches of Mathematics	
Unit	Contents	Hrs
Unit-I	Set theory - Mappings - The Integers	15 hours
Unit-II	Definition of a Group - Some Examples of Groups - Some preliminary Lemmas - Subgroups - A Counting principle - Normal Subgroups and Quotient Groups.	16 hours
Unit-III	Homomorphisms – Automorphisms - Cayley's Theorem - Permutation Groups- Another counting Principal – Sylow's Theorem.	16 hours
Unit-IV	Definition and Examples of Rings - Some Special Classes of Rings – Homomorphism	16 hours
Unit-V	Ideals and Quotient Rings - More Ideals and Quotient Rings - The Field of Quotients of an Integral Domain.	15 hours
Text Book	Herstein, I.N. (2010) <i>Topics in Algebra</i> . 2 nd Edition. Wiley India Pvt. Ltd., New Delhi.	
Reference Books	1. Herstein I. N. (1996) <i>Abstract Algebra</i> , Prentice-Hall international, inc.. 2. Surjeetsingh, Qazizameeruddin (1975) <i>Modern Algebra</i> , Vikas	

	<p>Publishing House Pvt. Ltd, Second Edition.</p> <p>3. Bhattacharya. P.B. Jain S.K (1972) <i>A first course in group theory</i>, Wiley Eastern Pvt Ltd.</p>
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Department	Mathematics	
Course	B.Sc	Effective From the Year :2015
Subject code :	15UMS510	
Title	: REAL ANALYSIS - I	
Hrs/ Week	6	Credit : 4
Objectives	One of the higher mathematical divisions, mathematical analysis provides the students a transition from elementary calculus to advanced courses in modern analysis. The course includes real and complex number systems, Sequence Series of Real numbers. On completion of the course the learners are expected to have obtained a strong foundation for further study in analysis.	
Unit	Contents	Hrs
Unit-I	Sets and Functions: Functions, Real-valued functions, Equivalence, Countability, Real numbers, Least upper bounds.	15 hours
Unit-II	Sequence of Real Numbers: Definition of sequence and subsequence, Limit of a sequence, Convergent sequences, Divergent sequences, Bounded sequences, Monotone sequences.	16 hours
Unit-III	Sequence of Real Numbers: Operations on convergent sequences, operations on divergent sequences, Limit superior and limit inferior, Cauchy sequences.	16 hours
Unit-IV	Series of Real Numbers: Convergence and divergence, Series with non-negative terms, Alternating series, Conditional convergence and Absolute convergence, Rearrangement of series, Tests for absolute convergence.	16 hours
Unit-V	Limits and Metric Spaces: Limit of a function on the real line, Metric spaces, Limits in metric spaces.	15 hours

Text Books	Richard Goldberg R. (1970), <i>Methods of Real Analysis</i> , Oxford & IBH Publishing Co. Pvt. Ltd.	
Reference Books	1. Walter Rudin (1976), <i>Principles of Mathematical Analysis</i> , Third Edition, and McGraw-Hill Inter Editions. 2. Tom Apostol M. (1985), <i>Mathematical Analysis</i> , Second Edition, Narosa Publishing House.	

CONTENTS:

For UNIT-I : Chapter 1- Sections 1.3, 1.4, 1.5, 1.6, and 1.7
UNIT-II : Chapter 2- Sections 2.1, 2.2, 2.3, 2.4, 2.5, 2.6
UNIT-III: Chapter 2- Sections 2.7, 2.8, 2.9, 2.10
UNIT-IV: Chapter 3-Sections 3.1-3.6
UNIT-V: Chapter 4

