DEPARTMENT OF MATHEMATICS

RATHINAM COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS)

Rathinam Techzone, Pollachi Road, Eachanari, Coimbatore – 641021

Syllabus for

B.Sc. Mathematics

(I -VI Semester) 2015 – 2016 Batch onwards

Advanced Learners Course papers - applicable from 2013-2014 Batch onwards

RATHINAM COLLEGE OF ARTS & SCIENCE, COIMBATORE-21.
(AUTONOMOUS)
B.SC MATHEMATICS

SCHEME OF EXAMINATION: CBCS PATTERN

(WITH FOUR SEMESTER LANGUAGE PAPER)

(APPLICABLE TO STUDENTS ADMITTED FROM THE ACADEMIC YEAR 2015 – 2016 AND

ONWARDS)

Sem	Part	Type	Sub. Code	Subject & Paper	HRS per week	CIA	ESE	Max mark	Exam Hours	Credit
I	I	L1		Language-I	6	25	75	100	3	4
I	II	E1		English-I	6	25	75	100	3	4
I	III	C1		Core Paper I- Algebra	5	25	75	100	3	3
I	III	C2		Core Paper II-Calculus	5	25	75	100	3	3
I	III	AL1		Allied I- Statistical Methods	6	25	75	100	3	4
I	IV	FCA		Environmental Studies*	2	-	50	50	3	2
II	I	L2		Language-II	6	25	75	100	3	4
II	II	E2		English-II	6	25	75	100	3	4
II	III	C3		Core Paper III-Analytical Geometry	5	25	75	100	3	4
II	III	C4		Core Paper IV- Trigonometry, Vector Calculus	5	25	75	100	3	4
II	III	AL2		Allied II-Advanced Statistical Methods	4	25	75	100	3	4
II	III	ALP1		Allied II-Spss-Practical	2	10	40	50	3	2
II	IV	FCB		Value Education – Human Rights *	2	-	50	50	3	2
III	I	L3		Language-III	6	25	75	100	3	4
III	II	E3		English-III	6	25	75	100	3	4
III	III	C5		Core Paper V-Differential Equations	4	25	75	100	3	4
III	III	C6		Core Paper VI :Statics	3	25	75	100	3	4
III	III	SB1		Skill Based Subject- C	3	15	35	50	3	2
III	III	SBP1		Skill Based Subject- C-Practical	2	10	40	50	3	2
III	III	AL3		Allied III-Accountancy-I	4	25	75	100	3	4
	IV	OL		Tamil ** / Advanced Tamil ** (OR) Constitution Of India*/Communicative English-I *	2	-	50	50	3	2
III		ALC		Advanced Learner Course-I	-	-	100	-	-	#2
IV	I	L4		Language-IV	6	25	75	100	3	4

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IV	II	E4		English-IV	6	25	75	100	3	4
IV	III	C7		Core Paper VII-Dynamics	4	25	75	100	3	4
IV	III	C8		Core Paper VIII-Numerical Methods	3	25	75	100	3	4
IV	III	SB2		Skill Based Subject-C++-Programming	3	15	35	50	3	2
IV	III	SBP2		Skill Based Subject-C++-Practical	2	10	40	50	3	2
IV	III	AL4		Allied IV-Accountancy-II	4	25	75	100	3	4
IV	IV	OL		Tamil ** / Advanced Tamil ** (OR) Non-Major Elective - II General Awareness */Communicative English -II*	2	-	50	50	3	2
IV		ALC		Advanced Learner Course-II	-	-	100	-	-	#2
V	III	C9		Core Paper-IX- Real Analysis-I	6	25	75	100	3	4
V	III	C10		Core Paper X- Modern Algebra	6	25	75	100	3	4
V	III	CP11		Core Paper-XI LT & FS	6	25	75	100	3	4
V	IV	SB3		Elective-I	6	25	75	100	3	4
V	IV	SB4		Skill Based Subject-Operations Research-I	6	25	75	100	3	4
V		ALC		Advanced Learner Course-III	-	-	100	-	-	#2
VI	III	C12		Core Paper XII-Complex Analysis	5	25	75	100	3	4
VI	III	C13		Core Paper XIII-Real Analysis-II	5	25	75	100	3	4
VI	III	SB5		Elective-II	5	25	75	100	3	4
VI	III	SB6		Elective-III	5	25	75	100	3	4
VI	III	SB7		Skill Based Subject-Operations Research-II	5	25	75	100	3	4
VI	III	SB8		Main Project	5	-	-	100	-	4
VI	V			Extension Activity						
VI		ALC		Advanced Learner Course-IV	-	-	100	-	-	#2
				TOTAL				**3500**		**140**

* No Internal Examinations only External Examinations

** No External Examinations only Internal Examinations

- Optional Credits, Advanced Learners will learn and appear for the exam – No Internal Mark and Not Counted for CGPA.

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Elective Subjects

	A	Graph Theory
Elective-I	B	C++ Programming
	C	Number Theory
	A	Java Programming
Elective-II	B	Partial Differential Equations
	C	Discrete Mathematics
	A	Astronomy
Elective-III	B	Fluid Dynamics
	C	Linear Algebra

Advanced Learner Courses

	A	Sampling Theory
ALC-I	B	Matrices
	C	Mathematical quantitative and Verbal Reasoning
	A	Linear Programming
ALC-II	B	History of Mathematics
	C	Business Mathematics
	A	Statistics Quality Control
ALC-III	B	Research Methodology
	C	Mathematical Modelling
	A	Data Analysis
ALC-IV	B	Mathematical Reasoning
	C	Statistics for Business

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SEMESTER-I

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	Tamil-I	6	0	0	4	L1

(nra;As;> fl;Liu> ,yf;fzk;> ,yf;fpatuyhW)

myF 1 jw;fhy ,yf;fpak;

1. ghujpahh;　　　- fz;zd; vd; Njhod;
2. ghujpjhrd;　　- jkpopd; ,dpik
3. ituKj;J　　- kiogpurq;fk; - (,e;j G+f;fs; tpw;gidf;fy;y)
4. fz;zjhrd;　- mtd; jhd; ,iwtd;
5. rpw;gp　　　- jkpo; epyT
6. Nkj;jh　　- kuq;fs;

myF 2 ngz;zpak;

1. jkpor;rp jq;f ghz;bad;　-Kl;fs; %ba ghij
2. fdpnkhop　　　　- nusj;jpuk; jJk;g…
3. kD\;a Gj;jpud;　　- gprhir gof;Fjy;
4. ,sk;gpiw　　- ahjhh;j;j rpijg;G
5. jpyfhkhh　　　- GidT Kfq;fs;

myF 3　fl;Liufs;

1. mwk; vdg;gLtJ – fl;Liufs; - mKjd;

myF 4　,yf;fzk;;

1. ty;ypdk; kpF> kpfh ,lq;fs;
2. ftpij vOJjy;
3. rpWfij vOJjy;
4. Ngr;Rj;jpwd;

myF 5　,yf;fpatuyhW

1. GJf;ftpijapd; Njhw;wKk; tsh;r;rpAk;
2. ciueilapd; Njhw;wKk; tsh;r;rpAk;
3. rpWfijapd; Njhw;wKk; tsh;r;rpAk;

gapw;rpf;Fhpad

nkhopngah;g;G

ghh;it Ehy;fs; : ,yf;fpa tuyhW – Nguh. Kidth; ghf;fpaNkhp

SEMESTER: I

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	English-I	6	0	0	4	E1

Objectives

1. To make students to understand and use familiar everyday expressions.
2. To inculcate a sense of appreciate and enjoyment of English prose and Poetry.

UNIT - I
1. Prose   -   The Stonecutter
2. Poem   -   Mending Wall by Robert Frost
3. Letter writing   -   Introduction (Formal Vs Informal)
4. Grammar   -   Parts Of Speech

UNIT - II
1. Prose   -   A Serious Case - by Chris Rose
2. Poem   -   Night Of The Scorpion by Nissim Ezekiel
3. Letter writing   -   Letters of Complaint, & Apology & Invitation
4. Grammar   -   Tenses

UNIT - III
1. Prose   -   Scarlett by Chris Rose
2. Poem   -   Loveliest Of Trees by A. E. Housman
3. Letter writing   -   Asking for /Giving Advice
4. Grammar   -   Making Subject Verb Agreement & Punctuation Marks

UNIT - IV
1. Prose   -   My Financial Career by Stephen Leacock
2. Poem   -   Where The Mind Is Without Fear By Rabindranath
                                 Tagore
3. Letter writing   -   Letter of Application
4. Grammar   -   Question Tag

UNIT - V
1. Prose   -   The Gift of Magi by O. Henry
2. Poem   -   Death, Be Not Proud (Holy Sonnet 10) John Donne
3. Letter writing   -   Asking of information /Making Request
4. Grammar   -   Wh Questions

Reference Book

1. Dr. M. Richard Robert Raa. (2015). KALOS. Laxmi Publications (P) Ltd. New Delhi.

2. Dr. Sumanth, English for Engineers

3. Raymond Murphy, English Grammar in Use. Cambridge University press

4. Learnenglish.britishcouncil.org/stories

SEMESTER: I

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	Core - I - Algebra	5	0	0	3	Core

Subject description: This paper focuses on the convergence and divergence of different types of series, also discusses the standard methods of solving both polynomial and transcendental type equations.

Goal: To enable the students to learn about the convergence and divergence of the series and to find the roots for the different types of the equation.

Objectives: On successful completion of this paper the students should gain knowledge about the convergence of series and solving equations.

UNIT I:
Binomial, exponential theorems-their statements and proofs- their immediate application to summation and approximation only.

UNIT II:
Logarithmic series theorem-statement and proof-immediate application to summation and Approximation only. Convergency and Divergency of series –definitions, elementary results comparison tests-De Alemberts and Cauchy's tests.

UNIT III:
Absolute convergence-series of positive terms-Cauchy's condensation test- Raabe's test.

UNIT: IV
Theory of equations: Roots of an equation- Relations connecting the roots and Coefficients-transformations of equations-character and position of roots-Descarte's rule of signs-symmetric function of roots-Reciprocal equations.

UNIT V:
Multiple roots-Rolle's theorem - position of real roots of f(x) =0 - Newton's method of approximation to a root - Horner's method.

Treatment as in
Algebra-T.K .Manicavachasam Pillai, T.Natarajan, K-S Ganapathy.S. Viswanathan Printers & Publishers Private Ltd-2013.

UNIT I: Chapter

Reference:

1. Mathematics for B.Sc. Branch I -Vol. I- P. Kandasamy and K. Thilagavathy (For B.Sc-I semester) S. Chand and Company Ltd, New Delhi, 2004.

SEMESTER-I

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	Core - II - Calculus	5	0	0	3	Core

Subject description: This paper presents the idea of curvatures, integration of different types of functions, its geometrical applications, double, triple integrals and improper integrals.

Goal: To enable the students to geometrical applications.

Objectives: On successful completion of paper the students should have gain about the evolutes and envelopes, different types of integrations, its geometrical application, proper and improper integration.

UNIT I:

Curvature-radius of curvature in Cartesian and polar forms-evolutes and envelopes- pedal equations- total differentiation- Euler's theorem on homogeneous functions.

UNIT II:

Integration of f'(x)/f(x), f'(x) $\sqrt{f(x)}$,(px+q)/$\sqrt{ax^2 + bx + c}$)], [√(x-a)/(b-x)],

[√(x-a)(b-x),1/[√(x-a)(b-x),1/(acosx+bsinx+c),1/(acos^{2}x+bsin^{2}x+c),Integration by parts

UNIT III:

Reduction formulae- problems- evaluation of double and triple integrals- applications to calculations of areas and volumes-areas in polar coordinates.

UNIT IV:

Change of order of integration in double integral- Jacobions.- change of variables in double and triple integrals.

