

SENGAMALA THAYAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

(Affiliated to Bharathidasan University)

(Accredited with "A" Grade by NAAC; An ISO 9001:2015 Certified Institution)

SUNDARAKKOTTAI, MANNARGUDI – 614016.

TAMILNADU, INDIA.



B.Sc., MATHEMATICS COURSE STRUCTURE UNDER CBCS

(For the candidates admitted in the academic year 2021–2022)

ELIGIBILITY: A Pass in 10+2 with Mathematics as one of the core subject

Sem	Part	Nature of the Course	Course Code	Title of the Course	Inst. Hours/Week	Credit	Exam Hours	Marks		Total	
								CIA	ESE		
I	I	Language Course (LC)-I-Tamil*/Other Languages ** #	21LC101	Ikkala Ilakkiyam	6	3	3	25	75	100	
	II	English Language Course (ELC) – I	21ELC101	Language through Literature I (Prose and Communication Skills)	6	3	3	25	75	100	
	III		Core Course (CC)–I	21MA101	Differential and Integral Calculus	5	4	3	25	75	100
			Core Course (CC) – II	21MA102	Trigonometry and Series	4	4	3	25	75	100
			First Allied Course (AC) – I	21APY101	Allied Physics – I	4	3	3	25	75	100
		First Allied Course (AP) – II	21APY102P	Allied Physics Practical – I	3	2	3	40	60	100	
	IV	Value Education		Value Education	2	2	3	25	75	100	
TOTAL					30	21				700	
II	I	Language Course (LC) – II-Tamil*/Other Languages** #	21LC201	Idaikkala Ilakkiyamum Pudhinamum	6	3	3	25	75	100	
	II	English Language Course (ELC) - II	21ELC201	Language through Literature II (Poetry and Communication Skills)	6	3	3	25	75	100	
	III		Core Course (CC) – III	21MA203	Probability & Statistics	6	5	3	25	75	100
			Core Practical (CP) – I	21MA204P	Practical - Statistics	3	3	3	25	75	100
			First Allied Course (AC)– III	21APY203	Allied Physics – II	4	3	3	25	75	100
		First Allied Course (AP) – IV	21APY204P	Allied Physics Practical – II	3	2	3	40	60	100	
	IV	Environmental Studies		Environmental Studies	2	2	3	25	75	100	
TOTAL					30	21				700	
III	I	Language Course (LC) -III Tamil*/Other Languages ** #			6	3	3	25	75	100	
	II	English Language Course (ELC) – III			6	3	3	25	75	100	
	III		Core Course (CC) – IV			4	4	3	25	75	100
			Core Course (CC) – V			5	4	3	25	75	100
			Second Allied Course (AC) –I			4	4	3	25	75	100
		Second Allied Course (AP) – II			3	2	3	40	60	100	
	IV	Non Major Elective - I			2	2	3	25	75	100	
TOTAL					30	22				700	

Sem	Part	Nature of the Course	Course Code	Title of the Course	Inst. Hours/Week	Credit	Exam Hours	Marks		Total	
								CIA	ESE		
I	I	Language Course (LC) -IV - Tamil* /Other Languages ** #			6	3					
	II	English Language Course(ELC) -IV			6	3	3	40	60	100	
	III	Core Course (CC) – VI				4	4	3	25	75	100
		Core Course (CC) – VII				4	4	3	25	75	100
		Second Allied Course (AC) – III				3	2	3	25	75	100
		Second Allied Course (AP) – IV				3	2	3	40	60	100
	IV	Non Major Elective II				2	2	3	25	75	100
Skill Based Elective – I				2	2	3	25	75	100		
	TOTAL				30	22				800	
V	III	Core Course (CC)– VIII			6	4	3	25	75	100	
		Core Course (CC) – IX			6	5	3	25	75	100	
		Core Course (CC) – X			5	4	3	25	75	100	
		Core Practical (CP) – II			2	2	3	40	60	100	
		Major Based Elective – I			5	5	3	25	75	100	
	IV	Skill Based Elective – II			2	2	3	25	75	100	
		Skill Based Elective – III			2	2	3	25	75	100	
		Soft Skill Development			2	2	3	25	75	100	
	TOTAL				30	26				800	
VI	III	Core Course (CC) – XI			6	5	3	25	75	100	
		Core Course (CC) – XII			6	5	3	25	75	100	
		Core Course (CC) – XIII			6	5	3	25	75	100	
		Major Based Elective – II			5	5	3	25	75	100	
		Core Course (CC) – XIV		Project	6	6	-	-	-	-	100
	V	Gender Studies			1	1	3	25	75	100	
		Extension Activities			-	1	-	-	-	-	-
	SWAYAM (EXTRA)				4						
	TOTAL				30	28				600	
	GRAND TOTAL				180	140				4300	

CURRICULAM DESIGN

LIST OF ALLIED COURSES

ALLIED COURSE I - PHYSICS

ALLIED COURSE II - COMPUTER SCIENCE

Subject	No. of Courses	Total Credits
Language Part – I	4	12
English Part –II	4	12
Core Course	13	57
Core Practical	2	05
Allied Course	4	12
Allied Practical	4	08
Non-Major Elective	2	04
Skill Based Elective	3	06
Major Based Elective	2	10
Project	1	06
Environmental Studies	1	02
Value Education	1	02
Soft Skill Development	1	02
Gender Studies	1	01
Extension Activities	-	01 (Credit only)
Total	43	140

* For those who studied Tamil upto 10th +2 (Regular Stream);

+ Syllabus for other Languages should be on par with Tamil at degree level;

those who studied Tamil upto 10th +2 but opt for other languages in degree level under Part I should study special Tamil in Part IV;

** Extension Activities shall be outside instruction hours.

Note:

	CIA	ESE
1. Theory	25	75
2. Practical	40	60
3. Separate passing minimum is prescribed for CIA and ESE		

FOR THEORY

The passing minimum for CIA shall be 40% out of 25 marks [i.e. 10 marks]

The passing minimum for ESE shall be 40% out of 75 marks[i.e. 30 marks]

FOR PRACTICAL

The passing minimum for CIA shall be 40% out of 40 marks [i.e. 16 marks]

The passing minimum for ESE shall be 40% out of 60 marks [i.e. 24 marks]

NON MAJOR ELECTIVE (NME) OFFERED BY THE DEPARTMENT

Semester	Part	Course		Title of the Paper
III		NME - I		
IV		NME -II		

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TAMILNADU, INDIA.

