Title of the Course	**:**	**Algebra and Trigonometry**			
Category of the Course	**:**	**CORE COURSE**	**Semester**	**:**	**I**
Course Code	**:**	**U1R3MACC1**	**Nature of the Course**	**:**	**Skill Development**
Marks	**:**	**CIA:25+Ext:75= 100**	**Hrs/Week**	**:**	**5**
Credits	**:**	**5**	**Total Inst. Hrs.**	**:**	**75**

Objectives:

1. Basic ideas on the Theory of Equations, Matrices and Number Theory.
2. Knowledge to find expansions of trigonometry functions, solve theoretical and applied problems.
3. To solve the Algebraic problems using the knowledge of equations
4. To find the expansions of exponential functions, logarithmic functions, trigonometric functions, and hyperbolic trigonometric functions
5. To apply the formulas for derivatives and integrals of the hyperbolic functions

Unit 1 : Reciprocal Equations **(15 hours)**

Reciprocal Equations-Standard form–Increasing or decreasing the roots of a given equation- Removal of terms, Approximate solutions of roots of polynomials by Horner's method – related problems

Unit II : Summation of Series **(15 hours)**

Summation of Series: Binomial– Exponential –Logarithmic series (Theorems without proof) – Approximations - related problems.

Unit III : Characteristic Equation **(15 hours)**

Characteristic equation –Eigen values and Eigen Vectors-Similar matrices - Cayley – Hamilton Theorem (Statement only) - Finding powers of square matrix, Inverse of a square matrix up to order 3, Diagonalization of square matrices - related problems.

Unit- IV: Expansions **(15 hours)**

Expansions of $\sin n\theta$, $\cos n\theta$ in powers of $\sin\theta$, $\cos\theta$ - Expansion of $\tan n\theta$ in terms of $\tan\theta$, Expansions of $\cos^n\theta$, $\sin^n\theta$, $\cos^m\theta\sin^n\theta$ –Expansions of $\tan(\theta 1+\theta 2+,\ldots,+\theta n)$-Expansions of $\sin\theta$, $\cos\theta$ and $\tan\theta$ in terms of θ - related problems.

Unit- V Hyperbolic Functions **(15 hours)**

Hyperbolic functions – Relation between circular and hyperbolic functions Inverse hyperbolic functions, Logarithm of complex quantities, Summation of trigonometric series - related problems.

Text Book:

1. W.S. Burnstine and A.W. Panton, Theory of equations

2. David C. Lay, Linear Algebra and its Applications, 3rd Ed., Pearson Education Asia, Indian Reprint, 2007

3. G.B. Thomas and R.L. Finney, Calculus, 9th Ed., Pearson Education, Delhi, 2005

4. C. V. Durell and A. Robson, Advanced Trigonometry, Courier Corporation, 2003

5. J. Stewart, L. Redlin, and S. Watson, Algebra and Trigonometry, Cengage Learning, 2012.

6. Calculus and Analytical Geometry, G.B. Thomas and R. L. Finny, Pearson Publication, 9th Edition, 2010.

Reference Books:

1) Algebra Vol I, TK. Manchivasogam Pillay and Others, SV Publications
2) Algebra Vol II, TK. Manchivasogam Pillay and Others, SV Publications
3) Trigonometry, TK. Manchivasogam Pillay and Others, SV Publications
4) Allied Mathematics, S.G. Vengatachalapathy
5) Trigonometry, S.Arumugam and Issac, New Gamma Publications.
6) Trigonometry, P.R.Vittal, Margham Publications.

Reference Books:

Unit I: Chapter 6, sec 16-19, 30 [1]
Unit II: Chapter 3, sec1.3,10,14, chapter 4 sec 3,5,6 [1]
Unit III:Chapter 2, sec 1,14.1,14.2,14.3, 16(page no. 110), 16.1,16.2,16.3,16.4, sec 8 [2]
Unit IV:Chapter 3 full [3]
Unit V: Chapter 4 full [3]

e-Resources: https://nptel.ac.in

Outcomes:

The learners would have the ability to,

CO1	Classify and Solve reciprocal equations	K3
CO2	Find the sum of binomial, exponential and logarithmic series	K2
CO3	Find Eigen values, eigen vectors, verify Cayley – Hamilton theorem and diagonalize a given matrix	K2
CO4	Expand the powers and multiples of trigonometric functions in terms of sine and cosine	K5
CO5	Determine relationship between circular and hyperbolic functions and the summation of trigonometric series	K5

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Title of the Course: Algebra and Trigonometry							Course Code: U1R3MACC1			
Course Outcomes (COs)	Programme Outcomes (POs)						Programme Specific Outcomes (PSOs)			Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	
CO1	3	1	3	-	-	-	3	2	1	1.4
CO2	2	1	3	1	-	-	3	2	1	1.4
CO3	3	1	3	1	-	-	3	2	1	1.5
CO4	3	1	3	-	-	-	3	2	1	1.4
CO5	3	1	3	-	-	-	3	2	1	1.4
									Mean Overall Score	1.4
									Result	Medium

3-Strong; 2-Medium; 1-Low

Title of the Course	**:**	**Differential Calculus**			
Category of the Course	**:**	**CORE COURSE**	**Semester**	**:**	**I**
Course Code	**:**	**U1R3MACC2**	**Nature of the Course**	**:**	**Employability**
Marks	**:**	**CIA:25+Ext:75= 100**	**Hrs/Week**	**:**	**5**
Credits	**:**	**5**	**Total Inst. Hrs.**	**:**	**75**

Objectives:

1. To extend student experience with functions
2. To study the fundamental concepts of calculus
3. To review and extend knowledge of trigonometry
4. To develop and strengthen the student problem- solving skills
5. To apply the tools of calculus to variety of problem situations

Unit I Successive Differentiation **(15 hours)**

Successive Differentiation – the n^{th} derivative – Standard Results – Trigonometrical transformations- Formation of equations involving derivatives- Leibnitz's formula for the n^{th} derivative of a product- Feynman's method of differentiation.

Unit II Partial Differentiation **(15 hours)**

Successive Partial derivatives, functions of function rule, Total differential coefficients- A special case- implicit Functions

Unit III Partial Differentiation (Continued) **(15 hours)**

Homogeneous functions – Partial derivatives of a function of two variables – Maxima and Minima of functions of two variables - Lagrange's method of undetermined multipliers.

Unit IV Envelop **(15 hours)**

Method of finding the envelope – Another definition of envelope – Envelope of family of curves which are quadratic in the parameter.

Unit V Curvature **(15 hours)**

Curvature- Circle, radius and centre of curvature- Cartesian formula for the radius of the Curvature- The co-ordinate of the centre of curvature- Evolute and Involute- Radius of curvature in polar co-ordinates.

