THE MADURA COLLEGE (Autonomous), MADURAI – 625 011
(AFFILIATED TO MADURAI KAMARAJ UNIVERSITY)
RE-ACCREDITED (3rd Cycle) WITH "A" GRADE BY NAAC

PROGRAMME : B.Sc., **COURSE CODE: 17U3MAC1**

COURSE TITLE : Office Automation **QN.NO: 8110**

TIME : 3Hrs **Max. Marks: 75**

LEARNING OBJECTIVES

- To enable the students to study MS Office and to enrich the practical knowledge in MS Office.

LEARNING OUTCOMES

After successful completion of this course, students will be

- Able to perform documentation and presenting skills.
- Proficient in using Windows, Word Processing Applications, Spreadsheet Applications, Database Applications and Presentation Graphics Applications.

Unit I MS Word

Introduction to MS Word, Starting word – Creating a Document – Saving and Printing a document – Move and Copy Text – Smart Cut and Paste – Quickly Opening Recently Used Files – Copying Text to Another File – Formatting Text – Using Bullets and Numbering in Paragraphs – Finding Text – Replace Command – Checking Spelling and Grammar – Using Auto Correct to Automatically Fix Typing Errors .

Unit II MS Word (Continued)

Enhancing a Document – Page Setup – Inserting Page Breaks – Looking at a Document in Different Views – Adding Borders and Shading to Paragraphs – Using Headers and Footers in the Document – Print Preview – Print Options – Creating Tables – Formatting a Table – Using Table Autoformat to Format a Table – Calculations in a Table – Using Mail Merge.

Unit III MS Excel

Introduction to Worksheet and MS Excel – Getting Started with Excel – Editing Cells and using Commands and Functions – Excel Functions – Range – Moving and Copying, Inserting and Deleting Rows and Columns – Formatting a Worksheet – Formatting Numbers.

Unit IV MS Excel (Continued)

Creating Charts – Resizing and Moving the Chart – Changing the Chart Type – Controlling the Appearance of a Chart – Updating, Modifying and Deleting a Chart – Previewing and Printing Charts – Using Date and Time in a Worksheet – Naming Ranges and Using Statistical, Math Functions.

UnitV Power Point

Power Point – Creating a Presentation – Power Point Views – Running a Slide Show – Printing a Presentation.

Text Book:

1. R K Taxali, PC Software for Windows 98 Made Simple, 2015, McGraw Hill Education Pvt. Ltd.

Chapters : 9(9.4 – 9.7), 11(11.1 – 11.5),12(12.1, 12.4), 13(13.2-13.4,13.7),15(15.1-15.4, 15.6,15.7,15.9),16(16.1-16.4),18, 20, 21, 22(22.1-22.5), 23, 24(24.2-24.4), 26, 27(27.2 – 27.5, 27.7,27.8), 28(28.1-28.6), Annexure B

Reference Books:

1. Jodi Davenport, Critch Greaves, Michael Groh and Eruce Hall berg, Inside Microsoft Office Professional , 1994, New Riders Publications.
2. CloriaMadumere, 3 – IN – 1 Microsoft Word, Powerpoint and Excel 2010, First Edition 2016, Create space Independent Publishing Platform.

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RE-ACCREDITED (3rd Cycle) WITH "A" GRADE BY NAAC

PROGRAMME: B.Sc., **COURSE CODE : 17U4MAC2**

COURSE TITLE : Programming in C **QN.NO : 8118**

TIME : 3 Hours **MAX.MARKS :75**

Learning Objectives

- Enrich the students to have a good foundation and practical knowledge on Programming in C.

Learning Outcomes

On satisfying the requirement of this course, students will have the knowledge and skills to

- Write a C program for simple applications of real life using Structures and files.
- Implement Programs with Pointer arrays.
- Design an algorithmic solution for a given problem.

Unit I Fundamentals

C Fundamentals - The C Character Set - Identifiers and Keywords - Data Types - Constants - Variables and Arrays- Declarations - Expressions - Statements - Symbolic Constants - Arithmetic Operators - Unary Operators - Relational and Logical Operators - Assignment Operators - The Conditional Operator - Library Functions.

Unit II Data Input and Output

The getchar Function - The putchar Function - The Scan f Function - The Print f Function - Writing a C Program - Compiling and Executing the Program.

Unit III Control Flow

The if else Statement - The while Statement - The do while Statement - The for Statement - Nested Control Structures - The switch Statement - The break Statement - The Comma Operator - The go to Statement.

Unit IV Functions

Accessing a Function - Function Prototypes - Passing Arguments to a Function - Recursion - Storage Classes - Automatic Variables - External (Global) Variables - Static Variables.

Unit V Arrays and Structures

Defining an Array - Processing an Array - Passing Arrays to Functions -Multidimensional Arrays - Arrays and Strings - Structures and Unions - Defining a Structure - Processing a Structure - Structures and Pointers- Unions.

Text Book:

1. Byron S. Gottfried, Programming with C, 2nd edition Thirteenth Reprint 2001, Schaum's Outline Series, Tata McGraw – Hill Publication.

Chapters: 2, 3, 4(4.2- 4.6), 5(5.2- 5.4), 6(6.2- 6.11), 7(7.2- 7.6), 8(8.1- 8.4), 9(9.1- 9.5), 11(11.1, 11.2, 11.4, 11.7).

Reference Books:

1. E. Balagurusamy, Programming in ANSI C, 2nd Edition, 2000, Tata McGraw-Hill.
2. YashavantKanetkar, Let us C, 7th Edition 2007, BPB Publications.

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RE-ACCREDITED (3rd Cycle) WITH "A" GRADE BY NAAC

PROGRAMME: B.Sc., Statistics **COURSE CODE : 17U5MSA2**

COURSE TITLE : Combinatorics **QN.NO : 8128**

TIME : 3 Hours **MAX.MARKS :75**

Learning Objectives

- To impart the knowledge of counting principles which is essential for the students to think critically and apply it in real-world problems.
- To acquire the knowledge of Lattices and its applications.

Learning Outcomes

After successful completion of this course, the students will be able to

- Solve counting problems by applying elementary counting techniques using the sum and product rules, permutations, combinations and pigeonhole principle.
- Apply the ideas of Permutations and Combinations, Combinatorial number theory in various real life situations.

Unit I Counting

Basic Counting Principles – Sum rule principle and product rule principle – Factorial notation – Binomial coefficient – Permutations – Problems.

Unit II Combinations

Combinations with repetitions – The Pigeonhole principle –Problems.

Unit III Ordered partitions

Ordered partitions and Unordered partitions – The inclusion – Exclusion principle – Generation of Permutations& Combinations –Tree diagrams – Problems.

Unit IV Orderedsets

Ordered sets – Hasse Diagrams of partially ordered sets – Consistent enumeration – Supremum and infimum –Isomorphic ordered sets – Well-ordered sets – Problems.

Unit V Lattices

Lattices – Bounded Lattices – Distributive Lattices – Complements and complemented Lattices – Problems.

Text Book:

Seymour Lipschutz and Marc Lars Lipson, Discrete Mathematics (Schaum's Outlines), 3rd Edition, 3rd Reprint 2010, Tata McGraw Hill.

Chapters: 6, 14.

Reference Books:

1. V.K. Balakrishnan, Combinatorics, Schaum's Outlines, 1995.
2. Dr. M. K. Venkataraman, Dr. N. Sridharan and N. Chandrasekaran,Discrete Mathematics, Reprint September 2007, The National Publishing Company.

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RE-ACCREDITED (3rd Cycle) WITH "A" GRADE BY NAAC

PROGRAMME: B.Sc., **COURSE CODE : 17U5MAC3**

COURSE TITLE : Programming with C++ **QN.NO : 8129**

TIME : 3 Hours **MAX.MARKS :75**

Learning Objectives

- To enable the students to have a good foundation and practical knowledge on Programming with C++.
- To enable the students to understand C++ language which improves C with Object – Oriented features.
- To learn the syntax and semantics of C++ programming language.

