



PSGR KRISHNAMMAL COLLEGE FOR WOMEN
College with Potential for Excellence
(An Autonomous College - Affiliated to Bharathiar University)
(Re - Accredited with 'A' Grade by NAAC)
An ISO 9001 : 2008 Certified Institution
Peelamedu, Coimbatore 641 004.



DEPARTMENT OF MATHEMATICS

CHOICE BASED CREDIT SYSTEM

SYLLABUS FOR
B.Sc MATHEMATICS

2015-16



PSGR KRISHNAMMAL COLLEGE FOR WOMEN
College with Potential for Excellence
(An Autonomous College - Affiliated to Bharathiar University)
(Re - Accredited with 'A' Grade by NAAC)
An ISO 9001 : 2008 Certified Institution
Peelamedu, Coimbatore 641 004.



DEPARTMENT OF MATHEMATICS

2015-16

Scheme of Examination

(Applicable to students admitted during the academic year (2015– 2018))

Semester	Part	Subject Code	Title of the Paper	Instruction hours per week	Contact Hours	Tutorial Hours	Duration of Examination (in hours)	Examination Marks			Credits
								CA	ESE	TOTAL	
I	I	TAM1401/ HIN1401/ FRE1401	Language Paper I	6	86	4	3	25	75	100	3
	II	ENG1301/ ENG13F1	Language through Literature level I/ Language through Literature Functional Level I	6	86	4	3	25	75	100	3
	II	TH14C01	Classical Algebra	5	71	4	3	25	75	100	4
	I	TH14C02	Calculus	5	71	4	3	25	75	100	4
		TH14A01/ HI12A01/ ES12A01/ ES12A02/ ENG12A01	Allied – Mathematical Statistics I/ Principles of Modern Govt/ Indian Economic Development / International Marketing/ English through Classics	6	86	4	3	25	75	100	5
	I	NME14B1/ NME14A1/ NME12WS/ NME12GS/ NME12AS	Basic Tamil/ Advanced Tamil / Women Studies/ Gandhian studies /Ambedkar studies	2	28/ 26	2/4	3	50/ 25	50/ 75	100/10 0	2
II	I	TAM1402/ HIN1402/	Language Paper II	6	86	4	3	25	75	100	3

		FRE1402									
	II	ENG1302/ ENG13F2	Language through Literature level II/ Language through Literature Functional Level II	6	86	4	3	25	75	100	3
	II I	TH15C03	Differential Equations and Laplace Transforms	5	71	4	3	25	75	100	4
		TH14C04	Analytical Geometry	5	71	4	3	25	75	100	4
		TH14A05/ ES12A03/ ES12A04/ ES13A05/ HI12A03/ ENG12A01	Allied - Mathematical Statistics II / Economic Analysis / Econometrics/ Monetary Economics / Indian Constitution/ English for secretarial practice	6	86	4	3	25	75	100	5
	I V	NME14B2/ NME14A2/ OPS14 05	Basic Tamil /Advanced Tamil // Open Course	2	28/ 29	2/1	3/3/2	50/ 25	50/ 75	100	2
	V I	NM11GAW	General Awareness	Self study			--	10 0	--	100	--
II I	I	TAM1303/HI N1203/ FRE1303	Language Paper III	6	86	4	3	25	75	100	3
	II	ENG1303/ ENG14F3	Language through Literature level III/ Language through Literature Functional Level III	5	71	4	3	25	75	100	3
	II I	TH13C05	Number Theory	3	41	4	3	25	75	100	4
		TH13C06	Statics	4	56	4	3	25	75	100	5
		PS12A03/ PLO8A01/A S12A01	Allied -Physics / Botany / Zoology / Paper I	4	56	4	3	20	55	75	4
		PS12AP1/ PL12AP1/AS 12AP1	Allied Physics Botany / Zoology / Practicals	3	45	--	--	--	--	--	--
		SB13MA01	SBS – Computer Programming C language	2	29	1	--	--	--	--	4
		SB13MAP1	Practical I	1	15						
		NM10VED	Value Education	2	26	4	--	10 0#	--	100	2
			Job Oriented Course	--			3	--	--	Grad e	--

I V	I	TAM1304/ HIN1004/ FRE1304	Language Paper IV	5	71	4	3	25	75	100	3
	II	ENG1304/ ENG13F4	Language through Literature level IV/ Language through Literature Functional Level IV	6	86	4	3	25	75	100	3
	II I	TH13C07	Trigonometry, Vector Calculus & Fourier Series	3	41	4	3	25	75	100	4
		TH13C08	Dynamics	4	56	4	3	25	75	100	5
		PS12A04/ PL12A02/ AS12A02	Allied -Physics / Botany / Zoology / Paper II	4	56	4	3	20	55	75	4
		PS12AP1/ PL12AP1/ AS12AP1	Allied Physics/Botany/Zoolo gy Practicals	3	45		3	10	40	50	2
	I V	SB13MA01 SB13MAP1	SBS Computer programming C language Practical I	2 1	29 15	1	2 2	25 40	75 60	100 100	4 2
			NSS/NCC/YRC/ECO watch club / YiNET/ Rotract/ Sports & Games	--			--	--	--	100	1
	I V		Internship			One mo nth	100	2			
			Personality Development	--			--	--	--		-
	I V	NM12EVS	Environmental Studies	2	26	4	--	10 0* *	--	100	2
V	II I	TH13C09	Real Analysis	7	101	4	3	25	75	100	5
		TH13C10	Abstract Algebra	7	101	4	3	25	75	100	5
		TH13E01/ TH12E02	Elective I- Numerical Methods/ Graph Theory	7	101	4	3	25	75	100	3
		TH12PROJ	Group Project	3	71	4		20 Vi va	80 Diss ertat ion	100	5
			Library	1							
		SB13MA02	SBS – Computer Programming C++	2	29	1	--	--	--	--	4

		SB13MAP2	SBS –Practical II	1	15						
			Information Security Level I/ Level II	2	26	4	3	25	75	100	-
		TH13AC1	Advanced learners' course – Astronomy I	--			3	--	100	100*	5*
		TH12AC2	Fuzzy Mathematics I	--			3	--	100	100*	5*
		TH12AC3	Topics in Fluid Dynamics I	--			3	--	100	100*	5*
		TH09CE	Comprehensive Examination			Online Examination				Grade	--
			Supportive Course			--	--	--	--	--	Submission of Certificate
V	II	TH13C11	Complex Analysis	6	86	4	3	25	75	100	5
I	I	TH13C12	Linear Algebra	6	86	4	3	25	75	100	5
		TH13C13	Operations Research	7	101	4	3	25	75	100	5
			Library	1			--	--	--	--	--
		TH13E03/ TH13E04	Elective II – Mathematical Modelling /Discrete Mathematics	7	101	4	3	25	75	100	5
		TH12AC4	Advanced learners' course – Astronomy II	--			3	--	100	100*	5*
		TH12AC5	Fuzzy Mathematics II	--			3	--	100	100*	5*
		TH12AC6	Topics in Fluid Dynamics II	--			3	--	100	100*	5*
		SB13MA02	SBS – Computer Programming Language C++	2	29	1	2	25	75	100	4
		SB13MAP2	Practical II	1	15		2	40	60	100	2
								Total		3800	140

* Not considered for Grand Total and CGPA

** Three internals each 25 marks and project 25 marks for total 100 marks.

Average of three internals for total marks of 100.

INTERNSHIP TRAINING

Students undergo training in groups in the software companies for 15 days in the IV semester vacation.

Semester I – Women Studies/ Ambedkar studies/Gandhian studies	: 100 marks (CA I-25 + CA II -25 + MODEL - 25+ PROJECT-25)
Semester II - General Awareness (ONLINE SELF STUDY)	: Grade
Semester II - Open Course	: 25marks(CIA)+75 marks (ESE)
Semester III – Value Education	: 100 marks (CA I-25 + CA II -25 + MODEL - 25 + PROJECT-25)
Semester IV – Environmental Studies	: 100 marks (CA I-25 + CA II -25 + MODEL - 25 + PROJECT-25)
Semester V- Information Security	: 100 marks (CA I - 40+ CAII - 40 + Quiz-10+ assignment -10)

SKILL ORIENTED COURSE

- Distribution of theory papers and practical papers in III, IV & V Semester with 3 Hrs per week practicals
- Maximum marks allotted for theory paper 75(ESE) +25(CA)
- Total marks 400 with 12credits

ADVANCE LEARNER COURSE:

- Student above 75% of marks and without any arrears is eligible for advanced level course at V and VI semester with subject options, so that the students can choose the subject of their interest.

COMPREHENSIVE EXAM

- Final year students undertake this online exam for 100 marks for 1Hour

CREDITS

- Student receives 140 credits with 3800 marks

QUESTION PAPER PATTERN FOR INFORMATION SECURITY

Section A (5X2 = 10 Marks) (5 out of 8)

Section B (6X5 = 30 Marks) (6 out of 8)

Total = 40Marks

Marks secured will be converted into grades

COMMUNITY ORIENTED SERVICE

UG Students should complete 30 Hrs Community Oriented Service during holidays before the end of fourth semester and can be taken up in any of the following fields: Literacy, Public Health, Hygiene, Crisis Management(Training the Public) Traffic Regulation, Green Projects etc., in villages, Schools, Orphanages,Hospitals, Old Age Homes, Prisons and SHG Groups

ADDITIONAL COURSES

- Add on course @ Certificate level = Job orientedcourse

TOTAL MARKS AND CREDITS

The course consist of

- Core = 15 papers
- Elective = 1
- Practical = 3papers
- Project = 1
- Allied = 4papers
- Totalmarks = 3800
- Totalcredits =140

PROGRAMMING LAB

The Practical's maximum marks for ESE and CA is splitted in the ratio **60:40**.Concept based practical list introduced so the Subject code for all practical papers has been changed for 2014 –15 batch onwards.

Semester : I
Core Paper : 1
Title : Classical Algebra
Subject code : TH14C01
Credits : 4

Hours: 71

Objective:

To orient the students to solve the equations using algebraic operations and develop problem solving skill.

UNIT I **14hrs**

Binomial, Exponential theorems –Positive integral index Vandermonde’s theorem – Binomial theorem for a rational index – Some important particular cases of Binomial expansion –Application of the binomial theorem to the summation of series – their statements and proofs – their immediate application to summation only- Integro Binomial series.

UNIT II **14hrs**

Logarithmic series theorem –Statement and proof –Immediate application to summation only –Modification of Logarithmic series -Convergency and divergency of series; definitions – elementary results – Comparison tests.

UNIT III **14hrs**

Series of positive terms – Cauchy’s condensation test – Raabe’s test– De Alembert’s & Cauchy ‘s root tests - Absolute convergence .

UNIT IV **14hrs**

Theory of equations: * Roots of an equation *- Relations connecting the roots and coefficient Transformations of equations – Character and position of roots – Descarte’s rule of signs - * Symmetric function of roots.*- Reciprocal Equations.

UNIT V **15hrs**

Multiple roots – Rolle’s theorem –Position of real roots of $f(x) = 0$ - Strum’s theorem –Strum’s functions -Horner’s method

* *: Self study portion

Text Book

1	T. Natarajan and others	<i>Algebra</i>	S.Viswanathan(Printers&Publishers), PVT., LTD (2010)
---	-------------------------	----------------	--

Book for reference

1	P.N. Chatterjee	<i>Algebra</i>	Rajhans Agencies, Meerut.
---	-----------------	----------------	---------------------------

UNIT I: Chapter 3-Sections1,4, 5, 6 & 10,13
Chapter 4-Sections 2 & 3.

UNIT II: Chapter 4-Sections 5 to 7 & 9.
Chapter 2-Sections 8 to 14.

UNIT III: Chapter 2-Sections 15 to 19 & 21 to 24.

UNIT IV: Chapter 6-Sections 1 to 12, 15 to 19, 21& 24.

UNIT V: Chapter 6-Sections 25,26,27

NOTE:

(Question paper setters to confine to the above text book only.)

Semester : I
Core Paper : 2
Title : Calculus
Subject code : TH14C02
Credits : 4

Hours: 71

Objective:

To expose certain rudiments of Newtonian calculus in differentiation and integration

UNIT I

14hrs

Curvature – Radius of curvature in Cartesian and polar forms – Evolutes and envelopes – Pedal equations – Total differentiation – Euler’s theorem on homogeneous functions – Linear asymptotes.

UNIT II

14hrs

Integration of $\frac{f'(x)}{f(x)}$, $\frac{px+q}{\sqrt{ax^2+bx+c}}$, $\frac{\sqrt{x-\alpha}}{\beta-x}$, $\sqrt{(x-\alpha)(\beta-x)}$, $\frac{1}{\sqrt{(x-\alpha)(\beta-x)}}$, $\frac{1}{\sqrt{a \cos x + b \sin x + c}}$, $\frac{1}{\sqrt{a \cos^2 x + b \sin^2 x + c}}$, Integration by parts.

UNIT III

14hrs

Reduction formulae– problems – Notion of improper integrals & their convergence- *simple tests for convergence *- simple problems – Beta and Gamma integrals – their properties & relation between them.-Simple problems – Applications of Gamma functions to multiple integrals.

UNIT IV

15hrs

Double and triple integral- Definition- Change of order of integration in double integral – change of variables in double & triple integrals -Jacobians.

UNIT V

14hrs

Applications to calculations of areas and volumes – Surface areas – Areas in polar coordinates.Approximate integration- Simpson’s rule- Trapezoidal rule.

* * :Self study portion

Text Book

1	S. Narayanan and T.K. M Pillai	<i>Calculus Vol I and Vol II</i>	S.Viswanathan(Printers &Publishers), PVT.,LTD Reprint (2000).
---	--------------------------------	----------------------------------	---

Unit I :Chapter 8 – Sections 1.3 to 1.7

Chapter 9 – Sections 2.1 to 2.8

Chapter 11 – Section 1 to 4

Unit II :Chapter 1 – Sections 1.0 to 12.0

Unit III:Chapter 1 – Sections 13.1 to 15.1

Chapter 7 – Sections 1.1 to 5.0 , 6.0

Unit IV:Chapter 5 – Sections 2.1 to 4.0

Chapter 6 - Sections 1.1 to 2.4

Unit V :Chapter 5 - Sections 5.1 to 7.0

Chapter 2 - Sections 2.1 to 2.2

NOTE:

(Question paper setters to confine to the above text book only.)

Semester : I

Allied Paper : 1

Title : Mathematical Statistics – I

Subject code : TH14A01

Credits : 5

Hours: 86

Objective:

To introduce statistical concepts and to help the students get a feel of statistics – what it is about, how and when to use its various techniques.

UNIT I

17hrs

Measures of location: Mean, Median, Mode, G.M&H.M-Partition values –Measures of dispersion –Range, QD, MD and SD, Coefficient of Variation, Moments-*Skewness& Kurtosis *-Verification by using Excel.