Text Books:

1. H. Anton, I. Birens and S. Davis, Calculus, John Wiley and Sons, Inc., 2002.
2. G.B. Thomas and R.L. Finney, Calculus, Pearson Education, 2010.
3. M.J. Strauss, G.L. Bradley and K. J. Smith, Calculus, 3rd Ed., Dorling Kindersley (India) P. Ltd. (Pearson Education), Delhi, 2007.

Reference Books:

1. Calculus Vol I, TK. Manchivasogam Pillay and Others, SV Publications
2. R. Courant and F. John, Introduction to Calculus and Analysis (Volumes I & II), Springer-Verlag, New York, Inc., 1989.
3. T. Apostol, Calculus, Volumes I and II.
4. S. Goldberg, Calculus and mathematical analysis.

Reference Book:

Unit I: Chapter III full [1]
Unit II: Chapter VIII, sec1.1 to 1.5 [1]
Unit III: Chapter VII, sec 1,6, 1.7, sec 4, 5. [1]
Unit IV: Chapter X, sec 1.1 to 1.4 [1]
Unit V: Chapter X, sec 2.1-2.6 [1]

e-Resources:

1. https://nptel.ac.in
2. https://www.youtube.com/watch?v=27_2DmQ0ZSU&feature=youtu.be
3. https://www.whitman.edu/mathematics/calculus_online/chapter15.html

Outcomes:

The learners would have the ability to,

CO1	Solve problems on successive differentiation and Leibnitz theorem.	K5
CO2	Find the partial derivative and total derivative coefficient	K2
CO3	Determine maxima and minima of functions of two variables and to use the Lagrange's method of undetermined multipliers	K2
CO4	Find the envelope of a given family of curves	K3
CO5	Find the evolutes and involutes and to find the radius of curvature using polar co-ordinates	K2

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Title of the Course: Differential Calculus							**Course Code: U1R3MACC2**			
Course Outcomes (COs)	**Programme Outcomes (POs)**						**Programme Specific Outcomes (PSOs)**			**Mean Score of Cos**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PSO1**	**PSO2**	**PSO3**	
CO1	3	1	3	-	-	-	3	2	1	1.4
CO2	2	1	3	-	-	-	3	2	1	1.4
CO3	3	2	3	2	-	-	3	2	1	1.7
CO4	3	2	3	2	1	-	3	2	1	1.8
CO5	3	2	3	2	1	-	3	2	1	1.8
									Mean Overall Score	**1.6**
									Result	**Medium**

3-Strong; 2-Medium; 1-Low

Title of the Course	**:**	**Numerical Methods with applications**			
Category of the Course	**:**	**DSE COURSE**	**Semester**	**:**	**I**
Course Code	**:**	**U1R3MADSE1:1**	**Nature of the Course**	**:**	**Employability**
Marks	**:**	**CIA:25+Ext:75= 100**	**Hrs/Week**	**:**	**5**
Credits	**:**	**3**	**Total Inst. Hrs.**	**:**	**60**

Objectives:

1. To make the students to aware of the problems in numerical processing
2. To develop appropriate numerical methods to approximate a function
3. To perform an error analysis for various numerical methods
4. To analyze and evaluate the accuracy of common numerical methods
5. To apply numerical methods to obtain approximate solutions to mathematical problems

Unit I - Algebraic & Transcendental equations (12 hours)

Introduction - Bisection Method – Iteration method - Method of False Position - Newton Raphson Method –Solution of simultaneous linear algebraic equations : Gauss Jacobi-Gauss Seidel method.

Unit II –Finite Differences (12 hours)

First and higher order differences - Forward and backward differences - Properties of operator - Differences of a polynomial – Factorial polynomial- Error propagation Operator E and E^{-1}Relation among δ,E,A□ and D-summation of series.

Unit III – Interpolation (12 hours)

Newton's forward – backward interpolation formula-Gauss forward-backward interpolation formula -Bessel's formula- Divided differences-Newton's divided difference formula-Lagrange's interpolation formula-Inverse interpolation.

Unit IV - Numerical differentiation & Integration (12 hours)

Introduction - Numerical differentiation –Errors in Numerical differentiation – The cubic spline method - Numerical Integration using Trapezoidal rule & Simpson's $1/3^{rd}$, $3/8^{th}$ rules - Theory and Problems.

Unit V - Numerical Solution of ODE (12 hours)

Introduction - Solution by Taylor Series Method - Picard's method of successive approximations - Euler's method - Modified Euler's Method – Runge Kutta 2^{nd} and 4^{th} order methods – predictor – Corrector method – Adams Moulton method – Milne's method.

Text Book :

[1] "Introductory Methods of Numerical Analysis" - S.S.Sastry, Prentice Hall of India Pvt. Limited, 1995.

Unit I: Chapter 2- 2.1 to 2.5, Chapter 6- 6.4
Unit II: Chapter 3-3.3-3.5
Unit III: Chapter 3- 3.6,3.7.1,3.11, 3.9-3.9.1,3.12
Unit IV: Chapter 5-5.1,5.2, 5.4-5.4.1,5.4.2,5.4.3
Unit V: Chapter 7- 7.1-7.6 (Except 7.4.1)

References:

1) "Numerical Analysis" - S.Narayanan& Others S.Viswanathan Publishers, 1994.
2) "Numerical Methods" - A.Singaravelu, Meenachi Agency, June 2000.
3) Kandasamy, P. K.Thilagavathy,andK.Gunavathy- "NumericalMethods",S.Chand&CompanyLtd.,Edn.2006.

e-Resources:

1. https://youtu.be/pUDeeE-ugyc
2. https://perhuaman.files.wordpress.com/2014/07/metodos-numericos.pdf

Outcomes:

The learners would have the ability to,

CO1	Obtain numerical solutions of algebraic and transcendental equations.	K5
CO2	Acquire the knowledge of Finite differences	K3
CO3	Learn about various interpolating and extrapolating methods to find numerical solutions.	K2
CO4	Use results and techniques involving Simpson's 1/3, 3/8 rules by using Trapezoidal rule	K3
CO5	Solve the ODE by using Taylor's, Picard's & Euler's Methods.	K5

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Title of the Course: Numerical Methods with applications							Course Code: U1R3MADSE1:1			
Course Outcomes (COs)	Programme Outcomes (POs)						Programme Specific Outcomes (PSOs)			Mean Score of Cos
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	
CO1	3	3	3	3	2	3	3	2	1	2.5
CO2	2	3	2	2	3	3	3	2	1	2.3
CO3	3	2	1	3	2	3	2	3	1	2.2
CO4	1	2	3	2	3	3	1	3	2	2.2
CO5	3	3	3	1	3	3	3	1	3	2.5
								Mean Overall Score		2.3
								Result		High

3-Strong; 2-Medium; 1-Low

Title of the Course	**:**	**Mathematical Statistics**			
Category of the Course	**:**	**DSE COURSE**	**Semester**	**:**	**I**
Course Code	**:**	**U1R3MADSE1:2**	**Nature of the Course**	**:**	**Employability**
Marks	**:**	**CIA:25+Ext:75= 100**	**Hrs/Week**	**:**	**4**
Credits	**:**	**3**	**Total Inst. Hrs.**	**:**	**60**

Objectives:

1. To Provide some basic statistical tools, statistical decision theory and statistical inference, useful for the future research
2. The student will see the Central Limit Theorem (CLT) arise from experimental data
3. To specify and test the fit of multiple time series model specifications for the same data
4. To forecast the future values of the time series
5. To identify the nature of the phenomenon represented by sequence of observation

Unit I – Statistics- Introduction and Presentation of Data **(12 hours)**

Definition of statistics - importance and scope of statistics - limitations of statistics - statistical data - primary and secondary data - frequency distribution - discrete and continuous frequency distribution - histogram - frequency polygon.