Learning Outcomes

On satisfying the requirement of this course, students will

- Have an ability to design C++ classes for code reuse.
- Able to design & implement programs using classes and objects.
- Acquire knowledge of writing inline functions for efficiency and performance.

Unit I Data Types and Functions

Basic Concepts of Object-Oriented Programming – Benefits of OOP – Identifiers and Constants – Basic Data Types– The Main Function – Function Prototyping – Call by Reference – Return by reference.

Unit II Classes and Objects

Specifying a Class – Defining Member Functions – A C++ Program with Class – Making an Outside Function Inline – Nesting of Member Functions – Private Member Functions – Arrays within a Class – Arrays of Objects – Objects as Function Arguments – Friendly Functions – Returning Objects.

Unit III Constructors and Destructors

Introduction – Constructors – Parameterized Constructors – Multiple Constructors in a Class – Constructors with Default Arguments – Copy Constructor – Dynamic Constructors – Destructors.

Unit IV Operator Overloading

Introduction – Defining Operator Overloading –Overloading Unary Operators – Overloading Binary Operators – Overloading Binary Operatorsusing Friends.

Unit V Inheritance

Introduction – Defining Derived Classes – Single Inheritance – Making a Private Member Inheritable – Multilevel Inheritance – Multiple Inheritance.

Text book:

E. Balagurusamy, Object-Oriented Programming with C++, 2nd Edition 2001, Tata McGraw-Hill Publishing Company Limited.

Chapters:1(1.5,1.6),3(3.4,3.5),4(4.2 – 4.5),5(5.3,5.4,5.6–5.9,5.13–5.16),6(6.1 – 6.5,6.7,6.8,6.11), 7(7.1–7.5), 8(8.1–8.6).

Reference Books:

1. D. Ravichandran,Programming with C++, 1996, Tata McGraw-Hill Publishing Company Limited.
2. YashvantKanetkar,Let us C++, 2006, BPB publication.

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RE-ACCREDITED (3rd Cycle) WITH "A" GRADE BY NAAC

PROGRAMME: B.Sc., Mathematics **COURSE CODE : 17U6MSM4/6SM**

COURSE TITLE : Quantitative Aptitude **QN.NO : 8140**

TIME : 3 Hours **MAX.MARKS :75**

Learning Objectives

- The main aim of introducing "Quantitative Aptitude"for mathematics students is to develop skill to meet the competitive examinations for better job opportunity.
- Effort has been made to accommodate fundamental, mathematical aspects to instill confidence among students.
- Enrich their knowledge and to develop their logical reasoning thinking ability.

Learning Outcomes

After successful completion of this course, students will have the knowledge and skills to

- Solve the problems easily by using Short-cut method with time management which will be helpful to them to clear the competitive exams for better job opportunity.
- Analyze the Problems logically and approach the problems in a different manner.

Unit I Problems on Ages – Percentage.

Unit II Profit &Loss – Ratio & Proportion.

Unit III Time & Distance – Problems on Trains.

Unit IV Calendar – Stocks & Areas.

Unit V True Discount – Banker's Discount.

Text Book:

R. S. Aggarwal, Quantitative Aptitude (Fully solved), Reprint 2016, S. Chand.

Chapters: 8, 10, 11, 12, 17, 18, 27, 29, 32, 33.

Reference Books:

1. R.V.Praveen,Quantitative Aptitude and Reasoning, 2nd Revised Edition 2013, Prentice-Hall of India Pvt.Ltd.
2. G. K. Ranganath, C. S. Sampangiram and Y. Rajaram, A text Book of business Mathematics, 2008, Himalaya Publishing House

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RE-ACCREDITED (3rd Cycle) WITH "A" GRADE BY NAAC

PROGRAMME: B.Sc., **COURSE CODE : 17U6MAC4**

COURSE TITLE : Fundamentals of Java Programming **QN.NO : 8141**

TIME : 3 Hours **MAX.MARKS :75**

Learning Objectives

- To enable the students to have a good foundation and practical knowledge on Programming with JAVA.
- To understand the basics of OOP & Object oriented approach to design software.

Learning Outcomes

On satisfying the requirement of this course, students will be

- Able to understand basic concepts of Java such as objects, classes, operators, packages & various keywords.
- Able to design the applications of Java.

Unit I Java evolution

Java history – Java features – Java and internet – Web browsers –Java environment – Overview of Java language: Java program structure – Java statements – Implementing a Java program – Java virtual machine – Command line arguments.

Unit II Java fundamentals

Constants, variables and data types – Operations and expressions – Decision making and branching – Decision making and looping.

Unit III Classes, objects and methods

Defining a class, adding variables – Adding methods – Constructors – Method overloading inheritance – Overriding methods, arrays, strings and vectors – Creating arrays – Strings – vectors – Wrapper classes.

Unit IV Interfaces

Defining interfaces – External interfaces – Implementing interfaces, packages: creating packages – Using a package – Adding a class to a package.

Unit V Multithreaded programming

Multithreaded programming – Creating threads – Extending the thread – Stopping and blocking a thread – Life cycle of a thread.

Text Book:

E. Balagurusamy, Programming with JAVA – A Primer, 2nd Edition 2000, Tata McGraw – Hill Publication.

Chapters: 2(2.1,2.2,2.4,2.9), 3(3.5,3.7,3.8,3.9,3.10),4(4.2–4.4),5(5.2–5.9),6(6.2 –6.8),7(7.2–7.4),8(8.2–8.4,8.7, 8.8, 8.11,8.12),9(9.2–9.7),10(10.2–10.4),11(11.5 –11.8),12(12.2–12.5).

Reference Books:

1. C. Xavier, JAVA Programming with JAVA 2, 2ndReprint 2003, Scitech Publication.
2. Patrick Naughton, Herbert Schildt, The complete reference, 3rd Edition1997, Obsborne Publishing.

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PROGRAMME: B.Sc., Statistics **COURSE CODE : 17U1SMC1**

COURSE TITLE : Foundation of Statistics **QN.NO : 8201**

TIME : 3 Hours **MAX.MARKS :75**

Unit I Origin of statistics and measures of central tendency

Origin –development –Definition – Important Scope of Statisitcs –frequency distribution – Graphic representation of frequency distribution – Measures of Central tendency – Arithmetic Mean – Properties, Merits and Demerits of Arithmetic Mean – Weighted Mean – Median – Merits and demerits of Median – Mode – Geometric Mean – Harmonic Mean – Merits and Demerits of Harmonic Mean.

Unit II Measures of dispersion

Dispersion – Measure of dispersion – Range – Quartile, Mean and Standard deviation's – Relation between Standard deviation and Root mean square deviation– Variance of the combined series – Coefficient of dispersion – Coefficient of Variation.

Unit III Moments, Skewness and Kurtosis

Moments – Relation between moment about mean in terms of moments about any point and vice versa – Effect of Change of Origin and Scale on moments – Pearson's β and γ Coefficients – Fractional moments and Absolute Moments – Skewness – kurtosis.

Unit IV Curve fitting

Curves fitting – Fitting of straight line – Fitting of second degree parabola – Change of origin – Conversion of data to linear form-Problems.

Unit V Correlation and regression

Bivariate Distribution, Correlation – Scatter Diagram – Karl pearson Coefficient of Correlation – Limits for Correlation Coefficients – Rank Correlation – Tied Ranks – Repeated Ranks – Limits for Rank Correlation Coefficient – Regression – Lines of Regression – Regression Curves – Regression Coefficients – Properties of Regression Coefficients – Angle between two line of Regression.

Text book:

S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, 9th Revised Edition, Sultan Chand & Sons.