Department	Mathematics	
Course	B.Sc	Effective From the Year : 2015
Subject code : 15UMS511		
Title : OPERATIONS RESEARCH -II		
Hrs/ Week	5	Credits : 4
Objectives	The prime objective of this paper is to introduce certain OR techniques such as Game theory, sequencing and networking models to help the students to develop logical reasoning for applying mathematical tools to managerial and other life oriented problems	
Unit	Contents	Hrs
Unit-I	Games and strategies: Two person zero sum games - Some basic terms – The maximin - Minimax principle - Games without Saddle points - mixed strategies - Graphical Solution of $2 \times n$ and $m \times 2$ games	13 hours
Unit-II	Sequencing problems: Problem of Sequencing - Basic terms used in Sequencing - Processing n jobs through 2 machines Processing n jobs through k machines Processing 2 jobs through k machines	13 hours
Unit-III	Inventory control: Types of inventories - Reasons for carrying inventories - The inventory decisions - Cost associated with inventories - Factors affecting inventory control - The concept of EOQ - Deterministic inventory problems with no shortages Case (i) The fundamental Problem of EOQ Case (ii) Problem of EOQ with finite replenishment (Production).	14 hours

Unit-IV	Inventory control: Deterministic inventory Problems with shortages Case (i) Problem of EOQ with instantaneous Production and variable order cycle Case (ii) Problem of EOQ with instantaneous Production and Fixed order cycle. Case (iii) Problem of EOQ with finite replenishment (Production). Problem of EOQ with price breaks Case (i) Problem of EOQ with one price break Case (ii) Problem of EOQ with more than one price break.	13 hours
Unit-V	Network scheduling by PERT / CPM: Network: Basic compounds - Logical Sequencing - Rules of Network constructions - Critical Path Method (CPM) – Probability considerations in PERT - Distinction between PERT & CPM - Simple Problems.	12 hours
Text Book	Kanti Swarup, Gupta P.K. & Man Mohan, <i>Operations Research</i> (2014), Sultan Chand & Sons, New Delhi.	
Reference Books	1. Taha H.A (2006), <i>Operation Research – An introduction</i> – Prentice Hall of India Pvt Ltd, New Delhi. 2. Philips D, Ravindran Solberg A (1976), <i>Operation Research: Principles and Practice</i> , JOHN WILLEY & SONS.	

Contents:

For Unit I: Chapter 17: Sections 17.1 – 17.6

For Unit II: Chapter 12: Sections 12.1 - 12.6

For Unit III: Chapter 19: Sections 19.1 – 19.4, 19.6, 19.7, 19.9, 19.10.

For Unit IV: Chapter 19: Sections 19.11, 19.12.

For Unit V: Chapter 25: Sections 25.1 - 25.4, 25.6 – 25.8.

(MATHEMATICAL DERIVATIONS IN ALL UNITS MAY BE OMITTED)

Department	Mathematics	
Course	B.Sc	Effective From the Year : 2015
Subject code : 15UMS512		
Title : THEORY OF NUMBERS		
Hrs/ Week	5	Credits : 4
Objectives	This course exposes the elementary basic theory of numbers and several famous theorems, function and some unsolved problems about primes to the students in order to enable them to deeper their understanding of the subject.	
Unit	Contents	Hrs
Unit-I	Basic Representation: Principles of Mathematical induction - The Basis Representation Theorem - The Fundamental Theorem of Arithmetic - Euclid's Division Lemma, Divisibility - The linear Diophantine Equation - The fundamental theorem of Arithmetic.	12 hours
Unit-II	Combinational and Computational Number Theory: Permutations and combinations - Fermat's Little Theorem (Statement only) - Wilson's Theorem (Statement only) - Fundamentals of Congruences - Basic properties of Congruences - Residue systems.	12 hours
Unit-III	Solving Congruences: Linear congruences - the theorems of Fermat and Wilson Revisited - The Chinese Remainder theorem - Polynomial congruences.	13 hours

Unit-IV	Arithmetic Functions: Combinational study of $\Phi(n)$ - Formulae for $d(n)$ and $\sigma(n)$ - Multiplicative arithmetic functions - The Mobius Inversion Formula.	14 hours
Unit-V	Primitive Roots: Properties of Reduced Residue Systems - Primitive Roots module p - Prime numbers - Elementary properties of $\pi(x)$ - Tchebychev's theorem - some unsolved problems about primes.	14 hours
Text Book	George E. Andrews (1992), <i>Number Theory</i> , HPS (India).	
Reference Books	1. David M. Burton (1997), <i>Elementary number theory</i> , McGraw-Hill. 2. Kumaravelu et al. (2002), <i>Elements of number theory</i> , Nagerkovil SKV. 3. Telang (1984), <i>Number theory</i> , Tata McGraw- Hill publishing Company Ltd.	