Unit II - Measures of Averages **(12 hours)**

Definition - requisites - Arithmetic Mean - Geometric Mean - Harmonic Mean -Median - Mode. (definition, merits & demerits, graphical location, problems based on raw, discrete and continuous frequency distribution)

Unit III – Measures of Dispersion **(12 hours)**

: Definition - range - Quartile Deviation - Mean Deviation - Standard Deviation and Coefficient of Variation (Definition, Merits and Demerits, problems based on Raw, Discrete and Continuous Frequency Distribution)-Concept of Skewness and Kurtosis.

Unit IV - Time series **(12 hours)**

Concept - components of a time series - trend - periodic changes - irregular component - analysis of time series - additive and multiplicative models - uses of times series - measurement of trend - graphical method - semi average - methods of curve fitting by principles of least squares - growth curves and fitting - moving averages - measurement of seasonal fluctuations - simple averages - ratio to trend - ratio to moving average - link relative methods - related problems.

Unit V - Correlation and Regression **(12 hours)**

Correlation : scatter diagram - correlation coefficient - Karl Pearson - limits for correlation coefficients - probable error - properties of correlation - Rank correlation - limits for rank correlation coefficient spearman rank correlation coefficient (Related Problems).

Regression : Lines of regression - regression curves - regression coefficients - properties of regression coefficients (Related Problems).

Text Books:

[1] "Fundamentals of Mathematical Statistics" - S.C.Gupta, V.K.Kapoor - Sultan Chand & sons - New Delhi,1994.

[2] "Fundamentals of Applied Statistics" - S.C.Gupta, V.K.Kapoor - Sultan Chand & Sons - New Delhi,2007.

Unit I : Chapter 1 : Sec. 1.2 , 1.4 and 1.5 [1]& Chapter 2 : Sec. 2.1 and 2.2 [1]

Unit II : Chapter 2 : Sec. 2.3 - 2.9 [1]&

Unit III : Chapter 3 : Sec. 3.1 – 3.7, 3.8.1, 3.13 - 3.14 [1]

Unit IV : Chapter 2 : Sec. 2.1 - 2.5.4. [2]

Unit V : Chapter 3 : Sec. 3.1 - 3.4, 3.6, 3.9, 3.10 [2]

Reference Books:

[1] " Fundamentals of Mathematical Statistics" by S.C Gupta and V.K Kapoor.

[2] "Fundamentals of Applied Mathematical Statistics" by S.C. Gupta and V.K. Kapoor.

e-Resources:

1. https://www.youtube.com/watch?v=nE67uQPfRbI&feature=youtu.be
2. **https://libguides.reading.ac.uk/mathematics/e-resources**

Outcomes:

The learners would have the ability to,

CO1	Calculate and apply measures of location and measures of dispersion for grouped & ungrouped data.	K5
CO2	Calculate and apply the measures of Averages and Dispersion.	K5, K3
CO3	Compute Correlation coefficients and to estimate Regression Analysis.	K5
CO4	Deals with consistency of data and independence of Attributes.	K2
CO5	Use the variation in Time series.	K3

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Title of the Course: Mathematical Statistics							**Course Code: U1R3MADSE1:2**			
Course Outcomes (COs)	**Programme Outcomes (POs)**						**Programme Specific Outcomes (PSOs)**			**Mean Score of Cos**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PSO1**	**PSO2**	**PSO3**	
CO1	3	1	3	3	1	3	2	3	1	2.2
CO2	3	3	3	2	3	2	3	2	3	2.7
CO3	2	1	3	3	2	3	2	2	3	2.3
CO4	3	2	3	1	3	3	2	1	2	2.2
CO5	2	3	3	1	3	2	2	3	1	2.2
								Mean Overall Score		**2.3**
									Result	**High**

3-Strong; 2-Medium; 1-Low

Title of the Course	**:**	**Quantitative Aptitude - I**			
Category of the Course	**:**	**SE COURSE**	**Semester**	**:**	**I**
Course Code	**:**	**U1R3MASEC1:1**	**Nature of the Course**	**:**	**Employability**
Marks	**:**	**CIA:25+Ext:75= 100**	**Hrs/Week**	**:**	**2**
Credits	**:**	**2**	**Total Inst. Hrs.**	**:**	**30**

Objectives:

1. To study about Percentage
2. To develop analytical thinking of Profit and Loss
3. To educate the students in computational skills of Simple and Compound Interest
4. To know about basic concepts of Average
5. To make the students prepare for competitive examinations by using Ratio and Proportion

Unit I: Percentage

Basic concepts of percentage – Important formulae and simple problems only.

Unit II: Profit and Loss

Profit (Gain) and Loss – Short Cut methods – Simple Problems only.

Unit III: Simple and Compound Interest

Formula for simple interest – Relation between amount and price – Simple problems on simple interest – Compound interest – Some important rules- Only simple problems based on Compound interest.

Unit IV: Average

Basic concepts of Average – Related Problems.

Unit V: Ratio and Proportion

Definition of ratio – Comparison of ratio – Components and dividendo rule – variations – Related problems – Definition of proportion – Fourth proportional – Third proportional – Mean Proportional – Related problems only.

Text Book:

[1] "Quantitative Aptitude for Competitive Examinations", by Dr. R.S. Aggarval, S.Chand & Sons, New Delhi, Reprint 2011.