DEPARTMENT OF MATHEMATICS

B.Sc., MATHEMATICS

(For the candidates admitted in the academic year 2021–2022)

Question Paper Pattern- (Theory)

Max time: 3 Hours

Max Marks: 75

Section – A (10 x 2 = 20)

Answer all the questions

Answer in One or Two sentences each

- | | |
|-------|----------|
| 1. } | |
| 2. } | Unit I |
| 3. } | |
| 4. } | Unit II |
| 5. } | |
| 6. } | Unit III |
| 7. } | |
| 8. } | Unit IV |
| 9. } | |
| 10. } | Unit V |

Section – B (5 x 5 = 25)

Answer all the questions

Each answer should not exceed 500 words

- | | |
|--------------|----------|
| 11. a (or) } | |
| b } | Unit I |
| 12. a (or) } | |
| b } | Unit II |
| 13. a (or) } | |
| b } | Unit III |
| 14. a (or) } | |
| b } | Unit IV |
| 15. a (or) } | |
| b } | Unit V |

Section – C (3 x 10 = 30)

Answer any THREE questions in 1200 words

- | | |
|------|----------|
| 16 . | Unit I |
| 17 . | Unit II |
| 18 . | Unit III |
| 19 . | Unit IV |
| 20 . | Unit V |

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SUNDARAKKOTTAI, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2021 – 2022)

DEPARTMENT OF MATHEMATICS

B.Sc., MATHEMATICS

Semester: I- CC-I : Differential and Integral Calculus

Ins. Hrs./Week: 5

Course Credit: 4

Course Code:

OBJECTIVES

- To inculcate the basics of differentiation and its applications
- To introduce the notion of curvature and polar coordinates
- To inculcate the basics of integration and its applications

UNIT-I : Differentiation

(16 Hours)

Basic Formulae on Differentiation - Methods of Successive Differentiation – Leibnitz's Theorem and its applications – Increasing and decreasing functions – Maxima and Minima of function of two variables.

UNIT-II : Curvature

(15 Hours)

Curvature – Definition - Radius of Curvature - Radius of curvature in Cartesian coordinates- Radius of curvature in polar coordinates - Centre of curvature - Formula - Problems.

UNIT-III : Integration

(14 Hours)

Basic Formulae on Integration - Integration of rational algebraic functions - Integration of Irrational functions –Integral of type $\int \frac{dx}{a+b\cos x}$ - Problems.

UNIT-IV : Definite integrals

(15 Hours)

Definite integral- Properties on definite integrals - Integration by Parts -Derivation of the formula for integration by parts- Problems using the formula for integration by parts-Reduction Formula for integration.

UNIT-V : Double integrals

(15 Hours)

Introduction to double integrals –Problems based on double integrals- Changing the order of Integration –Triple Integrals- Properties- Examples.

Total Lecture Hours - 75

COURSE OUTCOME

The students will be able to

1. Learn the basics of differentiation and their applications.
2. Learn the notion of curvature and polar coordinates.
3. Understand the basic concepts of double and triple integrals
4. Solve problems using various methods in integration.
5. Learn the concepts of definite integrals.

TEXT BOOK(S)

1. Narayanan .S and Manicavachagam Pillai T.K. 2011.Calculus Volume I. S. Viswanathan Pvt. Ltd., Chennai.
2. Narayanan.S and Manicavachagam Pillai. T.K. 2011.Calculus Volume II. S.Viswanathan (Printers & Publishers) Pvt. Limited, Chennai.

UNIT- I	Chapter 3	: Sec. 1.1 to 2.2
	Chapter 4	: Sec. 2.1, 2.2 &
	Chapter 5	: Sec. 1.1 to 1.5 of [1]
UNIT- II	Chapter 10	: Sec. 2.1 to 2.4 & 2.6 of [1]
UNIT -III	Chapter 1	: Sec. 7 to 10 of [2]
UNIT -IV	Chapter 1	: Sec. 11, 12 & 13 of [2]
UNIT -V	Chapter 5	: Sec. 2.1, 2.2 & 4 of [2]

REFERENCE BOOK(S)

1. Courante R and Shane Mc. 1988. Wiley online library, North America.
2. Khanna M.L. 1994. Integral Calculus, 19 th Edition. Jai Prakash Nath & Co, Meerut.
3. Piskunov N. 1996. Differential and Integral Calculus, Vol 1. CBS Publishers and distributors, New Delhi.
4. Singh U.P, Srivastava R.J and Siddiqui N.H. 2003. Calculus. Dominant Publishers and Distributors, New Delhi.
5. Gorakh Prasad. 2016. Differential Calculus. Rashi Kansal (Pothishala), Kanpur.

E- RESOURCES

1. <https://www.slideserve.com/jerod/hyperbolic-functions?fitview=true#ssShare>
2. [https:// www.slideshare.net/informaticaacademy/ successive differentiation](https://www.slideshare.net/informaticaacademy/successive-differentiation)
3. <http://www.math.odu.edu/~jhj/counter10.html>
4. <https://ocw.mit.edu/ans7870/resources/Strang/Edited/Calculus/Calculus.pdf>
5. http://www.ru.ac.bd/wp-content/uploads/sites/25/2019/03/205_07_-Courant-Differential-and-Integral-Calculus-Volume-11988.pdf

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DEPARTMENT OF MATHEMATICS

B.Sc., MATHEMATICS

Semester: I-CC-II: Trigonometry and Series

Ins. Hrs./Week: 4

Course Credit: 4

Course Code:

OBJECTIVES

- To understand the basic concepts of Trigonometry
- To know the concepts of hyperbolic functions
- To distinguish the concepts of binomial, exponential theorem and logarithmic series

UNIT-I : Expansions of Trigonometric Functions (12 Hours)

Introduction of Trigonometric Functions - Basic Definitions - Trigonometric Functions - Expansions of $\sin(nx)$, $\cos(nx)$ and $\tan(nx)$ – Expansions of $\sin^n x$ and $\cos^n x$ – Expansions of $\sin(x)$, $\cos(x)$ and $\tan(x)$ in powers of x – Problems.

UNIT-II : Hyperbolic functions (10 Hours)

Introduction of Hyperbolic Functions- Basic Definitions - Hyperbolic functions - Circular functions - Relation between hyperbolic and Circular functions – Inverse hyperbolic functions –Problems.

UNIT-III : Summation of Trigonometric series (11 Hours)

Introduction of Trigonometric Series- Basic Definitions - Logarithm of a complex number – Trigonometric Series - Summation of Trigonometric Series – Difference Method – Angles in Arithmetic Progression Method.

UNIT-IV : Binomial Series (14 Hours)

Introduction of Binomial Series - Binomial Theorem for a rational index – Some important particular cases of the binomial expansions – Sign of terms in binomial expansions – Numerical greatest term – Method of splitting functions into partial fractions – Application of the binomial theorem to the summation of the series – Sum of coefficients.

UNIT-V : Exponential and Logarithmic series (13 Hours)

Introduction of Exponential and Logarithmic Series - Exponential limit - The exponential Theorem - Summation – The Logarithmic Series – Modification of the Logarithmic Series- Euler's Constant – Summation.

Total Lecture Hours - 60

COURSE OUTCOME

The students will be able to

1. Learn the expansions of trigonometric functions.
2. Learn the Hyperbolic and Inverse hyperbolic functions.
3. Learn the logarithm of a complex number, Summation and angles.
4. Understand the concept of binomial theorem.
5. Understand the concept of Exponential and Logarithmic theorem.

TEXT BOOK(S)

1. S.Arumugam & others, 1999. Trigonometry and Fourier series, New Gamma Publications
2. Manicavachagam Pillai T.K. Natarajan T. and Ganapathy K.S. 2007. Algebra Volume-1. Viswanathan S. Pvt. Ltd, Chennai.