Department	Mathematics	
Course	B.Sc	Effective From the Year :2015
Subject code : 15UMS513		
Title : PROGRAMMING IN ‘C’		
Hrs/ Week	4	Credits : 3
Objectives	C is a general purpose structured programming language that is powerful, efficient and compact. The programming language C finds a wide variety of applications in the development of software. This course provides the students with all the fundamental concepts of the C language with some practical experience. Also helps the students to develop their programming skills and to build large programs.	
Unit	Contents	Hrs
Unit-I	History of C - Importance of C - Character set - Keywords - Constants - Variables - Data types - Declaration of variables - Assigning values to variables - Defining symbolic constants - Arithmetic, Relational, Logical, Assignment, increment, Decrement and conditional operators-Arithmetic expressions - Evaluation of expressions - Precedence of arithmetic operators - Type conversions in expressions - Operator precedence - Mathematical functions - Reading a character - Writing a character - Formatted input and output.	11 hours
Unit-II	Simple if statement - If ... else statement - Nesting of if ... else statements - else if ladder - switch statement - go to statement - while statement - do while statement - for statement - Jumps in loops - Simple programs.	11 hours

Unit-III	One dimensional arrays - Two dimensional arrays - Declaring and initializing string variables - Reading strings from terminal - Writing strings to screen Arithmetic operations on characters – Putting strings together comparison of two strings - String handling functions – Table of strings - Simple programs.	10 hours
Unit-IV	Need for user defined functions - The form of C functions - Return values and their types – Calling a function - No arguments and no return values - Arguments but no return values - Arguments with return values - handling of non integer functions – Functions returning nothing Nesting of C functions - recursion - Functions with arrays – Simple programs.	10 hours
Unit-V	Understanding pointers - Accessing the address of a variable - Declaring and initializing pointers - Accessing a variable through its pointer - Pointer expressions – Pointer increments and scale factor - Pointers and arrays - Pointers and characters strings - Pointers as function arguments - Pointers to functions - Simple programs.	10 hours
Text Book	Balagurusamy E. (2004), <i>Programming in ANSI C</i> , Third Edition, Tata McGRAW Hill Publishing Company Limited.	
Reference Books	1. Kernighan, B.W. and Ritchie D.M. (1997), <i>The C programming language</i> , Prentice Hall. 2. Kochan S.G. (1983), <i>Programming in C</i> , Hyden. 3. Venugopal, K.R. and Prasad S.R. (1997), <i>Programming with C</i> , Tata McGRAW Hill Publishing company limited.	

Department	Mathematics	
Course	B.Sc	Effective From the Year :2015
Subject code : 15UMS514		
Title : PROGRAMMING LAB IN 'C'		
Hrs/ Week	2	Credits : 2
<p>List of programs:</p> <ol style="list-style-type: none"> 1. Program to convert the given temperature in Fahrenheit to Celsius. 2. Program to convert days into months and days. 3. Program to find the solution of quadratic equation. 4. Program for finding Fibonacci sequence. 5. Program to sort a list and find its median. 6. Program to sort a list in ascending / descending order. 7. Program to calculate mean and standard deviation of a given series of numbers. 8. Program for finding the addition of two matrices. 9. Program for finding the multiplication of two matrices. 10. Program to find trace of a square matrix. 11. Program to sort a list of strings in alphabetical order. 12. Program to compute nCr value. 13. Program to check whether the number is prime or not. 14. Program to check whether the year is leap year or not. 15. Program to illustrate the use of pointers in one dimensional array. 		