UNIT II

17hrs

Theory of probability: Probability function-Theorems on probability of events-Boole's inequality- Multiplication law and conditional probability- Pair wise independent events- Baye's theorem.

Random variables and Distribution functions: Marginal density function- Conditional distribution function and conditional probability density function.

UNIT III

17hrs

Mathematical expectations: Definition-Addition-Multiplication theorem of expectation- Covariance- MGF- Chebychev's inequality- Correlation - Rank correlation- Regression – Verification by using Excel.

UNIT IV

17hrs

Theoretical distributions: Binomial, Poisson & Normal- Moments –Recurrence relation for moments- M.D about Mean, Mode, Recurrence relation for probabilities of Binomial distribution, Fitting of curve, M.G.F, Normal distribution as a limiting form of B.D, Characteristics of the normal curve.

UNIT V

18hrs

Testing of Hypothesis: Statistical hypothesis- Null and alternate hypothesis –Critical region- Two types of errors- Level of significance-Power of a test – Most powerful test- UMP- Neyman Pearson lemma.

Text Book

1	S.C.Gupta, V.K.Kapoor	Fundamentals of Mathematical Statistics	Sultan chand and sons, New Delhi-Eleventh thoroughly revised edition (2002), Reprint 2009.
---	--------------------------	---	--

UNIT I : Chapter 2 sections 2.5-2.17(excluding 2.10)

UNIT II : Chapter 3 sections 3.9, 3.9.3, 3.10, 3.11,3.12, 3.13 and 3.15

Chapter 4 sections 4.2, 4.2.1.

Chapter5 sections5.1,5.2, 5.3,5.31,5.3.2,5.4:5.4.1,5.4.2,5.4.3, 5.5:5.5.1-5.5.6

UNIT III : Chapter 6 sections 6.1-6.7

Chapter 7 sections 7.5; 7.5.1

Chapter10 sections 10.1-10.4, 10.4.1,10.4.2, 10.6, and 10.7.1- 10.7.4,

Chapter 11 sections 11.1, 11.2, 11.2.1, 11.2.2, 11.2.3, 11.2.2, 11.2.

UNITIV : Chapter8 sections 8.4: 8.4.1-8.4.7, 8.4.12, 8.5: 8.5.1-8.5.5, 8.5.10

Chapter 9 sections 9.1, 9.2: 9.2.1-9.2.5, 9.2.7.

UNIT V : Chapter 18 sections 18.1, 18.2:18.2.1-18.2.7, 18.3, 18.4: 18.4.1, 18.4.2, 18.5:18.5.1, 18.5.2.

Semester : II
Core Paper : 3
Title : Differential Equations And Laplace Transforms
Subject code : TH15C03
Credits : 4

Hours:71

Objective:

To introduce the existence and the methodology of solving differential equations and in the process expose it as a powerful tool in solving problems in physical, social and managerial sciences.

UNIT I 14hrs

Linear equations with constant coefficients - * Linear equations with variable coefficients – Equations reducible to the linear homogeneous equation (reducible to Q form) *

UNIT II 14hrs

ODE : First order higher degree equations solvable for x,y,p – Clairaut’s form – Simultaneous differential equations

$$(i) \quad \begin{aligned} f_1(D)x + f_2(D)y &= F_1(t) \\ g_1(D)x + g_2(D)y &= F_2(t) \end{aligned}$$

$$(ii) \quad \frac{dx}{P} = \frac{dy}{Q} = \frac{dz}{R}$$

Conditions of integrability . Exact differential equations.

UNIT III 14hrs

PDE : Formation of equations by elimination of arbitrary constants and arbitrary functions. Definition of general, particular and complete solutions – Singular and general solutions of first order equations in the standard form : * f(p,q) = 0 * ; f(x,p,q)=0 ; f(y,p,q)=0 ; *f(z,p,q)=0 ; * f(x,p) = f(y,q) ; z = px + qy + f(p,q)- Equations reducible to the standard forms.

UNIT IV 14hrs

Lagrange method of solving the linear partial differential equations $P_p + Q_q = R$ - * Simple Problems * - Charpit’s method . Laplace Transforms : Definitions - Laplace Transforms of e^{at} , $\cos at$, $\sin at$ & t^n where n is an integer. $L[f'(t)]$, $L[f''(t)]$, ..., $L[f^{(n)}(t)]$.First shifting theorem - Laplace transforms of $e^{at}\cos bt$, $e^{at}\sin bt$ and $e^{at}t^n$. Some general Theorems.

UNIT V 15hrs

Inverse Laplace Transforms - * Solutions of ordinary differential equations of 1st order using Laplace transforms * Solutions of 2nd order differential equations using Laplace Transforms - Solutions of Differential equations with variable coefficients using Laplace transforms.

* *:Self study portion

Text Book

1	S. Narayanan & T.K Manickavachagam Pillai	Calculus Volume III	S. Viswanathan(Printers and Publishers) Pvt. Ltd.- Revised eighteenth edition (2002).
---	---	---------------------	--

Reference Books

1.	N.M Kapur	A text book of Differential equation	Pitambar Publishing Company Educational Publishers, NewDelhi - 110005
2.	M.D Raisinghania	Advanced differential equations	S.Chand& Co NewDelhi

Unit I : Chapter 2 – Sections – 1.0 to 9.0

Unit II : Chapter 3 – Sections – 1.0 to 7.4
Chapter 1- Sections – 3.1 to 3.3

Unit III: Chapter 4 – Sections – 1.0 to 5.5

Unit IV Chapter 4- Sections – 6.0 to 7.0
Chapter 5 – Sections – 1.0 to 5.0

Unit V : Chapter 5 – Sections – 6.0 , 10.0

NOTE:

(Question paper setters to confine to the above text book only.)

Semester : II

Core Paper : 4

Title : Analytical Geometry

Subject Code :TH14C04

Credits : 4

Hours: 71

Objective :

To expose the students to the most essential mathematical concepts of three dimensional geometry and to highlight an alternative to two dimensional Cartesian geometry.

UNIT I **14hrs**

Polar Coordinates – Equation of a Conic – *Tracing of Curves* - Directrix – Chord – Tangent - Normal.

UNIT II **14hrs**

Coplanarity of lines – Shortest distance - Simple problems.

UNIT III **14hrs**

Sphere : Standard Equation of a Sphere – Results based on the properties of a Sphere – Tangent plane – Equation of a circle.

UNIT IV **14hrs**

Cone and Cylinder : Cone whose vertex is at the origin – Right circular Cone – Equation of a Cylinder – Right Circular Cylinder.

UNIT V **15hrs**

Conicoids : Nature of conicoids – Standard Equation of central Conicoids – *Enveloping cone* - Tangent plane – Condition for Tangency Director sphere and Director plane - *Normal to a Conicoid*.

Ruled surfaces.

* * :Self study portion

Text Book

1.	T.K.ManicavachagamPillay&T.Natarajan	A Text Book of Analytical Geometry two and three dimensions(For unit	S. Viswanathan (Printers and Publishers) Pvt. Ltd.- Reprint (2005).
----	--------------------------------------	---	--

		I)	
2.	P.Duraipandian, LaxmiDuraipandian&D.Muhilan	Analytical Geometry of 3 Dimension	Emerald Publishers (For Unit II, III, IV & V)

UNIT I : Chapter 1 - Sections -1 to13

UNIT II : Chapter 4 – Sections - 4.1 to 4.11

UNIT III : Chapter 5 - Sections - 5.1 to 5.8

UNIT IV&UNIT V : Chapter 6 &chapter 7 - 7.1 & 7.2

NOTE:(Question paper setters to confine to the above text book only.)

Semester : II

Allied Paper : 2

Title : **Mathematical Statistics – II**

Subject Code :TH14A05

Credits : 5

Hours: 86

Objective:

To introduce Statistical techniques of analysis and inference that have been found useful in many areas of scientific research.

UNIT I

17hrs

Theory of estimation: Estimator-Properties- Rao Blackwell theorem-Method of maximum likelihood- Method of minimum variance-Rao Cramer inequality, *Confidence Interval* & Confidence limits.

UNIT

17hrs

Large sample test: Procedure for testing of hypothesis- Test of significance for large samples- Test of significance for a single proportion-Test of significance for difference of proportions-Test of significance for single mean-*Test of significance for difference of mean*.

UNIT III

17hrs

Exact sampling distribution- χ^2 , t, F, Z-Derivations - Application-Assumption.

Verification by using Excel

UNIT IV

17hrs

Analysis of variance: One and Two way classification-principles of experimentation. Analysis: RBD & LSD. Verification by using Excel

UNIT V

18hrs

Statistical quality control: Control charts-Single and Double sampling plans- Time Series Analysis -Components- Methods of estimation of linear trend – Seasonal Variation – Simple average.

TEXT BOOK

1.	S.C.Gupta and V.K.Kapoor	Fundamentals of Mathematical Statistics	Sultan Chand & sons, New Delhi.11 th Thoroughly Revised edition(2002) Reprint(2009) (for units 1,2,3)
2.	S.P.Gupta	Statistical methods	Sultan chand&sons, New Delhi-34 th edition(2005) (for units 4,5)

UNIT I : Chapter 17 Sections 17.1-17.6.2
UNIT II : Chapter 14 Sections 14.5-14.7.1, 14.7.2, 14.8.1-14.8.4
UNIT III : Chapter 15 &16 Sections 15.1, 15.2, 15.6,16.1, 16.2, 16.2.1, 16.3,16.5, 16.5.1, 16.6-16.9.
UNIT IV : Chapter 5&6
UNIT V : Chapter 7&14
Semester : **III**
Core Paper : **5**
Title : **Number Theory**
Subject Code : **TH13C05**
Credits : **4**

Hours: 41

Objective:

This paper facilitates understanding and appreciation of the beauty of Number Theory, which has contributed significantly to the development of Algebra and Analysis.

UNIT I **8 hrs**

Natural numbers: Peano's axioms- *Mathematical induction – Addition and multiplication* – order relation – principle of well ordering. Integers: Addition and multiplication- positive and negative integers- Trichotomy law- absolute value – Binomial theorem- Divisibility: Associates – Division algorithm – g.c.d (H.C.F) – Euclidean algorithm – l.c.m

UNIT II **8 hrs**

Prime and Composite numbers: Coprimes – Sieve of Eratosthenes – Euclid's theorem – unique factorization – Fundamental theorem of Arithmetic – *positional representation of integers* – number of divisors - sum of divisors – symbols $d(n)$, $\sigma(n)$ – Arithmetic functions- Product of divisors.

UNIT III **8 hrs**

Perfect numbers – Euclid's theorem on perfect numbers – Amicable numbers – Euler function $\phi(n)$ – greatest integer function – Mobious function $\mu(n)$ – inversion formula and its converse – Fibonacci numbers – generating function – Lucas numbers.

UNIT IV : **8 hrs**

Distribution of primes : General discussion – Fermat's conjecture – Fermat numbers – Gold Bach's conjecture – Mersenne numbers – Gap theorem – infinitude of primes. Congruences : Definition - residue classes – complete and least residue systems – reduced residue systems – casting out 9 magic numbers – Divisibility tests – linear congruences – solution of congruences – Chinese remainder theorem.

UNIT V : **9 hrs**

Theorems of Fermat and Wilson :Little Fermat's Theorem – Euler's extension – inverse modulo – Wilson's Theorem and its converse – Lagrange's Theorem – Wolstenholme theorem – Algebraic congruences – Polynomial congruences.

* *Self study portion

Text Book

1.	Elements of Number Theory	S. Kumaravelu&SusheelaKumaravelu (Jan 2002)
----	---------------------------	---

Books for reference :

1.	Ivan Niven&Herberts Zuckerman	Introduction to the theory of numbers	Wiley Publishing House- Fifth edition Narosa
----	-------------------------------	---------------------------------------	--

2.	Tom M. Apostol	Introduction to Analytical Number Theory	Publishing House- Eighth reprint (1998)
----	----------------	--	--

Unit I	:	Sections – 1-76
Unit II	:	Sections – 77-97
Unit III	:	Sections – 98-139
Unit IV	:	Sections – 140-189
Unit V	:	Sections – 191-215

Note:(Question paper setters to confine to the above text book only)

Semester : III
Core Paper : 6
Title : Statics
Subject Code : TH13C06
Credits : 5

Hours:56

Objective :

To learn the basic principles and to develop the ability to describe position, forces and moments and to select suitable reference coordinate axes, construct free body diagrams and understand the relation between constraints imposed by supportive forces.

UNIT I

11hrs

Forces acting at the point – Resultant and components – Definition – Simple cases of finding the resultant – Parallelogram of forces theorem –Analytical expression for the resultant of two forces acting at a point –Triangle of forces – Perpendicular triangle of forces – Converse of the Triangle of forces –The polygon of forces – Lami’s Theorem –An extended form of the parallelogram law of forces Theorem – Resolution of a force –Components of a force along two given directions – Theorem on Resolved parts – Resultant of any number of forces acting at a point – Resultant of any number of coplanar forces acting at a point – Condition of Equilibrium of any number of forces acting upon a particle Resolution of a Force - Theorem on resolved parts resultant of any number of coplanar forces acting at a point: Analytical method.

UNIT II

11hrs

Parallel Forces and Moments- Introduction – The resultant of two like parallel forces acting on a rigid body – The resultant of two unlike and unequal parallel forces acting on a rigid body – Resultant of a number of parallel forces acting on a rigid body – conditions of equilibrium of three coplanar parallel forces – centre of two parallel forces – Moment of a force – physical significance of the moment of a force – Geometrical representation of a moment – sign of the moment – unit of moment – Varignon’s theorem of moments – Generalised theorem of moments (Principle of moments) Couples – Definition –Equilibrium of two couples – Equivalence of two couples – couples in parallel planes theorem – Representation of a couple by a vector -*Resultant of a Couple and a Force*

UNIT III

11hrs

Equilibrium of Three Forces Acting on a Rigid body- Rigid body subjected to any three forces – Three coplanar forces theorem – conditions of equilibrium – procedure to be followed in solving any statistical problem – Two Trigonometrical theorem-Coplanar forces -Introduction – Reduction of any number of coplanar forces theorem – Condition for a system of forces to reduce to a single force or to a couple – Alternative conditions for a system of forces to reduce to a single force or to a couple – change of the base –point – Equation to the

line of action of the resultant – Equation to the line of action of the resultant. *Change of base point*.

UNIT IV

11hrs

Friction- Introduction –Experimental results – statistical ,Dynamical and limiting friction –Friction – a passive force – coefficient 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 forces -Centre of gravity - Centre of Like Parallel Forces – Centre of mass or centre of Inertial – Centre of gravity – Distinction between centre of gravity and centre of mass – The centre of gravity of a body – Determination of uniqueness of the centre of gravity in simple cases – Centre of gravity by integration.