UNIT – I Chapter 1 : Sec. 1.2 to 1.4 of [1]

UNIT – II Chapter 2 : Sec. 2.1 & 2.2 of [1]

UNIT – III Chapter 3 : Sec. 3.1

Chapter 4 : Sec. 4.1, 4.2 of [1]

UNIT – IV Chapter 3 : Sec. 5 to 11 of [2]

UNIT – V Chapter 4 : Sec. 1 to 3 ,5 to 9 of [2]

REFERENCE BOOK(S)

1. Francis Raj M.I. 2004. Algebra. Margham Publications, Chennai.
2. Khanna M.L. 1994. Integral Calculus. 19th Edition. Jai Prakash Nath & Co, Meerut.
3. Surya Narayan Iyer S. 2002. Algebra. Margham Publications, Chennai.
4. Kandasamy and K.Thilagavathy. 2004. Mathematics, Volume I. S.Chand and Company Ltd., New Delhi
5. Kandasamy P. and Thilagavathi K. 2004. Mathematics for Branch I: Vol I and Vol II. S.Chand and Company Ltd., New Delhi.

E_RESOURCES

1. <http://www.math.odu.edu/~jhh/counter10.html>
2. www.math.columbia.edu/grc.nasa.gov
3. <http://www2.trinity.unimelb.edu.au/~rbroekst/Notes/Ch1.pdf>
4. https://learn.lboro.ac.uk/archive/olmp/olmp_resources/pages/workbooks_1_50_jan2008/Workbook16/16_3_binomial_series.pdf
5. <https://www.flowsurf3.net/c.Trigonometry-Schaum-s.pdf>

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DEPARTMENT OF MATHEMATICS
B.Sc., MATHEMATICS

Semester: II-CC-III: Probability and Statistics

Ins. Hrs./Week: 6

Course Credit: 5

Course Code:

OBJECTIVES:

- To learn the basic concepts of Probability.
- To learn Random variables, Probability distributions and their applications.
- To study the basic concepts of Statistics, Correlation and Regression.

UNIT- I: Theory of Probability (18 Hours)

Introduction – Short history – Basic terminology – Mathematical probability – Limitations of Mathematical probability - Statistical probability – Limitations of Empirical probability. Definition of probability - Some problems.

UNIT –II: Random variables and Distribution functions (18 Hours)

Introduction – Some theorems on Random variables – Distribution function – Properties of Distribution function - Discrete Random variables - Probability Mass function – Discrete Distribution function - Continuous Random variables - Probability Density function.

UNIT –III: Discrete Probability Distributions (17 Hours)

Introduction: Discrete uniform distribution – Bernoulli distribution - Binomial and Poisson distributions: Moment generating functions of Binomial and Poisson distributions - Additive properties of Binomial and Poisson distributions - Recurrence relations for the moments of Binomial and Poisson distributions.

UNIT- IV: Origin and development of statistics (18 Hours)

Statistics defined -- Importance and scope of statistics – Limitations of statistics – Distrust of statistics – Role of computers in solving statistics problems - Frequency distribution - Continuous Frequency distribution - Graphical representation of a frequency distribution – Histogram – Frequency polygon.

UNIT –V: Correlation and Regression (19 Hours)

Introduction - Meaning of Correlation - Scatter diagram - Karl Pearson's coefficient of correlation - Limits for correlation coefficient - Assumptions underlying Karl Pearson's correlation coefficient. Linear regression - Regression coefficients – Properties of regression coefficients - Problems for finding correlation and regression coefficients.

Total Lecture Hours – 90

COURSE OUTCOME:

The students will be able to

1. Understand the foundations of probability theory.
2. Understand the different types of distribution functions.
3. Apply probability distributions to a variety of problems in various diversified fields.
4. Know a short historical development of mathematical statistics.
5. Derive important properties of correlation and regression coefficients.

TEXT BOOK(S):

1. Gupta S.C, Kapoor V.K. 2002. Fundamentals of Mathematical statistics. Sultan Chand & sons. Educational Publishers. New Delhi.

UNIT – I	Chapter 3:	Sec. 3.1 to 3.5(3.5.1)
UNIT – II	Chapter 5:	Sec. 5.1 to 5.4(5.4.1)
UNIT – III	Chapter 8:	Sec. 8.1 to 8.4(8.4.2,8.4.6 & 8.4.7) & 8.5(8.5.4,8.5.5 & 8.5.8)
UNIT – IV	Chapter 1:	Sec. 1.1 to 1.6
	Chapter 2:	Sec. 2.2 & 2.3(2.3.1 & 2.3.2)
UNIT – V	Chapter 10:	Sec. 10.1 to 10.4(10.4.1 & 10.4.2)
	Chapter 11:	Sec. 11.1 & 11.2(11.2.1 & 11.2.2)

REFERENCE BOOK(S):

1. Das G. 2008. Statistical Methods. First Edition. McGraw Hill Education (India) Pvt. Ltd.
2. Jim Pitman. 1996. Probability. Narosa Publishing House. New Delhi - 110017.
3. Murray R. Spiegel, John Schiller, Alu Srinivasan R. 2012. Probability and Statistics. Fourth Edition. McGraw Hill Education (India) Pvt. Ltd.
4. Pillai R.S.N and Bagavathi V. 2016. Statistics Theory and Practice. Eight Edition. S Chand & Company Ltd. New Delhi – 110055.
5. Sharma A. K. 2005. Text book of Elementary statistics. Discovery Publishing House. New Delhi - 110002.

E-RESOURCES:

1. <https://mason.gmu.edu/~jgentle/books/MathStat.pdf>.
2. http://www.crectirupati.com/sites/default/files/lecture_notes/P%20%26%20S%20Lecture%20Notes.pdf.
3. http://wiki.stat.ucla.edu/socr/index.php/Probability_and_statistics_EBook.
4. <https://www.bcebhagalpur.ac.in/wp-content/uploads/2020/04/Probability-and-Statistics.pdf>.
5. <http://bio5495.wustl.edu/Probability/Readings/DeGroot4thEdition.pdf>.

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DEPARTMENT OF MATHEMATICS

B.Sc., MATHEMATICS

Semester: II-CP-I: Practical - Statistics

Ins. Hrs./Week: 3

Course Credit: 3

Course Code:

OBJECTIVES:

- To study some measures of central tendency in statistics.
- To study some measures of dispersion in statistics.
- To learn Probability Distributions and their applications.

UNIT- I: Measures of Central Tendency (10 Hours)

Arithmetic mean – Properties of Arithmetic mean – Merits and Demerits of Arithmetic mean – Weighted Arithmetic Mean-Median – Medians for continuous Frequency distribution – Merits and Demerits of median - Mode – Mode for continuous frequency distribution – Merits and Demerits of mode - Geometric mean – Geometric mean of the combined group - Merits and Demerits of Geometric mean - Harmonic mean - Merits and Demerits of Harmonic mean.

UNIT –II: Measures of Dispersion (8 Hours)

Range – Quartile deviation – Mean deviation – Standard deviation and Root mean square deviation – Different formulae for calculating variance – variance of the combined series.

UNIT –III: Mathematical Expectation & Generating Functions (10 Hours)

Moments of Bivariate Probability Distributions Conditional Expectation and Conditional variance – Moment Generating function – Some Limitations of moment Generating function – Properties of Moment Generating function - Uniqueness Theorems of Moment Generating function.