Department	Mathematics	
Course	B.Sc	Effective From the Year : 2015
Subject code :	15UMS5S1	
Title	: MATHEMATICS IN FINANCE-I	
Hrs/ Week	1	Credits : 2
Unit	Contents	Hrs
	Financial Statement Analysis Ratio Analysis Meaning and objectives of financial statement analysis Ratio analysis Types of ratios Liquidity ratios Leverage / Capital structure ratios *Profitability ratios Profitability ratios related to sales Profitability ratios related to investments Return on investments(ROI) Activity ratios Importance of ratio analysis	13 hours
Text Book	Khan M.Y and Jain P.K (1990), <i>Financial Management</i> Tata McGraw-Hill Publishing Company Ltd, New Delhi.	
Reference Books	1. Aswath Damodaran (2007), <i>Corporate Finance</i> , Theory and Practice, John Wiley and Sons, Inc. 2. Prasanna Chandra (1998), <i>Managing Investment</i> , Tata McGraw- Hill Publishing Company Ltd, New Delhi.	

Department	Mathematics	
Course	B.Sc	Effective From the Year : 2015
Subject code :15UMS5C2		
Title : ACTUARIAL MATHEMATICS-I		
Hrs/ Week	1	Credits : 2
Unit	Contents	Hrs
	<p>Basics of Probability and Interest: Probability.</p> <p>Theory of Interest: Variable Interest Rates, Continuous-time Payment Streams.</p> <p>Interest and Force of Mortality: More on Theory of Interest, Annuities and Actuarial Notation, Loan Amortization and Mortgage Refinancing, Illustration on Mortgage Refinancing.</p> <p>Interest and Force of Mortality: Computational Illustration in Splus, Coupon and Zero Coupon Bonds.</p> <p>Interest and Force of Mortality: Force of Mortality and Analytical Models, Comparison of Forces of Mortality.</p>	13 hours
Text Book	Actuarial Mathematics and Life-Table Statistics, Eric V. Slud, Department of Mathematics, University of Maryland, College Park, 2001.	
Reference Books	<ol style="list-style-type: none"> 1. Fundamental Concepts of Actuarial Mathematical Science, Charles L.Trowbridge, Actuarial Education and Research Fund, Revised Edition, 1989. 2. Lecture Notes on Actuarial Mathematics, Jerry Alan Veeh, (E-notes), 2006. 	

CONTENTS:

For UNIT I Section- 1.1
For UNIT II Sections- 1.2-1.4
For UNIT III Section- 2.1(2.1.1-2.1.3)
For UNIT IV Section- 2.1(2.1.4 & 2.1.5)
For UNIT V Section- 2.2

Department	Mathematics	
Course	B.Sc	Effective From the Year : 2015
Subject code :	15UMS615	
Title	: LINEAR ALGEBRA	
Hrs/ Week	6	Credits : 4
Objectives	To enable the students to study how to solve system of linear algebraic equations, a new algebraic structure vector space and its properties, linear transformations on vector spaces and their relation between matrices.	
Unit	Contents	Hrs
Unit-I	Linear equations: Fields - Systems of linear equations Matrices and elementary row operations - Row reduced echelon matrices Matrix multiplication – Invertible matrices.	16 hours
Unit-II	Vector Spaces: Vector spaces – Subspaces - Bases and dimension Coordinates - Summary of row equivalence.	16 hours
Unit-III	Linear transformation: Linear transformations - The algebra of linear Transformations - Isomorphism.	16 hours
Unit-IV	Representation of transformations by matrices - Linear functionals.	15 hours
Unit-V	The double dual - The transpose of a linear transformation.	15 hours
Text Books	Kenneth Hoffman and Ray Kunze (2013), <i>Linear Algebra</i> , Second Edition PHI Learning Pvt Ltd, New Delhi.	