UNIT V:

Notion of improper integrals, their convergence, simple tests for convergence simple problems, Beta and Gamma integrals-their properties, relation between them- evaluation of multiple integrals using Beta and Gamma functions.

Text Book:

1. Calculus vol 1 and vol 2- S. Narayanan and T.K.M. Pillai. Viswanathan Publishers,2013.

Reference:

1. Mathematics for BSc – Vol I and. II - P. Kandasamy & K.Thilagarathy S.Chand and Co-2004

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SEMESTER-I

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	Allied- I -Statistical Methods	6	0	0	4	Allied

Subject description: This course introduces Statistical concepts.

Goal: To enable the students to understand mathematical aspects of statistics.

Objective: on successful completion of the paper the students should have understood the concepts of probability, various discrete and continuous probability distributions and the concepts of correlation and regression.

UNIT-I:

Origin, scope, limitations of Statistics - Collection – Classification - Tabulation of data and Diagrammatic representation of data: Types of variables – Random, Discrete, Continuous Variables.

UNIT-II:

Measures of central tendency: Mean, Median, Mode, Geometric mean and Harmonic Mean, Measures of Dispersion: Mean deviation, Quartile deviation and Standard deviation – Coefficient of variation.

UNIT-III:

Probability – Concept and Definition – Addition and Multiplication theorems of Probability (statement only) – simple problems. Probability distributions: Binomial, Poisson and Normal distributions and their properties (without proof) - simple problem

UNIT-IV:

Correlation – Meaning and Definition – Types of Correlation - Scatter diagram, Karl Pearson's co-efficient of Correlation - Spearman's Rank Correlation – Concept and Simple problems, Regression Analysis – Meaning of regression and linear prediction – Regression in two variables – Simple problems.

UNIT-V:

Time Series – Meaning and Components– Methods of estimating trend – Graphic, Semi-average, Moving average and Method of Least squares – Seasonal Variation – Method of Simple average

Text Book:

1.Fundamentals of Applied Statistics -S.C.Gupta & V.K.Kapoor, sultan chand & sons, Educational publishers, New Delhi.

2.Business Mathematics and Statistics by P.A. Navaneetham, Jai Publishers,Trichy-2012

Reference Books:

Fundamentals mathematical Statistics -S.C.Gupta & V.K.Kapoor, sultan chand & sons, Educational publishers, New Delhi.

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SEMESTER-I

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	Environmental Studies	2	0	0	2	FCA

Subject description: This course introduces Environmental concepts and its importance.

Goal: To enable the students to understand importance of environmental issues.

Objective: on successful completion of the paper the students should have understood the concepts of Save Environment and importance of Environment.

UNIT I

Multi Displinary nature of environmental studies: Definition –Scope and importance- need for public awareness-natural recourses : introduction-renewable and non-renewable recourses-Forest Recourses-Water recourses-mineral recourses-food resources-land recourses-Role of an individual in conservation of natural resources.

UNIT II

Eco systems: Concept of an ecosystems-ecosystem degradation-Resource utilization-structure and functions of an ecosystem-Procedures , consumers and decomposers-energy flow in the ecosystem-food chains, food webs and ecological pyramids.

UNIT III

Environmental Pollution**:** Definition-Causes, effects and control measures – solid waste management-role of individual in pollution prevention- Disaster management- Floods-Earthquakes-cyclones-landslides.

UNIT IV

Social issues and the environment - From unsustainable development – urban problems related to energy – water conservation, rain water harvesting- watershed management – Resettlement and Rehabilitation of people, its problems and concerns

UNIT V

 Environment ethics – climate change – global warming – acid rain – ozone layer depletion – nuclear accidents – wasteland reclamation – consumerism and wasteland reclamation – environment protection act –(air , water, wildlife and forest) – public awareness.

Text Books
1. Environmental Studies- Erach Bharucha

Reference Book:
2. Agarwal KC, 2001. Environmental Biology, Nidi Publishing Ltd.Bikaner
3. Down to Earth, Center for science and environment

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SEMESTER-II

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	Tamil-II	6	0	0	4	L2

(gf;jp ,yf;fpak;> rpw;wpyf;fpak;>mw ,yf;fpak;> rpWfijfs;>,yf;fpa tuyhW)

myF 1 gf;jp ,yf;fpak;

1. Mz;lhs;   - jpUg;ghit (10 ghly;fs;)
2. ts;syhu;   - 10 ghly;fs;
3. Njk;ghtzp   - 10 ghly;fs;
4. rPwhg;Gwhzk;   - 10 ghly;fs;
5. fhiuf;fhy; mk;ikahh; - jpUthyq;fhl;L gjpfk; (10 ghly;fs;)

myF 2 rpw;wpyf;fpak;

1. kPdhl;rpak;ikg; gps;isj;jkpo; - 2 ghly;fs;
2. fypq;fj;Jg;guzp - Nfhapy; ghbaJ
3. kJiuf;fyk;gfk;
4. fps;is tpL J}J

myF 3 mw ,yf;fpak;

1. jpUf;Fws; - mwj;Jg;ghy; - nrhy; td;ik
         nghUl;ghy;   - mikr;R
         ,d;gj;Jg;ghy; - jifazq;F cWj;jy;
2. Mrhuf;Nfhit – Kjy; 10 ghly;fs;
3. gonkhop – 5 ghly;fs; (20>40>46>66>278)
4. ed;ndwp – 5 ghly;fs;

myF 4 rpWfijfs;

1. rpWfijfs; -10 fijfs; (GJikg;gpj;jd-5;> nIafhe;jd;-5)

myF 5**;** ,yf;fpa tuyhW

1. ePjp ,yf;fpak;
2. rpw;wpyf;fpak;
   gf;jp ,yf;fpak; - irtk;> itztk;> ngsj;jk;>rkzk;> ,];yhkpak;> fpwpj;Jtk;
   (K.t.,yf;fpatuyhW gf;jpg;ghly;fs; (1 to 30) gf;fk; rkaNehf;F tiffs;.

SEMESTER-II

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	English-II	6	0	0	3	E2

Objectives

To encourage students to inculcate effective communication

UNIT I

- **Communication**
  - o Verbal and Non Verbal
  - o Barriers of communication
  - o Process of Communication
- **Communication through Body Language**
  - o Eye Contact
  - o Body Posture
  - o Distance Contact
  - o Facial Expression
  - o Gestures
  - o Vocal Tone
- **Communication through Technology**
  - o Telephonic Etiquette
  - o Email Etiquette
  - o SMS Language

UNIT II

- **Oral Communication**
  - o Public Speaking
  - o Presentation Skills
  - o Group Discussion

UNIT III

- **Written Communication**
  - o Report Writing
  - o Precis Writing
  - o Technical Proposals
  - o Writing for conferences & journals

UNIT IV

- **Corporate Communication**
  - o Intrapersonal Communication
  - o Interpersonal Communication
  - o Group Communication
  - o Meetings
  - o Agenda & Minutes
  - o Memo

UNIT V

- **Etiquette and Manners**
  - o Table Etiquette
  - o Workplace Etiquette
  - o Social Etiquette
  - o Dress Etiquette
  - o Toilet Etiquette

Reference Book

1. Dr. M. Richard Robert Raa. (2015). Developing Communication Skills . Laxmi Publications (P) Ltd. New Delhi.
2. Dr. Sumanth, English for Engineers

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3. Meenakshi Raman & Sangeetha Sharma, Technical Communication, Oxford University Press
4. Krishna Mohan, Developing Communication Skills, Macmillian

SEMESTER: II

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	Core - III -Analytical Geometry	5	0	0	4	Core

Subject Description: This paper gives emphasis to enhance student knowledge in two dimensional and three Dimensional analytical geometry. Particularly about two dimensional conic sections in polar coordinates and the geometrical aspects of three dimensional figs, viz, sphere, cone and cylinder, Conicoides.

Goal: To enable the students to learn and visualize the fundamental ideas about co-ordinate geometry.

Objectives: On successful completion of the paper students should have gained knowledge above the regular geometrical figures and their properties.

UNIT I

Analytical geometry of 2D-Polar Equations -directrix- chord tangent- normal- Problems.

UNIT II

Analytical Geometry 3D-straight lines-co planarity of straight-line-shortest distance (S.D) and equation of S.D between two lines.

UNIT III

Sphere: standard equation of sphere-results based on the properties of a sphere-tangent plane to a sphere-equation of a circle.

UNIT IV

Cone and cylinder: Cone whose vertex is at the origin- envelope cone of a sphere-right circular cone-equation of a cylinder-right circular cylinder.

UNIT V

Conicoides: Nature of a conicoide- standard equation of central conicoid –enveloping cone tangent plane-condition for tangency –director Sphere- director plane.

Text Book

1. Analytical Geometry by P. Durai Pandian & Kayalal Pachaiyappa, 2009.

Reference

1. Analytical Geometry of 2D by T.K. M. Pillai and Others – Viswanathan Publications- 2010

2. Analytical Geometry of 3D by T.K. M. Pillai and Others – Viswanathan Publications- 2009

SEMESTER II

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	Core - IV -Trigonometry, Vector Calculus	5	0	0	4	Core

Subject Description: This paper presents the circular functions, hyperbolic functions, Differentiation of functions in scalar.

Goal: To enable the students to learn about the expansion of trigonometrically functions

Objectives: On successful completion of this paper the students should have gained knowledge about expansion of trigonometric functions and Fourier series.

UNIT-I

Expansion in Series – Expansion of $\cos^n \theta$, $\sin^n \theta$ in a series of cosines and sines of multiples of θ – Expansions of $\cos n\theta$ and $\sin n\theta$ in powers of sines and cosines .

UNIT II

Expansion of $\sin \theta$, $\cos \theta$ and $\tan \theta$ in powers of θ – hyperbolic functions and inverse hyperbolic functions.

UNIT III

Logarithm of complex quantities - summation of series – when angles are in arithmetic

progression – C + iS method of summation – method of differences.

UNIT IV

Scalar and vector fields –Differentiation of vectors – Gradient, Divergence and Curl.

UNIT V

   Integration of vectors – line integral – surface integral – Green's theorem in the plane – Gauss divergence theorem – Strokes theorem – (Statements only) - verification of the above said theorems.

Text Book

1. T.K. Manichavasagam Pillai and S.Narayanan, Trigonometry - Viswanathan Publishers and Printers Pvt. Ltd,2013

2. Calculus vol III-- S. Narayanan and T.K.M. Pillai. Viswanathan Publishers,Pvt,Ltd-2010.

References

1. Kandasamy. P, Thilagavathi. K " Mathematics for B.Sc. Branch I", Volume I II and IV, S.Chand and Company Ltd, New Delhi, 2004.

SEMESTER-II

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	Allied- II -Advanced Statistical Methods	4	0	0	4	Allied

Subject description: This paper introduces Applied Statistical concepts and mathematical analysis.

Goal: To enable the students to understand mathematical aspects of applied statistics.

Objective: on successful completion of the paper the students should have understood the concepts of estimation ,testing ,sampling, design of experiments

UNIT-I

Concept of population, sample, statistics, parameter-point estimation-concept of point estimation - consistency, Unbiasedness, Efficiency- Sufficiency - Cramer Rao inequality - Rao-Blackwell theorem

UNIT-II

Test of hypothesis: Statistical hypothesis - simple and composite hypothesis, null and alternative hypotheses - sample and parameter space – two types of errors – critical region - power test. Test of significance - standard error - large sample tests with respect to mean, proportion, difference between means, - exact tests based on t, chi-square and F distributions - simple applications

UNIT-III

Elementary ideas on distribution – free and non - parametric tests – Run, Median, Sign

And Mann Whitney tests (without proof) - Equality of two distributions

UNIT-IV

Sampling – Methods of Sampling – Simple random sampling, Stratified random sampling, Systematic random sampling and Cluster sampling – Sampling and Non-sampling errors. Analysis of variance: one way, two classifications - fundamental principles of experimentation-CRD, RBD and LSD

UNIT-V

Need for SQC – Role of frequency distribution – Statistical basis for SQC – variable

Control charts – X, R and σ charts.   Quality system standards - ISO 9000 - Elements of ISO 9000 – Benefits of ISO 9000 - Elements of a quality system – Documentation ISO 9000 accreditation

Text Book

1.Fundamentals of Applied Statistics -S.C.Gupta & V.K.Kapoor, sultan chand & sons, Educational publishers, New Delhi.