Chapters:

UNIT I **: Chapter 1 (**1.1 to 1.3), **Chapter 2(** 2.1 to 2.3, 2.5 to 2.9)
UNIT II **: Chapter 3** (3.1 to 3.8)
UNIT III **: Chapter 3 [** 3.9(3.9.1, 3.9.2), 3.10 to 3.14]
UNIT IV **: Chapter [**9.1(9.1.1, 9.1.2, 9.1.4), 9.3]
UNIT V **: Chapter 10 [**10.1,10.2,10.3,10.3.1, 10.6, 10.7,10.7.1,10.7.3 to10.7.5]

Reference Book(s):

1. S.Arumugam and A.T.Issac, Statistics, 2009 edition, New Gamma Publishing House.
2. T. Veerarajan, Fundamentals of Mathematical Statistics, 2017 Edition, Yes Dee Publishing Pvt. Ltd.,

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PROGRAMME: B.Sc., Statistics **COURSE CODE : 17U1SMC2**

COURSE TITLE : Probability theory **QN.NO : 8202**

TIME : 3 Hours **MAX.MARKS :75**

Unit I Theory of probability

Mathematical or classical probability – statistical or Empirical probability – Axiomatic approach to probability – Random Experiment (Sample space) – Event – Some Illustrations – Algebra of Events - Probability – Mathematical notation - Probability function – Law of Addition Probabilities – Extension of General Law of Addition of Probabilities – Multiplication Law of Probability and Conditional Probability – Extension of Multiplication Law of Probability – Probability of Occurrence of At least one of the n Independent events – Independent Events – Pairwise independent events – Conditions for Mutual Independence of n Events – Bayes Theorem.

Unit II Random variables and distribution functions

Random Variable – Distribution Function – Properties of Distribution Function – Discrete Random Variable – Probability Mass Function – Discrete Distribution Function – Continuous Random Variable – Probability Density Function – Various Measures of Central Tendency , Dispersion, Skewness and Kurtosis for Continuous Distribution – Continuous Distribution Function – Joint Probability Law – Joint Probability mass function – Joint Probability Distribution Function – Marginal Distribution function – Joint Density Function – The Conditional Distribution Function

Unit III Stochastic independence

Transformation of One – dimensional Random Variable – Transformation of two – dimensional Random Variable.

Unit IV Mathematical expectation and generating functions

Mathematical Expectation – Expectation of a Function of a Random Variable – Addition Theorem of Expectation – Multiplication Theorem of Expectation – Expectation of a Linear Combination of Random variables – Covariance – Variance of a Linear Combination of Random Variables – Moment of Bivariate Probability Distribution – Conditional Expectation and Conditional Variance – Moment Generating Function – Some Limitation Of Moment Generating Function – Theorems on Moment Generating Function – Uniqueness Theorem of Moment Generating Function.

P.T.O

Unit V Characteristic function and its properties

Characteristic Function – Properties of characteristic Function – Theorem of Characteristic Function – Necessary and Sufficient Condition for a Function φ(t) to be a Characteristic Function – Multivariate Characteristic Function – Chebychev's Inequality – Convergence in Probability – Weak Law of Large Numbers – Bernoulli's Law of Large Numbers – Probability Generating Function – Convolution.

Text Book:

1. S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, 9th Revised Edition, Sultan Chand & Sons.

Chapters:

Unit I: Chapter 4[4.3,4.5,4.6,4.7,4.8

Unit II:Chapter 5[5.1 to 5.5,5.5.1 to 5.5.5)]

Unit III:Chapter 5[5.5(5.5.6),5.6,5.7]

Unit IV:Chapter6[(6.1to6.10)

Unit V:Chapter6[6.12,6.13]

Reference Book(s):

1. S.Arumugam andA.T.Issac, Statistics, 2009 edition , New Gamma Publishing House.
2. T.Veerarajan, Fundamentals of Mathematical Statistics, 2017 Edition, Yes Dee Publishing Pvt. Ltd.,

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PROGRAMME: B.Sc., Statistics **COURSE CODE : 17U1SSM1**

COURSE TITLE : Theory of equations and Trigonometry **QN.NO : 8203**

TIME : 3 Hours **MAX.MARKS :75**

Unit I Theory of Equations

Formation of equations-Relation between roots and Coefficients -Problems.

Unit II Theory of Equations(Continued)

Reciprocal equations-Solving Reciprocal equations(Type I toIV)- Transformation of equations.

Unit III Theory of Equations(Continued)

Nature and Position of roots - Descarte's Rule of Sign and Rolles Theorem- Horners method.

Unit IV Trigonometry

Expressions of $\sin n\theta$, $\cos n\theta$ *and* $\tan n\theta$-Expressions for $\sin^n \theta$ *and* $\cos^n \theta$ - Expansion of $\sin\theta$, $\cos\theta$ *and* $\tan\theta$ in powers of θ-Problems.

Unit V Trigonometry(Continued)

Hyperbolic functions- Inverse hyperbolic functions- Logarithm of complex numbers-Problems.

Text Book:

1. S.Arumugam and Issac, Theory of equations and Trigonometry,Edition(2006)New gamma publishing House.

Chapters: Part-C–Chapter 5(5.1-5.2, 5.4,5.5,5.7,5.10(Horner's Method only)).

Part-D– Chapter 6,7and 8.

Reference Book(s):

1. M. K. Venkatraman, Manorama Sridhar, Classical Algebra & Trigonometry, 1st Edition 2002, The National Publishing Company.

T. K. ManicavachagomPillai, Trigonometry, 1997 Edition, S. Viswanathan (Printers & Publishers, Pvt Ltd.,

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PROGRAMME: B.Sc., Statistics **COURSE CODE : 17U1SAC1**

COURSE TITLE : Calculus **QN.NO : 8204**

TIME : 3 Hours **MAX.MARKS :75**

Unit I Differentiation

Higher derivatives - n^{th} derivatives - Leibnitz's theorem (without proof) – Partial differentiation – Problems.

Unit II Application of Differentiation

Tangent and Normal–PolarCurves–P-r equations –Curvature and Radius of Curvatures (Problems only) –Maxima and Minima of two variables – Jacobian.

Unit III Evaluation of Integrals

Evaluation of definite integrals - Properties– Integration by parts - Reduction formulae – Problems.

Unit IV Double and Triple Integrals

Double Integrals–Evaluation of Double and Triple Integrals.

Unit V Beta and Gamma functions

Definition – Properties of Beta and Gamma functions –Problems.

Text Book:

1. S. Arumugam and A. T. Isaac,Calculus Edition 2011, New Gamma Publishing House.

Chapters: Part I : Chap 2 (2.11-2.13),Chap 3(3.1-3.4,3.7,3.9)
Part II:Chap 2 (2.6-2.8), Chap 3(3.1-3.3),Chap 4(4.1only).

Reference Book(s):

1. T. K. ManicavachagomPillay, Differential Calculus, 2003 Edition, S. Viswanathan (Printers & Publishers) Pvt. Ltd.

2. T. K. ManicavachagomPillay, Integral Calculus 2000 Edition, S. Viswanathan(Printers & Publishers, Pvt Ltd.,

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RE-ACCREDITED (3rd Cycle) WITH "A" GRADE BY NAAC

PROGRAMME: B.Sc., Statistics **COURSE CODE : 17U2SMC3**

COURSE TITLE : Descriptive Statistics **QN.NO : 8205**

TIME : 3 Hours **MAX.MARKS :75**

Unit I: Index Number

Definitions-Characteristics of index number-Types of index numbers-Problems in construction of index numbers- Methods of construction of index numbers- Price index number- Quality index number.

Unit II: Index Number(Continued)

Tests of adequacy of index numbers- Formulae(Time reversal tests, Factor reversal tests)-Chain of index numbers-Cost of living index number- Aggregate expenditure Method-Family budget Method.

Unit III: Time Series

Definition- Utility of time series analysis, Components of time series-Decomposition of time series models- Method of finding trend- Graphic Method-Statistical Method-Algebraic Method-Method of moving averages.

Unit IV: Time Series(Continued)

Measurements of seasonal variations-Method of simple averages-Ratio to trend method-Method of moving averages- Method of link relatives.

Unit V: Association of Attributes

Introduction-Classification of data-Relationship between classes of various order-Consistency of data,Meaning of Association-Types of Association- Methods of studying associations-Coefficient of collignation-Association of three attributes.

Text Book:

1. D. C. Sancheti, V.K.Kapoor, Statistics(Theory, Methods and Applications), Sultan Chand and sons, 7th thoroughly revised edition.