Reference Books	<ol style="list-style-type: none"> 1. Herstein, I.N. (1981), <i>Topics in algebra</i>, Vikas Publishing House Pvt. Ltd. 2. Kumaresan, S. (2001), <i>Linear Algebra</i>, Prentice-Hall of India.
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Department	Mathematics	
Course	B.Sc	Effective From the Year : 2015
Subject code :	15UMS616	
Title	: REAL ANALYSIS - II	
Hrs/ Week	6	Credit : 4
Objectives	To enable the learners <ul style="list-style-type: none"> (i) To get introduction to some of the advanced topics in Real Analysis like continuity, connectedness, completeness and compactness. (ii) To learn the fundamentals of Riemann integral and Derivatives. 	
Unit	Contents	Unit
Unit-I	Continuous Functions On Metric Spaces: Functions continuous at a point on the real line, Reformation, Functions continuous on a metric space, open sets, Closed sets	13 hours
Unit-II	Connectedness, Completeness, And Compactness: More about open sets, Connected spaces, Bounded sets and totally bounded sets, Complete metric spaces	13 hours
Unit-III	Connectedness, Completeness, And Compactness: Compact metric spaces, Continuous functions on compact metric spaces, Continuity of the inverse function, Uniform continuity	14 hours
Unit-IV	Calculus: Sets of measure zero, Definition of the Riemann integral, Existence of the Riemann integral, Properties of the Riemann integral	14 hours
Unit-V	Calculus: Derivatives, Rolle's Theorem, The law of the mean, Fundamental theorem of calculus.	11 hours

Text Books	Richard Goldberg R. (1970), <i>Methods of Real Analysis</i> , Oxford & IBH Publishing Co.Pvt.Ltd,
Reference Books	<p>1. Walter Rudin (1976), <i>Principles of Mathematical Analysis</i>, Third edition, McGraw-Hill inter Editions,.</p> <p>2. Tom Apostol M. (1985) <i>Mathematical Analysis</i>, Second Edition, Narosa Publishing House.</p>

CONTENTS:

- For UNIT-I : Chapter 5- Sections 5.1-5.5
UNIT-II : Chapter 6- Sections 6.1-6.4
UNIT-III : Chapter 6- Sections 6.5-6.8
UNIT-IV : Chapter 7- Sections 7.1-7.4
UNIT-V : Chapter 7- Sections 7.5-7.8

Department	Mathematics	
Course	B.Sc	Effective From the Year :2015
Subject code : 15UMS617		
Title : COMPLEX ANALYSIS		
Hrs/ Week	5	Credits : 4
Objectives	To enable the learners <ul style="list-style-type: none"> (i) To get a chance to explore the concept of analytic functions, the theory of Power Series, Exponential functions and Trigonometric functions (ii) Have studied fundamental theorems, Cauchy' integral formula, local properties of analytic functions and related results. (iii) Have developed a solid base for further study. 	
Unit	Contents	Hrs
Unit-I	Introduction to the concept of analytic function: Limits and Continuity – Analytic functions – Polynomials – Rational Functions.	16 hours
Unit-II	Elementary theory of power series : Sequences – Series – Uniform Convergence – Power Series – Abel's Limit Theorem.	16 hours
Unit-III	The Exponential, Trigonometric Functions and Conformality : The Exponential -The Trigonometric Functions -Arcs and Closed Curves – Analytic Functions in Regions – Conformal Mapping – Length and Area.	16 hours
Unit-IV	Fundamental Theorems : Line Integrals – Line Integrals as Function of Arcs – Cauchy's Theorem in a Rectangle - Cauchy's Theorem in a Disc – The Index of a Point with respect to a Closed Curve -	15 hours

	Cauchy's Integral Formula.	
Unit-V	Local Properties of Analytic functions : Removable Singularities, Taylor's Theorem – Zeros and Poles – The Local Mapping – The Maximum Principle.	15 hours
Text Book	Lars V. Ahlfors (2013), Complex Analysis, MCGRAW HILL international Edition (Indian Edition).	
Reference Books	1. Ponnusamy S (2009), <i>Foundations of Complex Analysis</i> Narosa publishing house, Second Edition. 2. Goyal & Gupta (2012), <i>Functions of a Complex Variable</i> – Pragati's Edition.	