Reference Books

Fundamentals mathematical Statistics -S.C.Gupta & V.K.Kapoor, sultan chand & sons, Educational publishers, New Delhi.

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SEMESTER-II

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	SPSS Practical	2	0	0	2	Allied

Subject description:
This course introduces the application of statistical tools on industrial   environment to study, analyze.

Goal:
To enable the students to know the concepts of application of statistical tools on industrial   environment to study

Experiments:

1. Creating Frequency Distribution.
2. Creating charts for the Frequency Distribution.
3. Correlation and Regression.
4. Test of Significance w.r.t Mean and Proportion.
5. Difference of two means.
6. t test – paired and independent cases.
7. Chi-square Distribution
8. F-Distribution.
9. Non parameter test.
10. Control charts.

SEMESTER-II

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	Value Education – Human Rights	2	0	0	2	FCB

UNIT – I

Aim of education and value education; Evolution of value oriented education; Concept of Human values; types of values. Self analysis and introspection; sensitization towards gender equality, physically challenged, intellectually challenged. Respect to - age, experience, maturity, family members, neighbours, co-workers.

UNIT – II

Constitutional or national values - Democracy, socialism, secularism, equality, justice, liberty, freedom and fraternity. Social Values - Pity and probity, self control, universal brotherhood.Professional Values - Knowledge thirst, sincerity in profession, regularity, punctuality and faith.

UNIT – III

Conflict of cross-cultural influences, mass media, cross-border education, materialistic values, professional challenges and compromise. Modern Challenges of Adolescent Emotions and behavior; Sex and spirituality: Comparision and competition; positive and negative thoughts.

UNIT - IV

Control of the mind through
a. Simplified physical exercise
b. Meditation – Objectives, types, effect on body, mind and soul
c. Activities:
(i) Moralisation of Desires
(ii) Neutralisation of Anger
(iii)Eradication of Worries
(iv) Benefits of Blessings

UNIT; V

Concept of Human Rights – Indian and International Perspectives- Broad classification of Human Rights and Relevant Constitutional Provisions.- Human Rights of Women and Children- Institutions for Implementation- Violations and Redressel

TEXT BOOKS

1. International Bill of Human Rights, Amnesty International Publication, 1988.

REFERENCE BOOK

1. . Human Rights, Questions and Answers, UNESCO, 1982
2. . Maurice Cranston- What is Human Rights

SEMESTER-III

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	Tamil-III	6	0	0	4	L3

myF 1 fhg;gpaq;fs;

1. rpyg;gjpfhuk; - ,e;jpu tpohhT+nuLj;j fhij
2. kzpNkfiy - kzpNkfyh nja;tk; te;J Njhd;wpa fhij

myF 2 fhg;gpaq;fs;

1. nghpa Guhzk; - nka;g;nghUs; ehadhh; Guhzk;
2. fk;guhkhazk; - Re;ju fhz;lk; - #lhkzpg; glyk;
3. rPtf rpe;jhkzp – ehl;Ltsk; (30-59) 30 ghly;fs; kl;Lk;

myF 3 ehty;

1. Gjpdk; - fy;kuk; -jpyftjp

myF 4 ,yf;fzk;> tpz;zg;gk; kw;Wk; fbjk; vOJjy;

1. mzpapyf;fzk; -1. cUtf mzp 2. ctik mzp 3.jw;Fwpg;Ngw;wzp
      4.rpNyil mzp 5. Cah;T etpw;rp mzp

2. tpz;zg;gk;> nra;jpf;Fwpg;G kw;Wk; fbjk;
   tpz;zg;gk;- NtiyNtz;b> trjpNtz;b…
   nra;jpf;Fwpg;G- fy;Y}hp epfo;T….
   fbjk;- ghuhl;L> ed;wp> gaz mDgtk;…

myF 5 ,yf;fpatuyhW

1. Ik;ngUq;fhg;gpaq;fs;
2. IQ;rpW fhg;gpaq;fs;
3. gpw;fhyf; fhg;gpaq;fspd; Njhw;wKk;> tsh;r;rpAk;
   (nghpaGuhzk;> fk;guhkhzk;> ghujrpjp kfhfhtpak;> ghz;bad; ghpR> G+q;nfhb>
   ,uhtzfhtpak;)
4. Gjpdq;fspd; Njhw;wKk;> tsh;r;rpAk;

   gapw;rpf;Fhpad
         1. nghJf;fl;Liu vOJjy;
         2. ftpij vOJjy;
         3. rpWfij vOJjy;

ghh;itE}y;fs;

1. Gjpa Nehf;fpy; jkpo; ,yf;fpa tuyhW - jkpoz;zy;

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2. tifik Nehf;fpy; ,yf;fpatuyhW – ghf;fpaNkhp
   ghlIEhy; - jkpo;f;fsQ;rpak;

SEMESTER-III

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	English-III	6	0	0	4	E3

UNIT – I - POETRY

1. Tables Turned   - William Wordsworth

2. Let me not to the marriage of true minds   - William Shakespeare

3. Menelanus and Helen   - Rupert Brooke

UNIT – II - ONE ACT PLAY

1. Refund   - Rritz Karinthy

2. Anthony and Cleopatra   - William Shakespeare

UNIT – III - PROSE

1. My Early Days   - Dr. A.P.J Abdul Kalam

2. Mother Terasa   - Khuswant Singh

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SEMESTER III

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	Core - V - Differential Equations	4	0	0	4	Core

Subject description: This paper presents the method of solving ordinary differential Equations of First Order and Second Order, Partial Differential equations. Also it deals with Laplace Transforms, its inverse and Application of Laplace Transform in solving ordinary Differential Equations with constant coefficients and Fourier series.

Goals: It enables the students to learn the method of solving Differential Equations.

Objectives: End of this paper, the students should gain the knowledge about the method of solving Differential Equations. It also exposes Differential Equation as a powerful tool in solving problems in Physical and Social sciences.

UNIT I

Differential Equations and their formation- Solution of differential equation - Rule to form the differential equation from a given equation is x and y containing arbitrary constants- Simple problems.

UNIT II

First order higher degree equations- solvable for x, y, p- Clairaut's form - Simultaneous equations $F_1(D)x + F_2(D)y = F(t)$ and $G_1(D)x + G_2(D)y = G(t)$ F_1, F_2, G_1, G_2 are rational functions of $D = d/dt$ and F,G are explicit functions of t.

UNIT III

Ordinary differential equations: General solution of Second order ODE with constant coefficient - Higher order equations where f(D) is easily factorizable.

UNIT IV

Partial differential equations: Formation by elimination of arbitrary constants and arbitrary functions - general, particular and complete solutions .

Partial differential equations :Singular and general solutions of first order equations the standard form: $f(p, q) = 0$, $f(x, p, q) = 0$,$f(y, p, q) = 0$,$f(z, p, q) = 0$, $f(x, p,) = g(y, q)$, $z = p(x) + q(y) + f(p ,q)$ and Lagrange's method of solving linear PDE $Pp + Qq = R$.

UNIT V

Homogeneous Linear Equation - Introduction - Reduce the Homogeneous linear Equation into linear equation - with constant co-efficient - Simple problems.

 Treatment as in

Kandasamy. P, Thilagavathi. K "Mathematics for B. Sc - Branch - I Volume III", S. Chand and Company Ltd, New Delhi, 2004.

References:

Approved in the UG – Mathematics BOS Meeting on 25-05-2016

1) S. Narayanan and T.K. Manickavasagam Pillai, Calculus, S. Viswanathan (Printers and Publishers) Pvt. Ltd, Chennai 1991

2).N.P.Bali, Differential Equations, Lakshmi Publications Ltd, New Delhi, 10 th edition,2006.

SEMESTER III

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	Core - VI -Statics	3	0	0	4	Core

Subject Description: This paper contains the nature of forces acting on a surface, friction and centre of gravity.

Goal: To enable the students to realize the nature of forces and resultant forces when more than one force acting on a particle.

Objectives: On successful completion of paper the students should realize the concept about the forces, resultant force of more than one force acting on a surface, friction and centre of gravity. Also we can differentiate static and dynamic forces.

UNIT I

Introduction - Forces - types of Forces - Equilibrium of two forces - Forces acting at a point - Parallelogram law of forces - Analytical expression for resultant of two forces acting at a point- triangle law of forces- Perpendicular triangle law of forces- Converse of the Triangle law of forces - The polygon law of forces - Lami's theorem - Simple problem.

UNIT II

Resolution of a forces - 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 - Conditions of Equilibrium of any number of forces acting upon a particle- Simple problems.

UNIT III

Parallel forces & Moments : Introduction- The resultant of two like parallel forces acting on a rigid body- The resultant of two unlike &un equal parallel forces acting on a rigid body- Resultant of a number of parallel forces acting on a rigid body - Moment of a force - Geometrical representation of a moment - sign of the moment - unit of moment - Varigon's theorem of Moments.

UNIT IV

Couples- Equilibrium of two couples - Equivalence of two couples - Couples in parallel planes - Resultant of coplanar couples - Resultant of a couple and a force - Simple problems.

UNIT V

Coplanar forces - Reduction of any number of coplanar forces - Conditions for a system of forces to reduce to a single force or to a couple- Equation to the line of action of the resultant - Simple Problems.

Text Book

Approved in the UG – Mathematics BOS Meeting on 25-05-2016

Dr. M.K.Venkataraman, "Statics", Agasthiar Publications, Trichy,15th edition,2012.

References

A.V.Dharmapadam, " Statics", S.Viswanathan Printers and Publishing Pvt., Ltd, 2011.

SEMESTER III

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	SB1 -C-Programming	3	0	0	2	SB1

Subject Description: This paper presents the importance of c language, its structure, Data types, Operators of C, Various control statements, Arrays, different types of functions and practical problems.

Goals: To enable the students to learn about the basic structure, Statements, arrays, functions and various concepts of C language.

Objectives: On successful completion of the paper the students should have:

Learnt the basic structure, operators and statements of c language. Learnt the decision making statements and to solve the problems based on it. Learnt arrays, functions and solve the problems Regarding about it.

UNIT – I

Overview of C - Introduction - Character set - keyword & Identifiers -Constants - Variables - Data types - Defining Symbolic Constants – Expressions.

UNIT – II

Arithmetic operators - Relational operators - logical operators –assignment operators –increment and decrement operates –Conditional operators – Special operators – formatted input and output.

UNIT – III

Decision Making and Branching -The Switch statement - The GOTO statement - Decision Making and Looping -The WHILE statement - The DO statement - The FOR statement - Jumps in Loops .

UNIT – IV

Functions – User defined functions –function types - Need for user Defined functions – A Multi-function program –Structures

UNIT – V

Arrays – Character Arrays — Strings ,standard string function - One and Two Dimensional arrays - Multidimensional arrays.

TEXT BOOKS

1 Programming in ANSI C – E.Balagurusamy , 3rd edition– Tata McGraw hill publishing Company Ltd.,2005.

REFERENCE BOOK:

Programming with ANSI and Turbo C – Ashok. N. N.Kamthane   – Pearson Education.

SEMESTER III

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	C-Practical	0	0	2	2	SBP1

1. Write a C program to find the sum, average, standard deviation for a given set of numbers.

2. Write a C program to generate "n" prime numbers.

3. Write a C program to generate Fibonacci series.

4. Write a C program to print magic square of order n where n > 3 and n is odd.

5. Write a C program to sort the given set of numbers in ascending order.

6. Write a C program to print all possible roots for a given quadratic equation.

7.Write a C program to sort a set of numbers.