Unit I: Chapter 10 fully.
Unit II: Chapter 11 Fully.
Unit III: Chapter 21 and 22 Fully
Unit IV: Chapter 6 Fully
Unit V: Chapter 12 Fully

Reference Books:
[1] **Quantitative Aptitude**, Naresh Sharma, Anjali Kaushik – Variety Books Publishers Distributions
[2] **Quantitative Methods**, D.C. Sanchati, S. Chand & Sons, New Delhi.

e – Resources:

1. **https://leverageedu.com/blog/problems-on-ages/**
2. **https://amsp.org.uk/resource/11-16-resources-ratio**

Outcomes:
The learners would have the ability to,

CO1	Learn the techniques for solving Aptitude problems.	K4
CO2	Appear for all Competitive examinations conducted by Central and State Government.	K5
CO3	Understood the concept of Mathematics with emphasis on analytical ability.	K2
CO4	Acquire the knowledge of Ratio and Proportion.	K1
CO5	Infer the problems on simple and compound interest.	K2

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Title of the Course	**:**	**Basic Mathematics**			
Category of the Course	**:**	**SE COURSE**	**Semester**	**:**	**I**
Course Code	**:**	**U1R3MASEC1:2**	**Nature of the Course**	**:**	**Skill Development**
Marks	**:**	**CIA:25+Ext:75= 100**	**Hrs/Week**	**:**	**2**
Credits	**:**	**2**	**Total Inst. Hrs.**	**:**	**30**

Objectives:

1. To develop the aptitude of Reasoning
2. To Guess & Check the Problems quickly
3. To prepare for Competitive & Entrance Examinations in various fields
4. To Study about the Numbers
5. To know about the Discount in Bank

Unit – I : Problems on Numbers and Ages

Problems on Numbers – Consecutive Numbers – Fraction of Numbers – worked out Problems on Ages.

Unit – II : Time & Work, Time & Distance

Relation between time and work – Problems – Formulae - Relation between time and Distance – Worked out problems.

Unit – III : Area

Definition – Formulae – Results on Quadrilateral – Area on Square, Rectangle, Triangle, Rhombus, Parallelogram – Applications.

Unit – IV : Volume and Surface Area

Definitions – Formulae – Problems on cuboid, cube, cylinder, cone, sphere & Hemisphere – simple Applications only.

Unit – V : True Discount & Banker's Discount

Important concepts – Formulae – Problems – Definitions – Banker's Discount – Problems.

Text Book:

[1] "Quantitative Aptitude for Competitive Examination" – R.S.Aggarwal – S. Chand & Sons – New Delhi –seventh edition – 2006.

Unit – I : Chapter 7 & 8
Unit – II : Chapter 15 & 17
Unit – III : Chapter 24
Unit – IV : Chapter 25
Unit – V : Chapter 32 & 33

Reference Book:

[1] "Quantitative Aptitude and Reasoning" – R.V.Praveen , Phi Second Edition - 2012.
[2] "Quantitative Methods" , D.C. Sanchati, S. Chand & Sons – New Delhi .
[3] Quantitative Aptitude , Naresh Sharma, Anjali Kaushik, variety book publishers distributors.

e – Resources:

1. https://www.khanacademy.org/math/cc-seventh-grade-math/cc-7th-geometry/cc-7th-area-volume-surface-area/v/crates-in-boxcar
2. https://www.javatpoint.com/aptitude/true-discount-and-banker-discount

Outcomes:

The learners would have the ability to,

CO1	Apply the short cut methods to solve the Problems	K3
CO2	Obtain the knowledge of Time and Distances.	K1
CO3	Formulate the area of a parallelogram.	K5
CO4	Compute the volume of a cuboid.	K1
CO5	Interpret the use of banker's discount.	K3

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Title of the Course	**:**	**Data Analytics by using SPSS**			
Category of the Course	**:**	**SE COURSE**	**Semester**	**:**	**I**
Course Code	**:**	**U1R3MASEC1:3P**	**Nature of the Course**	**:**	**Employability**
Marks	**:**	**CIA:40+Ext:60= 100**	**Hrs/Week**	**:**	**2**
Credits	**:**	**2**	**Total Inst. Hrs.**	**:**	**30**

Objectives:

1. To provide concepts used in routines in SPSS on the following problems
2. Understand how to start SPSS
3. Enter, modify and analyze data
4. Define a variety of statistical variables
5. Work with multiple data sources

List of Topics:

1. Mean, Standard deviation, Variance.
2. Bar diagram, Line diagram, Pie chart and Histogram.
3. Co efficient of correlation.
4. Regression equation of X on Y.
5. Regression equation of Y on X.
6. Application of t-test for one sample problem.
7. Application of t-test for two sample problems.
8. Application of t-test for testing the significance of Correlation Coefficient.
9. One-tailed and Two-tailed tests.
10. Application of analysis of variance.

Text Books:

1. **SPSS for You**, A. Rajathi& P. Chandran, MJP Publications, Edition – 2010.

Reference Books:

1. SPSS 17.0 for Researches, Gupta & Hitesh Gupta, International Book Home, Pvt., Ltd., 2014.

e- Resources:

1. **https://youtu.be/cjTgyRUaD1s**
2. **https://www.lib.sfu.ca/find/research-tools/spss-resources**
3. **https://libguides.marquette.edu/spss#s-lg-box-687220**

Outcomes:

The learners would have the ability to,

CO1	*Analyze statistical data using measures of central tendency, dispersion and location.*	K4
CO2	*Calculate and interpret the correlation between two variables.*	K5
CO3	*Interpret results of analysis of variance tests.*	K2
CO4	*Develop the simple linear regression equation for a set of data.*	K6
CO5	*Evaluate the simple linear regression equation for a set of data.*	K5

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Title of the Course	**:**	**Bridge Mathematics**			
Category of the Course	**:**	**FOUNDATION COURSE**	**Semester**	**:**	**I**
Course Code	**:**	**U1R3MAFC**	**Nature of the Course**	**:**	**Skill Development**
Marks	**:**	**CIA:25+Ext:75= 100**	**Hrs/Week**	**:**	**2**
Credits	**:**	**2**	**Total Inst. Hrs.**	**:**	**30**

Objectives:

1. To bridge the gap and facilitate transition from higher secondary to tertiary education;
2. To instill confidence among stakeholders and inculcate interest for Mathematics
3. To introduce the fundamental principles
4. To understand the concepts of Calculus
5. To gain the working knowledge Permutations

Unit 1 : Algebra **(6 hours)**

Algebra: Binomial theorem, General term, middle term, problems based on these concepts

Unit II : Sequences and Series **(6 hours)**

Sequences and series (Progressions). Fundamental principle of counting. Factorial n.

Unit III : Permutations and Combinations **(6 hours)**

Permutations and combinations, Derivation of formulae and their connections, simple applications, combinations with repetitions, arrangements within groups, formation of groups.

Unit IV : Trigonometry **(6 hours)**

Trigonometry: Introduction to trigonometric ratios, proof of sin(A+B), cos(A+B), tan(A+B) formulae, multiple and sub multiple angles, sin(2A), cos(2A), tan(2A) etc., transformations sum into product and product into sum formulae, inverse trigonometric functions, sine rule and cosine rule

Unit V: Calculus **(6 hours)**

Calculus: Limits, standard formulae and problems, differentiation, first principle, uv rule, u/v rule, methods of differentiation, application of derivatives, integration - product rule and substitution method.