Contents:

UNIT – I: Chapter 2 – Sections 1.1 – 1.4.

UNIT – II: Chapter 2 – Sections 2.1 – 2.5.

UNIT – III: Chapter 2 – Sections 3.1, 3.2.
Chapter 3 – Sections 2.1 – 2.4.

UNIT – IV: Chapter 4 – Sections 1.1, 1.3, 1.4, and 1.5.
Chapter 4 - Sections 2.1, 2.2.

UNIT – V: Chapter 4 – Sections 3.1, 3.2, 3.3, and 3.4.

Department	Mathematics	
Course	B.Sc	Effective From the Year : 2015
Subject code : 15UMS618		
Title : DISCRETE MATHEMATICS		
Hrs/ Week	5	Credits : 5
Objectives	Discrete mathematics is the theoretical foundation for much of today's advanced technology. In this paper a set of topics that are of genuine use in computer science and elsewhere are identified and combined together in a logically coherent fashion, to enable the students to get a good training in these topics which will inevitably lead the students in the direction of clear thinking, sound reasoning and a proper attitude towards the applications of mathematics in computer science and other related fields.	
Unit	Contents	Hrs
Unit-I	Recurrence Relations and Generating functions: Recurrence - an introduction; Polynomials and their Evaluations; Recurrence Relations; Solution of Finite order Homogeneous (linear) Relations.	14 hours
Unit-II	Recurrence Relations and Generating functions: Solution of Non-homogeneous relations; Generating Functions; Some common recurrence relations; Primitive Recursive functions.	14 hours
Unit-III	Logic: Introduction; TF-Statements; Connectives; Atomic and Compound Statements; Well Formed (statement) Formulae; The Truth table of a Formulae.	13 hours
Unit-IV	Logic: Tautology; Tautological Implications and Equivalence of Formulae; Replacement Process; Functionally Complete Sets of Connectives and Duality Law; Normal Forms;	12 hours

	Principal Normal Forms.	
Unit-V	Lattices and Boolean algebra: Lattices; Some properties of Lattices; New lattices; Modular and distributive lattices.	12 hours
Text Book	Venkataraman, M.K. Sridharan, N. Chandrasekaran, N. (2000). <i>Discrete Mathematics</i> . The National Publishing Company.	
Reference Books	1. Ralph P. Grimaldi. (1994). <i>Discrete and Combinatorial Mathematics - An applied introduction</i> . Third Edition. Addison-Wesley Publishing Company. 2. Tremblay, J.P. and Manohar, R. (2001). <i>Discrete Mathematical Structures with Applications to Computer Science</i> . TATA Mc Graw- Hill.	

Department	Mathematics	
Course	B.Sc	Effective From the Year : 2015
Subject code : 15UMS619		
Title : OBJECT ORIENTED PROGRAMMING WITH C++		
Hrs/ Week	4	Credits : 3
Objectives	C++ is an extension of C language which is widely used all over the world. It is a powerful modern language that combines the power, elegance and flexibility of C and the features of object oriented programming. C++ offers significant software engineering benefits over C. This course content enables the students to know all needed about C++ and object oriented programming and also to meet the global requirements in software industries.	
Unit	Contents	Hrs
Unit-I	Beginning with C++ - Tokens - Expressions and Control structures.	11 hours
Unit-II	Functions in C++ - Constructors and Destructors.	10 hours
Unit-III	Classes and objects	11 hours
Unit-IV	Operator overloading and Type conversions, Pointers, Virtual Functions and Polymorphism.	10 hours
Unit-V	Inheritance: Extending classes.	10 hours
Text Book	Balagurusamy, E. (2009) <i>Object Oriented Programming with C++</i> , Tata Mc Graw Hill Publishing Company, New Delhi	
Reference Books	<ol style="list-style-type: none"> 1. Robert Lafore. (1992), <i>Object Oriented Programming in turbo C++</i>, Waite group. 2. Bjarne Stroustrup, (1991), <i>The C++ Programming language</i>, Addison – Wesley. 3. Herbert Schildt Osborne. (1994), <i>Teach Yourself C++</i>, Mc Graw Hill. 	