Chapters:

Unit-I:Chapters 10[10.2 to 10.9]

Unit-II: Chapters 10[10.10, 10.11 and 10.15]

Unit-III: Chapters 11[11.2 to 11.6]

Unit-IV: Chapters 11[11.7(11.7.1 to 11.7.4)]

Unit-V: 12.1 to 12.10

Reference Book(s):

1. S.Arumugam andA.T.Issac, Statistics, 2009 edition , New Gamma Publishing House.
2. S.P.Gupta, Statistical Methods 40th Revised Edition, 2011Sultan Chand and sons.

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PROGRAMME: B.Sc., Statistics **COURSE CODE : 17U2SMC4**

COURSE TITLE : Distribution Theory **QN.NO : 8206**

TIME : 3 Hours **MAX.MARKS :75**

Unit I Theoretical discrete distribution

Introduction- Bernoulli Distribution- Moments of Bernoulli Distribution- Binomial Distribution- Moments- Recurrence Relation for the moments of Binomial Distribution- Factorial Moments of Binomial Distribution – Mean Deviation about Mean of Binomial Distribution- Mode of Binomial Distribution – Moment Generating Function of Binomial Distribution- Additive Property of Binomial Distribution- Characteristic Function of Binomial Distribution- Cumulants of Binomial Distribution – Recurrence Relation for Cumulants of Binomial Distribution – Probability Generating Function of Binomial Distribution – Fitting of Binomial Distribution – Poisson Process – Moments of Poisson Distribution – Mode of Poisson Distribution – Recurrence Relation for the Moments of Poisson Distribution- Moment Generating Function of Poisson Distribution – Characteristic Function of Poisson Distribution - Cumulants of Poisson Distribution – Additive or Reproduction Property of Independent Poisson Variates- Probability Generating Function of Poisson Distribution- Fitting of Poisson Distribution.

Unit II Theoretical discrete distribution (continued)

Negative Binomial Distribution- Moment Generating Function of Negative Binomial Distribution- Cumulants of Negative Binomial Distribution- Poisson Distribution as Limiting Case of Negative Binomial Distribution- Probability Generating Function of Negative Binomial Distribution- Deduction of Moments of Negative Binomial Distribution From Binomial Distribution- Geometric Distribution- Lack of memory – Moment Generating Function of Geometric Distribution- Hyper geometric Distribution- Mean and variance of Hyper geometric Distribution- Factorial Moments of Hyper geometric Distribution- Approximation to the Binomial Distribution- Recurrence Relation for Hyper geometric Distribution- Multinomial Distribution- Moments of Multinomial Distribution – Discrete Uniform Distribution- Power Series Distribution- Moment Generating Function of p.s.d- Recurrence Relation for Cumulants of p.s.d- Particular Casas of g.p.s.d.

Unit III Theoretical continuous distribution

Rectangular or Uniform Distribution- Moments of Rectangular Distribution- M.G.F. of Rectangular Distribution – Characteristic Function- Mean Deviation about Mean – Triangular Distribution- Normal Distribution - Normal Distribution as a Limiting form of Binomial Distribution- Chief Characteristics of the Normal Distribution and Normal Probability curve- Mode of Normal distribution – Median of Normal Distribution – M.G.F. of Normal Distribution- Cumulant Generating Function (c.g.f) of Normal Distribution- Moments of Normal Distribution –A Linear Combination of Independent Normal Variates is also a Normal Variate – Points of Inflexion of Normal Curve- Mean Deviation from the Mean for Normal Distribution- Area Property; Normal Probability Integral- Error function – Importance of Normal Distribution – Fitting of Normal Distribution – Log-NormalDistribution.

P.T.O.

Unit IV Theoretical continuous distribution (continued)

Gamma Distribution- M.G.F. of Gamma Distribution – Cumulant Generating Function of Gamma Distribution – Additive property of Gamma Distributon – Beta Distribution of First Kind – Constants of Beta Distribution of First kind – Beta Distribution of Second kind– Constants of Beta Distribution of Second kind- The Exponential Distribution- M.G.F. of Exponential Distribution – Laplace Double Exponential Distribution-Weibul Distribution – Moments of Standard Weibul Distribution – Characterisation of Weibul Distribution-Logistic Distribution – Cauchy Distribution – Characteristic Function of Cauchy Distribution- Moments of Cauchy Distribution.

Unit V Order statistics

Order statistics - Cumulative Distribution Function of a Single Order statistics- Probalility Density Function (p.d.f.) of a Single Order Statistic – Joint p.d.f. of two Order Statistics-Joint p.d.f. of k-Order Statistics – Joint p.d.f. of all n-Order Statistics.

Text Book:

1. S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, 9 th Revisied Edition, Sultan Chand & Sons.

Chapters

Unit-I– Chapter7 (7.0 -7.3.10)

Unit-II– Chapter 7(7.4-7.9.3)

Unit-III– Chapter 8(8.1-8.1.5, 8.2-8.2.15)

Unit-IV– Chapter 8(8.3-8.9.2)

Unit-V– Chapter8(8.14-8.14.5)

Reference Book(s):

1. S.Arumugam andA.T.Issac, Statistics, 2009 edition , New Gamma Publishing House.
2. S.P.Gupta, Statistical Methods 40th Revised Edition, 2011Sultan Chand and sons.

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THE MADURA COLLEGE (Autonomous), MADURAI – 625 011

(AFFILIATED TO MADURAI KAMARAJ UNIVERSITY)

RE-ACCREDITED (3rd Cycle) WITH "A" GRADE BY NAAC

PROGRAMME: B.Sc., Statistics **COURSE CODE : 17U2SSM2**

COURSE TITLE : Matrices and Fourier Series **QN.NO : 8207**

TIME : 3 Hours **MAX.MARKS :75**

Unit I Matrix Theory

Rank of a matrix- Simultaneous linear equations using the rank method-Characteristic equations - Cayley Hamilton theorem- Verification and application of Cayley Hamilton theorem.

Unit II Eigen Values and Eigen Vectors

Eigen values-Eigen vectors-Properties of Eigen values and Eigen vectors-Problems.

Unit III Fourier Series

Fourier Series-Euler's formula-Drichlet's conditions- Fourier expansion of f(x) in $(0,2\pi)$- Odd and Even functions-Fourier Series expansion for the function f(x) in $(-\pi,\pi)$.

Unit IV Fourier Series(Continued)

Change of intervals in $(0,2l)$-Half range Fourier Sine and Cosine series in $(0,\pi)$ *and* $(0,l)$ **-** Problems.

Unit V Harmonic Analysis

Harmonic Analysis- Introduction- 1st,2ndand 3rdHarmonics-Problems.

Text Book(s):

1. S. Arumugam and A.T. Isaac, Modern Algebra Reprint 2011, Scitech Publications (India) Pvt. Ltd.,
   (For Unit I and II)Chapter: 7 (7.5-7.8).
2. T. K. ManicavachagomPillay and S. Narayanan, Calculus Vol. III 2002 Edition,
3. S. Viswanatham (Printers & Publishers) Pvt. Ltd.
   (For Units III to V)Chapters: 6(6.1-6.8).

Reference Book(s):

1. T.Veerarajan, Engineering Mathematics, 4th Edition 2005, Tata McGraw Hill Publishers.
2. P. R. Vital, Allied Mathematics, Margam Publications (2009).

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RE-ACCREDITED (3rd Cycle) WITH "A" GRADE BY NAAC

PROGRAMME: B.Sc., **COURSE CODE : 17U2SAC2**

COURSE TITLE : Numerical Methods **QN.NO : 8208**

TIME : 3 Hours **MAX.MARKS :75**

Unit I Solutions of Linear equations

Bisection method – Iteration method – Regulafalsi method – Newton Raphson's method.

Unit II Simultaneous linear equations

Gauss elimination method – Inversion of matrix using Gauss elimination – Method of triangularization - Iterative methods – Gauss – Jacobi method – Gauss seidal method.

Unit III Finite differences

First difference – Differences of a polynomial – Factorial polynomial – Interpolation for equal interval – Newton's forward interpolation formula – Newton's backward interpolation formula.