Text Book:

1. NCERT class XI and XII text books.
2. Any State Board Mathematics text books of class XI and XII

e-Resources:
https://nptel.ac.in

Course Learning Outcome

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

CLO1	Prove the binomial theorem and apply it to find the expansions of any $(x + y)^n$ and also, solve the related problems	K5
CLO2	Find the various sequences and series and solve the problems related to them. Explain the principle of counting	K3
CLO3	Find the number of permutations and combinations in different cases. Apply the principle of counting to solve the problems on permutations and combinations	K3
CLO4	Explain various trigonometric ratios and find them for different angles, including sum of the angles, multiple and submultiple angles, etc. Also, they can solve the problems using the transformations	K4
CLO5	Find the limit and derivative of a function at a point, the definite and indefinite integral of a function. Find the points of min/max of a function.	K3

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Title of the Course: Bridge Mathematics							**Course Code: U1R3MAFC**			
Course Outcomes (COs)	**Programme Outcomes (POs)**						**Programme Specific Outcomes (PSOs)**			**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PSO1**	**PSO2**	**PSO3**	
CO1	1	1	1	1	1	1	1	1	1	1.0
CO2	2	1	1	2	2	1	2	1	1	1.4
CO3	2	1	1	2	2	1	2	1	1	1.4
CO4	1	1	1	1	1	1	2	1	1	1.1
CO5	1	1	1	1	1	1	2	1	1	1.1
									Mean Overall Score	**1.2**
									Result	**Medium**

3-Strong; 2-Medium; 1-Low

Title of the Course	**:**	**Analytical Geometry(2D and 3D)**			
Category of the Course	**:**	**CORE COURSE**	**Semester**	**:**	**II**
Course Code	**:**	**U2R3MACC3**	**Nature of the Course**	**:**	**Skill Development**
Marks	**:**	**CIA:25+Ext:75= 100**	**Hrs/Week**	**:**	**5**
Credits	**:**	**5**	**Total Inst. Hrs.**	**:**	**75**

Objectives:

- Necessary skills to analyze characteristics and properties of two- and three-dimensional geometric shapes.
- To present mathematical arguments about geometric relationships.
- To solve real world problems on geometry and its applications.
- To develop logical and systematic computational skills
- To understand and apply the concepts cone and cylinder

Unit I: Diameter **(15 hours)**

Pole, Polar - conjugate points and conjugate lines – diameters – conjugate diameters of an ellipse - semi diameters- conjugate diameters of hyperbola.

Unit II: Polar Coordinates **(15 hours)**

Polar coordinates: General polar equation of straight line – Polar equation of a circle given a diameter, Equation of a straight line, circle, conic – Equation of chord, tangent, normal. Equations of the asymptotes of a hyperbola.

Unit III: System of Planes **(15 hours)**

System of Planes-Length of the perpendicular–Orthogonal projection.

Unit IV: Representation of Line **(15 hours)**

Representation of line–angle between a line and a plane – co – planar lines–shortest distance between two skew lines –length of the perpendicular–intersection of three planes.

Unit V: Equation of Sphere **(15 hours)**

Equation of a sphere-general equation-section of a sphere by a plane-equation of the circle- tangent plane- angle of intersection of two spheres- condition for the orthogonality-radical plane.

Text Books:

1. S. L. Loney, Co-ordinate Geometry.
2. Robert J. T. Bell, Co-ordinate Geometry of Three Dimensions.
3. William F. Osgood and William C. Graustein, Plane and Solid Analytic Geometry, Macmillan Company, New York, 2016.

Reference Books:

1. Duraipandian and Chatterjee, "**Analytical Geometry**" S.Chand& Co, June 1997.
2. Calculus and Analytical Geometry, G.B. Thomas and R. L. Finny, Pearson Publication, 9th Edition, 2010.
3. Robert C. Yates, Analytic Geometry with Calculus, Prentice Hall, Inc., New York, 1961.

e- Resources:

1. https://nptel.ac.in
2. https://www.khanacademy.org/math/geometry-home/analytic-geometry-topic
3. https://csumec.merlot.org/teacher_resources/trigresources.htm

Outcomes:
The learners would have the ability to,

CO1	Find pole, polar for conics, diameters, conjugate diameters for ellipse and hyperbola	K3
CO2	Find the polar equations of straight line and circle, equations of chord, tangent and normal and to find the asymptotes of hyperbola	K2
CO3	Explain in detail the system of Planes	K2
CO4	Explain in detail the system of Straight lines	K5
CO5	Explain in detail the system of Spheres	K5

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Title of the Course: Analytical Geometry (2D and 3D)							**Course Code: U2R3MACC3**			
Course Outcomes (COs)	**Programme Outcomes (POs)**						**Programme Specific Outcomes (PSOs)**			**Mean Score of Cos**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PSO1**	**PSO2**	**PSO3**	
CO1	2	2	2	1	-	-	3	2	1	1.4
CO2	2	2	2	1	-	-	3	2	1	1.4
CO3	3	2	2	1	-	-	3	2	1	1.5
CO4	3	2	3	1	-	-	3	2	1	1.6
CO5	3	2	3	1	-	-	3	2	1	1.6
		Mean Overall Score								**1.5**
		Result								**Medium**

Title of the Course	**:**	**Integral Calculus**			
Category of the Course	**:**	**CORE COURSE**	**Semester**	**:**	**II**
Course Code	**:**	**U2R3MACC4**	**Nature of the Course**	**:**	**Employability**
Marks	**:**	**CIA:25+Ext:75= 100**	**Hrs/Week**	**:**	**5**
Credits	**:**	**5**	**Total Inst. Hrs.**	**:**	**75**

Objectives:

- To introduce the fundamental principles, concepts and knowledge in the areas of integral calculus
- Knowledge on integration and its geometrical applications, double, triple integrals and improper integrals.
- Knowledge about Beta and Gamma functions and their applications.
- To gain the working knowledge of definite integrals
- To inculcate the basics of integration and their applications

Unit 1 : Evaluation of Reduction Formulae **(15 hours)**

Reduction formulae -Types, integration of product of powers of algebraic and trigonometric functions, integration of product of powers of algebraic and logarithmic functions - Bernoulli's formula, Feyman's technique of integration.

Unit II : Multiple integrals **(15 hours)**

Multiple Integrals - definition of double integrals - evaluation of double integrals – double integrals in polar coordinates - Change of order of integration.

Unit III : Triple integral **(15 hours)**

Triple integrals –applications of multiple integrals - volumes of solids of revolution - areas of curved surfaces – change of variables - Jacobian.