8. Write a C program to sort the given set of names.

9.Write a C program to find the product of two given matrix.

10. Write a C program to prepare pay list for a given data.

SEMESTER III

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	Allied - III -Accountancy-I	4	0	0	3	AL3

Goal: To enable the students to learn principles and concepts of Accountancy.

Objective: On successful completion of this course, the student should have understood Concepts and conventions of Accounting &Basic Accounting framework.

UNIT –I

Fundamentals of Book Keeping – Accounting Concepts and Conventions – Journal – Ledger – Subsidiary books – Trial balance.

UNIT – II

 Final accounts of a sole trader with adjustments – Errors and rectification.

UNIT – III

 Bills of exchange - Accommodation bills – Average due date – Account current.

UNIT – IV

 Accounting for consignments and Joint ventures.

UNIT – V

 Bank Reconciliation statement – Receipts and Payments and income and expenditure

account and Balance sheet – Accounts of professionals.

REFERENCE BOOKS

1. N.Vinayakam, P.L.Mani, K.L.Nagarajan – Principles of Accountancy – S.Chand & Company Ltd.,

2. T.S.Grewal – Introduction to Accountancy- S.Chand & Company Ltd.,

3. R.L.Gupta, V.K.Gupta, M.C.Shukla – Financial Accounting – Sultanchand & sons

4. T.S.Grewal, S.C.Gupta, S.P.Jain – Advanced Accountancy- Sultanchand & sons

5. K.L.Narang, S.N.Maheswari - Advanced Accountancy-Kalyani publishers

SEMESTER III

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type

Module	Communicative Situations	Category	Hours
I	Nouns , verbs ,pronouns, adjectives, adverbs , gerunds , infinitives	**Grammar**	**10**
	Direct and indirect speeches , active and passive voice , prepositions , articles , conjunctions , interjections		
II	Reading written instruction / advice	**Reading**	**10**
	Reading abstracts of projects		
	Reading Journals and publications		
	Reading Manuals		
	Reading Office documents		

	Communicative English & Soft Skills	2	0	0	2	OL

Introduction: This course introduces the basic Grammar and various soft skills required for the student to meet the corporate needs during placements.

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III	Delivering oral presentations	Speaking	7
	Attending meetings / occasional visits		
	Talking about daily life situations		
	Telephonic conversation with Boss/Clients		
	Facing interviews		
	Public speeches formal/informal		
	Listening in international seminars	**Listening**	**3**

Objective: The objective of this program is to make the students communicate soundly in English to meet the corporate requirements and it grooms them in various soft skills.

Evaluation Mode: 50 marks objective type test at the end of the course

SEMESTER-IV

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	Tamil-IV	6	0	0	4	L4

myF- I : rq;f ,yf;fpak;;

    1. ew;wpiz   - 1. 'gL Rlh; mile;j gF tha; neL tiu' - gh.v-33

            2. rpW nts;shq;FUNf! rpW nts;sq;FUNf!-gh.v-70

  2. FWe;njhif   1. Kl;L Ntd;nfhy; jhf;F Ntd;nfhy;…(28-ghiy)

            2. Mk;gw; g+tpd; rhk;gyd;d…(46-kUjk;)

  3. fypj;njhif - 1. kiyapDk; nghpNj – FwpQ;rpf;fyp gh.v -12

            2. mwKk; fhjyUk; - FwpQ;rpf;fyp gh.v – 26.

  4. Iq;FWEhW   - gUtq;fz;L fpoj;jpAiuj;jgj;J (10 ghly;fs;)

  5. gjpw;Wg;gj;J   - 1 gfy; ePL MfhJ ,uTg;nghOJ ngUfp!

             (Mwhk; gj;J gh.v-59)

myF- II

  1. mfehDhW   - 1 md;dha;! thop Ntz;L md;id epd;kfs;

       (mfk;-fspw;Wahidepiu –gh.v-48)

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2. GwehDhW   - 1. rpwg;gpy; rpjLk;> cWg;gpy; gpz;lKk; - 28

                    2. ,Uk;gid ntz;NfhL kiye;Njhd;… 45

 3. ghpghly;   - 1. jpUkhy; tho;j;J

                    jPapDs;njwy; eP.............gpwg;gpj;Njhh; ,iyNa....

                2. nrt;Nts; -. cUT jphpj;Njd;! - (gh.v- 5)

 4. Ky;iyg;ghl;L   — KOtJk;

myF- III: ,jopay;

   1. nra;jp Nrfhpg;G

   2. nra;jp vOJjy; Kiw

   3. Ngl;bAk; mjd; tiffSk;

   4. nra;jp tiff;

myF IV : ehlfk;

        1. Ntiyf;fhhp - Mrphpah; mz;zhJiu

myF - V: ,yf;fpa tuyhW

 1. vl;Lj;njhif

 2. gj;Jg;ghl;L

 3. ,jopaypapd; Njhw;wKk;> tsh;r;rpAk;

 4. jw;fhy ehlfq;fs;

   gapw;rpf;Fhpad

 1. ,yf;fpaj; jpwdha;T

 2. ,yf;fpaf; fye;Jiuahly;

 3. E}y; kjpg;gPL

 4. ,jo; jahhpj;jy;

ghh;it Ehy;fs;

   ,jopay; fiy - ,uhr .gh. FUrhkp

SEMESTER-IV

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	English-IV	6	0	0	4	E4

UNIT – I

Synonyms – Antonyms – Prepositions – Prefixes – Suffixes – Definitions – Editing - Letter Writing – Word Formation – Punctuation Marks – Infinitives - Gerunds

UNIT – II

Tag Questions – Phrasal verbs – Modal Verbs – Reading Comprehension – Jumbled Sentences – Chart and Diagrams – Paragraph Writing

UNIT – III

Numerical Expressions – British and American English – Homophones – Homonym – Note making – Checklist – Report writing

UNIT – IV

Technical Report Formatting – Notices – Agenda – Minutes – Memo – Connectives – odd Words – SI UNITs

REFERENCE BOOK

1. **English for Engineers - Dr. Sumant -**

SEMESTER IV

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	Core - VIII – Dynamics	4	0	0	3	Core

Subject Description: This paper provides the knowledge about the field Kinematics, projectile, simple harmonic motion and impact of a particle on a surface.
Goal: To enable the students to apply Laws, Principles, Postulates governing the Dynamics in physical reality.

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Objectives: End of this paper, the student understands the reason for dynamic changes in the body.

UNIT – I

   Kinematics: Velocity - Parallelogram law of velocity - Components of a velocity along two given directions - Triangle law of a velocities –Polygon law of velocities - Relative Velocity - Angular Velocity of a particle moving along a circle with uniform speed- Angular Velocity of a particle moving along any curve- Simple Problems.

UNIT - II

          Acceleration - Parallelogram law of Acceleration - Motion in a straight line under uniform acceleration - The equations of motion of a particle under constant acceleration - Acceleration of falling bodies - Vertical motion under gravity - Bodies freely falling down ward - Motion of a particle down a smooth include plane - The law of motion- Newton's law of motion- Simple problems.

 UNIT –III

Weight - difference between mass& weight - conservation linear momentum - force of   friction - Motion of a particle on a rough horizontal plane under the action of a constant force- Pressure of a body resting on a moving horizontal plane - Simple problems - Momentum of Inertia - Uniform rod - Rectangular lamina - Uniform Rectangular Parallelepiped of edges 2a,2b,2c- Simple problems

UNIT - IV

Projectiles: Path of   a projectile is a parabola- Characteristics of the motion of a projectile - Horizontal range of a projectile is maximum - velocity of the projectile in magnitude and direction at the end of time t - Simple problems.

UNIT - V

Impulsive force - Impact   of two bodies - Loss of Kinetic energy in impact - motion of   a shot & gun- Impact of water on surface - Simple problems

Treatment as in

M.K. Venkataraman, "Dynamics", 14th Ed. Agasthiar Publications, Trichy, 2011.

References

1. A.V.Dharamapadam , "Dynamics", S.Viswanathan Printers and Publishers Pvt., Ltd, Chennai, 1st edition,2011.

2. K.Viswanatha Naik and M.S.Kasi, "Dynamics", Emerald Publishers, 2004.

3. Naryanamurthi, "Dynamics", National Publishers, New Delhi, 2008.

Semester IV

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	Core - IX -Numerical Methods	3	0	0	4	CORE

Subject Description: This paper presents method to solve linear algebraic and transcendental equations and system of linear equations. Also Interpolation by using finite difference formulae.

Goal: It exposes the students to study numerical techniques as powerful tool in scientific

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computing.

Objective: On successful completion of this paper the student gain the knowledge about solving the linear equations numerically and finding interpolation by using difference formulae.

UNIT I The solution of numerical algebraic and transcendental Equations:
Bisection method- Regula Falsi Method - Newton Raphson method

UNIT II

Solution of simultaneous linear algebraic equations: Gauss elimination method - Gauss Jacobi method - Gauss Seidel method

UNIT III

Finite Differences- operators - forward and backward difference tables - Central difference Interpolation formulae: Gauss forward and backward formulae - Lagrange's formula-

UNIT IV

Numerical Differentiation: Newton's forward and backward formula - Numerical Integration: Trapezoidal rule - Simpson's 1/3rd and 3/8th rules

UNIT V

Numerical solution of ordinary differential equations : Taylor series method - Euler's method - Modified Euler method - Runge Kutta methodc(Fourth order Runge Kutta method only)

Treatment as in

Kandasamy. P, Thilagavathi. K and Gunavathi. K   "Numerical methods" - S. Chand and Company Ltd, New Delhi - 2009.

References:

1. Venkataraman M. K.,"Numerical Methods in Science and Engineering" National Publishing company V Edition 1999.

2. Sankara Rao K., "Numerical Methods for Scientists and Engineers" 2

nd Edition Prentice Hall India 2004.

SEMESTER IV

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	SB 2 -C++--Programming	3	0	0	2	SB2

Subject Description : This paper enriches the knowledge of students on the Applicability of OOPs concept with the help of C++

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Goals: To promote the knowledge of OOPs Concepts through C++.
Objectives: After the successful completion of the paper the student must be able to construct an Application with C++

UNIT – I
OOPs: A New Paradigm – Evaluation of Programming Paradigm – Objects – Classes — OOPs Languages –Application of OOPs.
UNIT –II
Application of C++ - Structure of C++ Program – Tokens, Expression -Basic Data Types – Symbolic Constants – Operator in C++ - Function.
UNIT – III
Array of Objects – Friend Function -Pointer to Members — Operator Overloading and Type Conversions – Overloading – Function Overloading – Special Features of Function Overloading.
UNIT – IV
Inheritance – Single Inheritance –public - Private – Protected Inheritance – Multilevel Inheritance – Multiple Inheritance – Hierarchical Inheritance – Hybrid Inheritance – Polymorphism – Virtual Functions
UNIT – V
 C++ Streams – Stream Classes -Unformatted I/O Operation – Managing Console I/O Operations - Classes for File Stream Operations – Opening and Closing a file.

Text Books:
1. E.Balagurusamy - 'Object Oriented programming with C++', 3rd edition, McGraw Hill Publishing Company Limited, 2006.

Books for Reference:
1. Ashok N.Kamthane – 'Object Oriented Programming with ANSI and Turbo C++', Pearson
2. D.Ravichandran, "Programming with C++", Tata McGraw-Hill Publishing CompanyLimited, New Delhi, 2002.