UNIT V

12hrs

Stability of equilibrium – Stable ,Unstable and Neutral equilibrium – Nature of equilibrium of a rigid body supported at one fixed point – conditions of stability for a body wuth one degree of freedom . Equilibrium of strings- Uniform string under the action of gravity – Equation of the common eatenary –Definitions – Tension at any point – Important formulae –Geometrical properties of the common eatenary’*Conditions of Stability*

* : Self study

Text Book

1.	Dr.M.K.Venkataraman	Statics	Agasthiar Publications- Eleventh edition (2005)
----	---------------------	---------	---

Books For Reference

1.	K.ViswanathaNaik&	Statics	Emerald Publishers
2.	M.S.Kasi N.P. Bali	Statics	(Golden Mathematics series),Laxmi Publications

UNIT I : Chapter 2: Sections 1 to 16

UNIT II : Chapter 3: Sections 1 to 13
Chapter 4: Sections 1 to 10

UNIT III : Chapter 5: Sections 1 to 5
Chapter 6: Sections 1 to 9

UNIT IV : Chapter 7: Sections 1 to 12
Chapter 8: Sections 1 to 6 &18

UNIT V : Chapter 10:Sections1 to 3
Chapter 11: Sections 1 to 6

Note: (Question paper setters to confine to the above text books only)

Semester : IV

Core Paper : 7

Title : Trigonometry, Vector Calculus & Fourier Series

Subject Code :TH13C07

Credits : 4

Hours: 41

Objective :

To expose the elementary ideas for applications used at a later stage.

UNIT I

8hrs

Solutions of simple trigonometric function - Expansion of $\cos^n\theta$, $\sin^n\theta$, $\cos^n\theta$, $\sin^n\theta$ – Hyperbolic functions – Separation of real and imaginary parts of $\sin(\alpha+i\beta)$, $\cos(\alpha+i\beta)$, $\tan(\alpha+i\beta)$, $\sin h(\alpha+i\beta)$, $\cos h(\alpha+i\beta)$, $\tan h(\alpha+i\beta)$, $\tan^{-1}(\alpha+i\beta)$.

UNIT II **8hrs**
 Logarithm of a complex number – Summation of trigonometric series – * Simple problems*.

UNIT III **8hrs**
 Scalar and vector point functions – Differentiation of vectors : Differential operator Directional derivative, gradient, Divergence, curl.

UNIT IV **8hrs**
 Integration for vectors ; line surface and volume integrals. Theorems of Gauss, Green &Stoke’s (Statement only) – Verification.

UNIT V **9hrs**
 Fourier series – Definition, finding fourier coefficient for a given periodic function with period 2π , odd and even functions – half range series *Change of interval*.

* *Self study portion

Text Book

1.	T.K.ManicavachagomPillayand S. Narayanan	<i>Trigonometry-</i> (For Unit I, II)	S.Viswanathan (Printers and Publishers) Pvt. Ltd. (2010)
2.	P. Duraipandian&LaxmiDuraipandian	<i>Vector Analysis-</i> (Unit III & IV)	Emerald publishers- Reprint (2000).
3.	T.K.ManicavachagomPillayand S. Narayanan	<i>Fourier Series-</i> (For Unit V)	S.Viswanathan (Printers and Publishers) Pvt. Ltd. (2010)

UNIT I : Chapter 1 - Sections - 1 to 4.
 Chapter 3 – Sections – 3.1 to 3.3 , 3.4.1 , 3.5,3.5.1
 Chapter 4 – Sections – 1 to 2.3

UNIT II : Chapter 5 – Sections – 5.1 to 5.2
 Chapter 6 - Sections – 1 to 3.2

UNIT III : Chapter 2 – Sections – 2.1 to 2.9

UNIT IV : Chapter 3 – Sections – 3.1 to 3.8
 Chapter 4 – Sections – 4.1 to 4.8

UNIT V : Chapter 6- Sections – 1 to 6

Note: (Question paper setters to confine to the above text books only)

Semester : IV
Core Paper : 8
Title : Dynamics
Subject Code :TH13C08
Credits : 5

Hours:56

Objective :

To teach the students basic mathematical and computational tools for modeling and analysis of dynamic systems.

UNIT I **11hrs**

Kinematics-Speed – Displacement – velocity – composition of velocities – Parallelogram law – Resolution of velocities – components of a velocity along two given directions – Triangle of velocities theorem –polygon of velocities theorem – resultant of

several simultaneous coplanar velocities of a particle – Relative velocity – Angular velocity – definition – Angular velocity of a particle moving along a circle with uniform speed – Acceleration – variable acceleration – units of acceleration – composition of accelerations – relative acceleration - motion in a straight line under uniform acceleration – space described in any particular second – motion in a straight line with variable acceleration – velocity – time curve – velocity- space graph – graphical the equations of motion of a particle under constant acceleration – Acceleration of falling bodies – motion of a particle down a smooth inclined plane.Laws of motion – Introduction – momentum – Newton’s law of motion – explanation and illustration of the first law – Explanation of the second law of motion – composition of forces –parallelogram law of forces – absolute units of forces – weight – gravitational units of forces – work – work function of a varying forces – unit of work – Tension in an elastic string – theorem – powers – energy – kinetic energy – the principle of work energy – potential energy – principle of conservation of energy.*velocity – acceleration*, composition of velocities and acceleration – relative velocity* -power-energy – (simple problems only)

UNIT II

11 hrs

Projectiles–Introduction – Definitions – Two fundamental principles – The path of a projectile (in vacuo) is a parabola – Characteristics of a motion of a projectiles-Moment of inertia – Definition – Theorem of parallel axes –Theorem of perpendicular axes – moments of inertia in some particular cases. *M.I of a thin uniform rod*, rectangular lamina - Uniform rectangular parallelepiped of edges 2a, 2b , 2c.

UNIT III

11 hrs

Motion under the action of Central forces –,Introduction – velocity and acceleration in polar coordinates –Equations of motion in polar coordinates – note on the equiangular spiral – Motion under a central force *Radial and transverse components of velocity and acceleration* - (simple problems only)

UNIT IV

11 hrs

Simple Harmonic motion - Introduction –Simple Harmonic motion in a straight line – General solution of the S.H.M.equation – Geometrical representation of a S.H.M – change of origin – composition of two S.H.M of the same period and in the same straight line – composition of two S.H.M of the same period in two perpendicular directions *Amplitude, periodic time and phase* - Units and Dimensions

UNIT V

12hrs

Impulsive forces– Impulse – Impulsive force – Impact of two bodies – loss of kinetic energy in impact – motion of a shot and gun – impact of water on a surfaces.*Collision of Elastic Bodies – Introduction – Definition –fundamental laws of impact – Impact of a smooth sphere on a fixed smooth plane – Direct impact of two smooth spheres –loss of kinetic energy due to direct impact of two smooth spheres-oblique impact of two smooth spheres – loss of kinetic energy due to oblique’s impact of two smooth spheres (simple problems only).

* * : Self study

Text Book

1	Dr.M.K.Venkataraman	<i>Dynamics</i>	Agasthiar Publications- Fifteenth Edition (2012)
----------	---------------------	-----------------	--

Books For Reference

1.	K.ViswanathaNaik&M.S.Kasi	<i>Dynamics</i>	Emerald Publishers
2.	N.P. Bali	<i>Dynamics</i>	(Golden Mathematics series), Laxmi Publications
3.	M L Khanna	<i>Dynamics</i>	Jai PrakashNath company

UNIT I : Chapter 3 :Sections 3.1 to 3.12 & 3.17 to 3.29,3.32

	Chapter 4	:Sections 4.1 to 4.9 & 4.24 to 4.35
UNIT II	: Chapter 6	:Section 6.1 to 6.11
	Chapter 12	:Section 12.1 to 12.4
UNIT III	: Chapter 11	:Sections 11.1 to 11.15
UNIT IV	: Chapter 10	:Sections 10.1 to 10.7
	Chapter 14	: Sections 14.1 to 14.5
UNIT V	: Chapter 7	:Sections 7.1 to 7.6
	Chapter 8	:Sections 8.1 to 8.8

Note:

(Question paper setters to confine to the above text books only)

Semester : V

Core Paper : 9

Title : Real Analysis

Subject Code :TH13C09

Credits : 5

Hours:101

OBJECTIVE

To introduce the concepts related to real numbers and the development of real analysis.

UNIT I

20hrs

Some Basic notions of set theory - Countable and uncountable sets – Uncountability of the real number system – Set algebra – Countable collections of countable sets. Elements of point set topology – Euclidean space \mathbb{R}^n – Open balls and open sets in \mathbb{R}^n -The structure of open sets in \mathbb{R}^n – closed sets and adherent points – the Bolzano Weierstrass theorem.

UNIT II

20hrs

The Cantor intersection theorem – covering – Lindelof covering theorem – the Heine Borel theorem – compactness in \mathbb{R}^n - Metric space – point set topology in metric space - *Compact subsets of a metric space* - convergent sequences in a metric space – Cauchy sequences – complete metric space.

UNIT III

20hrs

Limit of a function: Continuous functions – Continuity of composite function - *Examples of continuous functions* - Continuity and inverse images of open and closed sets – Functions continuous on compact sets – Topological mappings – Bolzano’s theorem – Connectedness – Components of a metric space – Arc wise connectedness- Uniform continuity- Fixed point theorem.

UNIT IV

20hrs

Definition of derivatives – Derivative and continuity – Algebra of derivatives – The chain rule – One sided derivatives - Zero derivatives - *Rolle’s theorem – The mean value theorem for derivative* - Taylor’s formula with remainder – Functions of bounded variations – Properties of monotonic functions – Total variations – Additive property – Continuous function of bounded variations – Total variation on $[a,x]$ as a function of x .

UNIT V

21hrs

The Riemann Stieltjes integral : *Introduction - Notation* – The definition of Riemann Stieltjes integral – Linear properties – Integration by parts – Change of variable in a Riemann stieltjes integral – Reduction of a Riemann integral – Step functions as integrators – Reduction of a Riemann Stieltjes integral to a finite sum – Eulers summation formula – *Upper and lower integrals* – Riemann’s condition – Comparison theorems – Necessary and sufficient condition for existence of Riemann Stieltjes integral.

* * :Self study portion

Text Book

1	T.M.Apostol	<i>Mathematical analysis second edition</i>	Narosa Publishing House 2002
---	-------------	---	------------------------------

Book For Reference

1	R.R.Goldberg	<i>Methods of Real Analysis</i>	Oxford and IBH Publishing Co. Pvt. Ltd.
---	--------------	---------------------------------	---

UNIT I : Chapter 2 – Sections — 2.1 to 2.11 & 2.12 to 2.15

Chapter 3 – Sections – 3.2 to 3.8

UNIT II : Chapter 3 – Sections – 3.9 to 3.15

Chapter 4 – Sections - 4.2 to 4.4

UNIT III : Chapter 4 – Sections –4.5, 4.8 to 4.21

UNIT IV : Chapter 5 – Sections – 5.1 to 5.12

Chapter 6 – Sections – 6.1 to 6.8

UNIT V : Chapter 7 – Sections – 7.1 to 7.17

Note: (Question paper setters to confine to the above text books only)

Semester : V

Core Paper : 10

Title : Abstract Algebra

Subject Code :TH13C10

Credits : 5

Hours:101

Objective :

To make the students acquaint themselves with the basic concepts of some of the fundamental algebraic structure.

UNIT I **20hrs**

Subgroups - Congruence relation-cosets-Lagrange's Theorem -Order of an element - A counting Principle – Normal subgroups and quotient groups – Homomorphisms - Kernel of a homomorphism

UNIT II **20hrs**

Automorphisms –Inner Automorphisms- Cayley's theorem - *Permutation groups* - Another counting principle – Sylow's Theorem – Finite abelian group.

UNIT III **20hrs**

Rings – Definition and examples – Basic properties – Special classes of rings – Integral domains and fields – Homomorphisms of rings.

UNIT IV **20hrs**

Ideals and quotient rings - * Maximal , principal and prime ideals* - The field of quotients of an integral domain.

UNIT V **21hrs**

Euclidean rings – A particular Euclidean ring – *polynomial rings* – Polynomials over the rational field – Polynomial rings over commutative rings.

* *Self Study portion

Text Book

1	I.N. Herstein	<i>Topics in Algebra</i>	Wiley Eastern Ltd. - 2 nd edition (2002)
---	---------------	--------------------------	---

Books for Reference

1	S. Arumugam & A. Thangapandi Isaac	<i>Modern Algebra</i>	New Gamma Publishing House
---	------------------------------------	-----------------------	----------------------------

2	M.L. Khanna	<i>Modern Algebra</i>	Jai PrakashNath and Co.
---	-------------	-----------------------	-------------------------

UNIT I	:	Sections – 2.4 to 2.7
UNIT II	:	Sections – 2.8 to 2.12 ,2.14
UNIT III	:	Sections – 3.1 to 3.3
UNIT IV	:	Sections – 3.4 to 3.6
UNIT V	:	Sections – 3.7 to 3.11

Note:

(Question paper setters to confine to the above text books only)

Semester : V

Elective Paper :1

Title : Numerical Methods

Subject Code :TH13E01

Credits : 5

Hours: 101

Objective :

To give an introduction of the numerical methods which will be helpful in scientific computing.

UNIT I **21 hours**

Solution of numerical, algebraic and transcendental equation : The bisection method – Method of false position – Newton Raphson method ,Geometrical interpretation of Newtons’ method ,Gauss elimination method – Gauss seidal iteration method – Gauss Jordan and Gauss Jacobi methods.

UNIT II **20 hours**

Finite differences – forward, backward and central differences – The operator E – Relation between E and the operator D and other difference operators- Interpolation :Gauss forward and backward interpolation formula ,Stirlings’ formula,Bessels’ formula - Newtons’ interpolation formulas for unequal intervals – Lagranges’ interpolation formula – Inverse interpolation.

UNIT III **20 hours**

Numerical differentiation and integration : Derivatives using Newtons’ forward, backward and divided differences – Derivatives using Stirlings’ formula – Maxima and minima of tabulated function – Numerical integration by Trapezoidal rule and Simpsons’ rules.

UNIT IV **20 hours**

Numerical solution of ordinary differential equations : Taylor series method – Euler, improved, modified Euler methods – RungeKutta methods – Multi step methods : Milnes’ and Adams’ predictor and corrector methods.

.UNIT V **20 hours**

Numerical solution of partial differential equations :

* *Self study portion

Text book

1	P. Kandasamy, K. Thilagavathy and K. Gunavathy,	Numerical Methods	S.Chand Co. Ltd., New Delhi, Reprint 2010
---	---	-------------------	---

Books for reference

1	M.K.Venkataraman	Numerical Methods in Science & Engineering	National Publishing Company 1990 edition
---	------------------	--	---

UNIT I: Ch3 : 3.1, 3.3, 3.4, Ch 4: 4.2, 4.7, 4.8, 4.9
 UNIT II: Ch5 : 5.1, 5.2, 5.4 (problems involving operators alone),
 Ch7 : 7.1, 7.2, 7.3, 7.4,7.5, 7.6, Ch 8 :8.1, 8.2, 8.5, 8.6, 8.7
 UNIT III: Ch 9: 9.1, 9.2, 9.3, 9.4, 9.5, 9.6, 9.7 ,9.9, 9.10, 9.11, 9.13, 9.14, 9.16
 UNIT IV: Ch 11: 11.5 to 11.18
 UNIT V: Ch 12:12.1 to 12.9

Semester : V

Elective Paper Option :

Title : Graph Theory

Subject Code : TH12E02

Credits : 5

Hours : 101

Objective:

To enable the students to learn many branches of mathematics such as probability, topology, combinatorics etc.