UNIT- IV: Calculation of the Correlation Coefficient (8 Hours)

Calculation of the correlation coefficient for a bivariate frequency distribution – Probable error of Correlation coefficient - Rank correlation – Spearman's Rank correlation coefficient – Tied ranks – Repeated ranks.

UNIT –V: Applications of t- Distributions (9 Hours)

t – Test for single mean, t – Test for Difference of means, Paired t – Test for difference of means – t-Test for testing the significance of an observed sample correlation coefficient – t- test for Testing the significance of an observed Regression coefficient- t - test for Testing the significance of an observed partial correlation coefficient.

Total Lecture Hours - 45

COURSE OUTCOME:

The students will be able to

1. Know the relationship between different measures of central tendency.
2. Define and compute different measures of dispersion.
3. Obtain moments of bivariate probability distributions.
4. Distinguish between the correlation coefficient and Spearman's rank correlation coefficient.
5. Understand the applications of t-distributions.

TEXT BOOK(S):

1. Gupta S.C. Kapoor V.K. 2002. Fundamentals of Mathematical statistics. Sultan Chand & sons. Educational Publishers. New Delhi.

UNIT – I Chapter 1: Sec. 2.5 to 2.9(2.9.1)

UNIT – II Chapter 2: Sec. 2.13(2.13.1 to 2.13.4)

UNIT – III Chapter 6: Sec. 6.8 & 6.9

Chapter 7: Sec. 7.1 (7.1.1. to 7.1.3)

UNIT – IV Chapter 10: Sec. 10.5 to 10.7(10.7.1 to 10.7.3)

UNIT – V Chapter 16: Sec. 16.3 (16.3.1 to 16.3.6)

REFERENCE BOOK(S):

1. Jim Pitman. 1996. Probability. Narosa Publishing House. New Delhi - 110017.
2. Murray R. Spiegel, John Schiller, Alu Srinivasan R. 2012. Probability and Statistics. Fourth Edition. McGraw Hill Education (India) Pvt. Ltd.
3. Pillai R.S.N and Bagavathi V. 2010. Practical statistics. S Chand & Company Ltd. New Delhi - 110055.
4. Pillai R.S.N and Bagavathi V. 2016. Statistics Theory and Practice. 8th Edition. S Chand & Company Ltd. New Delhi – 110055.
5. Sharma A. K. 2005. Text book of Elementary statistics. Discovery Publishing House. New Delhi - 110002.

E-RESOURCES:

1. <https://mathes.clarku.edu/~djoyce/ma218/>.
2. http://www.crectirupati.com/sites/default/files/lecture_notes/P%20%26%20S%20Lecture%20Notes.pdf
3. http://wiki.stat.ucla.edu/socr/index.php/Probability_and_statistics_EBook.
4. <https://www.bcebhagalpur.ac.in/wp-content/uploads/2020/04/Probability-and-Statistics.pdf>.
5. <http://bio5495.wustl.edu/Probability/Readings/DeGroot4thEdition.pdf>.

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DEPARTMENT OF MATHEMATICS
ALLIED MATHEMATICS-I
(For Physics & Chemistry)

Semester: I-AC-I : Calculus

Ins. Hrs. / Week: 4

Course Credit: 3

Course Code:

OBJECTIVES

- To train the students to learn the basics related to their major courses
- To train the students in the basic concepts of Integrations and Differentiation
- To introduce the notion of Curvature, Radius and Centre of curvature

UNIT- I : Successive Differentiation (13 Hours)

Basic Formulae on Differentiation - Successive Differentiation – Definition with Examples - n^{th} derivative of standard functions (Derivation not needed) - Leibnitz Theorem (proof not needed) and its applications - Simple problems.

UNIT- II : Curvature (11 Hours)

Total differential coefficients (proof not needed) – Definition - Curvature and Radius of curvature in Cartesian only (proof not needed) – Centre of curvature (proof not needed) – Definition with Examples - Related problems.

UNIT – III : Evaluation of Integrals (12 Hours)

Evaluation of Integrals of types

$$1) \int \frac{px+q}{ax^2+bx+c} dx \quad 2) \int \frac{px+q}{\sqrt{ax^2+bx+c}} dx \quad 3) \int \frac{dx}{(x+p)\sqrt{ax^2+bx+c}}$$
$$4) \int \frac{dx}{a+b\cos x} \quad 5) \int \frac{dx}{a+b\sin x}$$

Integration by trigonometric substitution

$$1) \int \sqrt{a^2 - x^2} dx \quad 2) \int \sqrt{a^2 + x^2} dx \quad 3) \int \sqrt{x^2 - a^2} dx$$

UNIT- IV : Reduction Formula (12 Hours)

General Properties of Definite Integrals - Integration by Parts.

Reduction Formula (when n is a positive integer) for

$$1) \int e^{ax} x^n dx \quad 2) \int x^n \cos ax dx \quad 3) \int \sin^n x dx$$
$$4) \int \cos^n x dx \quad 5) \int_0^x e^{ax} x^n dx \quad 6) \int_0^{\frac{\pi}{2}} \sin^n x dx$$

7) Without proof $\int_0^{\frac{\pi}{2}} \sin^m x \cos^n x dx$ – and illustrations

UNIT –V : Double Integrals (12 Hours)

Double Integrals –Definition with Examples - Changing the order of Integration – Triple Integrals (Cartesian only) – Definition with Examples – Related Problems.

Total Lecture Hours- 60

COURSE OUTCOME

The students will be able to

1. Understand the concept of successive Differentiation.
2. Learn the notation of curvature and radius of curvature.
3. Solve the problems in integration using various methods.
4. Understand the concept of properties of definite integrals, integration by parts and reduction formulae.
5. Understand the concept of double and triple integrals.

TEXT BOOK(S)

1. Narayanan S. and Manicavachagam Pillai T.K. 2003. Calculus Volume I. S.Viswanathan (Printers & Publishers) Pvt. Limited, Chennai.
2. Narayanan S. and Manicavachagam Pillai T.K. 2011. Calculus. Volume II. S.Viswanathan (Printers & Publishers) Pvt. Limited, Chennai.

UNIT - I Chapter 3 : Sec. 1.1 to 1.6, 2.1, 2.2 of [1]

UNIT - II Chapter 8 : Sec. 1.3 to 1.5 &
Chapter 10 : Sec. 2.1 to 2.4 of [1]

UNIT - III Chapter 1 : Sec. 7.3, 7.4, 8, 9 of [2]

UNIT - IV Chapter 1 : Sec. 11,12, 13.1 to 13.5 of [2]

UNIT - V Chapter 5 : Sec. 2.1, 2.2, 4 of [2]

REFERENCE BOOK(S)

1. Arumugam S. and Issac. 2013. Calculus Volume I. New Gamma Publishing House, Palayamkottai.
2. Khanna M.L. 1994. Integral Calculus. 19th Edition. Jai Prakash Nath & Co. Meerut.
3. Hari Krishnan. 2013. Calculus. Atlantic Publishers & Distributions Pvt. Ltd., Chennai.
4. Singh U.P., Srivastava R.J., and Siddiqui N.H. 2003. Calculus. Dominant Publishers and Distributors, New Delhi.
5. Shanthi Narayan and Mittal P.K. 2005. Integral Calculus. S.Chand and Company Ltd., New Delhi.