Unit IV Interpolation

Interpolation with unequal intervals – Divided differences – Lagrange's interpolation formula – Lagrange's inverse interpolation formula – Numerical differentiation Newton's forward difference formula to get the derivative – Newton's backward difference formula to compute the derivative – Stirling's formula – problems.

Unit V Numerical integration

Trapezoidal rule – Simpon's one third rule – Simpon's three - eight rule– Taylor series method(Problems only).

Text Book:

1. P.Kandasamy, K.Thilagavathy andK.Gunavathi, Numerical MethodsReprint 2008, S. Chand & Company Ltd.

Chapters:3(3.1- 3.4), 4(4.1 - 4.5,4.7 - 4.9), 5(5.1 - 5.4), 6(6.1 - 6.6), 8(8.1,8.2,8.5 - 8.7), 9(9.1 - 9.14), 11(11.1 - 11.5).

Reference Books:

1. S. Arumugam, A.T. Isaac &Somasundaram,Numerical Analysis with Programming in C New Gamma Publishing House(2007).
2. M.K.Jain, S.R.K.Iyengar and R.K.Jain, Numerical Methods for Science and Engineering Computation 6th edition, New Age International Publishers (2012).

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RE-ACCREDITED (3rd Cycle) WITH "A" GRADE BY NAAC

PROGRAMME: B.Sc., Statistics **COURSE CODE : 17U3SMC5**

COURSE TITLE : Sampling Techniques **QN.NO : 8210**

TIME : 3 Hours **MAX.MARKS :75**

Learning Objectives

- This course enables them to understand the concepts of Sampling Techniques which enhance them to analyse the data.

Learning Outcomes

On satisfying the requirement of this course, students will be able to

- Understand the different types of sampling methods.
- Discuss the relative advantages and disadvantages of each sampling methods.
- Apply the Sampling techniques to analyze the data.

Unit IEqual Probability Sampling

Basic Definitions – Estimation of Population Total – Simple Random Sampling – Estimation of Total - Problems.

Unit IISystematic Sampling

Linear Systematic Sampling – Schemes for Populations with Linear Trend – Autocorrelated Populations – Estimated Variance – Circular Systematic Sampling – Systematic Sampling in Two Dimensions – Problems.

Unit IIIUnequal Probability Sampling

PPSWR Sampling Method – PPSWOR Sampling Method – Random Group Method – Midzuno Scheme – PPS Systematic Scheme – Problems.

Unit IVStratified Sampling

Introduction – Sample Size Allocation – Comparison with Other Schemes - Problems.

Unit VMulti Sampling

Introduction – Estimation under Cluster Sampling – Multistage Sampling – Adaptive Sampling.

Text Book:

1. S. Sampath, Sampling Theory & Methods, 2nd Edition, Narosa Publishing House.

Chapters: 1, 2, 3, 4, 5, 8, 10(10.1)

Reference Books:

1. Daroga Singh, F.S. Chaudary, Theory and Analysis of Sample Survey Designs, New Age International Pvt. Ltd.
2. William G. Cochran, Sampling Techniques, Third Edition, Wiley - India Edition.

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RE-ACCREDITED (3rd Cycle) WITH "A" GRADE BY NAAC

PROGRAMME: B.Sc., Statistics **COURSE CODE : 17U3SAC3**

COURSE TITLE : Theory of sets and groups **QN.NO : 8211**

TIME : 3 Hours **MAX.MARKS :75**

Learning Objectives

- Enable the students to understand the basic fundamentals in Theory of sets and groups which is very essential in algebra.
- Make them to understand the algebraic structures and to enrich them to have a strong mathematical base for logical thinking.

Learning Outcomes

After successful completion of this course, students will be able to

- Explain the basic mathematical concepts such as Sets, Relations and Functions.
- Explain the fundamental concepts of Groups and their role in modern mathematics and applied contexts.
- Demonstrate accurate and efficient use of algebraic techniques.

Unit I Theory of Sets

Introduction – The Concept of a Set – Set Inclusion –Union of Sets – Intersection of Sets – Difference of Sets – Complement of a Set – Symmetric Difference of Two Sets – Cartesian Product of Sets.

Unit II Relations and Mappings

Relations – Definition and Examples of relation – Types of relation – Reflexive, Symmetric and Transitive – Equivalence Relations – Partial Order – Functions – Binary Operations.

Unit III Groups

Definition and Examples of Groups – Elementary Properties of a Group – Permutation Groups.

Unit IV Subgroups

Definition – Cyclic Groups–Order of an Element – Cosetsand Lagrange's Theorem.

UnitV Homomorphisms&Isomorphism

Normal Subgroups and Quotient Groups –Homomorphisms&Isomorphism.

Text Book:

1. S. Arumugam and A. T. Issac, Modern Algebra, Reprint 2011, Scitech Publications.

Chapters: 1, 2, 3

Reference Books:

1. Seymour Lipsechutz and Marc Lars Lipson, Discrete Mathematics, 3rd Edition 2013, Schaum's Outlines Tata McGraw - Hill.
2. Vijay K. Khanna and S.K. Bhambri, A Course in Abstract Algebra, 3rd Edition, Vikas Publishing House Pvt. Ltd.(2009).

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RE-ACCREDITED (3rd Cycle) WITH "A" GRADE BY NAAC

PROGRAMME: B.Sc., Statistics **COURSE CODE : 17U3SSM3**

COURSE TITLE : Switching Theory **QN.NO : 8212**

TIME : 3 Hours **MAX.MARKS :75**

Learning Objectives

- TThis course enables them to understand the codes and enhance thorough knowledge in Switching Theory.

Learning Outcomes

After successful completion of this course, students will be able to

- Understand the conversion of bases and be familiar with codes.
- Use the concepts of switching algebra for the analysis & design of various combinational & sequential logic circuits.
- Design various logic gates starting from simple ordinary gates to complex programmable logic devices & arrays.

Unit I Number system and Codes

Number representation – Conversion of bases – Binary arithmetic – Binary codes weighted and non-weighted codes.

Unit II Switching Algebra

Fundamental postulates – Basic properties – Switching expressions and their manipulation – De' Morgan's theorem.

Unit III Switching Function

Definition - Simplification of expression – Canonical forms-functional properties-exclusive-OR operation-functionally complete operations.

Unit IV Isomorphic System

Series – Parallel switching circuits –Propositional calculus – Electronic gate networks – Boolean algebras.

Unit V Minimization of Switching Function

Introduction – The map method – Simplification and minimizing of functions – Determination of the minimal product of the sums – Don't care combination-The five-variable map.

Text Book:

1. Zvikohaviand Niraj K. Jha, Switching and Finite Automata Theory , 3rd Edition 2010, Cambridge University Press.

Chapters: 1(1.1,1.2), 3 & 4 (4.1, 4.2).

Reference Books:

1. Anita Goel and Ajay Mittal, Computer Fundamentals and Programming in C, Second Impression (2014), by Pearson (India).
2. A.P. Godse and D. A. Godse, Switching Theory and Logic Design by, 1st Edition 2009, Technical Publications.

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RE-ACCREDITED (3rd Cycle) WITH "A" GRADE BY NAAC

PROGRAMME: B.Sc., Statistics **COURSE CODE : 17U4SMC6**

COURSE TITLE : Theory of Estimation **QN.NO : 8213**

TIME : 3 Hours **MAX.MARKS :75**

Learning Objectives

- This course enables the students to have a good knowledge in Theory of Estimation which will make them to estimate the sample.

Learning Outcomes

After successful completion of this course, students will be able to

- Explain the fundamental concepts of Estimation , methods of estimation and its applications.
- Estimate parameters with multiple criteria : Minimum variance, Maximum Likelihood, Bayesian assumptions.

Unit I Estimators

Introduction – Point Estimators – Interval Estimators – Unbiased Estimators – Asymptotically Unbiased – Efficiency Estimator – Problems.

Unit II Estimators (Continued)

Consistency Estimators – Sufficiency Estimators – Statement of Factorization Theorem – Robustness – Problems.