UNIT I 20hrs

Graphs : varieties of graphs – Walks and connectedness – degrees – The problem of Ramsaey – extremal graphs – *intersection graphs*– Konigsberg bridge problem.

UNIT II 20hrs

Operations on graphs - Blocks – Cut points – Bridges and blocks – Block graphs and cut point graphs.

UNIT III 20hrs

Trees : Characterization of trees – *Centers and centroids* – Block- Cutpoint trees – Independent cycles and co-cycles – Matroids.

UNIT IV 20hrs

Connectivity and line connectivity – Graphical variations of Mengers’ theorem – Further variations of Mengers’ theorem. Matrices: *the adjacency matrix* – the incidence matrix – the cycle matrix.

UNIT V 21hrs

Partitions – traversability – Eulerian graphs – Hamiltonian graphs – properties of line graphs – characterization of line graphs

Text Book

1	Frank Harary	<i>Graph theory</i>	Narosa publishing house 10 th reprint 2001
---	--------------	---------------------	--

UNIT I : Chapters 1 and 2

UNIT II : Chapter 3

UNIT III : Chapter 4

UNIT IV : Chapters 5 and 13

UNITV : Chapters 6, 7 and 8

Note:

(Question paper setters to confine to the above text books only)

Semester : V

Advanced Learners’ Course

Title : Astronomy I

Subject Code :TH13AC1

Credits : 5

Hours : 60

Objective

To study the solar system and expose the mathematical tools used to solve the mysteries of the universe.

UNIT I:

A brief history of solar system - General description of the solar system-comets and meteorites-spherical trigonometry.

UNIT II:

Celestial sphere-celestial coordinates – diurnal motion – variation in length of the day

UNIT III:

Dip – twilight – geocentric parallax.

UNIT IV:

Refraction – Tangent formula – Cassini’s formula

UNIT V:

Kepler’s laws – Relation between true eccentric and mean anomalies.

Text Book:

1	S. Kumaravelu and SuseelaKumaravelu	Astronomy	Revised edition 2005.
---	-------------------------------------	-----------	-----------------------

**SEMESTER V – Advanced Learners’ Course
Topics in Fluid Dynamics I**

Credits : 5

Hours : 60

Subject Code : TH12AC3

OBJECTIVE

To introduce the basic concepts of fluid dynamics and expose the students to the practical applications of mathematics

UNIT I:

Basic concepts : Types of fluid - properties.

UNIT II:

Kinematics of flow field : Definitions – Velocity – Local, convective and material derivatives – equation of continuity in Cartesian co-ordinates – velocity potential , irrotational flow – rotational flow – vorticity

UNIT III:

Conservation of momentum – equation of motion of an inviscid fluid in Cartesian co-ordinates – Bernoullis’ equation –Applications of Bernoullis’ theorem

UNIT IV:

Irrotational motion : General motion of a fluid element – Vorticity – body forces and surface forces – flow and circulation – stokes’ theorem – Kelvin circulation theorem

UNIT V:

Motion in two dimensions : Stream function – Physical interpretation of stream function – complex potential and complex velocity – Two dimensional source and sink – complex potential of a source – two dimensional doublet – complex potential of a doublet

Text Book:

1	ShanthiSwarup	<i>Fluid dynamics</i>	Krishna Prakashan media (p) ltd, Meerut 11th edition 2003,
---	----------------------	-----------------------	--

UNIT I : Chapter 1 Sections 1.0 –1.1

UNIT II : Chapter 2 Sections 2.4 – 2.9, 2.14 – 2.15

UNIT III : Chapter 3 Sections 3.11, 3.3, 3.10

UNIT IV : Chapter 4 Sections 4.0 –4.5

UNIT V : Chapter 5 Sections 5.1 –5.7

Advanced Learners’ Course

FUZZY MATHEMATICS I

Credits : 5

60 hours

Subject Code : TH12AC2

UNIT I

From Classical sets to Fuzzy sets Introduction-Crisp sets-Fuzzy sets-Basic Types-Basic concepts-Characteristics and significance of the paradigm shift.

UNIT II

Fuzzy Sets versus Crisp Sets Additional properties of α sets-Representation of Fuzzy sets-Extension principle for Fuzzy sets.

UNIT III

Operations on Fuzzy sets Types of operations-Fuzzy compliments-Fuzzy intersections: t – norms-Fuzzy Unions: t – conforms.

UNIT IV

Fuzzy Arithmetic Fuzzy Numbers-Linguistic variables-Arithmetic operations on intervals-Lattice of fuzzy numbers-Fuzzy equations.

UNIT V

Fuzzy Relations Crisp versus Fuzzy relations-Projections and cylindric extensions-Binary Fuzzy relations-Fuzzy equivalence relations-Fuzzy compatibility relations-Fuzzy morphisms.

Books for reference:

1	George J. Klir/Bo Yuan	Fuzzy sets and Fuzzy logic Theory and applications	Prentice Hall of India Fourth printing June 2001.
---	------------------------	---	--

Semester : V

Title : Information Security (Level I)

Hours: 26

Objective :

This course aims on introducing the theory and practice of designing and building secure computer systems that protect information and resist attacks. It covers all aspects of cyber security including network security, computer security and information security.

UNIT I

(5 HRS)

Information security: History of IS-What is security?-characteristic of IS-components of I system –security system life cycle model.

UNIT II

(6 HRS)

Cryptography: Concepts and techniques-Plain text and cipher text- Encryption principles-Cryptanalysis. Authentication methods-passwords-keys versus passwords-Attacking Systems via passwords-Password verification

UNIT III

(5 HRS)

Fire walls: Viruses and worms- Digital rights management-What is firewalls- Types of Fire wall-Design Principles of Firewall

UNIT IV

(5 HRS)

Hacking: Hacker hierarchy-password cracking-Phishing- Network Hacking- Wireless hacking.

UNIT V

(5 HRS)

Case studies: DNS,IP SEC- Social media

TEXT BOOK:

S.no	Author	Title of book	Publisher	Year of publication
1	Dr.Michael E. Whitman, Herbert J. Mattord	Principles and Practices of Information Security	Course Technology Cengage Learning	4 th edition, 2012
2	AtulKahato	Cryptography and Network Security	McGraw Hill Education	3 rd Edition 2012
3	William Stallings	Network Security Essential Applications and standard	Prentice Hall	2 nd Edition 2009
4	Devan N. Shah	Information Security Principles and Practice	Wiley India	2009

Semester : V

Title : Information Security (Level II)

Hours: 26

Objective

This course aims on introducing the theory and practice of designing and building secure computer systems that protect information and resist attacks. It covers all aspects of cyber security including network security, computer security and information security.

UNIT I

(5HRS)

Information security: History of IS-What is security?-characteristic of IS-components of I system –security system life cycle model.

UNIT II

(6HRS)

Cryptography: Concepts and techniques- plain text and cipher text- Encryption principles- Cryptanalysis-cryptograph algorithm- Cryptograph tools
Authentication methods-passwords-keys versus passwords-Attacking Systems via passwords- Password verification

UNIT III

(5HRS)

Fire walls: Viruses and worms- Digital rights management--What is firewalls- Types of Fire wall-Design Principles of Firewall

UNIT IV

(5HRS)

Hacking: Hacker hierarchy-password cracking-Phishing- Network Hacking- Wireless hacking.-Windows hacking- Web hacking- Ethical hacking

UNIT V

(5 Hrs)

Case studies: DNS, IP SEC- Social media

TEXT BOOK:

S.no	Author	Title of book	Publisher	Year of publication
1	Dr.Michael E. Whitman, Herbert J. Mattord	Principles and Practices of Information Security	Course Technology Cengage	4 th edition, 2012

			Learning	
2	AtulKahato	Cryptography and Network Security	McGraw Hill Education	3 rd Edition 2012
3	William Stallings	Network Security Essential Applications and standard	Prentice Hall	2 nd Edition 2009
4	Devan N. Shah	Information Security Principles and Practice	Wiley India	2009

Semester : VI
Core Paper : 11
Title : Complex Analysis
Subject Code : TH13C11
Credits : 5

Hours: 86

Objective:

To expose a fertile area of pure mathematics as a source of powerful techniques that are widely applied in sciences.

UNIT I

17 hrs

Complex number system : *Field of complex number scalar multiplication of a complex number –Field of real numbers – Expression of (α, β) in the form of $\alpha + i\beta$ * – Conjugation- Absolute value of a complex number –Inequalities in terms of moduli-Results – Problems. Complex plane: Representation of complex number by points-nth roots of a complex number –Elementary transformation ; *Infinity and extended complex plane* ; Stereographic projection – Problems ; Complex functions –Limit of a Function ; Continuity of a function –Differentiability and analyticity of a function - Necessary condition for differentiability – Sufficient condition for differentiability - CR equations in polar coordinates - Complex function on a function of z and \bar{z} - problems.

UNIT II

17hrs

Bilinear Transformation –Special bilinear transformations- Circle and inverse points – Problems – Complex Integration : Simple rectifiable oriented curves -Integration of complex functions – Simple integrals using definition –Definite Integrals – *Simply connected region* – multiply connected region - Cauchy’s fundamental theorem(statement only) Extension to Cauchy’s fundamental theorem (statement with proof) Integral along an arc joining two points - Cauchy’s integral formula and formula for first and higher derivatives - Extensions- Problems.

UNIT III

17hrs

Morera’s Theorem –Zeros of a function – Related integral theorems- Cauchy’s inequality - Liouville’s theorem –Fundamental theorem of algebra – Maximum modulus theorem – Gauss’ mean value theorem, Theorem on the mean of the values of a harmonic function on a circle - Problems

UNIT IV

17hrs

Taylor and Laurent’s series – Singular points –Isolated singularities-*Removable singularities* – pole – Behaviour of a function at an isolated singularity- *Determination of the nature of singularities*- Problems.

UNIT V

18hrs

Residue-calculation– Real definite integrals: Integrals of type I $\int_0^{2\pi} f(\cos \theta, \sin \theta) d\theta$

type II $\int_{-\infty}^{\infty} \frac{P(x)}{Q(x)} dx$ evaluation – Problems – Meromorphic functions : Principle of argument –

Rouche's theorem – *Fundamental theorem of algebra* – Function meromorphic in the extended plane – problems.

** Self study portion

Text Book

1	P. Duraipandian, Laxmi Duraipandian and D. Muhilan	<i>Complex Analysis</i>	Emerald Publishers- revised edition 1994.
---	--	-------------------------	---

Books for reference

1	Shanti Narayan	<i>Theory of functions of a complex variable</i>	S.Chand & company
2	J.N.Sharma	<i>Functions of a complex variable</i>	Krishna Prakashan Mandir

UNIT I	:	Chapter I	Sec 1.1 to 1.7
		Chapter II	Sec 2.1 to 2.2, 2.6 to 2.8
		Chapter IV	Sec 4.1 to 4.9
UNIT II	:	Chapter VII	Sec 7.1 to 7.3
		Chapter VIII	Sec 8.1 to 8.9
UNIT III	:	Chapter VIII	Sec 8.10 to 8.12
UNIT IV	:	Chapter IX	Sec 9.1 to 9.3, 9.5 to 9.11
UNIT V	:	Chapter X	Sec 10.1 to 10.3 (partly)
		Chapter XI	Sec 11.1 and 11.2

Note:

(Question paper setters to confine to the above text books only)

Semester : VI

Core Paper : 12

Title : Linear Algebra

Subject Code : TH13C12

Credits : 5

Hours: 86

Objective :

To develop a working knowledge of the algebraic properties of vectors, vector spaces and matrices.

UNIT I

17hrs

* Matrices: Algebraic operations – triangular, diagonal, scalar and unit matrices – Transpose, adjoint and inverse of a square matrix – symmetric and skew-symmetric matrices - Hermitian and skew – Hermitian matrices* – Orthogonal and unitary matrices - rank of a matrix- Characteristic roots and characteristic vectors of a square matrix.

UNIT II

17hrs

Vector space : Definition and examples – Basic properties – Linear independence and bases – dimension.-Finite dimensional vector spaces- Homomorphisms of vector spaces – Dual spaces

UNIT III

17hrs

Inner product spaces- Linear transformation – Algebra of linear transformations – Characteristic roots – matrix of linear transformations.

UNIT IV**17hrs**

Canonical forms – Nilpotent Transformation, Triangular forms - * Trace and transpose* – Hermitian, unitary and normal transformations

UNIT V**18hrs**

Lattices & Boolean Algebra : Lattices – Some properties of lattices – new lattices modular & Distributive lattices – Boolean Algebra – Boolean polynomial.

** Self Study portion

Text Book

1	R. Balakrishnan & N. Ramabhadran	<i>A Text book of Modern Algebra - (Unit I)</i>	Vikas Publishing House Pvt Ltd, New Delhi-Bombay-Bangalore-Calcutta Second Revised Edition
2	I.N. Herstein	<i>Topics in Algebra</i> (Unit II, III, IV)	Wiley Eastern Ltd 2 nd edition (2002)
3	Dr.M.K.Venkataraman, Dr.N.Sridharan & Dr.N.Chandrasekaran	Discrete Mathematics (Unit V)	The national publishing company reprinted May 2009.

Books for Reference

1.	R.J. Goult	<i>Applied linear Algebra</i>	Ellis Horwood Ltd, Publisher Chichester
----	------------	-------------------------------	---

UNIT I : Sections – 1.1 to 1.9 & 3.9

UNIT II : Sections – 4.1 to 4.3

UNIT III : Sections – 4.4, 6.1 to 6.3

UNIT IV : Sections – 6.4, 6.8, 6.10

UNIT V : Sections – 10.1 to 10.6

Note: (Question paper setters to confine to the above text books only)

Semester : VI

Core Paper : 13

Title : **Operations Research**

Subject Code : TH13C13

Credits : 5

Hours:101hrs**Objective :**

To expose the application of optimization techniques to social sciences and to enhance the indispensability of mathematical tools in day today problems.

UNIT I**20 hrs**

Operations Research – An overview - * Natures and features of OR* Linear Programming problem : Mathematical Formulation-graphical solution-Linear Programming: Simplex Method – Two - Phase method - Duality in Linear programming – Dual simplex method.

UNIT II**20 hrs**

Integer Programming: Gomory's All I.P.P method - * Construction of Gomory's constraints* Fractional Cut method – All integer - Transportation Problem – Finding an Initial Basic Feasible Solution - Test for optimality – Transportation Algorithm(Modi Method) - Assignment Problem – Mathematical formulation – Assignment method.