Department	Mathematics	
Course	B.Sc	Effective From the Year : 2015
Subject code : 15UMS620		
Title : PROGRAMMING LAB IN OOP WITH C++		
Hrs/ Week	2	Credits : 2
<p style="text-align: center;">List of programs:</p> <ol style="list-style-type: none"> 1. Program to find the Mean and variance 2. Program to find the largest of two numbers using nesting of member functions 3. Program to illustrate the use of array of objects 4. Program to illustrate the use of objects as arguments 5. Program to swap private data of classes using friend function 6. Program to illustrate overloaded constructors 7. Program to illustrate matrix multiplication 8. Program to illustrate the use of 'new' in constructors 9. Program to illustrate overloading + operators 10. Program to explain single inheritance 11. Program to illustrate multilevel inheritance 12. Program to explain hybrid inheritance 13. Program to illustrate the use of initialization lists in the base and derived constructors 14. Program to illustrate the use of pointers to objects 15. Program to illustrate runtime polymorphism 		

Department	Mathematics	
Course	B.Sc	Effective From the Year :2015
Subject code :15UMS6S2		
Title : MATHEMATICS IN FINANCE-II		
Hrs/ Week	1	Credits : 2
Unit	Contents	Hrs
Unit	Introduction: Meaning of Capital budgeting Rationale of Capital Expenditure Kinds of Capital budgeting decisions Data Requirement Identifying relevant cash flows: Cash outflow estimates Cash inflow estimates Capital budgeting: Methods of Appraisal: Traditional Techniques Discounted cash flow or time adjusted techniques NPV and IRR methods	13
Text Book	Khan M.Y and Jain P.K (1990), <i>Financial Management</i> Tata McGraw-Hill Publishing Company Ltd, New Delhi.	
Reference Books	1. Aswath Damodaran (2007), <i>Corporate Finance</i> , Theory and Practice, John Wiley and Sons, Inc. 2. Prasanna Chandra (1998), <i>Managing Investment</i> , Tata McGraw- Hill Publishing Company Ltd, New Delhi.	

Department	Mathematics	
Course	B.Sc	Effective From the Year :2015
Subject code :15UMS6C2		
Title : ACTUARIAL MATHEMATICS -II		
Hrs/ Week	1	Credits : 2
Unit	Contents	Hrs
Unit	<p>Probability and Life tables: Interpreting Force of Mortality, Interpolation Between Integer Ages.</p> <p>Binomial variables and Law of Large Numbers, Exact Probabilities, Bounds and Approximations.</p> <p>Simulation of Life Table Data, Expectation for Discrete Random Variables.</p> <p>Rules for Manipulating Expectations.</p> <p>Some Special Integrals.</p>	13
Text Book	Actuarial Mathematics and Life-Table Statistics- Eric V. Slud, Department of Mathematics, University of Maryland, College Park, 2001.	
Reference Books	<ol style="list-style-type: none"> 1. Fundamental Concepts of Actuarial Mathematical Science, Charles L.Trowbridge, Actuarial Education and Research Fund, Revised Edition, 1989. 2. Lecture Notes on Actuarial Mathematics, Jerry Alan Veeh, (E-notes), 2006. 	

CONTENTS:

For UNIT I Section- 3.1, 3.2
For UNIT II Section- 3.3, 3.3.1
For UNIT III Section- 3.4, 3.4.1
For UNIT IV Section- 3.4.2
For UNIT V Section- 3.5