SEMESTER IV

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	C++--Practical	0	0	2	2	SBP2

1. Program to calculate depreciation under Diminishing Balance method (Using

class, defining member function inside the class)

2. Program to print the Employees' payroll statement (using control structures).

3. Program to calculate simple Interest and compound Interest(using nested class).

4. Program to calculate net income of a family(using friend function in two classes).

5. Program to print the book list of library(using array of objects).

6. Program to prepare cost sheet (using inheritance).

7. Program to calculate margin of safety (using multilevel inheritance).

8. Program for bank transaction (using constructor and destructor).

9. Program to calculate increase or decrease in working capital using operator overloading.

10. Program to create the student file and prepare the marks slip by accessing the file.

SEMESTER IV

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	Allied - IV -Accountancy-II	4	0	0	3	AL4

Goal: To enable students to learn the Principles and Concepts of Accountancy.

Objective: On successful completion of the course, the student should have understood the Concepts and Conventions of Accounting & Basic Accounting Framework.

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UNIT -I:

Depreciation - Meaning- Features- Methods- Straight Line Method– WDV Method - Annuity Method - Sinking Fund Method.

UNIT- II :

Single Entry System – Meaning and Features – Statement of Affairs Method and Conversion Method.

UNIT -III :

Departmental Accounts –Branch Accounts excluding Foreign Branches.

UNIT- IV :

Hire Purchase and Installment Systems excluding Hire Purchase Trading Account.

UNIT - V :

Royalties excluding Sub - lease.

Books for Reference:

1. Principles of Accountancy - M.C.Shukla

2. Introduction to Accountancy - T.S.Grewel

3. Financial Accounting - R.L.Gupta & Radhaswamy

4. Advanced Accountancy - S.N.Maheswari

5. Principles of Accountancy - N. Vinayakam, P.L. Mani, K.L. Nagarajan

6. Fundamentals of Accounting- Jain and Narang

SEMESTER IV

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	Communicative English & Analytical Skills	2	0	0	2	OL

Approved in the UG – Mathematics BOS Meeting on 25-05-2016

Introduction: This course introduces the basic Grammar and various analytical skills required for the student to meet the corporate needs during placements.

Objective: The objective of this program is to make the students to solve various quantitative

problems and to communicate soundly in English to meet the corporate requirements and it grooms them in various soft skills.

Evaluation Mode: 50 marks objective type test at the end of the cours

Module	Communicative Situations	Category	Hours
I	Number series , Simplifications	**Aptitude**	**10**
	Average , percentage , profit and loss		
	Work and Time , speed , Time and distance		
	Permutation and combinations, probability		
	Problems on ages		
	Data Table , pie chart , bar charts		
	Mixed graph		
	Data sufficiency		
II	Doing post graduate study	**Writing**	**10**
	Joining field trips abroad		
	Training abroad		
	Resolving conflicts		
	Negotiating with team members		
III	Teleconferencing	**Multi skills**	**10**
	Working in a team		
	Doing post graduate study		
	Joining field trips abroad		
	Training abroad		
	Resolving conflicts		
	Negotiating with team members		
	Teleconferencing		
	Working in a team		

SEMESTER-V

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	Core - X -Real Analysis-I	6	0	0	4	Core

Subject Description : This paper focuses on the Real and Complex number systems, set theory, point set topology and metric spaces.
Goal: To introduce the concepts which provide a strong base to understand and analysis mathematics.

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Objective: On successful completion of this paper the students should gain the knowledge about real and complex numbers, sets and metric space.

UNIT-I

The real and complex number systems: Introduction- The field axioms-The order axioms-Intervals-Integers-The unique factorization theorem for integers-Rational numbers-Irrational numbers-Upper bound, Maximum element, least upper bound-The completeness axiom –Some properties of the supremum-Properties of the integers deduced from the completeness axiom-The Archimedian property-Absolute values and the triangular inequality-The Cauchy-Schwartz inequality-plus and minus infinity and the extended real number system R^*.

UNIT-II

Some basic notations of set theory: Notations-ordered pairs-cartesian product of two sets-Relations and functions-one to one functions-sequences-finite and infinite sets-countable and uncountable sets-uncountability of the real number system-set algebra-countable collection of countable sets.

UNIT-III

Elements of point set topology: Euclidean space R^n- Open balls and open sets in R^n-The structure of open sets in R^1-closed sets-Adherent points –Accumulation points-closed sets and adherent points- The Bolzono-Weierstrass theorem-The Cantor intersection theorem-The Lindelof covering theorem-The Heine Borel covering theorem-Compactness in R^n.

UNIT-IV

Metric Spaces-Point set topology in metric spaces-Compact subsets of a metric space-boundary of a set. **Limits and continuity:** Convergent sequences in a metric space-Cauchy sequences-Complete metric spaces-limit of a function-limits of vector valued functions.

UNIT-V

Continuous functions- Continuity of composite functions- continuity and inverse images of open or closed sets-Connectedness- Uniform continuity- Uniform continuity and compact sets- Discontinuities of real valued functions- Monotonic functions.

TEXTBOOK:
Tom. M. Apostol, Mathematical Analysis, 2nd edition, Addison Wesley, Narosa Publishing Company, Chennai,2002.

References:
1. F.Simmons, Introduction to Topology and Modern Analysis, Mc Graw-Hill, Newyork,2004.
2. J.N.Sharma and A.R.Vasistha, Real Analysis, Krishna Prakashan Media (P) Ltd, 40th edition,2012.

SEMESTER V

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	Core - XI -Modern Algebra	6	0	0	4	Core

Subject Description : This course provides knowledge about sets, mappings, Different types of groups and rings.

Goal: To enable the students to understand the concepts of sets, groups and rings. Also mappings on sets, groups and rings.

Objective: On successful completion of the course, the students should have concrete knowledge about the abstract thinking like sets, groups and rings by proving theorems.

UNIT I
Sets – mappings – Relations and binary operations. Groups: Abelian group, Symmetric group Definitions and Examples – Basic properties.

UNIT II
Subgroups – Cyclic subgroup - Index of a group – Order of an element – Fermat theorem - A Counting Principle - Normal Subgroups and Quotient Groups.

UNIT III
Homomorphisms – Cauchy's theorem for Abelian groups– Sylow's theorem for Abelian groups Automorphisms – Inner automorphism - Cayley's theorem, permutation groups.

UNIT IV
Rings: Definition and Examples –Some Special Classes of Rings – Commutative ring – Field – Integral domain - Homomorphisms of Rings.

UNIT V
Ideals and Quotient Rings – More Ideals and Quotient Rings – Maximal ideal - The field of Quotients of an Integral Domain.

TEXTBOOK:

1. I. N. Herstein, Topics in Algebra, John Wiley & Sons, New York, 2003.

References

1.Surjeet Singh and Qazi Zameeruddin, Modern Algebra, Vikas Publishing house, 1992.

2. A.R.Vasishtha, Modern Algebra, Krishna Prakashan Mandir, Meerut, 1994 - 95.

SEMESTER-V

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	Core - XII -Linear Transformation & Fourier Series	6	0	0	4	Core

Goal: It exposes the students to study transform techniques as powerful tool in engineering.

Approved in the UG – Mathematics BOS Meeting on 25-05-2016

Objective: To Introduce Fourier series analysis which is central to many applications in engineering apart from its use in solving boundary value problem and make the student appreciate the purpose of using transforms to create a new domain in which it is easier to handle the problem that is being investigated.

UNIT – I
LINEAR TRANSFORMS: Introduction – Linear equation and matrices - Evaluation of LT – Inverse of LT - Canonical forms –Triangular form - Nilpotent transformations. Jordan form – rational canonical form.

UNIT II
FOURIER SERIES: Introduction - Dirichlet's conditions – General Fourier series – Odd and even functions – Half range sine series – Half range cosine series – Complex form of Fourier series – Parseval's identity – Harmonic analysis.

UNIT III
FOURIER TRANSFORMS: Statement of Fourier integral theorem – Fourier transform pair – Fourier sine and cosine transforms – Properties – Transforms of simple functions – Convolution theorem – Parseval's identity.

UNIT IV
 LAPLACE TRANSFORM: Laplace transform –Sufficient condition for existence –Transform of elementary functions –Basic properties –Transforms of derivatives and integrals of functions Derivatives and integrals of transforms -Transforms of unit step function and impulse functions – Transform of periodic functions.

UNIT V
INVERSE LAPLACE TRANSFORM: Inverse Laplace transforms -Statement of Convolution theorem –Initial and final value theorems –Solution of linear ODE of second order with constant coefficients using Laplace transformation techniques.

TEXTBOOK:
1. Veerarajan. T, " Transforms and Partial Differential Equation", Tata McGraw Hill Education Pvt. Ltd., Second Reprint, New Delhi, 2012.
2. Bali.N.P and Manish Goyal, " A Textbook of Engineering Mathematics", 7th Edition, Laxmi Publications Pvt. Ltd., 2007.
References:
1. Grewal.B.S., " Higher Engineering Mathematics", 41st Edition, Khanna Publications, Delhi 2011.
2. Narayanan.S., Manicavachagom Pillay.T.K and Ramanaiah.G " Advanced Mathematics for Engineering Students" Vol. II & III, S. Viswanathan Publishers Pvt. Ltd., 1998.

SEMESTER-V

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	SB – 3 Operations Research – I	6	0	0	4	SB3

Approved in the UG – Mathematics BOS Meeting on 25-05-2016

Subject description: This course contains advantages, limitations and applications of O.R, formulation of Linear Programming Problems (L.P.P), methods to solve L.P.P. like simplex method, Penalty Method and Two Phase Simplex method. Also it deals about duality in L.P.P, Transportation and Assignment Problems with applications

Goal: It enables the students to use the mathematical knowledge in optimal use of resources.

Objectives: On successful completion of this course students should have gained knowledge about optimal use of resources.

UNIT I:

Basics of O.R – Definition of O.R – Characteristics of O.R - Scientific methods in O.R –
Necessary of O.R in Industry – O.R and Decision Making – Scope of O.R in Modern Management – Uses and limitations of O.R. Linear Programming Problem – Formulation of L.P.P – Graphical solutions of L.P.P – Simplex Method-Problems.

UNIT II:

Penality Method (or) Big – M Method - Duality in L.P.P – Concept of duality – Duality and Simplex Method – Problems

UNIT III:

The transportation Problems – Basic feasible solution by L.C.M – NWC- VAM optimum
solutions – unbalanced Transportation problems.
The Assignment Problems – Assignment algorithm – optimum solutions – Unbalanced
Assignment Problems

UNIT IV:

Network scheduling by PERT / CPM – Introduction – Network and basic components – Rules of Network construction – Time calculation in Networks – CPM. PERT – PERT calculations – Cost Analysis – Crashing the Network – Problems.

UNIT V:

1. Linear Programming Problems 2. Transportation Problems 3. Assignment Problems 4. PERT (Case Studies based on the above stated models)

TEXTBOOK:

1. Operations Research – Kandiswarup, P. K. Gupta, Man Mohan, S. Chand & Sons Education Publications, New Delhi, 12th Revised edition.

References:

1. Operations Research – Prem Kumar Gupta D. S. Hira, S. Chand & Company Ltd, Ram Nagar, New Delhi

2. Operations Research Principles and Problems: S. Dharani Venkata Krishnan, Keerthipublishing house PVT Ltd.

SEMESTER-VI

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	Core - XIII -Complex Analysis	5	0	0	4	Core

Subject description: This paper provides the knowledge about complex number system and complex functions.

Goal: To enable the students to learn complex number system, complex function and complex integration.

Objectives: On successful completion of this paper   the students should gained knowledge about the origin, properties and application of complex numbers and complex functions.

UNIT I

Complex number system, Complex number –Field of Complex numbers – Conjugation – Absolute value -Argument –Simple Mappings.

i) $w = z + \alpha$ ii) $w = az$ iii) $w = 1/z$, $w = e^z$ (iv) $w = z^{1/2}$; (v) $w = \sin z$

invariance of cross-ratio under bilinear transformation – Conformal Mapping

UNIT II

Complex functions: Limit of a function –continuity –differentiability – Analytical function defined in a region –Conjugate Hamiltonian function-necessary conditions for differentiability –sufficient conditions for differentiability –Cauchy-Riemann equation in Cartesian polar coordinates –Definition of entire function.