UNIT III**20 hrs**

Dynamic Programming: Recursive Equation Approach- *Characteristics of Dynamic Programming*- Dynamic Programming Algorithm - Games and Strategies – Two- person Zero-Sum games- Maximin-Minimax Principle-Games Without Saddle Points-Mixed Strategies- Graphical Solution of 2 x n and m x 2 games.

UNIT IV **20 hrs**

Inventory Control: – Costs Associated with Inventories- Factors Affecting Inventory Control- Economic Order Quantity- Deterministics Inventory Problems with no Shortages - Queuing Theory- *Elements of a Queuing System*-Operating Characteristics of Queuing System-Probability Distribution –Classification of Queuing Models-Poisson Queuing Systems .

UNIT V **21 hrs**

Network Scheduling By PERT / CPM. *Distinction between PERT & CPM*

* *:Self study

Text Book

1	KantiSwarup ,P.K.Gupta and Man Mohan	<i>A Text Book of operation research</i>	Twelfth Thoroughly Revised Edition Published By sultan chand& sons, 2008
---	--------------------------------------	--	---

UNIT I :Chapter 1 –Sections 1.1 & 1.2
Chapter 2 –Sections 2.1 & 2.2
Chapter 3 –Sections 3.1 to 3.5,3.6
Chapter 4 -Sections 4.1 to 4.4
Chapter 5 – Section 5.1 , 5.2 & 5.9

UNIT II :Chapter 7-Sections 7.1 to 7.4 ,
Chapter 10-Sections 10.1 to 10.9, 10.10,10.12.
Chapter 11-Sections 11.1 to 11.3

UNIT III :Chapter 13-Sections 13.1 to 13.4
Chapter 17-Sections 17.1 to 17.6

UNIT IV :Chapter 19-Sections 19.1 to 19.6
Chapter 20-Sections 20.1 to 20.8(in 20.8 Model I , II, III, IV Only)

UNIT V :Chapter 21-Sections 21.1 to 21.7

Note: (Question paper setters to confine to the above text books only)

Semester : VI

Elective Paper : 3

Title : **Mathematical Modelling**

Subject Code : TH13E03

Credits : 5

Hours: 101

UnitI **21 hrs**

Mathematical Modellingthrough Ordinary Differential Equations of First order:LinearGrowthandDecay Models–Non-LinearGrowthandDecay Models– Compartment Models– Dynamicproblems– *Geometrical problems*.

UnitII **20 hrs**

MathematicalModellingthroughSystemsofOrdinaryDifferentialEquationsofFirst Order :PopulationDynamics–Epidemics–CompartmentModels–Economics– Medicine, Arms Race, Battles andInternational Trade– Dynamics.

UnitIII **20 hrs**

MathematicalModellingthroughOrdinaryDifferentialEquationsofSecondOrder:Planet

ary Motions–CircularMotionandMotionofSatellites–MathematicalModelling throughLinearDifferentialEquationsofSecondOrder–MiscellaneousMathematical Models.

UnitIV **20 hrs**

MathematicalModellingthroughDifferenceEquations:SimpleModels– *Basic Theory ofLinear Difference EquationswithConstantCoefficients*–EconomicsandFinance– Population Dynamics and Genetics– ProbabilityTheory.

UnitV **20 hrs**

Mathematical ModellingthroughGraphs : Solutions that can be ModelledThrough Graphs – Mathematical Modelling in Terms of Directed Graphs, Signed Graphs, Weighted DigraphsandUnoriented Graphs.

---- :Self study portion

TEXT BOOK(S)

1	J.N. Kapur	Mathematical Modelling	WileyEasternLimited, New Delhi, 1988
---	------------	------------------------	--------------------------------------

REFERENCE(S)

1	J.N. Kapur	Mathematical Models in BiologyandMedicine	EWP, New Delhi, 1985
---	------------	---	----------------------

Unit I: Chapter 2: Sections 2.1 to 2.6

Unit II:Chapter 3: Sections 3.1 to 3.6

Unit III:Chapter 4: Sections 4.1 to 4.4

Unit IV:Chapter 5: Sections 5.1 to 5.6

Unit V:Chapter 7: Sections 7.1 to 7.5

Semester : VI

Elective Option: 4

Title : Discrete Mathematics

Subject Code : TH13E04

Credits : 5

Hours:101

Objective :

To introduce the basic Mathematics which is applicable for Computer Science.

UNIT I: **20hrs**

Logic : IF – Statement – Connectives –Atomic and compound statements- Well formed formulas – *Truth tables* – Tautology – Tautological implications and equivalence – Replacement process.

UNIT II **20hrs**

Normal forms: Normal forms – Principal normal forms – Theory of inference – *open statements – quantifiers* – theory of inference for Predicate calcululs – Statements involving more than one quantifiers.

UNIT III **20hrs**

Coding theory : Introduction – Hamming distance – Encoding a message – Group codes – procedure for generating group codes – Decoding and error correction – An example of simple error correcting code.

UNIT IV **20hrs**

Automata and Languages : Finite Automata – Definition – representation – acceptability of a string by a FA – Languages accepted by a FA – Equivalence of a FA and NFA – Procedure of finding a FA equivalent to a given NFA.

UNIT V: **21hrs**

Push down Automata : Push down automata – definition – description – *properties of move relation* – acceptance by a PDA – equivalence of two types of a acceptance by PDA – context free languages and PDA –turing machines

Text Book:

1	Dr. M.K. Venkataraman, Dr. N. Sridharan and N. Chandrasekaran	<i>Discrete Mathematics</i>	First edition <i>Reprint</i> 2003, The National Publishing company, Chennai
---	--	-----------------------------	--

UNIT I	:	Chapter 9	Sections 9.1-9.9
UNIT II	:	Chapter 9	Sections 9.11-9.18
UNIT III	:	Chapter 10	Sections 10.1 – 10.8
UNIT IV	:	Chapter 12	Sections 12.1-12.10
UNIT V	:	Chapter 12	Sections 12.23-12.30

Note:

(Question paper setters to confine to the above text books only)

Semester : VI

Title : Advanced Learners' Course

Subject :Fuzzy Mathematics II

Credits : 5

Hours : 60

Subject Code : TH12AC5

UNIT I

Fuzzy Relation Equations Sup- ω compositions of Fuzzy relations-Inf – ω compositions of Fuzzy relations-Fuzzy relation equations based on sup – i and inf – ω compositions.

UNIT II

Solution method-Approximate solutions-The use of neural networks.

UNIT III

Possibility theory -Fuzzy measures-Evidence theory-Possibility theory-Fuzzy sets and possibility theory.

UNIT IV

Fuzzy logicx-Fuzzy propositions-Fuzzy quantifiers-Inference from conditional Fuzzy propositions-Inference from conditional and qualified propositions.

UNIT V

Uncertainty based information- Information and uncertainty-Non specificity of crisp sets and Fuzzy sets-Fuzziness of Fuzzy sets-Uncertainty in evidence theory.

Books for reference:

1.	George J	Fuzzy sets and Fuzzy logic Theory and applications	Klir/Bo Yuan., Prentice Hall of India, Fourth printing June 2001
----	----------	--	--

Semester : VI

Title : Advanced Learners' Course

Subject : Topics in Fluid Dynamics II

Subject Code: TH12AC6

Credits : 5

Hours: 60

Objective :

To introduce the basic concepts of fluid dynamics and expose the students to the practical applications of mathematics.

UNIT I

Motion in two dimensions: images, image of a source with regard to a plane – image of a doublet with regard to a plane, circle theorem, image of source with regard to a circle – image of doublet with regard to a circle

UNIT II

General motion of cylinder in two dimensions – motion of a circular cylinder in a uniform stream - Blasius theorem – equation of motion of a circular cylinder with circulation

UNIT III

The aerofoil – Joukowski transformation – Kutta-Joukowski theorem – d’Alembert’s paradox

UNIT IV

Vortex motion : Vortex line – properties of the vortex – strength of a vortex – rectilinear vortex – velocity component – center of vortices – a case of a two vortex filament – stream function when the strength of the vortex filaments are equal – vortex pair – vortex doublet – vortex inside an infinite circular cylinder

UNIT V

Navier Stokes theorem – equation of motion of a viscous fluid – equation of energy – dissipation of energy – vorticity and circulation in viscous fluids – diffusion of vorticity – the equation of state

Text Book:

1	ShanthiSwarup	<i>Fluid dynamics</i>	Krishna Prakashan media (p) ltd, Meerut 11th edition 2003,
---	----------------------	-----------------------	---

UNIT I	:	Chapter 1	Sections 5.8-5.13
UNIT II	:	Chapter 2	Sections 5.17 –5.18, 5.22,5.24
UNIT III	:	Chapter 3	Sections 5.34 – 5.37
UNIT IV	:	Chapter 4	Sections 6.0 – 6.10
UNIT V	:	Chapter 5	Sections 9.13 ,9.15-9.19

Semester : VI

Title : Advanced Learners’ Course

Subject : Astronomy II

Credits : 5

Hours:60

Subject Code: TH12AC4

Objective :

To study the solar system and expose the mathematical tools used to solve the mysteries of the universe.

UNIT I

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

UNIT II

Annual parallax – aberration.

UNIT III

Precession – Nutation.

UNIT IV

The moon – eclipses.

UNIT V

Planetary phenomenon – The stellar system.

Text Book:

1	Mr. S. Kumaravelu and Mrs. SusheelaKumaravelu	Astronomy	Revised edition 2005.
---	---	-----------	-----------------------

Skill Based Subject

Semester : III and IV

Title : Computer Programming – C Language

Credits : 4

Subject Code : SB13MA01

Hours: 58

Objective:

To enable the students to learn one high level language and help them to write programs for various numerical methods.

UNIT I

11hrs

* Introduction – Importance of C* – Basic structure of C program – Character set – Constants – Keywords and identifiers – Variables - Data types – Declaration of variables – Assigning values to variables – Defining symbolic constants.

UNIT II

11hrs

Arithmetic operators – Relational operators – Logical Operators – Assignment operators – Increment and decrement operators – Conditional operators – Special operators – Arithmetic expressions – *Evaluation of expressions – Precedence of arithmetic operators* – Some computational problems – Type conversion expressions – Operator precedence and associativity – Mathematical functions.

UNIT III

12hrs

Reading and writing character – Formatted input and output – Decision making with IF statement – Simple IF statement – The IF....ELSE statement – Nesting of IF....ELSE statement – The ELSE....IF ladder – The switch statement – The !operator – The GOTO statement – The WHILE statement – The DO statement – The for loops - *Jumps in loops.*

UNIT IV

12 hrs

One, Two dimensional arrays – Initiating two dimensional arrays – Multi dimensional arrays – Declaring and initializing string variables – Reading string from terminal – Writing strings on the screen – Arithmetic operators on characters. Putting strings together- Comparison of two strings- String handling functions.

UNIT V

12hrs

User defined functions – Their need – Multifunction programme – The form of C functions - Definition of functions – Return values and their types – Function calls – Function declaration - Category of functions. No arguments and no return values – Arguments but no return values –Argument with Return values – No arguments but return a value – Functions that return multiple values.

**study portion

Text Book

1	E. Balagurusamy	<i>Programming in C</i>	Tata McGrawhill Publishing Company Ltd,
---	-----------------	-------------------------	---

Books For Reference

1	YashwantKanitkar	<i>Let us 'C'</i>	BPB Publications, New Delhi
---	------------------	-------------------	-----------------------------

UNIT I:Ch 1; 1.1, 1.2, 1.4.Ch 2:2.1, 2.2, 2.5 to 2.10**UNIT II:** Ch 3**UNIT III:**Ch 4, Ch 5, Ch 6**UNIT IV:**Ch 7, Ch 8**UNIT V:**Ch 9 - **9.1 to 9.14****Semester : III and IV****Title : C Practicals****Credits : 2****Hours: 30****Subject Code : SB13MAP1**

1. To find the sum of two matrices
2. To find the product of two matrices.
3. To find the mean and standard deviation.
4. To generate Fibonacci numbers.
5. To sort the set of numbers in ascending order.
6. To find the roots of an equation by Newton Raphson method.
7. To find the factorial of a given number.
8. To find the exponential x as a sum of series.
9. To convert the given decimal number into a binary number.
10. To determine whether a given number is prime or not.
11. To check whether given number is a palindrome or not.
12. To compare and join two strings

Skill Based Subject**Semester : V and VI****Title : Computer Programming – C ++Language****Credits : 4****Hours: 58****Subject Code : SB13MA02****Objective:**

To enable the students to learn object oriented programming and help them to write programs for various numerical methods.

UNIT I**11 hrs**

EvolutionofC++-applicationsofC++-structureofC++program.Tokens-keywords-identifiersand constants-basicdatatypes-user-defineddatatypes-constantpointersand pointers to constants – symbolic constants –type compatibility – declaration of variables – dynamicinitializationofvariables-referencevariables- operatorsinC++-scoperesolutionoperator-memorymanagementoperators-manipulators- typecastoperator-expressionsandtheirtypes-specialassignmentexpressions-implicitconversions-operatorprecedence.

UNIT II**11 hrs**

FunctionsinC++:Themainfunction-functionprototyping-callbyreference-returnby reference- inlinefunctions-defaultarguments-constantarguments-functionoverloading. ManagingConsoleI/OOperations:C++streams-C++streamclasses-unformattedconsoleI/O operations-formattedconsoleI/Ooperations-managingoutputwithmanipulators.

UNIT III**12 hrs**

Classes and Objects: Specifying aclass- definingmember functions – making an

outsidefunctioninline–nestingofmemberfunctions–privatememberfunctions–arrayswithinaclass –memoryallocationforobjects–arraysofobjects–objectsasfunctionarguments–friend functions–returningobjects–constantmemberfunctions. ConstructorsandDestructors: Introduction – constructors – parameterized constructors – multipleconstructorsinaclass–constructorswithdefaultarguments–copyconstructor.

UNIT IV **12 hrs**

Operator Overloading: Introduction – definingoperator overloading – overloading unary operators–overloadingbinaryoperators-overloadingbinaryoperatorsusingfriends–rulesforoverloadingoperators. Inheritance: Introduction –definingderivedclasses –single inheritance –making aprivatememberinheritable– multilevelinheritance– multipleinheritance– hierarchicalinheritance– hybridinheritance.

UNITV **12 hrs**

WorkingwithFiles:Introduction–ClassesforFileStreamOperations-OpeningandClosinga File –DetectingEnd-of-file–Moreaboutopen():FileModes–File PointersandtheirManipulations–SequentialInputandOutputOperations– UpdatingaFile:RandomAccess.

TextBooks:

1.	E.Balagurusamy	ObjectOrientedprogrammingwithC++	McGrawHill
2.	RobertLafore	ObjectorientedprogramminginTurboC++,	GalgotiapublicationsPvt.Ltd, NewDelhi-11000211994
3.	BjarneStroutstrup	TheC++programminglanguage II Edition	AddisionWesley,1991.