Unit III Moments

Method of Moments – Method of Maximum Likelihood Estimator – Bayesian Estimation.

Unit IVEstimation of Means

Introduction – The Estimation of Means – The Estimation of Differences between Means – Problems.

Unit VEstimation of Proportions and Variances

The Estimation of Proportions – Differences Between Proportions – Variances – The Ratio of Two Variances.

Text Book:

1. John E. Freund, Mathematical Statistics (1998), Fifth Edition, Prentice Hall of India Private Limited.

Chapters: 10(10.1 - 10.9), (11.1 – 11.7)

Reference Books:

1. S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, 9th Revised Edition, Sultan Chand & Sons.

2. J.N. Kapur, H.C. Saxena, Mathematical Statistics, 20th Revised & Enlarged Edition, S. Chand & Company Ltd.

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RE-ACCREDITED (3rd Cycle) WITH "A" GRADE BY NAAC

PROGRAMME: B.Sc., Statistics **COURSE CODE : 17U4SMC7**

COURSE TITLE : Elements of Stochastic Processes **QN.NO : 8214**

TIME : 3 Hours **MAX.MARKS :75**

Learning Objectives

- This course enables them to understand the basic concepts of Stochastic Processes which will enrich them to apply in real life problems.

Learning Outcomes

After successful completion of this course, students will be able to

- Explain the fundamental concepts of Stochastic Processes and its applications.
- Apply the knowledge of family of random variables in real life situations.
- Think of random variables as an intrinsic need for the analysis of the random phenomena.
- Demonstrate the specific applications of Markov chains and Higher Transition Probabilities.

Unit I Differential Difference Equations

Introduction – Properties of Laplace Transforms – Difference Equations – Differential Difference Equations.

Unit II Probability Distributions

Generating Functions – Probability Generating Functions : Mean and Variance – Sum of Random Variables – Sum of a Random Number of Discrete Random Variables – Generating Function of Bivariate Distribution.

Unit III Laplace Transform of a Probability Distribution

Inverse Laplace Transforms – Laplace Transform of a Probability Distribution of a Random Variable – Mean and Variance in Terms of Laplace Transforms – Some Important Distributions - Problems.

Unit IV Stochastic Processes

Introduction – Specification of Stochastic Processes – Stationary Processes – Martingales – Problems.

Unit V Markov Chains

Introduction – Markov Chain – PolyaUrn Model – Higher Transition Probabilities – Problems.

Text Book:

1. J. Medhi, Stochastic Processes, 2nd Edition, Reprint 2008, New Age International Publisher (1984).

Chapters: 1[1.1(1.1.1 - 1.1.5), 1.2,1.3(1.3.1 – 1.3.4)], 2(2.1 - 2.4), 3(3.1, 3.2), Appendix A (A1-A3).

Reference Books:

1. A. Papoulis, Probability Random Variable and Stochastic Processes, 1991, Tata McGraw – Hill.
2. S. K. Srinivasan, K.M. Mehata, Stochastic processes, 2nd Edition 1978, Tata McGraw – Hill .

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RE-ACCREDITED (3rd Cycle) WITH "A" GRADE BY NAAC

PROGRAMME: B.Sc., Statistics **COURSE CODE : 17U4SSM4**

COURSE TITLE : Mathematical Analysis **QN.NO : 8215**

TIME : 3 Hours **MAX.MARKS :75**

Learning Objectives:

- To provide a strong foundation in basic concepts of Mathematical Analysis which will enrich them to have a good knowledge to apply in statistics.

Learning Outcomes

On satisfying the requirement of this course, students will

- Have the good knowledge of the fundamental mathematical concepts in analysis.
- Understand the basic concepts of Limit Points, Neighbourhood of a point, Open and closed sets, limit of a function.
- Be familiar with Geometric behavior of a continuous and discontinuous functions and able to point out the discontinuities on the graph of a function.
- Understand the consequences of discontinuities for real-world problems in mathematical models.
- Be familiar with the concepts of uniform continuity, derivative, Properties of derivatives and its theorems.
- Demonstrate the ability to solve mathematical problems in Mathematical analysis & be able to prove statements and to formulate precise mathematical arguments.

Unit I Limit Points, Open and Closed Sets

Introduction – Neighbourhood of a Point – Interior Points of a Set – Open Sets – Limit Points of a Set – Bolzano-Weierstrass Theorem – Closed Sets / Closure of a Set – Basic Theorems.

Unit II Limit of a Function

Limits – Left hand and Right hand Limits – Theorems on Limits – Problems.

Unit III Continuity

Continuous Functions – Discontinuous Functions – Types of Discontinuities – Theorems of Continuity – Uniform Continuity – Problems.

Unit IVDerivability

Derivative – Derivability at a Point – Derivability in an Interval – Properties of Derivatives – Darbaux's Theorem – Problems.

Unit V Continuity and Derivability

Rolle's Theorem – Lagrange's Mean Value Theorem – Cauchy's Mean Value Theorem – Problems.

Text Book:

1. S.C. Malik, Principles of Real Analysis, Third Edition 2011, New Age International Publishers.

Chapters: 2, 5 (5.1, 5.2, 5.4), 6(6.1 – 6.7)

Reference Books:

1. S. Arumugam and A. Thangapandi Isaac, Calculus, 2014, New Gamma Publishing House.
2. Richard R. Goldberg, Methods of Real Analysis, Second Edition, John Wiley & Sons, Inc.

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THE MADURA COLLEGE (Autonomous), MADURAI – 625 011

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RE-ACCREDITED (3rd Cycle) WITH "A" GRADE BY NAAC

PROGRAMME: B.Sc., Statistics **COURSE CODE : 17U4SAC4**

COURSE TITLE : Differential Equations **QN.NO : 8216**

TIME : 3 Hours **MAX.MARKS :75**

Learning Objectives

- To enable the students to understand the concepts of Ordinary Differential Equations and its applications.
- To model a Simple Physical System to obtain a first order Linear differential equations, Simultaneous differential equations and to solve them using Various Methods and to interpret its solution graphically.
- To provide a good foundation on Ordinary differential equations which will enrich them to apply in real life problems.

Learning Outcomes

After successful completion of this course, students will be able to

- Explain the concepts of Differential Equation and Classify the Differential Equation with respect to their order and linearity.
- Solve First order Ordinary Differential Equation and Exact Differential equations.
- Model a Simple Physical System to obtain a first order Linear differential equations, Simultaneous differential equations and to solve them using Various Methods &able to interpret its solution graphically.
- Apply the concepts of Ordinary Differential Equation in real life problems.

Unit I First Order Differential Equations

Introduction – Definition – Solutions of Differential Equations – Formation of Differential Equations – Differential Equations of the First Order and of the First Degree – Variable Separable Method – Homogeneous Equations – Non-Homogeneous Equations of the first degree in x and y – Linear Differential Equation – Problems.

Unit II Exact Differential Equation

Bernoulli's Equation – Exact Differential Equations – Practical Rule for Solving an Exact Differential Equation – Rules for Finding Integrating Factors – Problems.

Unit III Applications of First Order Differential Equations

Growth, Decay and Chemical Reactions – Falling Bodies and Other Rate Problems – Problems.

Unit IV Linear Differential Equations with Constant Coefficients

Complementary function of a Linear Differential Equation with Constant Coefficients – Special Methods of Finding Particular Integral – Applications to vibrations in Mechanical Systems – Problems.

Unit V Simultaneous Differential Equations

Simultaneous Differential Equation of First Order and First Degree – Methods of Solving $\frac{dx}{P}=\frac{dy}{Q}=\frac{dz}{R}$ - Simultaneous Linear Differential Equations – Problems.

Text Book :

1. S. Narayanan & T.K. Manicavachagam Pillay, Differential Equations and its Applications, 2011, S. Viswanathan Printers & Publishers Pvt. Ltd.

Chapters: I, II, III (§1, §3), V(§1 to §4, §7(7.1,7.2)) , VI(§1 to §4, §6).