E_RESOURCES

1. file:///C:/Users/ELCOT/Downloads/AnElementaryTreatiseontheDifferentialandIntegralCalculus_10449393.pdf
2. http://djm.cc/library/Elements_Differential_Integral_Calculus_Granville_edited_2.pdf
3. <https://www.slideserve.com/jerod/hyperbolic-functions?fitview=true#ssShare>
4. <https://www.slideshare.net/informaticaacademy/successive-differentiation>
5. <http://www.math.odu.edu/~jhj/counter10.html>

SENGAMALA THAYAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)



SUNDARAKKOTTAI, MANNARGUDI- 614016

(For the Candidates admitted in the academic year 2021 – 2022)

DEPARTMENT OF MATHEMATICS

ALLIED MATHEMATICS- II

(For Physics & Chemistry)

Semester: I – AC – II : Algebra and Analytical Geometry (3D)

Ins. Hrs./Week: 3

Course Credit: 2

Course Code:

OBJECTIVES

- To inculcate the basic concepts of Algebra
- To give depth knowledge of matrices and inculcate habit of problem solving
- To enable the students to develop their skill in three dimensions

UNIT-I: Binomial and Exponential Series (7 Hours)

Introduction about Binomial and Exponential Series - Binomial Theorem to evaluate summation of series - Approximation of the series – Exponential Theorem (Proof not needed) – Summation of series - Related Problems.

UNIT-II: Matrices (9 Hours)

Non-Singular, Symmetric, Skew Symmetric, Orthogonal, Hermitian, Skew Hermitian and Unitary matrices – Characteristic equation, Eigen values, Eigen vectors – Cayley Hamilton's Theorem (proof not needed) related problems only - Related Problems.

UNIT-III: The Plane (11 Hours)

Standard equation of a plane – Intercept form – Equation of the Plane Passing through the Points – Direction Cosines of the Line which is perpendicular to a plane - Angle between the planes – The ratio in which the plane divides the line joining the points – Equation of a Plane through the line of intersection of two given planes - Related Problems.

UNIT-IV: The Straight Line (8 Hours)

Symmetrical form of straight line – Straight line passing through two points – The Condition for the line to be parallel to the plane - Angle between the plane – Conditions for the line Parallel to the plane - Coplanar lines – Shortest distance between two lines - Related Problems.

UNIT-V: The Sphere (10 Hours)

Equation of a sphere – Centre and Radius – The Length of the tangent from the point to the Sphere – Equation of a circle on a Sphere - Equation of a sphere Passing through a circle – Intersection of two spheres is a circle – Equation of the Tangent plane to the Sphere - Related Problems.

Total Lecture Hours - 45

COURSE OUTCOME

The students will be able to

1. Learn the binomial theorem and its summation and approximations.
2. Understand the types of matrices and its definitions and compute the Eigen value and Eigen vector.
3. Learn the angle between planes, bisector planes, perpendicular distance from a point to a plane and intersection of two lines.
4. Compute the angle between a line and a plane, length of perpendicular from a point to a line.
5. Understand the equation of a Sphere passing through the circle and tangent of the plane to the Sphere.

TEXT BOOKS

1. Manicavachagam Pillai T.K., Natarajan T., Ganapathy K.S. 2007. Algebra Volume I, S.Viswanathan Pvt. Limited, Chennai.
2. Manicavachagam Pillai.T.K., Natarajan.T., Ganapathy K.S., 2012. Algebra, Volume II, S.Viswanathan Pvt Limited, Chennai.
3. Manicavachagam Pillai T.K., Natarajan T., 2008. Analytical Geometry (3D), S.Viswanathan Pvt. Limited, Chennai.

UNIT- I Chapter 3 : Sec. 10 and 14 &
Chapter 4 : Sec. 2,3 of [1]

UNIT- II Chapter 2 : Sec. 1 to 14 and 16.2 to 16.3 of [2]

UNIT- III Chapter 2 : Sec. 1 to 9 of [3]

UNIT- IV Chapter 3 : Sec. 1 to 8 of [3]

UNIT- V Chapter 4 : Sec. 1 to 8 of [3]

REFERENCE BOOK(S)

1. Jain P.K.1991. A Textbook of Analytical Geometry of Three Dimensions, Second Edition. New Age International Private Limited, New Delhi.
2. Sannu Rahi. 2009. Algebra, Tata McGraw Hill Publishing Company Limited, New Delhi.
3. Shanti Narayan, P.K. Mittal. 2016. Analytical Solid Geometry. S.Chand & Company Private limited, New Delhi.
4. Vaishtha A.R. 1990. Analytical Solid Geometry. Krishna Prakashan Media Pvt Ltd., New Delhi.
5. William H. McCrea. 2012. Analytical Geometry of Three Dimensions. Dover Publications, New York.

E-RESOURCES

1. <https://www.google.com/amp/s/dokumen.tips/amp/documents/free-download-here-manickavasagam-pillai-volume-1pdf-free-download-here-algebra.html>
2. https://www.academia.edu/19646465/Analytical_solid_geometry_Shanti_Narayan
3. http://fhscastormath.weebly.com/uploads/1/2/4/7/12476962/chapter11_precal.pdf
4. <https://ncert.nic.in/textbook/pdf/lemh205.pdf>
5. <https://pdfbookslibs.com/a-textbook-of-analytical-geometry-of-three-dimensions-2nd.pdf>

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)



SUNDARAKKOTTAI, MANNARGUDI- 614016

(For the Candidates admitted in the academic year 2021 – 2022)

DEPARTMENT OF MATHEMATICS

ALLIED MATHEMATICS-III

(For Physics & Chemistry)

Semester: II – AC – III: Trigonometry and Fourier series

Ins.Hrs./Week: 3

Course Credit: 2

Course Code:

OBJECTIVES

- To inculcate the basic concepts of Trigonometry with reference to number system, hyperbolic functions and logarithm of complex number
- To acquire problem solving skills to the students in Fourier series
- To learn the Fourier series expansion of periodic function with the period of 2π

UNIT-I : Demovier's Theorem for Rational Number (12 Hours)

Introduction on Number System - Expansion of $\sin n\theta$, $\cos n\theta$, $\tan n\theta$ (n being a positive integer) – Related Problems–Expansion of $\sin^n\theta$, $\cos^n\theta$ –Related Problems–Expansion of $\sin\theta$, $\cos\theta$ and $\tan\theta$ in terms of powers of θ – Related Problems.

UNIT –II : Hyperbolic Functions (10 Hours)

Introduction on Hyperbolic functions – Results – Related Problems – Relation between Hyperbolic and Circular functions–Related Problems–Expansion of Inverse Hyperbolic functions–Related Problems–Separation of real and imaginary parts–Related Problems.

UNIT –III : Logarithm of a Complex Number (8 Hours)

Introduction - Logarithm of a complex number – Related Problems – Summation of a series – Related Problems – Difference Method – Related Problems – Angles in Arithmetic Progression method – Related Problems.

UNIT- IV : Fourier series (9 Hours)

Fourier Series – Definition – Related Problems – Fourier Series Expansion of Periodic Functions with period 2π – Definition – Related Problems – Odd and Even Functions – Definition– Properties of Odd and Even Functions – Related Problems.