Books for Reference

1	D.RaviChandran	ProgrammingwithC++	TataMcGraw-Hillpublishingcompanylimited(1996),NewDelhi
2	AshokN.Kamthane	ObjectOrientedProgrammingwithANSIandTurboC++	Pearson Educationpublishers(2003).
3	JohnR.Hubbard	ProgrammingwithC++,2ndEdition	TMHpublishers(2002)

Semester : V and VI

Title : ProgramminginC++ Practicallist.

Credits : 2

Hours:30

Subject Code : SB13MAP2

1. Writea function‘power ()’toraiseanumber‘m’toapower‘n’. Thefunctiontakesa‘double’ valuefor‘m’and‘int’valuefor‘n’,andreturnstheresultcorrectly. Useadefaultvalueof2 for‘n’to makethefunctionto calculatesquareswhenthisargumentisomitted. Writea‘main()’thatgetsthevaluesof‘m’and‘n’fromtheusertotestthefunction.
2. Writeaprogramtocompute compoundinterestofagivenamountAMTfor‘n’years. Use functionoverloadingsothattheprogramgetsinputofinterestrateRATEinanyofthedata type‘float’or‘int’.
3. CreateaclasswhichconsistsofemployeedetailENO,ENAME,DEPT,BASICSALARY. Write amemberfunction togetanddisplay them. Derive a class PAY from the above classand write

a

- member function to calculate DA, HRA and PF depending on the grade and display the payslip in a neat format using console I/O.
4. Define two classes POLAR and RECTANGLE to represent points in the polar and rectangular system. Write a program to convert from one system to another.
 5. Create a class FLOAT that contains one float data member. Overload all the four arithmetic operators so that they operate on the objects of FLOAT.

Job Oriented Course
Statistics – A Tool for Research SPSS

Hours: 60

OBJECTIVE

To enable the students to have a sound knowledge in the concepts and their applications on various statistical tools.

UNIT I

Working with descriptive statistics – Frequency tables – Using frequency tables for analysing qualitative data – Explore the data – Graphical representation of data – Histogram – Line chart – Cluster – Scatter plot – Pie chart – Bar chart – Calculation of mean, median, mode, Measures of dispersion – Range – Quartile deviation – Standard deviation

UNIT II

Coefficient of variation – Examining the consistency – Calculation of quartiles. Calculation of percentiles – Skewness – Kurtosis – Explanation – Cross tabs – Data entry for correlation – Karl Pearson's correlation coefficient – Rank correlation.

UNIT III

Hypothesis testing – Null and alternate hypothesis – Level of significance – Type I and type II errors – Explanation with examples and regression.

UNIT IV

Testing the difference between group means – t test – One sample test – Independent sample test – Paired sample test χ^2 test.

UNIT V

F test – One way ANOVA and two way ANOVA - Problems

Text Book :

1.	Andrew Garth	Analysing data using SPSS	Sheffield Hallam University, 2008
2.	S.P.Gupta	Statistical methods	Sultan chand & sons publishers- Thirty third revised edition (2004)

Semester : III / IV

Title : Value Education

Credits : 2

Subject code: NM10VED

Hours: 26 hrs.

UNIT I **5hrs**
Education systems in India - Need for value education ; Personal values, Development of values as personal and lifelong processes, and family values; Universal values – truth, righteous conduct , peace, love and nonviolence; The concept of Human Excellence.

UNIT II **5hrs**
CommUNITY values – Mutual co-existence without religious bias, Concern for aged and handicapped, deprived sections of the society etc., Care of the Elders and Senior Citizen Act.Social values – Responsibilities towards society; Human rights – Duty based rights, Rights to education, Rights to equality, Rights to social security; Impact of media on values.

UNIT III **5hrs**
Cultural values –Ancient civilization, Cultural heritage of India - Value system in Indian culture, Achievements in the field of education, science, technology, art, literature, agriculture, ecology, architecture, governance and economy.

UNIT IV **5hrs**
National values – Brief history of democracy and highlights of Indian democracy; National identity and citizenship; Right to Information; Ethical values, Ethical standards and codes, Professional ethics, Work place ethics, Ethical issues and dilemmas.

UNIT V **6hrs**
Life skills – Soft skills and body language and its importance in the corporate world today ; Inter personal skills and leadership skills; Yoga for modern life and its benefits; Meditation and prayers for stress free living,

Note
Evaluation of project / group discussion and report presentation on any topic suggested in the text. for a maximum of 25 marks will form the internal component. Students can take up either individual work or group work. Best reports can be submitted to the Magazine Committee for publication in the college magazine/newsletter

SEMSTER : I WOMEN’S STUDIES

Credit: 2 **Hours: 26**

Subject Code:NME12WS

CHAPTER I **5hrs**

WOMEN’S STUDIES AS A DISCIPLINE

1.1 CONCEPT, RELEVANCE, PURPOSE OF WOMEN’S STUDIES

1.2 UNDERSTANDING GENDER

1.3 DEFINING FEMINISM

CHAPTER II **5hrs**

INDIAN WOMEN

2.1 HISTORICAL BACKGROUND

2.2 WOMEN’S MOVEMENT

2.3 ORGANISATIONS FOR WOMEN

CHAPTER III **5hrs**

ROLE OF WOMEN

3.1 WOMEN IN FAMILY

3.2 WOMEN IN SOCIETY

3.3WOMEN IN POLITICS

3.4 WOMEN IN SCIENCE AND TECHNOLOGY

CHAPTER IV	5hrs
STATUS OF WOMEN	
4.1 WOMEN AND LITERACY	
4.2 WOMEN EMPLOYMENT	
4.3 WOMEN EMPOWERMENT	
4.4 WOMEN AND HEALTH	
4.5 WOMEN AND DEVELOPMENT	

CHAPTER V	6hrs
WOMEN'S UPLIFTMENT	
5.1 WOMEN'S RIGHTS-CONSTITUTIONAL RIGHTS AND LEGAL RIGHTS	
5.2 PLANS, POLICIES AND PROGRAMMES FOR WOMEN	
5.3 ROLE OF UNITED NATIONS	
5.4 WOMEN-A MULTIFACETED PERSONALITY	

Semster : I

Title :Ambedhkar Studies

Subject Code :NME12AS

CONTENTS

1. Ambedkar's Childhood
2. Ambedkar's Education
3. Ambedkar's Employment
4. Ambedkar's Social Revolution
5. Ambedkar's Drive: Towards Establishing Equality
6. Ambedkar's Political Mission
7. Ambedkar's Economic Concerns
8. Ambedkar's Crowning Glory-Chief Architect of Indian Constitution

The Grand Finale

Semester : I

Title : Foundation Course

Subject :Gandhian Studies

Credits : 2

(30) =26 hrs&4 hrs

Tutorial

Subject Code: NME12GS

Unit I 5 hrs

1869 – 93 – Gandhiji's family – his early life – School education – London phase.

Unit II 5 hrs

1893 – 1914 – Gandhiji's work in South Africa – The land made Gandhi as Mahatma.

Unit III 5 hrs

1915 – 1948 – Gandhiji's role in Freedom struggle and his martyrdom.

Unit IV 5 hrs

Gandhiji's values – His political philosophy – His socialism – His Economic ideas- His concern on environment; Conflict resolution and peace education.

Unit V 6 hrs

Gandhiji as a world leader; Martin Luther king Jr – Nelson Mandela; AungSuiki – Barrack Obama.

References:

1. Autobiography of Gandhi – My Experiment of Truth with Truth
2. Gandhi – Louis Fisher

**CORE MODULE SYLLABUS FOR ENVIRONMENTAL STUDIES FOR UNDER
GRADUATE COURSES OF ALL BRANCHES OF HIGHER EDUCATION**

Credit: 2

ESE: 75 hrs

Subject Code : NM10EVS

26 hrs&4hrs Tutorial

CA: 25 marks

Unit I

3hrs

The multidisciplinary nature of environmental studies – Definition, scope and importance. Need for public awareness.

Unit II

3hrs

Renewable and non-renewable resources : Natural resources and associated problems.

- a) Forest resources : use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
- b) Water resources : Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams – benefits and problems.
- c) Mineral resources : Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
- d) Food resources : World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer – pesticide problem, water logging, salinity, case studies.
- e) Energy resources : Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies.
- f) Land resources : Land as a resource, land degradation, man induced landslides, soil erosion and desertification.
 - Role of an individual in conservation of natural resources
 - Equitable use of resources for sustainable lifestyles.

Unit III

3hrs

Ecosystems – Concept of an ecosystem – Structure and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological succession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystem : (a) Forest ecosystem (b) Grassland ecosystem (c) Desert ecosystem (d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Unit IV

3hrs

Biodiversity and its conservation – Introduction – definition : genetic, species and ecosystem diversity – Biogeographical classification of India – Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values – Biodiversity at global, National and local levels – India as a mega – diversity nation – Hot-spots of biodiversity – Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts – Endangered and endemic species of India – Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity.

Unit V

4hrs

Environmental Pollution – Definition – Causes, effects and control measures of : (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution. (e) Noise pollution (f) Thermal and electromagnetic pollution (g) Nuclear hazards

Solid waste management: Causes, effects and control measures of urban and industrial wastes - Role of an individual in prevention of pollution - Pollution case studies - Disaster management: floods, earthquake, cyclone and landslides

Unit VI

3hrs

Social issues and the environment –

From unsustainable to sustainable development - Urban problems related to energy - Water conservation, rain water harvesting, watershed management - Resettlement and rehabilitation of people ; its problems and concerns, case studies. - Environmental ethics : Issues and possible solutions - Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies - Wasteland reclamation - Consumerism and waste products - Environment protection act - Air (prevention and control of pollution act) - Water (Prevention and control of pollution) act - Wildlife protection act - Forest conservation act - Issues involved in enforcement of environment legislation - Public awareness.

Unit VII

3hrs

Human population and the environment -Population growth, variation among nation - Population explosion – Family Welfare programme - Environment and human health - Human Rights - Value Education - HIV/AIDS - Women and child welfare - Role of information technology in Environment – Remote sensing application , Global Positioning Systems (GPS) - Case studies .

Unit VIII

4hrs

Field work – Visit to a local area to document environmental grassland / hill / mountain. Visit to a local polluted site – Urban / Rural / Industrial / agricultural - Study of common plants, insects, birds- Study of simple ecosystems-pond, river, hill slopes, etc. (Field work equal to 5 lecture hours)

Contact Hours: 26hrs

Tutorial Hour: 4hrs

References

1. Agarwal.K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
2. BharuchaErach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad – 380 013, India, Email: mapping@icenet.net(R)
3. Brunner.R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc.480p
4. Clark.R.S, Marine Pollution, Clarendon Press Oxford (TB)
5. Cunningham.V.P, Cooper, T.II.Gorhani.E&Hepworth.M.T, 2001, Environmental Encyclopedia, Jaico Publ. House, Mumbai 1196p
6. De A.K., Environmental Chemistry, Wiley Eastern Ltd.
7. Down to Earth, Centre for Science and Environment (R)
8. Gleick.H.P, 1993, Water in crisis, Pacific Institute for Studies in Dev. Environment & Security, Stockholm Env. Institute Oxford Univ. Pres 173 p
9. Hawkins.R.E, Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay ®
10. Heywood.V.II& Watson.R.T.1995, Global Biodiversity Assessment. Cambridge Univ.Press 11.10p
11. Jadhav.II& Bhosale.V.M.1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284 p.
12. Mekinney.M.I&Schoeh.R.M 1996, Environmental Science systems & Solutions, Web enhanced edition 639p.
13. Mhaskar.A.K, Matter Hazardous, Techno-Science Publications (TB)
14. Miller.T.G. Jr., Environmental Science, Wadsworth Publishing Co.(TB)

15. Odum.E.P 1971, Fundamentals of Ecology, W.B.Saunders Co. USA. 574p
16. Rao.M.N&Datta.A.K. 1987, Waste Water treatment, Oxford & IBM Publ. Co. Pvt. Ltd. 345 p.
17. Sharma.B.K. 2001, Environmental Chemistry, Goel Publ. House, Meerut
18. Survey of the Environment, The Hindu (M)
19. Townsend.C, Harper.J and Michael Begon, Essentials of Ecology, Blackwell Science (TB)
20. Trivedi.R.K, Handbook of Environmental Laws, Rules, Guidelines, compliances and Standards, Vol I and II Enviro Media (R).
21. Trivedi.R.K and P.K.Goel, Introduction to air pollution, Techno-Sciences Publications (TB)
22. Wagner.K.D., 1998, Environmental Management. W.B.Saunders Co., Philadelphia, USA 499p

(M) Magazine
 (R) Reference
 (TB) Textbook

Semester : III & IV

Title :AdobePagemaker 7.0.1

Subject code : SB082D01

45 hrs

Objective :*

To provide a conceptual understanding of the basics of Adobe Pagemeker and in-depth coverage of drawing and editing tools.

Unit I

9Hrs

About the Work Area-Using the toolbox- Creating and opening publications- Creating a publication from scratch-Opening an existing publication-Opening publications created in previous PageMaker versions-About templates-Opening templates.

Working with pages: Adding and deleting pages-Viewing pages- Applying masters to new pages as you create them-Naming and saving a publication.

Working with Palettes-Adding text and graphics to templates-Building your own template.

Unit II

9hrs

Specifying a save option preference: -Saving publication with a new or in a different location-Saving linked and associated files with publication-Saving a file to open in an earlier version of PageMaker-closing a publication-Setting up pages-Changing document setup options.

About Master Pages: -Creating master pages-Applying master pages-Applying Grids.

Text Formatting and word processing: selecting text or text objects-Importing text-Editing text-Threading text blocks-Threading text frames.

Unit III

9hrs

Balancing columns-controlling page and column breaks-Adding jump lines.Setting text preferences: -About formatting text-Formatting characters-Formatting paragraphs-Setting indents and tabs-Adding rules above or below paragraphs-Using paragraph styles-Understanding how text is composed-Tracking type-Setting word and letter spacing-Customizing hyphenation for specific words- Customizing hyphenation for paragraphs-Leading: Adjusting the space between lines of text.

Unit II

9hrs

Manipulating an object using the control palette- Grouping and ungrouping objects-Locking objects- Masking objects-Aligning and distributing objects-Rotating, skewing, and reflecting objects. Drawing and editing lines and shapes-Using frames-Changing the stacking order of

objects-Deleting an object-Manipulating an object using the control palette. Cropping a Graphic-Wrapping text around graphics- Attaching a graphic to text.

Unit II

9hrs

Using image control on a bitmap-Using Photoshop effects- Compressing and decompressing a TIFF image- Viewing images on-screen at different resolutions-Keylining-Viewing clip-art images-Using layers. About hypertext links-About Adobe PDF-Preparing a PageMaker publication for Adobe PDF-Exporting a document to Adobe PDF-Changing distiller options in PageMaker-Preparing a PageMaker publication for HTML.

TEXT BOOK: Course materials will be provided.