Unit IV: Beta and Gamma Functions **(15 hours)**

Beta functions - Definition - properties of Beta function - Gamma function - Definition - properties of Gamma function - relations between Beta and Gamma functions-Improper integrals.

Unit V: Applications of Integral Calculus **(15 hours)**

Geometric and Physical Applications of Integral calculus.

Text Books.

1. H. Anton, I. Birens and S. Davis, Calculus, John Wiley and Sons, Inc., 2002.
2. G.B. Thomas and R.L. Finney, Calculus, Pearson Education, 2007.
3. D. Chatterjee, Integral Calculus and Differential Equations, Tata-McGraw Hill Publishing Company Ltd.
4. P. Dyke, An Introduction to Laplace Transforms and Fourier Series, Springer Undergraduate Mathematics Series, 2001 (second edition).

Reference Books:

1) H. Anton, I. Birens and S. Davis, Calculus, John Wiley and Sons, Inc., 2002.
2) G.B. Thomas and R.L. Finney, Calculus, Pearson Education, 2007.
3) Shanti Narayan, **"Differential & Integral Calculus"** S. Chand & company ltd Reprint 1994.

e-Resources:

1. https://nptel.ac.in
2. https://youtu.be/ksS_yOK1vtk
3. https://www.youtube.com/watch?v=9_m36W3cK74

Outcomes:
The learners would have the ability to,

CO1	Determine the integrals of algebraic, trigonometric and logarithmic functions and to find the reduction formulae	K3
CO2	Evaluate double and triple integrals and problems using change of order of integration	K5
CO3	Solve multiple integrals and to find the areas of curved surfaces and volumes of solids of revolution	K6
CO4	Explain beta and gamma functions and to use them in solving problems of integration	K5
CO5	Explain Geometric and Physical applications of integral calculus	K4

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Title of the Course: Integral Calculus							**Course Code: U2R3MACC4**			
Course Outcomes (COs)	**Programme Outcomes (POs)**						**Programme Specific Outcomes (PSOs)**			**Mean Score of Cos**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PSO1**	**PSO2**	**PSO3**	
CO1	3	1	3	-	-	-	3	2	1	1.4
CO2	3	1	3	-	-	-	3	2	1	1.4
CO3	3	1	3	-	-	-	3	2	1	1.4
CO4	3	1	3	-	-	-	3	2	1	1.4
CO5	3	1	3	-	2	1	3	2	1	1.8
		Mean Overall Score								**1.5**
		Result								**Medium**

Title of the Course	**:**	**R- Programming**			
Category of the Course	**:**	**ELECTIVE COURSE:3**	**Semester**	**:**	**II**
Course Code	**:**	**U2R3MADSE2:1P**	**Nature of the Course**	**:**	**Employability**
Marks	**:**	**CIA:40+Ext:60= 100**	**Hrs/Week**	**:**	**4**
Credits	**:**	**3**	**Total Inst. Hrs.**	**:**	**60**

Objectives

- To learn the open source platform
- To be familiar with the workspace in R
- To understand the Arithmetic and Logarithms concepts
- To interact with Vectors
- To work with matrices in R-programming

List of Topics:

Diagrammatic and Graphical Representation:

1. Simple Bar Diagram
2. Multiple Bar Diagram
3. Line Diagram
4. Pie Diagram
5. Histogram and Frequency Curve
6. Box Plot
7. Scatter Diagram

Measures of Central Tendency:

8. Arithmetic Mean
9. Median
10. Mode
11. Geometric Mean
12. Harmonic Mean

Measures of Dispersion:

13. Range
14. Quartile Deviation
15. Mean Deviation
16. Standard Deviation

Reference Books:

[1] **"The Book of R - A First Course in Programming and Statistics",**Tilman M. Davies, William Pollock publisher 2016.

Reference Books:

[2] **"R Fundamentals and Programming Techniques",** Thomas Lumley, R Core Development Team and UW Dept of Biostatistics, 2006.

[3] **"Hands-On Programming with R"**, Garrett Grolemund, O'Reilly Media publication, 2014.

e-Resources:

1. https://youtu.be/mqaffQZ-U3M
2. https://cran.r-project.org/doc/contrib/Paradis-rdebuts_en.pdf

Outcomes:

The learners would have the ability to,

CO1	Understand the basics in R-Programming	K2
CO2	Handle big data analysis using R- Programming	K3
CO3	Apply R- Programming for vectors	K3
CO4	Appreciate the statistical perspective in R- Programming	K4
CO5	Create the R- Programming documentations	K6

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Title of the Course: R- Programming							**Course Code: U2R3MAEC2:1**			
Course Outcomes (COs)	**Programme Outcomes (POs)**						**Programme Specific Outcomes (PSOs)**			**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PSO1**	**PSO2**	**PSO3**	
CO1	3	3	2	3	1	3	3	3	2	2.5
CO2	3	3	3	2	3	1	3		3	2.5
CO3	3	1	3	3	2	3	1	2	3	2.3
CO4	3	2	3	1	3	3	3	1	2	2.3
CO5	3	3	2	1	1	3	3	3	1	2.2
		Mean Overall Score								**2.3**
		Result								**High**

Title of the Course	**:**	**Discrete Mathematics**			
Category of the Course	**:**	**ELECTIVE COURSE:4**	**Semester**	**:**	**II**
Course Code	**:**	**U2R3MADSE2:2**	**Nature of the Course**	**:**	**Skill Development**
Marks	**:**	**CIA:25+Ext:75= 100**	**Hrs/Week**	**:**	**4**
Credits	**:**	**3**	**Total Inst. Hrs.**	**:**	**60**

Objectives

- To understand the theory logic and technique of and algebraic system.
- Apply the knowledge and skills obtained to investigate.
- Able to understand have to Communicate Mathematical ideas.
- Make effective use of appropriate technology.
- To Attempt questions related to enumeration in various competitive Examination.

Unit I: Mathematical Logic **(15 hours)**

Introduction- Statements and Notations- Connectives- Normal forms- The theory of Inferences for Statement calculus.

Unit II: Predicate calculus and Inference Theory **(15 hours)**

The Predicate calculus- Predicates, statement functions, variables and quantifier, Predicate formulas, Free and Bound variables, Universe of discourse, Inference Theory- Valid formulas, Equivalences, Theory of inferences for the Predicate calculus, formulas involving more than one quantifier.

Unit III: Lattices and Boolean Algebra **(15 hours)**

Introduction- Lattices as partially ordered sets- Boolean Algebra- Boolean functions- Representation and minimization of Boolean functions.

Unit IV: Combinatorics **(15 hours)**

Permutations – Combinations – Permutations with Repetitions Combinations with Repetition – Permutations of sets with Indistinguishable objects-Miscellaneous problem on permutations and combinations- Binomial Identities.