UNIT –V : Half Range Fourier series (6 Hours)

Half range sine series – Definition – Related Problems - Half range cosine series – Definition – Related Problems – Change of Interval – Definition – Related Problems.

Total Lecture Hours-45

COURSE OUTCOME

The students will be able to

1. Learn the expansion of $\sin n\theta$ and $\cos n\theta$ and its related problems.
2. Understand the hyperbolic functions and its relation between hyperbolic and circular functions.
3. Understand the summation of series and its methods.
4. Understand the concept of Fourier series and familiarizes with odd, even Fourier series with their periodic functions.
5. Analyze the half range sine and cosine functions and its change of interval.

TEXT BOOKS

1. Arumugam S, Thangapandi Issac A and Somasundaram A. 1999. Trigonometry and Fourier Series. New Gamma Publications, Palayamkkottai.
2. Narayanan S and Manicavachagam Pillay. T.K 2014. Calculus Volume III. Viswanathan Publishing Company, Chennai.

UNIT-I Chapter 1 : Sec. 1.2 to 1.4 of [1]

UNIT-II Chapter 2 : Sec. 2.1 and 2.2 of [1]

UNIT-III Chapter 3 of [1]

Chapter 4 : Sec. 4.1&4.2 of [1]

UNIT-IV Chapter 6 : Sec. 1 to 3 of [2]

UNIT- V Chapter 6 : Sec. 4 to 6 of [2]

REFERENCE BOOK(S)

1. Dyke P.G 2001. An Introduction to Laplace Transforms and Fourier Series. Spinger – Verlag, London.
2. Gelfand I.F. and Saul M. 2012. Trigonometry. Spinger – Verlag, London.
3. Jain S.K. 2001. Fourier Series and Fourier Transforms. Sarup and Sons, New Delhi.
4. Rawat K.S. 2005. Trigonometry. Sarup and Sons, New Delhi.
5. Robert T Seeley. 2006. An Introduction to Fourier Series and Integrals. Dover Publications, New York.

E-RESOURCES

1. https://orion.math.iastate.edu/butler/PDF/trig_notes.pdf
2. <http://users.auth.gr/~siskakis/GelfandSaul-Trigonometry.pdf>
3. <https://lib.alfaisal.edu/pdf/AlgebraAndTrigonometry-LR.pdf>
4. <https://math.mit.edu/~gs/cse/websections/cse41.pdf>
5. <https://fenedebiyat.siirt.edu.tr/dosya/personel/uygulamali-matematik-siirt-201935221347541.pdf>

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)



SUNDARAKKOTTAI, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2021 – 2022)

DEPARTMENT OF MATHEMATICS

ALLIED MATHEMATICS-IV
(For Physics & Chemistry)

Semester: II – AC – IV: ODE, PDE and Laplace Transforms

Ins. Hrs./Week: 4

Course Credit: 3

Course Code:

OBJECTIVES

- To learn the basic concepts of Ordinary Differential Equations and Partial Differential Equations
- To learn the concept of linear equation with constant coefficient
- To train the students in problem solving skills of Partial Differential Equations and Laplace Transforms

UNIT-I : Differential Equations of the First Order (10 Hours)

Basic Formulae on Differential Equations - Equations of the first order, higher degree differential equations solvable for x - Equations solvable for y - Equations solvable for dy/dx – Clairaut's Form – Related problems.

UNIT –II : Linear Differential Equations with Constant coefficients (12 Hours)

Linear differential equations with constant coefficients – Particular Integral– Finding Particular integrals in the cases of e^{kx} , $\sin(kx)$, $\cos(kx)$ (where k is a constant), x^k (where k is a positive integer), and $e^{kx}f(x)$ (where $f(x)$ is any function of x) – Related problems.

UNIT–III : First Order Partial Differential Equations (15 Hours)

Formation of Partial differential equations by eliminating constants and by elimination of arbitrary functions – Definition of general, particular & complete solutions – Singular integral (geometrical meaning not required) –Solutions of first order equations in the standard forms - $f(p, q) = 0$, $f(x, p, q) = 0$, $f(y, p, q) = 0$, $f(z, p, q) = 0$, $f_1(x,p) = f_2(y,q)$, $z = xp+yq+f(p, q)$ - Lagrange's Equations - Related problems.

UNIT-IV : Laplace Transform (11 Hours)

Laplace Transform – Definition – Basic theorems and formulas – Related Problems – First Shifting Theorem – Laplace transform of first and second derivatives – Related Problems – Laplace Transforms of Periodic functions – Related Problems.

UNIT–V : Inverse Laplace Transform (12 Hours)

Inverse Laplace Transforms related to the above standard forms– Definition – basic Theorems and formulas – Related Problems – Solving Second Order ODE with constant Co-efficient using Laplace Transforms– Related Problems.

Total Lectures Hours – 60

COURSE OUTCOME

The students will be able to

1. Learn the order and degree of the Ordinary Differential Equations.
2. Identify some specific methods to solve the Differential Equations.
3. Understand the formation of Partial Differential Equations by eliminating constants and arbitrary functions.
4. Learn the Laplace Transforms and its related problems.
5. Understand the Inverse Laplace Transforms and solving second order Ordinary Differential Equations with constant co-efficient.

TEXT BOOKS

1. Narayanan S and Manicavachagam Pillay T.K. 2014. Calculus Volume III. S.Viswanathan Pvt. Ltd., Chennai.

UNIT – I Chapter 1 : Sec. : 5,6

UNIT – II Chapter 2 : Sec. : 1 to 4

UNIT – III Chapter 4 : Sec. : 1, 2, 3, 5 [5.1 to 5.4], 6

UNIT – IV Chapter 5 : Sec. : 1 to 5

UNIT – V Chapter 5 : Sec. : 6 to 11

REFERENCE BOOK(S)

1. Dyke P.P.G. 2001. An Introduction to Laplace Transforms and Fourier Series. Springer – Verlag, London.
2. Joel Schiff.J. 1999. The Laplace Transform Theory and Applications. Springer – Verlag, New York.
3. Khanna M.L. 1994. Differential Equation. Jaiprakash Nath, Meerut.
4. Rauat K.S. 2003. Differential Equation. Swarup and Sons, New Delhi.
5. Raisinghania M.D. 2013. Ordinary and Partial Differential Equations. S.Chand and Co. Ltd, New Delhi.

E-RESOURCES

1. <https://www.math.ust.hk/~machas/differential-equations.pdf>
2. https://www.researchgate.net/publication/267487772_Differential_Equations_and_Thier_Applications
3. https://www.researchgate.net/publication/332863667_PROBLEMS_SET_SOLUTIONS_DIFFERENTIAL_EQUATION
4. https://www.researchgate.net/publication/333894393_Notes_on_the_Laplace_Transform
5. <http://www.personal.psu.edu/wxs27/250/NotesLaplace.pdf>

SENGAMALA THAYAR EDUCATIONAL TRUST WOMEN'S COLLEGE
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SUNDARAKKOTTAI, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2021 – 2022)

DEPARTMENT OF MATHEMATICS

ALLIED MATHEMATICS-I
(For CS & BCA)

Semester: I - AC – I : Algebra and Calculus

Ins.Hrs./Week:4

Course Credit: 3

Course Code:

OBJECTIVES

- To learn the basic concepts in the integration
- To train the students to solve the problems in Theory of Equations
- To introduce the basic concept of Theory of equations, Matrices and Differentiation

UNIT- I: Theory of Equations

(12 Hours)

Introduction on Theory of Equations - Relation between roots and coefficients – Transformations of Equations – Diminishing, Increasing and multiplying the roots by a constant - Problems.