Reference Books:

1. Purna Chandra Biswal, Ordinary Differential Equations, 2008, Eastern Economy Edition, PHI Learning Private Limited.
2. S. Arumugam and A.T. Isaac, Differential Equations and Applications, 2011, New Gamma Publishing House.

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THE MADURA COLLEGE (Autonomous), MADURAI – 625 011

(AFFILIATED TO MADURAI KAMARAJ UNIVERSITY)

RE-ACCREDITED (3rd Cycle) WITH "A" GRADE BY NAAC

PROGRAMME: B.Sc., Statistics **COURSE CODE : 17U5SMC8**

COURSE TITLE : Testing of Hypothesis **QN.NO : 8218**

TIME : 3 Hours **MAX.MARKS :75**

Learning Objectives:

- To impart knowledge about Testing of Hypothesis.

LearningOutcomes:

After successful completion of this course, students will be able to

- Understand Type I & Type II error and its implication in making a decision.
- Develop hypothesis testing methodology for accepting or rejecting null hypothesis.

Unit I

Statistical hypothesis

Introduction – Simple and Composite – Test of a statistical hypothesis – Null and Alternative Hypothesis – Critical region – Twotypes of errors – Level of Significance – Power of the test–Most Powerful test – Neyman Pearson lemma – Likelihood Ratio (L.R) Test – Procedure and simple applications – Properties and use of L.R test.

Unit II

Large sample Theory

Introduction–Large Sample Test – Test of Significance for Single Proportion – Test of Significance for Difference of Proportions – Test of Significance for Single Mean –Test of Significance for Difference of Means – Test of Significance for the Difference of Standard Deviations.

Unit III

t-Distribution

Introduction– Student's 't' Distribution – t-Test for Single Mean – t-Test for Difference between Means - Paired 't' Testfor Difference of Means – t-Test for Testing the Significance of an Observed Sample Correlation Coefficient – Simple problems.

Unit IV

F-Distribution

Snedecor's F-Distribution – F-test for Equality of Two Population Variances –Simple problems.

P.T.O.

Unit V

Chi-Square test

Introduction – Inferences about a population variance and goodness of fit – Association of Attributes – Order of Classes and ClassFrequencies–Yule's coefficient of association (Simple problems).

Text book:

S.C. Gupta and V.K. Kapoor, Fundamental of Mathematical Statistics, 2013, Sultan Chand & Sons, New Delhi

Chapters:

Unit I	Chapter – 18 (18.1, 18.2, 18.4 (18.4.1), 18.5, 18.6, 18.6.1).
Unit II	Chapter – 14 (14.1, 14.6, 14.7, 14.8(14.8.3 – 14.8.5))
Unit III	Chapter – 16 (16.1, 16.2, 16.3 (16.3.1 – 16.3.4)).
Unit IV	Chapter – 16 (16.5,16.6(16.6.1 only))
UnitV	Chapter–15 (15.6(15.6.1 – 15.6.3)&
	Chapter–13(13.4(13.4.1 only),13.7(13.7.1 only))

Reference Books

1. A.M. Goon,M.A. Gupta and B. Das Gupta, An outline of Statistics Theory, Vol. I & II,1980, World press, Calcutta.
2. C. RadhakrishnaRao, Linear Statistical Inference and its Applications, 2nd Edition, Wiley Eastern Limited.

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THE MADURA COLLEGE (AUTONOMOUS - SF), MADURAI – 11

(Re- Accredited with 'A' grade by NAAC)

DEPARTMENT OF STATISTICS

CLASS : III B.Sc., STATISTICS **Max.Marks: 75**

SUBJECT : TESTING OF HYPOTHESIS **Time : 3 hrs**

SUB.CODE: 17U5SMC8 **Semester : V**

QN. NO : 8512

Textbook : S.C.Gupta and V.K. Kapoor ,Fundamentals of Mathematical Statistics,

2013 , Sultan Chand and Sons, New Delhi.

Reference books : 1. A.M.Goon, M.A.Gupta and B.Das Gupta, An outline of Statistics theory,

Vol. I & II, 1980, World Press, Calcutta.

2. C.Radhkrishna Rao, Linear Statistical Inference and its applications, 2nd

Edition, Wiley Eastern Limited.

Chapters : **UNIT I: Chapter** 18 (18.1, 18.2, 18.4(18.4.1), 18.5, 18.6(18.6.1))

UNIT II: Chapter 14 (14.1, 14.6 to 14.8 (14.8.3-14.8.5))

UNIT III: Chapter 16 (16.1, 16.2, 16.3(16.3.1-16.3.4))

UNIT IV: Chapter 16 (16.5, 16.6(16.6.1 only))

UNIT V: Chapter 15 (15.6(15.6.1 – 15.6.3)) &

Chapter 13 (13.4(13.4.1 only), 13.7 (13.7.1 only))

BLUE PRINT

Part A **Answer all questions** **(10 X 1 = 1marks)**

1. O

ne question from Unit I

2. O

ne question from Unit I

3. O

ne question from Unit II

4. O

ne question from Unit II

5. O

ne question from Unit III

6. O

ne question from Unit III

7. O

ne question from Unit IV

8. O

ne question from Unit IV

9. O

ne question from Unit V **Contd…**

10. O

ne question from Unit V

Part B **Answer all questions** **(5 X 7 =35marks)**

(Either or pattern)

11. (a) Any one question from Unit I **(Or)**(b) Any one question from Unit I.

12. (a) Any one question from Unit II **(Or)** (b) Any one question from Unit II.

13. (a) Any one question from Unit III **(Or)** (b) Any one question from Unit III .

14. (a) Any one question from Unit IV **(Or)** (b) Any one question from Unit IV.

15. (a) Any one question from Unit V **(Or)** (b) Any one question from Unit V.

Part C **Answer any three questions** **(3 X 10 = 30 marks)**

16. One question from Unit I

17. One question from Unit II

18. One question from Unit III

19. One question from Unit IV

20. One question from Unit V

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RE-ACCREDITED (3rd Cycle) WITH "A" GRADE BY NAAC

PROGRAMME: B.Sc., Statistics **COURSE CODE : 17U5SMC9**

COURSE TITLE : Operations Research **QN.NO : 8219**

TIME : 3 Hours **MAX.MARKS :75**

Learning Objectives

- To impart Optimization Techniques.
- To make the Students become familiar with the basic Principle of LPP and enrich knowledge to formulate and solve an LPP using various methods.
- To make the Students become familiar withNetwork scheduling by PERT/CPM.

Learning Outcomes

- On satisfying the requirement of this course, students will have the knowledge and skills to
- Formulate the LPP for a real life Problems and give the solution for the problem using suitable optimization techniques.
- Solve Transportation Problems by usingvarious methods and solve the Assignment & Travelling Salesman Problem using Hungarian Algorithm.
- Do network scheduling by PERT/CPM.
- Apply Optimization Techniques in Various fields such as Science, Engineering, Agriculture, Industry, Business, etc.

Unit I

Linear programming problem (LPP)

Introduction – Mathematical formulation of the problem – Graphical solution method – Some exceptional cases – General LPP – Canonical & standard form of LPP.

Unit II

Simplex method

Introduction – Fundamental properties of solutions – The Computational procedure (Simplex Method) – Use of artificial variables (Two-Phase method & Big-M method).

Unit III

Duality in LPP

Introduction – General primal – Dual pair – Formulating a dual problem – Primal – Dual pair in matrix form – Duality theorems – Duality & simplex method – Dual simplex method.

Unit IV

Transportation problem and Assignment problem

Introduction – Solutions of transportation problem for finding an initial basic feasible solution & test for optimality (MODI method) – Degeneracy in transportation problem – Introduction to assignment problem – Mathematical formulation and solution – Travelling salesman problem.

Unit V

Network scheduling by PERT/CPM

Introduction – Network and basic components – Time calculation in network – Floats –CPM - PERT calculations – Distinction between PERT and CPM.

Text Book:

KantiSwarup, P.K. Gupta and Man Mohan, Operations Research, 9th Edition 2001, Sultand Chand Publication.