Unit V: Recurrence Relations **(15 hours)**

Formulation - Solving by iteration method-Solving Recurrence Relations- Solving Linear Homogeneous Recurrence Relations of order two- Solving Linear Homogeneous Recurrence Relations-Generating functions.

Text Books:

[1] " Discrete Mathematical Structures with applications to computer science", J.P. Tremblay and R. Manohar, McGraw Hill, 1987.
[2] " Discrete Mathematics", N.Chandrasekaran and M.Umaparvathi, PHI Learning Private Limited, New Delhi, 2010.

Unit I : Chapter 1: Sec 1,1, 1.2- Except 1.2.5, 1.3- Except 1.3.5, 1.3.6, 1.4- Except 1.4.4 [1]
Unit II : Chapter 1: Sec 1.5, 1.6 full [1]

Unit III: Chapter 2: Sec 2.3, 2.4, 2.6 –Except 2.6.2 [1]
Unit IV : Chapter3: Sec 3.1 to 3.6, 3.7.1 [2]
Unit V : Chapter 6: Sec 6.1 to 6.6 [2]

Reference Books:

[1] "Application Oriented Algebra" by James L.Fisher, Dun Donnelly Publisher.
[2] "Elements of Discrete Mathematics``, C.L. Liu, second edition. McGraw Hill.

e-Resources:

1. https://nptel.ac.in
2. https://www.zib.de/groetschel/teaching/WS1314/BondyMurtyGTWA.pdf

Outcomes:
The learners would have the ability to,

CO1	Learn core idea in logic , permutations and combinations counting principles.	K2
CO2	Use generating functions to solve a variety of combinatorial problems.	K2
CO3	Apply the mathematical ideas for solving the problems.	K3
CO4	Acquire the knowledge of basics of Boolean algebra.	K5
CO5	Solve systems of recurrence relations and algorithm.	K3

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Title of the Course: Discrete Mathematics							**Course Code: U2R3MAEC2:2**			
Course Outcomes (COs)	**Programme Outcomes (POs)**						**Programme Specific Outcomes (PSOs)**			**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PSO1**	**PSO2**	**PSO3**	
CO1	3	3	2	3	1	-	3	3	1	1.9
CO2	3	3	2	3	1	-	3	3	1	2.0
CO3	3	3	2	3	2	-	3	3	1	2.2
CO4	3	3	2	3	1	-	3	3	1	2.1
CO5	3	3	2	3	2	-	3	3	1	2.2
		Mean Overall Score								**2.1**
		Result								**High**

Title of the Course	**:**	**Quantitative Aptitude- II**			
Category of the Course	**:**	**S E Course**	**Semester**	**:**	**II**
Course Code	**:**	**U2R3MASEC2:1**	**Nature of the Course**	**:**	**Entrepreneurship**
Marks	**:**	**CIA:25+Ext:75= 100**	**Hrs/Week**	**:**	**2**
Credits	**:**	**2**	**Total Inst. Hrs.**	**:**	**30**

Objectives:

- To develop the aptitude of reasoning
- To understand the problem quickly
- To calculate the number of permutations of n objects taken r at a time
- To analyze and complete the series
- To learn of conveying a message through signals

Unit I : H.C.F and L.C.M

H.C.F – Split method –Division method – HCF of more than two numbers – HCF of decimals – HCF of fractions – Common multiple – L.C.M – Method of prime factors – LCM of decimals and fractions .

Unit II :Problems of Calendar

Odd days – Ordinary year – Leap year – Counting of odd years .

Unit III :Permutation and Combination

Permutation – Factorial notation – Combination – Arrangements – Fundamental principles of counting .

Unit IV: Series Completion, Coding and Decoding

Number series – Alphabet series – Letter series – Letter Coding – Coding – Decoding – Number Coding .

Unit V: Time and Distances

Bodies moving in the same direction – Bodies moving in the Opposite direction – Average speed.

Text Books:

1. " Quantitative Aptitude and Reasoning " – **R.V. Praveen**, Second Edition, 2013.

Unit I : Chapter 1
Unit II : Chapter 28
Unit III : Chapter 2
Unit IV : Chapter 3 and Chapter 4
Unit V : Chapter 29

Reference Books:

1. "Quantitative Aptitude For Competitive Examinations", Dr. R. S. Aggarwal – S. Chand & Sons, New Delhi, 2011.
2. "Quantitative Aptitude", Naresh Sharma, Anjali Kaushik – Variety Books Publishers Distributions.

e – Resources:

1. https://www.tutorialspoint.com/quantitative_aptitude/aptitude_hcf_lcm_quiz.htm
2. https://examsdaily.in/time-and-distance-problems-with-solutions-pdf

Outcomes:

The learners would have the ability to,

CO1	Be familiar with the common multiples	K1
CO2	Prepare for competitive and entrance examinations in various fields	K3
CO3	Use factorial notation to represent the number of permutations of a set of objects	K5
CO4	Analyze the Decode the messages	K4
CO5	Describe the motion of the object with complete accuracy	K5

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create

Title of the Course	**:**	**Statistics with R**			
Category of the Course	**:**	**S E Course**	**Semester**	**:**	**II**
Course Code	**:**	**U2R3MASEC2:2**	**Nature of the Course**	**:**	**Employability**
Marks	**:**	**CIA:25+Ext:75= 100**	**Hrs/Week**	**:**	**2**
Credits	**:**	**2**	**Total Inst. Hrs.**	**:**	**30**

Objectives

- To learn the open source platform
- To be familiar with the workspace in R
- To understand the Arithmetic and Logarithms concepts
- To interact with Vectors
- To work with matrices in R-programming

List of Topics:

Diagrammatic and Graphical Representation:

1. Simple Bar Diagram
2. Multiple Bar Diagram
3. Line Diagram
4. Pie Diagram
5. Histogram and Frequency Curve

Measures of Central Tendency:

6. Arithmetic Mean
7. Median
8. Mode

Measures of Dispersion:

9. Mean Deviation
10. Standard Deviation

Reference Books:

[1] **"The Book of R - A First Course in Programming and Statistics",**Tilman M. Davies, William Pollock publisher 2016.

Reference Books:

[2] **"R Fundamentals and Programming Techniques",** Thomas Lumley, R Core Development Team and UW Dept of Biostatistics, 2006.