UNIT-II: Matrices

(15 Hours)

Formation of Matrices - Singular Matrices – Inverse of a non-singular matrix using adjoint method - Rank of a Matrix – Consistency - Characteristic equation, Eigen values, Eigen vectors – Cayley Hamilton's Theorem (proof not needed) –Simple applications only.

UNIT-III: Differentiation

(13 hours)

Basic Formulae on Differentiation - Maxima & Minima – Concavity , Convexity – Points of inflexion- Partial differentiation – Euler's Theorem - Total differential coefficients (proof not needed) –Simple problems only.

UNIT-IV: Integration

(10 Hours)

Basic Formulae on Integration - Evaluation of Integrals of the following Types,

$$1] \int \frac{px+q}{ax^2+bx+c} dx \quad 2] \int \frac{px+q}{\sqrt{ax^2+bx+c}} dx \quad 3] \int \frac{dx}{a+b\cos x} \quad 4] \int \frac{dx}{a+b\sin x}$$

Evaluation using Integration by parts – Properties of definite integrals –Reduction formula

$$1] \int x^n e^{ax} dx \quad 2] \int \cos^n x dx \quad 3] \int \sin^n x dx.$$

UNIT- V: Differential Equations

(10 Hours)

Formation of Differential Equations - Linear Equations – Second order of types $(aD^2 + bD + c)y = F(x)$ where a,b,c are constants and $F(x)$ is one of the following types (i) e^{ax} (ii) $\sin(ax)$ or $\cos(ax)$ (iii) x^n , n being an integer (iv) $e^{ax} f(x)$

Total Lecture Hours – 60

COURSE OUTCOME

The students will be able to

1. Find the solutions of transformation of equation by increasing and decreasing roots.
2. Acquire the Knowledge of pertaining to consistency of equations of matrices, Eigen value and Eigen vector.
3. Understand the concept of maxima and minima and partial differential equation.
4. Understand the different types of Integral Equations and their properties.
5. Perform the problems in different methods of Differential Equations.

TEXT BOOK(S)

1. Manicavachagam Pillai. T.K & Others. 2010. Algebra Volume I. Revised Editions. S.V Publications, Chennai.
2. Manicavachagam Pillai. T.K & Others. 2008. Algebra Volume II. Revised Editions. S.V Publications, Chennai.
3. Narayanan.S, Manicavachagam Pillai.T.K. 2008. Calculus Volume I. S.Viswanathan Pvt. Limited, Chennai.
4. Narayanan.S, Manicavachagam Pillai.T.K. 2008. Calculus Volume II. S.Viswanathan Pvt. Limited, Chennai.
5. Narayanan.S, Manicavachagam Pillai.T.K. 2003. Differential Equations. S.Viswanathan Pvt. Limited, Chennai.

UNIT-I Chapter 6 : Sec. 11,15 and 17 of [1].

UNIT- II Chapter 2 : Sec. 1 to 16 of [2].

UNIT -III Chapter 5 : Sec. 1,2 of [3].

Chapter 8 : Sec. 1.1,1.3 and 1.6 of [3].

UNIT -I Chapter 1 : Sec. 7.3,8,9,11,12,13.1,13.3,13.4 of [4].

UNIT -V Chapter 5 : Sec. 1, 2, 3 and 4 of [5].

REFERENCE BOOK(S)

1. Arumugam, Issac 2007. Allied Mathematics. New Gamma Publishing House, Palayamkottai.
2. Khanna M.L. 2004. Differential Calculus. Jai prakash Nath and Co., Meerut.
3. Khanna M.L. 1994. Integral Calculus. 19 th Edition. Jai Prakash Nath & Co. Meerut.
4. Sannu Rahi. 2009. Algebra. Tata McGraw Hill Publishing Company Limited, New Delhi.
5. Singh U.P, Srivastava R.J, Siddiqui N.H. 2003. Calculus. Dominant Publishers and Distributors, New Delhi.

E_RESOURCES

1. <https://www.pdfdrive.com/calculus-volume-1-d33472743.html>.
2. https://www.academia.edu/38014615/Lecture_Notes_on_Differentiation
3. https://www.researchgate.net/publication/323401207_ELEMENTS_OF_LINEAR_ALGEBRA_AND_MATRIX_THEORY_Course_by_E_Kogan
4. https://www.researchgate.net/publication/319449049_Integral_Calculus
5. <https://ocw.mit.edu/courses/mathematics/18-03-differential-equations-spring-2010/lecture-notes>

SENGAMALA THAYAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)



SUNDARAKKOTTAI, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2021 – 2022)

DEPARTMENT OF MATHEMATICS

ALLIED MATHEMATICS-II
(For CS & BCA)

Semester: I- AC-II: Numerical Analysis

Ins. Hrs./Week: 3

Course Credit: 2

Course Code:

OBJECTIVES

- To introduce the concept of algebraic and transcendental equations
- To enable the students to learn the numerical techniques of interpolation
- To inculcate numerical techniques of differentiation and integration to the students

UNIT-I: Solutions of Algebraic and Transcendental Equations (8 Hours)

Introduction on Algebraic and Transcendental Equations - The Solution of Algebraic and Transcendental Equations -Bisection method, Steps for finding roots of equations using bisection method-Method of false position-Newton Raphson method-Theory and problems.

UNIT-II: Interpolation (10 Hours)

Introduction on Interpolation - Errors in polynomial Interpolation - Finite differences - Formula for finding Forward differences-Formula for finding Backward differences -Some basic problems-Formula for finding Newton's forward and backward Interpolation -Problems based on Newton forward and backward interpolation -Lagrange's Interpolation formula -Theory and problems

UNIT-III: Numerical Differentiation and Integration (11 Hours)

Basic Formulae on Differentiation and Integration-Numerical Differentiation-Errors in numerical differentiation-Formula for finding Numerical differentiation-Problems based on Numerical differentiation-Numerical Integration: Trapezoidal Rule - Simpson's 1/3 Rule, Simpson's 3/8-Rule.

UNIT-IV: Solutions of Linear Systems (10 Hours)

Formulation of Linear Systems - Solutions of linear systems- Theory and problems of linear systems using Gauss Elimination Method – Theory and problems of linear systems using Gauss Jacobi Method –Theory and problems of linear systems using Gauss Seidel Method.

UNIT-V: Numerical Solution of Ordinary Differential Equations (6 Hours)

Formation of Ordinary Differential Equations - Method of finding Solution of ordinary differential equations by Taylor's Series -Formula for Euler's method- Runge Kutta Second and Fourth order method, Theory and Problems.