UNIT III

Cauchy's integral   theorem- problem based on Cauchy's derivatives –Taylor's series –Laurent's series .

UNIT IV

Singularities and Residues: Isolated singularities –Residues –Residue theorem. Meromorphic functions: Theorem on number of zeros minus number of poles –Principle of argument

UNIT V

Real definite integrals: Evaluation using the calculus of residues – Integration on the unit circle –Integral with - ∞ and + ∞ as lower and upper limits with the following integrals:
i) $P(x) /Q(x)$ where the degree of $Q(x)$ exceeds that of $P(x)$ at least 2. Rouche's theorem – Fundamental Theorem of Algebra-Morera's theorem.

Text Book

1. P.Duraipandian and Kayalal Pachappa, Complex Analysis, Emerald Publishers, Chennai – 2,1986.

References

1. . P.Duraipandian and Laxmi Duraipandian, Complex Analysis,Emerald Publishers, Chennai-2,1986.

2.Santhinarayan , Theory of functions of Complex Variable, S.Chand and Company, Meerut, 1995.

3.Lars V. Ahlfors, Complex Analysis, Mc Graw Hill company,Newyork, 3rd Edition.

SEMESTER-VI

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	Real Analysis-II	5	0	0	4	Core

Subject description: This paper focuses on the Real and Complex number systems, set theory, point set topology and metric spaces.

Goal: To introduce the concepts which provide a strong base to understand and analysis mathematics.

Objective: On successful completion of this paper the students should gain the knowledge about real and complex numbers, sets and metric space.

UNIT-I:

Derivatives: Introduction-Definition of a derivative-Derivative and continuity-Algebra of derivatives-The chain rule-One sided derivatives and infinite derivatives-Function with non-zero derivatives-Zero derivatives and local extrema- Rolle's theorem-The mean value theorem for derivatives-Intermediate value theorem for derivatives-Taylor's formula with remainder.

UNIT-II:

Functions of bounded variations: Introduction-properties of monotonic functions-functions of bounded variations-total variations- total variation on [a,x] as a function of X- functions of bounded variation expressed as the difference of increasing functions-continuous functions of bounded variation.

UNIT-III:

The Riemann- Stieltjes integral: Introduction-notation-the definition of of Stieltjes integral-linear properties-integration by parts-change of variable in Riemann-Stieltjes integral-reduction to Riemann-Stieltjes integrals to a finite sum-Euler's summation formula.

UNIT-IV:

Monotonically increasing integrals- upper and lower integral- Additive and linearity-Properties of upper and lower integral- Riemann's conditions-comparison theorems- integrals of bounded variation-sufficient condition for existence of Riemann- Stieltjes integrals.

UNIT-V:

Mean value theorms for Riemann-Stieltjes integrals-The integral as a function of the integral-second fundamental theorem of integral calculus-change of variable in a Riemann integral-Second mean value theorem for Riemann integrals.

TEXTBOOK:

1.Tom. M. Apostol, Mathematical Analysis, 2nd edition, Addison Wesley, Narosa Publishing Company, Chennai,2002.

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References:

1. F.Simmons, Introduction to Topology and Modern Analysis, Mc Graw-Hill, Newyork,2004.

Approved in the UG – Mathematics BOS Meeting on 25-05-2016

2. J.N.Sharma and A.R.Vasistha, Real Analysis, Krishna Prakashan Media (P) Ltd, 40th edition,2012.

SEMESTER VI

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	PROJECT	4	0	0	8	Core

To be eligible to register for project work, student should have minimum of 60% in overall aggregate mark in all the five semester.

For Project work

1. Student has to choose a guide.

2. Project dissertation and project viva carry 40 marks each.

3. Project dissertation to be evaluated by an examiner other than guide.

4. Project viva is to be evaluated by a committee consisting of the guide and at least one more examiner.

5. A duly filled-in form and three copies of the dissertation has to be submitted [by the Student] to the Mathematics office on or before the last date prescribed by the class committee.

SEMESTER-VI

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	SB4 - Operations Research – II	5	0	0	4	SB4

Subject description: This course contains advantages, limitations and applications of O.R, The Maxmini – Minimax principle, Characteristics of Queueing, Types of inventories and Simulation.

Goal: It enables the students to use the mathematical knowledge in optimal use of resources.

Objectives: On successful completion of this course students should have gained knowledge about optimal use of resources.

UNIT I

Game Theory – Two person zero sum game – The Maxmini – Minimax principle – problems - Solution of 2 x 2 rectangular Games – Domination Property – (2 x n) and (m x 2) graphical method – Problems.

UNIT II

Queueing Theory – Introduction – Queueing system – Characteristics of Queueing system – symbols and Notation – Classifications of queues – Problems in (M/M/1) : (∞/FIFO); (M/M/1) : (N/FIFO); (M/M/C) : (∞/FIFO); (M/M/C) : (N/FIFO) Models.

UNIT III

Inventory control – Types of inventories – Inventory costs – EOQ Problem with no shortages – Production problem with no shortages – EOQ with shortages – Production problem with shortages – EOQ with price breaks.

UNIT IV

Simulation – Introduction – simulation models – Event – Types of simulation - Generation of Random Numbers – Mante-carlo simulation – simulation of queueing system.

UNIT V

Decision Analysis – Decision Making environment – Decisions under uncertainty – Decision under risk – Decision – Tree Analysis.

TEXTBOOK:

1. Operations Research – Kandiswarup, P. K. Gupta, Man Mohan, S. Chand & Sons Education Publications, New Delhi, 12th Revised edition.

References:

1. Operations Research – Prem Kumar Gupta D. S. Hira, S. Chand & Company Ltd, Ram Nagar, New Delhi

2. Operations Research Principles and Problems: S. Dharani Venkata Krishnan, Keerthipublishing house PVT Ltd.

ELECTIVE-I

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	Graph Theory	5	0	0	4	Elective

Subject description: This paper focuses on the basic concepts of graph theory, connectedness, eulerian graphs, and Hamiltonian graphs, also discusses the characteristics of trees, planarity and chromatic number.

Goal: To enable the students to learn about the Basic concepts of graph theory.

Objectives: On successful completion of this paper the students should gain knowledge about the Basic concepts of graph theory, characteristics of trees.

UNIT-I:
     Graphs and Subgraphs - Operations of graphs.

UNIT-II:
     Isomorphism of graphs Walks - Trails and Paths and cycles.
UNIT-III:
   Connected graphs – Trees.

UNIT-IV:
   Connectivity - Eulerian graphs - Hamiltonian graphs.

UNIT-V:

     Planarity: Plane and Planar graphs - Kuratowski's Theorem.
Text books:
1. S. Kumaravelu, Susheela Kumaravelu, Graph Theory, SKV Publishers, Sivakasi, 1999.

Reference:
1. Harary: "Graph Theory" (Narosa Publishing HQCK).
2. Graph Theory with applications to Engineering & Computer Science - Narsingh DEO PHI Learning Pvt. Ltd., 2011.

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ELECTIVE-I

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	C++--Programming	5	0	0	4	Elective

Subject Description: This paper enriches the knowledge of students on the Applicability of OOPs concept with the help of C++.

Goals: To promote the knowledge of OOPs Concepts through C++.

Objectives: After the successful completion of the paper the student must be able to construct an Application with C++.

UNIT – I
OOPs: A New Paradigm – Evaluation of Programming Paradigm – Objects – Classes — OOPs Languages –Application of OOPs.

UNIT –II
Application of C++ - Structure of C++ Program – Tokens, Expression -Basic Data Types – Symbolic Constants – Operator in C++ - Function.

UNIT – III
Array of Objects – Friend Function -Pointer to Members — Operator Overloading and Type Conversions – Overloading – Function Overloading – Special Features of Function Overloading.

UNIT – IV
Inheritance – Single Inheritance –public - Private – Protected Inheritance – Multilevel Inheritance – Multiple Inheritance – Hierarchical Inheritance – Hybrid Inheritance – Polymorphism – Virtual Functions

UNIT – V
 C++ Streams – Stream Classes -Unformatted I/O Operation – Managing Console I/O Operations Classes for File Stream Operations – Opening and Closing a file.

Text Books:
1. E.Balagurusamy - 'Object Oriented programming with C++', 3rd edition, McGraw Hill Publishing Company Limited, 2006.

References:
1. Ashok N.Kamthane – 'Object Oriented Programming with ANSI and Turbo C++', Pearson.

2. D.Ravichandran, "Programming with C++", Tata McGraw-Hill Publishing CompanyLimited, New Delhi, 2002.

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ELECTIVE-I

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	Number theory	5	0	0	4	Elective

Subject description: This paper focuses on the basic concepts of Number Theory.
Goal: To enable the students to learn about the Basic concepts of Number Theory.
Objectives: On successful completion of this paper the students should gain knowledge about the Basic concepts of Divisiblity, congruences and Arithmetic functions.

UNIT I
     Introduction, Divisibility, Primes.

UNIT II
     Congruences, solutions of congruences –Chinease Remainder Theorem-Prime power moduli-Prime modulus- Primitive roots and power residues.

UNIT III
     Congruences degree 2 - prime modulus -Number theory from an algebraic view point - Multiplicative groups.

UNIT IV
     Quadratic reciprocity –Quadratic residues -The Jacobi Symbol – Greatest integer function.

UNIT V
     Arithmetic functions – The Moebius Inversion formula – The multiplication of arithmetic functions – Reccurrence functions..

Text Book:

1. An Introduction to Theory of Numbers by Ivan Nivan and Herberts Zucherman. Third Edition, 1976, Wiley Eastern Limited, New Delhi.

References:

1. T.M. Apostol, Introduction to Analytic Number Theory, Springer Verlag, 1976.

2. Kennath and Rosan, Elementary Number Theory and its Applications, Addison Wesley Pulishing Company, 1968.

3. George E. Andrews, Number Theory, Hindustan Publishing, New Delhi, 1989.

ELECTIVE - II

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	Java Programming	5	0	0	4	Elective

Subject Description: This subject deals with Java Programming concepts.
Goal: Enable to create wide range of Applications and Applets using Java.
Objective: To inculcate knowledge on Java Programming concepts.

UNIT-I

Fundamentals of Object- Oriented Programming: Object-Oriented Paradigm –Basic Concepts of object- Oriented Programming– Benefits of Object- Oriented Programming–Application of object- Oriented Programming. Java Evolution: History – Features– How Java differs from C and C++ Java and Internet–Java and www–Web Browsers. Overview of Java: simple Java program Structure – Java Tokens –Statements –Java Virtual Machine.

UNIT-II

Constants, Variables, Data Types-Operators and Expressions

UNIT-III

Decision Making and Branching: if, if ..else, nested if, switch, ? : Operator -Decision Making and Looping: while, do, for–Jumps in Loops -Labeled Loops–Classes, Objects and Methods.

UNIT-IV

Arrays, Strings and Vectors –Interfaces: Multiple Inheritance –Packages: Putting Classes together –Multithreaded Programming.

Managing Errors and Exceptions – Applet Programming -multithreaded Programming.

UNIT-V:

Managing Input / Output Files in Java : Concepts of Streams-Stream Classes –Byte Stream classes –Character stream classes –Using streams –I/O Classes –File Class –I/O exceptions – Creation of files –Reading / Writing characters, Byte-Handling Primitive data Types –Random Access Files.

TEXTBOOKS:

1. PROGRAMMING WITH JAVA –A PRIMER -E. Balagurusamy, 3rd Edition, TMH.

REFERENCE BOOKS:

1. THE COMPLETE REFERENCE JAVA 2 -Patrick Naughton &Hebert Schildt, 3rd ed,TMH

2. PROGRAMMING WITH JAVA –John R. Hubbard, 2nd Edition, TMH

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ELECTIVE-II

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	Partial Differential Equations	5	0	0	4	Elective

Subject description: This course is designed to give an overview of Partial Differential Equations.