[3] **"Hands-On Programming with R"**, Garrett Grolemund, O'Reilly Media publication, 2014.

e-Resources:

3. https://youtu.be/mqaffQZ-U3M
4. https://cran.r-project.org/doc/contrib/Paradis-rdebuts_en.pdf

Outcomes:

The learners would have the ability to,

CO1	Understand the basics in R-Programming	K2
CO2	Handle big data analysis using R- Programming	K3
CO3	Apply R- Programming for vectors	K3
CO4	Appreciate the statistical perspective in R- Programming	K4
CO5	Create the R- Programming documentations	K6

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Title of the Course	**:**	**Bio Statistics**			
Category of the Course	**:**	**S E Course**	**Semester**	**:**	**II**
Course Code	**:**	**U2R3MASEC2:3**	**Nature of the Course**	**:**	**Employability**
Marks	**:**	**CIA:25+Ext:75= 100**	**Hrs/Week**	**:**	**2**
Credits	**:**	**2**	**Total Inst. Hrs.**	**:**	**30**

Objectives:

- To update and expand the basic knowledge of Biostatistics.
- To review the basic concepts and knowledge in collection of Data
- To develop the skills pertinent to practice Measures of central tendency and Measures of Dispersion.
- To understand the basic concepts of coefficient of Correlation

Unit I: Introduction to Biostatistics

Biostatistics: Definition- Application of Biostatistics - Role of Statistics – Characteristics – Limitations of statistics.

Unit II: Diagrams and Graphical representations

Diagrams: Simple bar diagram – Multiple Bar diagram – Pie diagram.

Graphical Representation: Histogram – Frequency Curve – Polygon.

Unit III: Measures of Central Tendency

Arithmetic mean - Median - Mode - Geometric mean, Harmonic Mean (definition simple problems only)

Unit IV: Measures of Dispersion

Measures of Dispersion: Definition - Characteristics - Range – Quartile Deviation - Mean derivation - Standard deviation - Coefficient of variation (definition simple problems only)

Unit V: Correlation

Definition – Karl Pearson's coefficient of correlation – Spearman Rank correlation.(definition simple problems only)

Text Books:

[1] "**Biostatistics"** - P.N. Arora, P.K.Malhan, Himalaya Publishing House.(2014).

[2] "**Business mathematics and statistics**"–PA. Navanitham, Jai Publishers..

Unit I : Chapter 1, Sec. 1.1 -1.5, 1.11 – 1.13[1]
Unit II: Chapter 6, Part II – Pg no. 98 – 118, 124 – 137 [2]

Unit III: Chapter 7, Part II Pg. no. 159 – 260 [2]
Unit IV: Chapter 8, Part II Pg. No. 305 – 368 [2]
Unit V : Chapter 12, Part II Pg. no. 503 - 522[2]

Reference Books:

1. "Introduction to Biostatistics", Sokal and Rohlf, Toppan Co., Japan.
2. "Primer of Biostatistics", Stanton A. Clantz, The McGraw Hill Inc., New York.

e- Resources:

1. https://www.cuemath.com/data/measures-of-dispersion/
2. https://www.statisticshowto.com/probability-and-statistics/correlation-coefficient-formula/

Outcomes:

The learners would have the ability to,

CO1	Understand the basic concept of statistics.	K2
CO2	Apply statistical measures which are used to analyze the data.	K3
CO3	Acquire knowledge on measures of central tendency and dispersion.	K5
CO4	Prepare reports to conclude the findings in Correlation.	K4
CO5	Develop computational skill and logical thinking in formulating industry oriented problems as a mathematical problem and finding solutions to these problems	K6

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Title of the Course	**:**	**A Prime on Divisibility and Number Sequences**			
Category of the Course	**:**	**SE COURSE**	**Semester**	**:**	**II**
Course Code	**:**	**U2R3MASEC3**	**Nature of the Course**	**:**	**Skill Development**
Marks	**:**	**CIA:25+Ext:75= 100**	**Hrs/Week**	**:**	**2**
Credits	**:**	**2**	**Total Inst. Hrs.**	**:**	**30**

Objectives

- *To connect number theory to the real world*
- *To examine the solution for the problem*
- *To apply the strategies to solve routine and non- routine problems*
- *To develop problem solving skills and to gain self assess knowledge*
- *To determine which concepts and procedures are needed to complete the problem*

Unit I - Introduction & Congruences

What is Number Theory? - Terms and Symbols - Odd and Even Numbers - The Remainder symbol - other divisors - The congruence symbol - Using congruences - A test for divisibility by 13 - Using negative remainders.

Unit II - Elementary and Remaining Cases

Introduction - Divisibility by 2, 5, 4 - A generalization. Introduction - Divisibility by 9, 11 - More general results - Divisibility by 101 - Divisibility by 7 and 13 - Divisibility by 27 and 37 - Other Divisors - concluding remarks - Divisibility by 7 - Another formulation - searching for new rules - divisibility by 17, 53, 11.

Unit III –The Method of differences

Introduction - what is a pattern? - Number sequences - sequences in mathematics - terms and symbols - polynomial sequences - introduction - a symbolic apparatus.

Unit IV - Exponential Sequences

Sequences of the form $\{a^n\}$ - The sequence $\{(-1)^n\}$ - The sequence $\{z^n\}$ - The sequence $\{2^n\}$ - The sequences $\{3^n\}$ - Mixed sequences - seeking an explanation.

Unit V –Square root

Closeness – Sum of square roots - A Square roots spiral – A random sequence – Worked out problems.

Text Books:

[1] FIRST STEPS IN NUMBER THEORY –ShaileshShirali - Universities press.
[2] A prime on number sequences –ShaileshShirali - Universities press.

Unit I : Chapter 1 & 2 All sections [1]
Unit II: Chapter 3, 4, 5 All sections [1]
Unit III: Chapter 1, 2, 3 All sections [2]
Unit IV: Chapter 5 All sections [2]
Unit V : Chapter 14 All sections [2]

Reference Books :

[1] **"**ElementaryNumber theory**" –** David .M.Burton – Tata McGraw – Hill - Edition
[2] "First steps in number theory – A prime on divisibilityA prime on number sequences" - ShaileshShirali - Universities press.

e-Resources:

1. https://www.math.upenn.edu/~mlazar/math170/notes04.pdf
2. https://www.arvindguptatoys.com/arvindgupta/primenumbers.pdf

Outcomes:

The learners would have the ability to,

CO1	Acquire the knowledge of Number theory and Congruence.	K3
CO2	Understand general results of Divisibility's.	K2
CO3	Develop problem solving skills and to gain self assess knowledge of method of differences.	K6
CO4	Know about the knowledge of mixed sequences.	K2
CO5	Understand the concept of square root.	K2

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Title of the Course: Discrete Mathematics							**Course Code: U2R3MAEC2:2**			
Course Outcomes (COs)	**Programme Outcomes (POs)**						**Programme Specific Outcomes (PSOs)**			**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PSO1**	**PSO2**	**PSO3**	
CO1	3	3	2	3	1	-	3	3	1	1.9
CO2	3	3	2	3	1	-	3	3	1	2.0
CO3	3	3	2	3	2	-	3	3	1	2.2
CO4	3	3	2	3	1	-	3	3	1	2.1
CO5	3	3	2	3	2	-	3	3	1	2.2
		Mean Overall Score								**2.1**
		Result								**High**