Chapters: 2, 3(3:1 – 3:5), 4(4:1 – 4:4), 5(5:1 – 5:5, 5:7, 5:9), 10(10:1 – 10:13), 11(11:1 – 11:6), 21(21:1- 21:8).

Reference Books

1. V. Sundaresen, K.S. Ganapathy Subramanian and K. Ganesan, Resource Management Techniques (Operations Research), 2000, A.R Publications.
2. Harvey M. Wagner, Principles of Operations Research, 2nd Edition,1975, PHI Publications.

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RE-ACCREDITED (3rd Cycle) WITH "A" GRADE BY NAAC

PROGRAMME: B.Sc., Statistics **COURSE CODE : 17U6SMC10**

COURSE TITLE : Statistical Quality Control **QN.NO : 8224**

TIME : 3 Hours **MAX.MARKS :75**

Learning Objectives

- To provide an insight into quality assessment techniques.
- To provide an insight into the real-life and varied application of the object.

Learning Outcomes

After successful completion of this course, students will have the skills to

- Demonstrate the ability to use the methods of statistical process control.
- Demonstrate the ability to design, use and interpret control charts for variables.
- Demonstrate the ability to design, use and interpret control charts for attributes.

Unit I

Statistical Methods for Quality Control

Definition, Dimension of quality – Brief history of quality control and improvement – Statistical methods for quality control and improvement – Describing variation – Important distributions – Probability plots – Some useful approximations.

Unit II

Control charts for variables

Introduction – Control charts for $\bar{X}$ and R – Control charts for $\bar{X}$ and S – Shewhart control chart for individual measurements – Summary of $\bar{X}$, R and S charts – Applications of variables control charts.

Unit III

Control charts for Attributes

Introduction – Control charts for fraction non-conforming – Control chart for defects – Choice between attributes and variables control charts – Guidelines for implementing control charts.

Unit IV

Acceptance Sampling for Attributes

Introduction – Acceptance – Sampling problem – Single-sampling plans for attributes – OC curve – Dodge-Roming sampling plans – AOQL plans – LTPD plans – Estimation of process average.

Unit V

Acceptance Sampling by Variables

Introduction – Advantages and disadvantages of variable sampling – Designing a variables sampling plan with a specified OC curve – Other sampling procedures.

Text Book:

D.C. Montgomery, Statistical Quality Control, 2nd Edition 1991, John Wiley and Sons, New York.

Chapters: 1 (1.1 – 1.3), 3(3.1 – 3.5), 6, 7, 15 (15.1, 15.2, 15.5), 16(16.1 – 16.4)

Reference Books:

1. Eugene L. Grant, and Richard S. Leavenworth, Statistical Quality Control, 6th Edition1988, McGraw Hill Book Company, New York.
2. Mahajan, Statistical Quality Control, 1997, DhanpatRai& Sons, New Delhi.

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THE MADURA COLLEGE (Autonomous), MADURAI – 625 011

(AFFILIATED TO MADURAI KAMARAJ UNIVERSITY)
RE-ACCREDITED (3rd Cycle) WITH "A" GRADE BY NAAC

PROGRAMME: B.Sc., Statistics **COURSE CODE : 17U6SMC11**

COURSE TITLE : Design of Experiments **QN.NO : 8225**

TIME : 3 Hours **MAX.MARKS :75**

Learning Objectives

- To expose the essential ideas about designing and interpreting statistical field experiments.
- In a country like ours, which is basically an agricultural one, one ought to know how to select the best agricultural inputs best fertilizers and reap the maximum yield.

Learning Outcomes

- Through this paper, the student is enabled to acquire the knowledge about this vital area and help the society (agriculturists) with his knowledge.

Unit I
Fundamental Principle of Experiments
Terminology in Experimental Designs – Principles of an Experimental Design – Replication – Randomization and Local Control–Size of the Plot.

Unit II
The Analysis of variance
Introduction – One-way Classification– Two-way Classification – Completely Randomized Design (C.R.D.) – Statistical Analysis of C.R.D.

Unit III
Basic Designs
Randomized Block Design (R.B.D.) – Statistical Analysis of R.B.D. for one Observation per Experimental Unit – Efficiency of R.B.D. relative to C.R.D. – Estimation of Missing value in R.B.D. – Latin Square Design (L.S.D.) –Statistical Analysis of m x m L.S.D. for one Observation per Experimental Unit.

Unit IV
Factorial Experiments
Factorial Experiments – 2^2-Design – Yates Method of Computing Factorial Effect Totals – 2^3-Factorial Experiment and 2^n-FactorialExperiment – Confounding in Factorial Designs – Confounding in2^3-Experiment – Partial Confounding.

Unit V
B.I.B.D.
Balanced Incomplete Block Designs (B.I.B.D.) – Parameters of B.I.B.D. – Incidence Matrix – Symmetric B.I.B.D. – Intra block analysis of B.I.B.D.

P.T.O.

Text Book:
S.C. Gupta, and V.K. Kapoor, Fundamentals of Applied Statistics, 3rdExtensively Revised Edition, Sultan Chand & Company.

Chapters:

Unit I	Chapter 6 (6.2, 6.3, 6.3.1, 6.3.2, 6.4)
Unit II	Chapter 5 (5.1, 5.2, 5.3)and Chapter 6(6.5, 6.5.1)
Unit III	Chapter 6 (6.6, 6.6.1, 6.6.3, 6.6.4, 6.7, 6.7.1)
Unit IV	Chapter 6 (6.8, 6.8.1, 6.8.2, 6.8.3, 6.8.4, 6.9, 6.9.1, 6.9.2)
Unit V	Chapter 6 (6.10, 6.10.1, 6.10.2, 6.10.3, 6.10.6)

Reference Books:

1. M.N. Das, N.C. Giri, Design and analysis of Experiments, 2nd Edition, 1986, New age International Publication.
2. Doughlas C. Montgomery, Design and analysis of Experiments, 1976, John Wiley & Sons.

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RE-ACCREDITED (3rd Cycle) WITH "A" GRADE BY NAAC

PROGRAMME: B.Sc., Statistics **COURSE CODE : 17U6SME3(G)**

COURSE TITLE : Queueing Theory **QN.NO : 8227**

TIME : 3 Hours **MAX.MARKS :75**

Learning Objectives

- This course aims to introduce topics in queueing theory.
- Build insights into best practices for designing service systems.

Learning Outcomes

After successful completion of this course, students will

- Understand the general concepts of a queueing system, measures of performance, arrival and service processes.
- Learns about single and multiple server models.
- Knows Channels in parallel and in series with limited and unlimited queues

Unit I **Queueing Systems**

Introduction – Types of Queueing systems – Symbolic representation of Queueing model – Arrival Distribution Theorem (Pure Birth Process).

Unit II **Single server with infinite capacity** $(M/M/1):(\infty/F/FO)$

Introduction – Characteristics of the model – Relationship between L_s, L_q, W_s & W_q – Problems.

Unit III **Multiple servers with infinite capacity** $(M/M/S):(\infty/F/FO)$

Introduction – Characteristics of model $(M/M/S)$ – Related problems – Single server with finite capacity $(M/M/I):(K/F/FO)$ – Characteristics – Problems.

Unit IV **Multiple servers with finite capacity** $(M/MS):(K/FIFO)$

Multiple servers with finite capacity $(M/MS):(K/FIFO)$ – Characteristics of model IV – Problems – $(M/M/1):(\infty/SIRO)$ – Problems.

Unit V **Non-Poisson Queueing Systems**

Non-Poisson Queuing systems – Technique to analyze Non-Poisson Queuing systems with Poisson input model $(M/G/1):(\infty/GD)$ – Related problems.

Text Book:

P. Kandasamy, K. Thilagavathi and K. Gunavathi, Probability Statistics and Queueing Theory, 2005, S. Chand **Chapter: 7**

Reference Books:

1. KantiSwarup, P.K. Gupta and Man Mohan, Operations Research, 9th Edition 2001, Sultand Chand Publication.
2. Trivedi K S, Probability and Statistics with Reliability, Queueing and Computer Science Applications, 1984, Prentice Hall of India, New Delhi.

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