Goal: To introduce students to areas of active research in Partial Differential Equations.

Objectives: This course aims to discuss Mathematical models, wave equation, separation of variables and Greens function.

UNIT I
Mathematical Models: The Classical equation – The vibrating string – The vibrating membrane – Conduction of Heat in solids. Classification of second order equations: Second order equations in two independent variables – Cannonical forms – equations with constant coefficients – general solution.

UNIT II
 The Cauchy problem – Cauchy – Kowlalewsky theorem –Homogeneous wave equation – Initial – Boundary value problems – Non-homogeneous boundary conditions – Finite string with fixed ends – Non-homogeneous wave equation.

UNIT III
Methods of separation of variables: Seperation of variables – The vibrating string problem – Existence and Uniqueness of solution of the vibrating string problem.

UNIT IV
Boundary value problems: Boundary value problems – Maximum and minimum
principles – Uniqueness and continuity theorems – Dirichlet problems for a circle –Dirichlet problems for a circular annulus.

UNIT V
Green's function: The delta function – Green's function – method of Green's function –Dirichlet problem for the Laplace operator – method of images – method of eigen functions.

Text Book:
1. Partial Differential Equations for Scientists and Engineers, 3rd Edition, by Tyn Myint. U with Lokenath Debnath,1987
References:
1. L.C.Evans, Partial Differential Equations, AMS, Providence, R I, 2003.

2.. I.N.Sneddon, Elements of Partial Differential Equations, McGraw Hill, London, 1957.

ELECTIVE- II

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	Discrete mathematics	5	0	0	4	Elective

Subject Description: This paper focuses on the mathematical logic, Relations& Functions, Formal languages and Automata, Lattices and Boolean Algebra and Combinatorics.

Goal: To enable the students to learn about the interesting branches of Mathematics.

Objectives: To extend student's Logical and Mathematical maturity and ability to deal with abstraction and to introduce most of the basic terminologies used in computer science.

UNIT-I
Mathematical logic: Statements and notation-Connectives-Normal forms-The theory of inference for the statement calculus-The predicate calculus-Inference theory and predicate calculus.

UNIT- II
Set theory: Sets-Basic concepts-Notation-Inclusion and equality of sets- The power set-Relations and the ordering-properties-relation matrix and graphof a relation-partiotion-equivalence and compatibility relations-composition-partial ordering-partially ordered set.

UNIT-III
Functions-definitions-composition-inverse-binary operations-characteristic functions-Hashing functions

UNIT-IV
Algebraic structures: Algebraic systems-examples and general properties-semi groups and monoids-definitions and examples-homomorphisms of semigroups and monoids-sub semigroups and sub monoids

UNIT-V
Groups:Definitions and examples-cosets and Lagrange-s theorem-normal subgroups-algebraic systems with two binary operations.

Text Book:
1**.** M.K Venkatraman, N. Sridharan, And N, Chandrasekaran Discrete Mathematics, The National Publishing Company,2000.

References:
1 J.P.Tremblay and R.P Manohar "Discrete Mathematical Structures with applications to computer science", Mc.Graw Hill, 1997.

2. Venkatraman .M.K ,Sridharan.M and Chandrasekaran.N, Discrete Mathematics, The national publishing company,2000

ELECTIVE- III

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	Astronomy	5	0	0	4	Elective

Subject Description : This course focuses on the Solar system, Celestial sphere, Dip-Twilight & Keplar's laws.

Goal: To enable the students to understand the Astronomical aspects and about the laws governing the planet movements.

Objectives: On successful completion of this course the students should gain knowledge about Astronomy.

UNIT I

General description of the Solar system. Comets and meteorites – Spherical trigonometry.

UNIT II

Celestial sphere – Celestial co – ordinates – Diurnal motion – Variation in length of the day.

UNIT III

Dip – Twilight – Geocentric parallex.

UNIT IV

Refration – Tangent formula – Cassinis formula.

UNIT V

Kepler's laws – Relation between true eccentric and mean anamolies.

Text Book:

1. "ASTRONOMY" by S.Kumaravelu and Susheela Kumaravelu.

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ELECTIVE-III

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	Fluid dynamics	5	0	0	4	Elective

Subject description: This course is designed to give an overview of fluid dynamics from a mathematical viewpoint.

Goal : To introduce students to areas of active research in fluid dynamics.

Objectives :   This course aims to discuss kinematics of fluids in motion, Equations of motion of a fluid, three dimensional flows, two dimensional flows and viscous flows.

UNIT I
Introductory Notions – Velocity – Stream Lines and Path Lines – Stream Tubes
and Filaments – Fluid Body – Density – Pressure..

UNIT II
Differentiation following the Fluid –Equation of continuity – Boundary conditions – Kinematical and physical – Rate ofchange of linear momentum – Equation of motion of an inviscid fluid.

UNIT III
Two Dimensional Motion– Complex Potential –basic singularities – source – sink – Vortex – Circle theorem. Flow past a circular cylinder with circulation – Blasius Theorem – Lift force. (Magnus effect)

UNIT IV
Viscous flows – Navier-Stokes equations – Steady flow through an arbitrary cylinder under pressure – Steady Couettc flow between cylinders in relative motion – Steady flow between parallel planes.

UNIT V
Laminar Boundary Layer in incompressible flow: Boundary Layer concept –Boundary Layer equations – Displacement thickness, Momentum thickness – Kinetic energy thickness – integral equation of boundary layer.

Text Book:

1. For UNITs I and II:
   Treatment as in: Theoretical Hydro Dynamics by L.M. Milne Thomson, McMillan Company, 5th Edition (1968).
2. For UNITs III, IV and V:
   Treatment as in Modern Fluid Dynamics – (Volume I) by N. Curle aand H.J.Davies, D Van Nostrand Company Limited., London (1968).

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ELECTIVE- III

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	Linear algebra	5	0	0	4	Elective

Subject description: This course provides knowledge about matrices, vector and dual spaces and linear transformation.

Goals: To enable the students to understand the concepts of matrices, vector and dual spaces and linear transformation.

Objectives: To introduce and develop abstract concepts and to understand the subject as a tool Applicable to all other branches of Science, Engineering and Technology.

UNIT I
Vector Spaces: Definition and Examples- Vector Subspace- Basics and dimension of a vector spaces- Quotient spaces.

UNIT II
Linear Transformations: Linear transformations-Representation of a linear maps by matrices – Kernel and image of linear transformation- Some special linear transformation.

UNIT III
 Inner Product space: Orthogonality – Orthonormal basis- Orthogonal complements and projections- Orthogonal transformation.

UNIT IV
Determinants: 2X2 determinants as area of a parallelogram –Determinants and properties – Computation of determinants- Basic results on determinants.

UNIT V
Determinants: Orientation and vector product.
Diagonalization: Eigen values and Eigen vectors- Diagonalization of symmetric matrices.

Text Book:
1. Linear Algebra, S.Kumaresan, PHI Learning Private Ltd Delhi-2017

Reference Books:

1. Theory of Matrices -B.S. Vatssa, Second Revised Edition-Wiley Eastern Limited 1995.

2. Topics in algebra I. N. Herstein ,Second Edition-John Wiley Sons (ASIA) Pvt Ltd 2004.

SEMESTER III

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	Sampling Theory	0	0	0	#2	ALC

Objective: The course will start with the fundamentals steps involved in the development of any sample survey.

UNIT I

Census and sample surveys – principal steps in a sample survey – Pilot survey – NSSO, CSO and its functions. Concept of sampling and non-sampling errors – sources of non-sampling errors – response errors, Randomized response technique-Finite population – sampling techniques – SRSWR/SRSWOR.

UNIT II

Stratified random sampling – systematic random sampling and results on estimation of population mean and total – Allocation problems in stratified random sampling.

UNIT III

Ratio and Regression estimators based on SRSWOR and Stratified random sampling. Cluster sampling – clusters of equal size – estimation of mean and its variance – optimum cluster size.

UNIT IV

Unequal probability sampling: PPSWR/WOR, Cumulative total and Lahiri's scheme. Methods and related estimators of finite population mean – Hurwitz-Thompson estimators – Desraj estimator for a general sample size and Murthy estimator for a sample of size.

UNIT V

Two stage sampling with equal first stage units – estimation of mean and its variance (Determination of sampling, sub sampling fractions) – optimum allocation. Double sampling: Double sampling for stratification – Double sampling for Ratio estimator – Double sampling for Regression estimator

Text Book:
1. Cochran, W.G. (977). Sampling Techniques, John Wiley, New York.
2. Desraj and Chandok. (998). Sampling Theory, Narosa, New Delhi.

REFERENCES:
1. Murthy M.N.(977), Sampling Theory and Methods, Statistical Publishing Society, Calcutta.

2. Singh, D. and Chaudhary, F.S. 986). Theory and Analysis of Sample Survey Designs, Wiley Eastern, New Delhi.

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SEMESTER III

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	Matrices	0	0	0	#2	ALC

UNIT-I

LINEAR EQUATIONS IN LINEAR ALGEBRA-Systems of Linear Equations -.Row eduction and Echelon Forms - Vector Equations - The Matrix Equation $Ax = b$ - Solution Sets of Linear Systems - Linear independence - Introduction to Linear Transformations - The Matrix of a Linear Transformation

UNIT-II.

MATRIX ALGEBRA- Matrix Operations -. The Inverse of a Matrix - Characterizations of Invertible Matrices - Linear Subspaces - Dimension and Rank.

UNIT-III.

DETERMINANTS- Introduction to Determinants - Properties of Determinants

UNIT-IV.

EIGENPROBLEMS - Eigenvaluesn and Eigenvectors - The Characteristic Equation - Diagonalization

UNIT -V.

ORTHOGONALITY AND LEAST-SQUARES- Inner Product, Length, and Orthogonality Orthogonal Sets - Orthogonal Projections - The Gram-Schmidt Process (no QR Factorization)

Text Book:

1. **Navanitham, P.A,"** Business Mathematics & Statistics" Jai Publishers,Trichy-21

2. **Sundaresan and Jayaseelan,"**Introduction to Business Mathematics",Sultan chand Co& Ltd,Newdelhi

References:

1. **Sanchetti, D.C and Kapoor, V.K,"** Business Mathematics" , Sultan chand Co& Ltd,Newdelhi

2. **G.K.Ranganath, C.S.Sampamgiram &Y.Rajan**-A Text book Business Mathematics - Himalaya Publishing House.

SEMESTER III

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	Mathematics For Quantitative Aptitude & Verbal Reasoning	0	0	0	#2	ALC

Goal: To enable the students to know the concepts of Quantitative Aptitude.

UNIT - I

Area-Average – Calendar - Chain Rule - Puzzles

UNIT – II

Partnership-Percentage - Pipes and Circumstances - Problems on age

UNIT – III

Problems on boat and steam – Ratio - Simple Interest-Time and work

UNIT - IV

Mental Ability and logical reasoning - Analogy Test - Series Test - Same Class (Odd) Test - Logical Venn Diagram - Syllogism.

UNIT -V

Analytical Reasoning - Mirror Images-Water Image - (Number Letter Figure) - Completion of Incomplete Pattern - Grouping of Identical figures.

Text Book

Mental Ability and Logical Reasoning – R.S. Agarwal - S. Chand and Company Ltd, New Delhi.

Approved in the UG – Mathematics BOS Meeting on 25-05-2016

Semester IV

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	Linear Programming	0	0	0	#2	ALC

Subject description: This course contains Basics of O.R, Simplex Method, Transportation Problems, Assignment Problems and Simulation.
Goal: It enables the students to use the mathematical knowledge in optimal use of resources.
Objectives: On successful completion of this course students should have gained knowledge about optimal use of resources.

UNIT I
Basics of O.R – Definition of O.R – Characteristics of O.R - Scientific methods in O.R – Necessary of O.R in Industry – O.R and Decision Making – Scope of O.R in Modern Management – Uses and limitations of O.R. Linear Programming Problem – Formulation of L.P.P – Graphical solutions of L.P.P – Problems.