PRACTICAL-I

ADOBE PAGEMAKER 7.0.1 SUBJECT CODE – SB082DP1

1. Create a business card using pagemaker.
2. Create a certificates using pagemaker.
3. Create greeting card for some festivals using pagemaker.
4. Type some text and give the drop cap effect
5. Create a slam book using pagemaker.
6. Create a simple logo using pagemaker.
7. Import a picture and give the mask effect for the picture.
8. Create an object and give reflect and rotate effect.
9. Create a news paper for three page and insert images.
10. Draw two or more objects in a same place and bring forward, backward using the arrange options

Semester : III & IV
Title : Basics Of Web Design I
Sub Code : Sb11wd01

Hours:45

Objective:

To provide a conceptual understanding of the methods & techniques of developing a simple to moderately complex website.

UNIT I : 9 hrs

Computers-computer development ,hardware components, operating systems ,textprocessors,presentationsoftware,photoediting software –digital imaging software tools: word ,powerpoint,photoshop,,etc.,MSPAIN,Photoshop,Corel Draw

UNIT II : 9 hrs

Development of internet-History & development of the internet.Access to internet browsers,,etc., websites with improved usability and accessibility .Internet service :protocols,emails,newsgroups,net meeting,charting,,etc.,.Advantages & disadvantages of popular search engines & how they perform collecting & indexing of websites .Hazards on the internet(Virus,spam,worms,hoaxes,&scans),&tips for safer computing .Practical Assignment: Creating of simple websites.

UNIT III: 9 hrs

Introduction to web design-Basic concepts of webdesign. Usability & usability errors in planning: Websites purpose, specification, creating user profiles, creating website

prototypes, quality testing, etc., user oriented webdesign.classification of users &needs of specified user groups. User opinion analysis&basic user characteristics affecting web design(sight,memory,patience.,etc.,).accessible design,w3c accessibility guidelines &use of automatic accessibility checking software. Website classification.different website structures &web design approaches website publishing & updating .Methods of website popularization.websserver performances. security issues: Attacks by hackers & viruses, security policies& information backup. secure pages ,client certificate, fire walls, security events tracking,etc.,,System recovery after a virus attack.

UNIT IV:

9 hrs

Internet languages &tools-Hypertext markup languages (HTML) Syntax.Document type definition, creating WebPages adding pictures textual & graphic hyperlinks through HTML &DHTML.background pictures. use of special characters ,list & table .Table formatting &manipulating .Cascading Style sheet,(CSS) for text formatting &other manipulations. Java script for creating interacting navigation commands &animations.cookies& their placement on the visitors hard disk. Simple HTML forms .Hidden fields. Java script manipulation such as submitted data verification & securing from accidental erasing of form elements by the visitor.

UNIT V:

9 hrs

DHTML & Database Systems-Database concept &History.Logical& physical organization of data, database models & data independence .Relational database concepts .some familiar databases.Embedding database languages in general programming languages. APPLIED DATABASES-Database for the web my SQL for database creating & updating connecting websites to MY SQL driven databases. Web application data errors &error reports.Sessions& their manipulation .Client identification &database security.

TEXT BOOK: Course materials will be provided

Semester : III & IV
Title : Basics Of Web Design I
Sub Code : Sb11wd01

PRACTICALS:

- 1) Designing Address
- 2) Online Voting Portal
- 3) Online Examination Portal
- 4) College Admission Form
- 5) Calculating Grand Total
- 6) Designing a Toolbar

Semester : V & VI
Title :Multimedia And Dtp Software Level II
Subject Code :Sb09md02

Objective:

To provide a thorough discussion of the fundamentals of Adobe Photoshop and provides knowledge of how to design web page.

UNIT I

9hrs

Introduction-Tools Descriptions-Rectangular Marquee Tool (M)-Move Tool (V)-Polygon Lasso Tool (L)-Magic Wand Tool (W)-Crop Tool (C)-Slice Tool (K)-Healing Brush Tool (J)-Brush Tool (B)-Clone Stamp Tool (S).

UNIT II

9hrs

History Brush Tool (H)-Eraser Tool (E)-Gradient Tool (G)-Blur Tool (R)-Dodge Tool (O)-Path Selection Tool (A)-Horizontal Type Tool (T)-Pen Tool (P)-Rectangle Tool (U)-Notes Tool (N)-Eyedropper Tool (I)-Hand Tool (T)-Zoom Tool (Z).

UNIT III

9hrs

Working with Layers: Active Layer-Color Modes: RGB-Indexed Color. Hue/Saturation: Hue Saturation shifts entire ranges of color within the image-Color modes.

UNIT IV

9hrs

Color Channels: Introduction-Image Types-Image Sizes and Pixels-blending modes-Using filters-Previewing filters-To apply a filter-To add a drop shadow to text-To convert a color photo to black-and-white-Converting images to Bitmap mode.

UNIT V

9hrs

Designing web pages: Page design-Slices-Rollovers-Animations-Preparation in Adobe GoLive-Automating the workflow.Slicing web pages: Introduction-Slice types-To create a slice with the Slice tool-Bitmap images and vector graphics.

TEXT BOOK: Course materials will be provided

Practical :II

Adobe Photoshop

Subject Code :Sb082dp2

PHOTOSHOP:

1. Import an image and then cut a particular part and move into another screen using rectangular marquee tool, move tool, polygon lasso tool and magic wand tool.
2. Import a damaged picture and modified into a perfect picture using clone stamp tool and healing brush tool.
3. Import two or more pictures and split that pictures and make it a new picture.
4. Import a face and remove the unwanted scratches and make it a clarity using blur tool, dodge tool, hand tool and zoom tool.
5. Import a natural pictures and insert your own quotes using horizontal type tool.
6. Modify a picture using some tools and prepare a notes about your changes using notes tool.
7. Merge two or more pictures using the layer options.
8. Convert a black and white picture into a color picture using color modes and hue/saturation options.
9. Convert a color photo into a black and white one.
10. Display a picture in paint and glass effects using filter options.
11. Create an image with multiple layers and give blending options.
12. Display a picture in texture and spherize effects using filter options.
13. Create a web page using slice tool and give link to it.

Semester : V &VI

Title: Basics Of Web Design II

Sub. Code : SB11WD02

Lecture hrs: 45

Objective:

To provide a basic understanding of the methods and techniques of developing a simple to moderately complex website.

UNIT I -

9hrs

Basics of Adobe Photoshop –Learn the tools & why they do, basic workflow,creating effective storing, batch renaming, how to save photos, digit asset management ,File types, File sizes, color types. Layer styles, opacity,adjustment layers.

UNIT II- **9hrs**
Basic Retouching –Colormanipulation, Levels, curves, seeing color accurately,patchtool,cropping,reading your palettes, dust &scratches.

UNIT III **9hrs**
Advanced retouching-Special effects-Smoothing skin,smoothingwrinkles,specialcoloreffects:Black&white ,sepia,Grainy.

UNIT IV **9hrs**
Website&animation-What can I do with my pictures,Printing basics,emailing basics,.,Makingcards,Making collages.

Semester : V &VI
Title: Basics Of Web Design II
Sub. Code : SB11WD02

PRACTICALS:

- 1) Placing an image in an attractive frame.
- 2) Morphing effect from Lion to Tiger and vice versa.
- 3) Sky and Lighting image using special effects.
- 4) Web page Design using Animated clock using visual effects in photoshop.
- 5) Web page Design using HTML and special effect tools.
- 6) E-Tutorial.

Allied Subjects Offered To Other Courses:

For The Students Admitted During The Year 2015 -2016:

Semester I:

BBA – Allied - Mathematics for Management I Level I (TH14A02B)
BBA - Allied - Mathematics for Management I Level II (TH14A02A)

Semester III:

B.COM Allied - Mathematics for Commerce Level I (TH13A11B)
B.COM Allied - Mathematics for Commerce Level II (TH13A11A)
B.SC (Chemistry/ Physics/Botany) Allied - Mathematics for Science I - Level II (TH13A09A)
B.SC (Chemistry/ Physics/Botany) Allied - Mathematics for Science I - Level I (TH13A09B)

Semester IV:

B.COM Allied - Statistics for Commerce Level I (TH13A16B)
B.COM Allied – Statistics for Commerce Level II (TH13A16A)
B.SC (Chemistry/ Physics/Botany) Allied - Mathematics for Science II - Level II (TH13A14A)
B.SC (Chemistry/ Physics/Botany) Allied - Mathematics for Science II - Level I (TH13A14B)

UNIT V : VolumeIIChapter -14 sections 1,2,3,4 Chapter - 10 sections 1,2,3,4 except fixed base, chain base.

References

S. No	Author	Title of the book	Publishers	Year of Publication
1.	S.P .Gupta	Statistical Methods	Sultan Chand & Sons	2002
2.	Sundaresan And Jayaselan	An Introduction To Business Mathematics	Sultan Chand & Sons	2003

Semester : I

B.COM

Title : ALLIED : MATHEMATICS FOR COMMERCE - LEVEL I

Sub Code : TH13A11B

Credits : 5

Hours:86

Objective:

To expose a few elementary tools in mathematics in order to solve problems related to business and to introduce the concept of optimization techniques.

Unit I

17 hrs

Series: Arithmetic and Geometric series - **Mathematics of Finance:** Simple and compound interest -Effective rate of interest –Annuities - Present value - discounting of bills - True discount - bank’s gain. **Set Theory:** Definition - notation - Methods of description of sets - types of sets - Venn diagram - Set operations - laws and properties of sets - number of elements - Cartesian product.

Unit II

17 hrs

Matrices : Basic concepts - Addition and Multiplication of Matrices - Inverse of a Matrix - *rank of a Matrix* - Solution of simultaneous linear equations by matrix inverse method and by Cramer’s rule.

Unit III

17 hrs

Variables - constants and functions - Limits of algebraic functions - simple differentiation of algebraic function - meaning of derivative - evaluation of first and second order derivatives for algebraic -exponential - logarithmic functions. Maxima and minima - applications to Business problems.

Unit IV

16 hrs

Integration : Elementary integral calculus - determine indefinite and definite integrals of simple functions - method of substitution - method of partial fractions - integration by parts - business applications.

Unit V

19 hrs

Linear programming problem: Formation - Solution by Graphical method & Simplex method (No theory problem only) . The **Transportation problem:** Mathematical formulation of the problem – Initial Basic feasible solution (Matrix Minima Method - North – West Corner rule and VAM).

* -----*: **Self Study**

Text books

S. No	Author	Title of the book	Publishers	Year of Publication
1.	P.A. Navnitham	Business Mathematics and Statistics	Jai Publishers, Trichy.	2003
		UNIT I : Chapter -1 sections 1,2,3,4. Chapter -3 sections 1, 2,3,4,5,6,7,8. Chapter -2 sections 1, 2,3,4,5,6,7,10 UNIT -II : Chapter -4 sections 1,2,3,4,5,6,7,9,10 UNIT -III: Chapter -7 sections 1, 2,3,4,5, 6 Chapter -6 sections 1,2,3,4,5, 6,7,8 Chapter -5, sections 1, 2,3,4,5 UNIT -IV: Chapter -8 sections 1,2,3,4,5,6,7,8 UNIT -V :Chapter -9 excluding “Charne’s method of penalties		
2.	Kantiswarup, P.K.Gupta and Man mohan	Operations Research	Sultan Chand and Sons - 14 th edition	2008
		UNIT -V :Chapter -2,3,4: 4.1 -4.3 Chapter 10: 10.1-10.9		

References

S. No	Author	Title of the book	Publishers	Year of Publication
1.	Dharmapadam	Business Mathematics	Visvanathan .S Ltd	1991
2.	Dr.P.R.Vittal	Business Mathematics and Statistics	Margham Publications	2000

Semester : III

B.COM

Title : ALLIED : MATHEMATICS FOR COMMERCE - LEVEL II

Sub Code : TH13A11A

Credits : 5

Hours:86

Objective:

To expose a few elementary tools in mathematics in order to solve problems related to business and to introduce the concept of optimization techniques.

Unit I

17 hrs

Series: Arithmetic and Geometric series - **Mathematics of Finance:** Simple and compound interest -Effective rate of interest - Annuities - Present value - discounting of bills - True discount - bank’s gain - **Set Theory:** Definition - notation - Methods of description of sets - types of sets - Venn diagram - Set operations - laws and properties of sets - number of elements - Cartesian product.

Unit II

17 hrs

Matrices : Basic concepts - Addition and Multiplication of Matrices - Inverse of a Matrix - *rank of a Matrix* - Solution of simultaneous linear equations matrix inverse method and by Cramer’s rule - Input-output analysis.

Unit III

17 hrs

Variables - constants and functions - Limits of algebraic functions - simple differentiation of algebraic function - meaning of derivative - evaluation of first and second order derivatives for algebraic-exponential - logarithmic and explicit functions .Maxima and minima - applications to business problem.

Unit IV**17 hrs**

Integration : Elementary integral calculus - determine indefinite and definite integrals of simple functions - method of substitution - method of partial fractions - integration by parts - business applications.

Unit V**18 hrs**

Linear programming problem: Formation - Solution by Graphical method & Simplex method (No theory - problem only) Game Theory: Useful Terminology – Rules for Game Theory - Pure Strategy - Mixed Strategy (2 x 2 games, 2 x n games or m x 2 games) - Simple problems only.

* -----*: **Self Study**

Text books

S. No	Author	Title of the book	Publishers	Year of Publication
1.	P.A. Navnitham	Business Mathematics and Statistics	Jai Publishers, Trichy.	2003
UNIT I : Chapter -1 sections 1, 2, 3, 4. Chapter -3 sections 1, 2,3,4,5,6,7,8. Chapter -2 sections 1, 2,3,4,5,6,7,10 UNIT -II : Chapter -4 sections 1,2,3,4,5,6,7,9,10 UNIT -III : Chapter -7 sections 1, 2,3,4,5, 6. Chapter -6 sections 1, 2,3,4,5,6,7,8. Chapter -5 sections 1, 2,3,4,5 UNIT -IV : Chapter -8 sections 1, 2,3,4,5,6,7,8				
2.	Kantiswarup, P.K.Gupta and Manmohan	Operations Research	Sultan Chand and Sons, 14 th edition	2008
UNIT -V :Chapter 2,3,4:4.1 -4.3 & Chapter -17 Sections 17.1 -17.6				

References

S. No	Author	Title of the book	Publishers	Year of Publication
1.	Dharmapadam	Business Mathematics	Visvanathan .S Ltd	1991
2.	Dr.P.R.Vittal	Business Mathematics and Statistics	Margham Publications	2000

Semester : III

B.Sc (Chemistry/Physics/Botany)

Title : ALLIED - MATHEMATICS FOR SCIENCES I –Level II

Sub Code : TH13A09A

Credits : 5

Hours:101

Objective

To acquaint the students with the tools to mathematics to problem solving in as many areas as possible.

UNIT I**20 Hrs**

Vector Calculus: Scalar and Vector point functions - Differentiation of vectors - Differential Operators - Directional derivative: Gradient - Divergence and curl

UNIT II**20 Hrs**

Integration for vectors : Line, surface and volume integrals – Theorems of Gauss, Green's and Stoke's (statements only) – Verification

UNIT III**20 Hrs**

Laplace Transforms : Definition – Laplace Transform of e^{at} , $\cos at$, $\sin at$, $\cosh at$, $\sinh at$, t^n , n is a positive integer – $L[f'(t)]$, $L[f''(t)]$,, $L[f^{(n)}(t)]$ – Laplace transform of $e^{at}\cos bt$, $e^{at}\sin bt$ and $e^{at}t^n$ – Inverse Laplace Transforms of standard functions - Solving differential equations of second order with constant coefficients using Laplace transform.

UNIT IV**20 Hrs**

Matrices: Eigen values and eigen vectors - Cayley Hamilton theorem (without proof) – Verification – Using this theorem finding the inverse of a matrix * - * Review of Set theory and equivalence relations*-Group – Properties – Order of an element

UNIT V**21 Hrs**

Subgroups - Cyclic groups – Theorems – Permutation group - Symmetric group S_n .

Text Books

S. No	Author	Title of the book	Publishers
1	P.Kandasamy&K.Thilagavathy	Allied Mathematics Volume II (For Unit I &II)	S.Chand& company LTD – First edition (2004)
2	T.K.Manicavachagam Pillai and S. Narayanan	Ancillary Mathematics (For Unit III & IV) Volume I & Volume II	S.Viswanathan (Printers and Publishers) Pvt. Ltd. Volume I – 2009 & Volume II – 2008
3	P.Kandasamy&K.Thilagavathy	Mathematics Volume II (For Unit V)	S Chand & Company LTD - First edition (2004)

Unit I & II : Chapters – 1 to 3

Unit III : Chapter 4 Sections – 1 to 6

Unit IV : Chapter 5 Sections – 1.1 to 6.2, 14.0 to 17

Unit V : Chapters 3 &4

Note: Question paper setters to confine to the above text book only

Semester : III

B.Sc (Chemistry/Physics/Botany)

Title : ALLIED - MATHEMATICS FOR SCIENCES I –Level I

Sub Code : TH13A09B

Credits : 5

Hours:101

Objective

The overall objective of this course is to provide an introduction to the process of mathematical tools while giving students an opportunity to develop and construct appropriate models for various problem situations, analyze given models to uncover underlying assumptions, and investigate particular problems to find out what has already been done toward developing solutions

Through work on assigned projects, students increase their fluency in technical training

UNIT I

20 Hrs

Functions and limits Classification of function – Limit of a function –Differentiation –Successive differentiation. **Integration** – Techniques of Integration –basic Integration – Integration by parts- Trigonometric Substitution – Definite Integral –Improper integrals

Thermodynamics –terms involved –Extensive and intensive propertied path function versus static – Exact and inexact differentials –first law of thermodynamics Adiabatic and isothermal process- work done –Joule Thomson co-efficient – problem. Thermo chemistry – Heat of neutralization – Heat of solution – Determination of heat of combustion –heat of dilution –Integral and differentials – Hess’s Law – calculation of bond energy – bond length dissociation energy – Kirchoff’s equation – application.

UNIT II

20 Hrs

Solving systems of Linear Equations and Inequalities :

Solving systems of Equations by graphing – Substitution – Elimination, General, Motion and Investment of Problems – System of Linear Inequalities

Roots and Radicals: Finding Roots – Multiplication and Division – Radicals – Addition and Subtraction of Radicals – Simplifying Radicals. Application : Solving Radical Equations

UNIT III

20 Hrs

Matrices: Eigen values and eigen vectors - Cayley Hamilton theorem (without proof) – Verification – Using this theorem finding the inverse of a matrix - Review of Set theory and equivalence relations

UNIT IV

20 Hrs

Curve fitting and Biological Modeling : Fitting curves to Data : The method of least squares – Polynomial Curve – Basic Analysis of Numerical Data – Histograms – mean, median & mode –Spread of Data.

UNIT V

21 Hrs

Hands on training for models using softwares **Excel, Minitab, SPS, Matlab.**
Individual project should be carried with guidance from faculty, Department of Mathematics

Books for Reference

S. No	Author	Title of the book	Publishers
-------	--------	-------------------	------------

1	T.K.Manicavachagam Pillai and S. Narayanan	Calculus Volume I & Volume II	S.Viswanathan (Printers and Publishers) Pvt. Ltd.
2	Poori Sharma pathaniya	Physical Chemistry	
3	Gurudeep Rajesh	Thermo dynamics	
4	T.K.Manicavachagam Pillai and S. Narayanan	Algebra	S.Viswanathan (Printers and Publishers) Pvt. Ltd.
5	S.P.Gupta	Statistical Methods	Sultan chand&sons publishers – Thirty third revised Edition (2004)

Semester : IV

B.COM

Title : ALLIED : STATISTICS FOR COMMERCE LEVEL I

Sub Code : TH13A16B

Credits : 5

Hours:86

Objective

To expose the importance of statistical tools at basic level in business in order to understand data and arrive at possible inferences relating to population under study.

Unit I 16 hrs

Diagrams and graphs - Measures of central tendency - Measures of dispersion.

(Verification by excel)

Unit II 19 hrs

Skewness - Correlation analysis :Introduction - significance of the study of correlation - correlation and causation - Types of correlation - methods of studying correlation - graphic method - Karl Pearson's coefficient of correlation - Coefficient of correlation and probable error - Coefficient of determination - Properties of the coefficient of the correlation - *Rank correlation coefficient* - Features of Spearman's correlation coefficient. Regression analysis.(Verification by excel)

Unit III 17 hrs

Analysis of time Series - Introduction -Utility of time series - Components of time series - Preliminary adjustments before analyzing time series - Measurement of trend - Free hand graphic method - method of semi averages - Moving average method - Measurement of seasonal variations - Method of simple averages only.

Unit IV 17 hrs

Index Numbers: Introduction - uses of index numbers - classification of index numbers - problems in construction of index numbers - methods of constructing index numbers - Quantity of volume index numbers - Value index numbers - tests of adequacy of index number formulae.

Interpolation: Introduction - Significance of interpolation and extrapolation - Assumptions of interpolation and extrapolation - methods of interpolation - binomial expansion methods - Lagrange's method

.Unit V 17 hrs

χ^2 Test and Goodness of fit: F -test - Analysis of variance (Problems only).

* -----*: **Self Study**

Text book

S. No	Author	Title of the book	Publishers	Year of Publication
1.	S P Gupta	Statistical Methods	Sultan chand& sons publishers	2004
Unit I : Volume I : Chapter: 6, 7 & 8. Unit II : Volume I : Chapter: 9(till measures of skewness),10,11. Unit III: Volume I : Chapter: 14 Unit IV: Volume I : Chapter: 13 & 15. Unit V : Volume II: Chapter: 4 & 5.				

Reference

S. No	Author	Title of the book	Publishers	Year of Publication
1.	P.A. Navnitham	Business Mathematics and Statistics	Jai Publishers, Trichy.	2003

Semester : IV**B.COM****ALLIED :STATISTICS FOR COMMERCE LEVEL II****Subject Code : TH13A16A****Credits: 5****Hours: 86****Objective**

To expose the importance of statistical tools at basic level in business in order to understand data and arrive at possible inferences relating to population under study.

Unit I**16 hrs**

Diagrams and graphs - Measures of central tendency - Measures of dispersion - Probability: Introduction - probability defined - importance of the concept of probability - calculation of probability - Theorems of probability (statements only) - simple problems.(Verification by Excel)

Unit II**19 hrs**

Skewness - Correlation analysis :Introduction - significance of the study of correlation - correlation and causation - Types of correlation - methods of studying correlation - graphic method - Karl Pearson's coefficient of correlation - Coefficient of correlation and probable error - Coefficient of determination - Properties of the coefficient of the correlation - *Rank correlation coefficient* - Features of Spearman's correlation coefficient - merits and limitations of the rank method - Regression analysis. (Verification by Excel)

Unit III**17 hrs**

Analysis of time Series -Introduction - Utility of time series - Components of time series - Preliminary adjustments before analysing time series - Measurement of trend - Free hand graphic method - method of semi averages - Moving average method - Measurement of seasonal variations - Method of simple averages only - Ratio-to-trend Method - Ratio-to - moving average method - Link relative method.

Unit IV**17 hrs**

Index Numbers :Introduction - uses of index numbers - classification of index numbers - problems in construction of index numbers - methods of constructing index numbers - Quantity of volume index numbers - Value index numbers - tests of adequacy of

index number formulae. Interpolation: Introduction - Significance of interpolation and extrapolation - Extrapolation - Assumptions of interpolation and extrapolation - methods of interpolation - binomial expansion methods - Newton's method - Lagrange's method.

Unit V

17 hrs

χ^2 Test and Goodness of fit: F-test - t-test - Analysis of variance: Test of significance for small samples - The assumptions of Normality - Student's t -distribution - Properties of t-distribution - Application of the t-distribution - To test the significance of the mean of a Random Sample - Testing Difference Between means of two samples(Independent sample). (Problems only)

* -----*: **Self Study**

Text book

S. No	Author	Title of the book	Publishers	Year of Publication
1.	S P Gupta	Statistical Methods	Sultan chand& sons publishers	2004
Unit I : Volume I : Chapter: 6, 7 & 8. Unit II : Volume I : Chapter: 9(till measures of skewness),10,11. Unit III: Volume I : Chapter: 14 Unit IV: Volume I : Chapter: 13 & 15. Unit V : Volume II: Chapter: 4 & 5.				

Reference

S. No	Author	Title of the book	Publishers	Year of Publication
1.	P.A. Navnitham	Business Mathematics and Statistics	Jai Publishers, Trichy.	2003

Semester : IV

B.Sc (Chemistry/Physics/Botany)

Title : ALLIED - MATHEMATICS FOR SCIENCES II –Level I

Sub Code : TH13A14A

Credits : 5

Hours:101

Objective:

To acquaint the students with the tools in Mathematics to problem solving in as many areas as possible.

UNIT I

20hrs

Integration – Integration by parts – Multiple integrals – Evaluation of the double integral – Changing the order of integration –Double integral in polar co-ordinates.

UNIT II

20hrs

Integration: Evaluation of triple integrals – Application of multiple integrals – Change of variables – Jacobian of two and three variables – Beta and Gamma functions – Relation – Evaluation of double and triple integrals using Beta and Gamma Functions.

UNIT III**20hrs**

Linear differential equations with constant and variable co-efficients: Differential equation of the form $(aD^2 + bD + C)y = e^{ax}\phi(x)$, where a,b,c are constants, $\phi(x) = \sin mx$ or $\cos mx$ or x^m –Solution of homogeneous linear differential equations of the form $(ax^2D^2 + bxD + c)y = X$, where X is a function of x–Equations reducible to the linear homogenous equation.

UNIT IV**20hrs**

Formation of partial differential equations by eliminating arbitrary constants and arbitrary functions – Solutions of standard types of first order equations: $f(p,q) = 0$, $f(x,p,q)=0$, $f(y,p,q)=0$, $f(z,p,q)=0$, $f_1(x,p) = f_2(y,q)$, $z = px+qy+f(p,q)$ – Equations reducible to the standard forms – Lagrange method of solving linear partial differential equation $P_p+Q_q = R$ – Charpit’s Method – Simple problems.

UNIT V**21hrs**

Fourier series: Definition – Finding Fourier coefficients for a given periodic function with period 2π – Odd and Even functions – *Half range series – Change of intervals*.

--- Self-study portions

Text Book

1	S. Narayanan and T.K. M Pillay	<i>Calculus Vol II & III</i>	S. Viswanathan (Printers and Publishers) Pvt. Ltd. – Reprint (2000)
---	--------------------------------	----------------------------------	---

UNIT I & II : VolIII Chapter 1– Section – 12.0.

Chapter 5 –Sections – 2.1 to 4.0, 5.1 to 5.4 &6.1 to 6.3.

Chapter 6 –Sections – 1.1 to 2.4.

Chapter 7 –Sections – 2.1 to 2.3,3,4,5,6.

UNIT III : Vol III Chapter 2 –Sections – 1.0 to 4, 8.0 to 8.3, 9.0.

UNIT IV : Chapter 4 –Sections – 1.0 to 7.0.

UNIT V : Chapter 6 –Sections – 1.0 to 6.0.

Note: (Question paper setters to confine to the above text books only)

Semester : IV

B.Sc (Chemistry/Physics/Botany)

Title : ALLIED - MATHEMATICS FOR SCIENCES I –Level I

Sub Code : TH13A14B

Credits : 5

Hours:101**Objective:**

To acquaint the students with the tools in Mathematics to problem solving in as many areas as possible.

UNIT I**20hrs**

Integration – Multiple integrals – Evaluation of the double integral – Changing the order of integration – Double integral in polar co-ordinates.

UNIT II**20hrs**

Integration: Evaluation of triple integrals – Application of multiple integrals – Change of variables – Jacobian of two and three variables – Beta and Gamma functions – Relation – Evaluation of double and triple integrals using Beta and Gamma Functions.

UNIT III

20hrs

Linear differential equations with constant and variable co-efficients: Differential equation of the form $(aD^2 + bD + C)y = e^{ax}\phi(x)$, where a,b,c are constants, $\phi(x) = \sin mx$ or $\cos mx$ or x^m – Solution of homogeneous linear differential equations of the form $(ax^2D^2 + bxD + c)y = X$, where X is a function of x.

UNIT IV

20hrs

Formation of partial differential equations by eliminating arbitrary constants and arbitrary functions – Solutions of standard types of first order equations: $f(p,q) = 0$, $f(x,p,q)=0$, $f(y,p,q)=0$, $f(z,p,q)=0$, $f_1(x,p) = f_2(y,q)$, $z = px+qy+f(p,q)$ –Equations reducible to the standard forms – Lagrange method of solving linear partial differential equation $P_p+Q_q = R$.

UNIT V

21hrs

Fourier series: Definition – Finding Fourier coefficients for a given periodic function with period 2π – Odd and Even functions – *Half range series – Change of intervals *.

--- Self -study portions

Text Book

1	S. Narayanan and T.K. M Pillay	<i>Calculus Vol II & III</i>	S. Viswanathan (Printers and Publishers) Pvt. Ltd. – Reprint (2000)
---	--------------------------------	----------------------------------	---

UNIT I & II : Vol II Chapter 5 –Sections – 2.1 to 4.0, 5.1 to 5.4 & 6.1 to 6.3.

Chapter 6–Sections– 1.1 to 2.4.

Chapter 7–Sections– 2.1 to 2.3,3,4,5,6.

UNIT III : Vol III Chapter 2 –Sections – 1.0 to 4, 8.0 to8.3.

UNIT IV : Chapter 4 –Sections – 1.0 to 6.0.

UNIT V : Chapter 6–Sections – 1.0 to 6.0.

Note:(Question paper setters to confine to the above text books only)