UNIT II
Simplex Method – Charles Penality Method (or) Big – M Method - Two Phase Simplex method – Problems.

UNIT III
Duality in L.P.P – Concept of duality – Duality and Simplex Method – Problems.

UNIT IV
The Transportation Problems – Basic feasible solution by L.C.M – NWC- VAM optimum solutions – unbalanced Transportation problems.

UNIT V
The Assignment Problems – Assignment algorithm – optimum solutions – Unbalanced Assignment Problems.

Text Book:

1. Operations Research – Kandiswarup, P. K. Gupta, Man Mohan, S. Chand & Sons Education Publications, New Delhi, 12th Revised edition.

References:

1. Operations Research – Prem Kumar Gupta D. S. Hira, S. Chand & Company Ltd, Ram Nagar, New Delhi

2. Operations Research Principles and Problems: S. Dharani Venkata Krishnan, Keerthi publishing house PVT Ltd.

SEMESTER IV

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	History of Mathematics	0	0	0	#2	ALC

Goal: To enable the students to know the Importance and History of Mathematics.

UNIT-I

Early Number Systems - Pre-History and Quipus - Egyptian Hieratic and Greek numeration - Babylonian Cuneiform

UNIT-I I

Mathematics in Early Civilizations - Rhind Papyrus - Egyptian Arithmetic - Egyptian Geometry - Plimpton 322 and Babylonian Mathematics

UNIT-III

Early Greek Mathematics - Thales, Pythagoras - Zeno and Constructions

UNIT-IV

Alexandrian Mathematics - Euclid, Plato – Eratosthenes - Archimedes

UNIT-V

Twilight of Greek Mathematics - Diophantus, Pappus, Constantinople - Islamic Culture- Chinese Mathematics

Text Book:

A History of Mathematics - Carl B. Boyer

SEMESTER IV

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	Business Mathematics	0	0	0	#2	ALC

Subject description: This course is designed to enable students to learn and apply mathematics skills to a business setting.

Goal: To enable the students to know the concepts of Business Mathematics.

UNIT – I

Set Theory – Arithmetic and Geometric Series – Simple and Compound Interest – Effective rate of Interest – Discounting of Bills – True-Discount – Banker's Gain.

UNIT – II

Matrix: Basic Concepts – Addition and Multiplication of Matrices – Inverse of a Matrix –Rank of Matrix - Solution of Simultaneous Linear Equations .

UNIT – III

Variables, Constants and Functions – Limits of Algebraic Functions – Simple Differentiation of Algebraic Functions – Meaning of Derivations – Evaluation of First and Second Order Derivatives – Maxima and Minima – Application to Business Problems.

UNIT – IV

Elementary Integral Calculus – Determining Indefinite and Definite Integrals of simple

Functions .

UNIT – V

Introduction of O.R-Meaning and Scope of O.R- limitations of O.R. Linear Programming Problem – Formulation of L.P.P – Graphical solutions of L.P.P – Problems.

Text Book:

1. **Navanitham, P.A,"** Business Mathematics & Statistics" Jai Publishers,Trichy-21

References:

1. **Sundaresan and Jayaseelan, "**Introduction to Business Mathematics", Sultan chand

Co& Ltd,Newdelhi

2. **Sanchetti, D.C and Kapoor, V.K,"** Business Mathematics", Sultan chand Co&

Ltd,Newdelhi

3. **G.K.Ranganath, C.S.Sampamgiram &Y.Rajan**-A Text book Business Mathematics -

Himalaya Publishing House.

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SEMESTER V

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	Statistical Quality Control	0	0	0	#2	ALC

Subject description: This course introduces the application of statistical tools on industrial environment to study, analyze and control the quality of products

Goal: To enable the students to know the concepts of process control and product control
Objective: on successful completion of the course the students should have understood various tools used such as control charts, sampling plans, quality system standards and reliability concepts to control the quality of industrial outputs.

UNIT I
Need for SQC – Role of frequency distribution – Statistical basis for SQC – variable control charts $X\ BAR$, R and charts.

UNIT II
Control Chart for attributes – np, p, chart – Group control chart, OC and ARL of control charts concept only.

UNIT III
Acceptance sampling for Attributes – Single sampling plan – Double sampling plan – multi stage sampling plan and their properties concept only.

UNIT IV
Quality system standards – ISO 9000- Elements of ISO – 9000 – Benefits of ISO 9000- Elements of a quality system.

UNIT V
Reliability concepts and measures, components and systems, reliability function, hazard rate, common life distribution viz,

Text Book:
1. Fundamentals of Applied statistics by Gupta S.C and Kapoor, V.K.
References:
2. Quality control and Industrial Management by Dunkan A.J.(Richard D.Irwin Inc.USA)
3. Statistical Quality Control by R.S. Leaven worth (Mc Graw Hill)
4 Statistics of Quality control, Sampling Inspection and Reliability by Biswas S (1996)
5. Statistical Analysis of Reliability and Life Testing Models, by Bain, L.J and Englehard, M. (1991) (Maral Dekker)

SEMESTER V

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	Research Methodology	0	0	0	#2	ALC

Subject description: The Objective of this course to pay attention to the most important dimension of Research i.e. Research Methodology. It will enable the Researchers to develop the most appropriate methodology for their Research Studies. The mission of the course is to impart research skills to the beginners and help improve the quality of Research by the existing researchers.

Goal: To enable the students to know the concepts of research methodology.

UNIT I
Dimensional analysis and scaling
Dimensional analysis – The program of Applied Mathematics –Dimensional Methods – The Buckingham Pi theorem – Formulation – Application to a Diffusion Problem – Proof of the Pi theorem – Scaling – Characteristic Scales
.
UNIT II
Regular Perturbation Method
The Perturbation Method – Motion in a Nonlinear Resistive Medium – A Nonlinear Oscillator – The Poincare-Lindsted Method – Asymptotics.

UNIT III
Singular Perturbation and boundary-layer analysis
Failure of Regular Perturbation – Inner and outer approximations – Algebraic equations and Balancing – The inner approximation – Matching – Uniform approximations – Worked example

UNIT IV
WKB Approximation & Asymptotic Expansion of Integrals
The WKB Approximation - The Nonoscillatory Case - The Oscillatory Case. Asymptotic Expansion of Integrals - Laplace Integrals - Integration by parts .

UNIT V
Wave Phenomena in Continuous Systems
Wave propagation - Waves - Linear Waves - Nonlinear Waves – Burgers' Equation - The Korteweg-deVries Equation.

Text book:
1. J.David Logan "Applied Mathematics**,** Second Edition, John Wiley & Sons, Inc. (1997). (Relevant Sections Only)

References:
1. A.H. Nayfeh, "Perturbation Methods", John Wiley & Sons, New York, (1973).
2. R. Bellman, "Perturbation Techniques in Mathematics, Physics & Engineering", Holt, Rinehart & Winston, Inc. New York. (1963).

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SEMESTER V

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	Mathematical Modelling	0	0	0	#2	ALC

Subject description: This course is an introduction to mathematical modeling using graphical, numerical, symbolic, and verbal techniques to describe and explore real - world data and phenomena.

Goal: To enable the students to know the concept of Mathematical modelling in real life

UNIT I

Mathematical Modelling through Ordinary Differential Equations of First order : Linear Growth and Decay Models – Non-Linear Growth and Decay Models – Compartment Models – Dynamic problems.

UNIT II

Mathematical Modelling through Systems of Ordinary Differential Equations of First Order : Population Dynamics – Epidemics – Compartment Models – Economics – Medicine, Arms Race, Battles and International Trade – Dynamics.

UNIT III

Mathematical Modelling through Ordinary Differential Equations of Second Order : Planetary Motions – Circular Motion and Motion of Satellites – Mathematical Modelling through Linear Differential Equations of Second Order .

UNIT IV

Mathematical Modelling through Difference Equations : Simple Models – Basic Theory of Linear Difference Equations with Constant Coefficients – Economics and Finance – Population Dynamics and Genetics.

UNIT V

Mathematical Modelling through Graphs : Solutions that can be Modelled Through Graphs – Mathematical Modelling in Terms of Directed Graphs, Signed Graphs, Weighted Digraphs and Unoriented Graphs.

Text Book:

[1] J.N. Kapur, Mathematical Modelling, Wiley Eastern Limited, New Delhi, 1988.

REFERENCES:

[1] J.N. Kapur, Mathematical Models in biology and Medicine, EWP, New Delhi, 1985.

Approved in the UG – Mathematics BOS Meeting on 25-05-2016

SEMESTER VI

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	Data Analysis	0	0	0	#2	ALC

Subject description: This course reviews and expands upon core topics in probability and statistics through the study and practice of data analysis.

Goal: To enable the students to know the concept of data analysis in real life.

UNIT-I
Review of Simple Linear Regression, Lack of Fit Test- Multiple Regression

UNIT-II
Inference in Multiple Regression-Model Checking and Refinement

UNIT-III
Variable Selection- Two-way ANOVA

UNIT-IV
Central tendency -Median, mode, and mean -The mean as a least-squares estimate Constant (or determinate) errors -The difference between the "true mean" and the truth   Validation standards for accuracy

UNIT-IV
Multifactor Studies Without Replication- Serial Correlation

Text Book:

1. The Statistical Sleuth, Second Edition, by Ramsey and Schafer.

2.P.Navaneetham-Business Mathematics and Statistics,Jai Publishers,Trichy(2015).

Reference Book:

1. Statistical Methods by S.P. Gupta, Sultan & Chand Publishers- 2009.

SEMESTER VI

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	Mathematical Reasoning	0	0	0	#2	ALC

UNIT - I
Average-Calendar-Puzzles

UNIT – II
Partnership-Percentage-Problems on age

UNIT – III
Problems on boat and steam-Ratio- Simple Interest

UNIT - IV
Mental Ability and logical reasoning - Analogy Test-Series Test-Same Class (Odd) Test-Logical Venn Diagram-   Syllogism.

UNIT -V
Analytical Reasoning-Mirror Images-Water Image-(Number Letter Figure)-Completion of Incomplete Pattern-Grouping of Identical figures.

Text Book

Mental Ability and   Logical Reasoning – R.S. Agarwal- S. Chand and Company Ltd, New Delhi.

Semester I

Subject Code	Subject Title	Lecture	Tutorial	Practical	Credit	Type
	Statistics for Business	0	0	0	#2	ALC

Goal: To enable the students to learn the Statistical methods and their applications in Commerce

Objective : On successful completion of this course the students shall enrich to solve the

Statistical problems in commerce

UNIT I

Meaning and Definition of Statistics – Collection of data –– Primary and Secondary -

Classification and Tabulation – Diagrammatic and Graphical presentation Measures of Central

tendency – Mean, Median, Mode –simple problems.

UNIT II

Measures of Dispersion – Range, Quartile Deviation, Standard Deviation and Co-efficient of

Variation.

UNIT III

Correlation –Meaning and Definition – Karl Pearson's co-efficient of Correlation, Spearman's

Rank Correlation, Co-efficient of Concurrent deviation. Regression Analysis – Regression in two

variables – Uses of Regression

UNIT IV

Time Series – Meaning, Components and Models – Business forecasting – Methods of

estimating trend – Graphic, Semi-average, Moving average – Seasonal Variation – Method of

Simple average.

UNIT V

Index Numbers – Meaning, Uses and Methods of construction – Un-weighted and Weighted

index numbers – Tests of an Index number – Cost of living index number.

Interpolation: Binomial, Newton's and Lagrange methods.

TEXTBOOK:

1. Business Mathematics and Statistics by P. Navaneetham

REFERENCES:

1. Statistics by R.S.N. Pillai and V. Bagavathi
2. Statistics- Theory, Methods & Application of D.C.Sancheti and V.K.Kapoor.