Total Lecture Hours- 45

COURSE OUTCOME

The students will be able to

1. Acquire knowledge about Algebraic and Transcendental Equations.
2. Knowledge of interpolation.
3. Enhance the knowledge on the concept of numerical differentiation and integration formulae, rules and problems.
4. Develop the knowledge on the theory, problems and solutions of linear systems.
5. Assimilate the concept of numerical solutions of ordinary differential equations.

TEXT BOOK(S)

1. Sastry S.S. 2012. A First Course in Introductory Methods of Numerical Analysis, Fifth Edition, PHI Learning Private Limited, New Delhi.

UNIT- I Chapter 2 : Sec.2.1, 2.2, 2.3, 2.5

UNIT- II Chapter 3 : Sec3.1, 3.2, 3.3(3.3.1&3.3.2), 3.6, 3.9.1

UNIT -III Chapter 6 : Sec.6.1, 6.2, (6.2.1), 6.4 (6.4.1, 6.4.2, 6.4.3)

UNIT -IV Chapter 7 : Sec.7.5, 7.5.1, 7.6

UNIT- V Chapter8 : 8.1, 8.2, 8.4(8.4.1) & 8.5

REFERENCE BOOK(S)

1. Arumugam S, Thangapandi issac and Somasundaram A. 2012. Numerical Methods. Scitech Publications, Chennai.
2. David Kincaid, Ward Cheney. 1991. Numerical Analysis. Brooks/Cole Publishing Company, USA.
3. Jain M.K, Iyengar S.R.K and Jain R.K. 2001. Numerical Methods for Scientific and Engineering Computation. New Age International Private Limited, Bangalore.
4. Mathew J.H. 1992. Numerical Methods for Mathematics, Science and Engineering. Prentice Hall, New Delhi.
5. Veerarajan T and Ramachandran T. 2008. Numerical Methods with programming in C. MC Graw Hill Education, New York.

E- RESOURCES

1. <http://www.math.iitb.ac.in/~baskar/book.pdf>
2. <http://spartan.ac.brocku.ca/~jvrbik/MATH2P20/notes.pdf>
3. <https://www.math.ust.hk/~machas/numerical-methods.pdf>
4. <https://rahulpatel121.files.wordpress.com/2018/07/s-s-sastry-introductory-methods-of-numerical-analysis-2012-phi-learning-pvt-ltd.pdf>
5. <https://authors.library.caltech.edu/25061/1/NumMethChE84.pdf>

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)



SUNDARAKKOTTAI, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2021 – 2022)

DEPARTMENT OF MATHEMATICS
ALLIED MATHEMATICS-III
(For CS & BCA)

Semester: II- AC-III : Statistics

Ins. Hrs./Week: 3

Course Credit: 2

Course Code:

OBJECTIVES

- To introduce the concepts, principles tools and techniques of Statistics
- To enable students to analyse the data graphically using frequency distributions
- To study the concept of measures of central tendency, dispersion, correlation, regression and binomial distribution

UNIT-I : Introduction on Statistics (8 Hours)

Origin and development of statistics- Scope of statistics- Limitations of statistics- Frequency distribution in statistics - Graphical representation of statistical data.

UNIT-II : Measures of central tendency (10 Hours)

Introduction on Measures of central tendency-Arithmetic Mean–Geometric Mean – Harmonic Mean - Median – Mode – Definitions – Properties – Merits and Demerits of Mean, Median and Mode – Problems to find Mean, Median and Mode.

UNIT-III : Measures of Dispersion (11 Hours)

Introduction on Measures of Dispersion- Definition- Objectives- Properties- Methods of measuring dispersion- Range- Quartile deviation- Mean deviation- Standard deviation- Coefficient of dispersion.

UNIT-IV : Correlation and Regression (10 Hours)

Introduction on Correlation–Definition-Properties of Simple Correlation – Karl Pearson's Correlation Coefficients – Limits of Correlation Coefficients - Simple Problems – Regression: Definition- Properties - Regression coefficients – Angles Between Two Lines of Regression - Simple Problems only.

UNIT-V : Binomial distribution (6 Hours)

Introduction on Binomial distribution: Definition –Properties - Moments- Recurrence relations for the Moments - Moment generating functions - Simple problems only - Additive property of Binomial distribution.

Total Lecture Hours- 45

COURSE OUTCOME

The students will be able to

1. Expand knowledge about introduction to the concepts, principles, tools and techniques in statistics.
2. Gain knowledge on the determination of measures of central tendency.
3. Acquire knowledge on the determination of measures of dispersion.
4. Learn the skill of determination of correlation coefficient and the regression coefficient.
5. Assimilate the basic concept, properties and moments of binomial distribution.

TEXT BOOK(S)

1. Gupta S.C and Kapoor V.K. 2002, Fundamentals of Mathematical Statistics. Sultan Chand & Sons, New Delhi.

UNIT- I	Chapter 1	: Sec.1.1 to 1.4
	Chapter 2	: Sec. 2.1 to 2.3
UNIT- II	Chapter 2	: Sec. 2.4 to 2.9
UNIT -III	Chapter 2	: Sec. 2.13 to 2.14
UNIT -IV	Chapter 10	: Sec. 10.1 to 10.4 (10.4.1)
	Chapter 11	: Sec. 11.1, 11.2 (11.2.1 to 11.2.3)
UNIT -V	Chapter 8	: Sec. 8.4 (8.4.1, 8.4.2, 8.4.7 only)

REFERENCE BOOK(S)

1. Freund J.E. 2001. Mathematical Statistics. Prentice Hall of India., New Delhi.
2. Goon A.M. Gupta M.K. and Dos Gupta B. 1991. Fundamentals of Statistics, Volume I. World Press, Calcutta.
3. Gupta S.P. 1994. Statistical Methods. Sultan Chand & Sons, New Delhi.
4. Kapil Sharma. 2011. Statistical Methods. ABO Publishers, Jaipur, India.
5. Pillai R.S.N and Bagavathi. 2003. Practical Statistics. S Chand & Company Ltd. New Delhi.

E- RESOURCES

1. <https://www.math.arizona.edu/~jwatkins/statbook.pdf>
2. <http://www.cimt.org.uk/cmmss/S1/Text.pdf>
3. <https://stat.ethz.ch/~geer/mathstat.pdf>
4. <https://mason.gmu.edu/~jgentle/books/MathStat.pdf>
5. <http://fstroj.uniza.sk/kam/orsansky/pdf/eng/basicsofstatisticalmethods.pdf>

SENGAMALA THAYAR EDUCATIONAL TRUST WOMEN'S COLLEGE

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DEPARTMENT OF MATHEMATICS

ALLIED MATHEMATICS-IV

(For CS & BCA)

Semester: II- AC – IV : Operations Research

Ins. Hrs./Week: 4

Course Credit: 3

Course Code:

OBJECTIVES

- To understand basics of operations research with reference to formulation, operation and research
- To provide introduction to mathematical formulation of Transportation Problem and formulation of Assignment Problems
- To train the students in solving the Network problems and sequencing problems

UNIT-I : Operations Research

(12 Hours)

Introduction of Operations Research - Basics of Operations Research – Operations Research & Decision making – Role of Operations Research – Mathematical Formulation of Linear Programming Problem - Graphical solution of two variables – Mathematical Formulation of Canonical form – Mathematical Formulation of Standard form – Conversion of Linear Programming Problem into Canonical and Standard Forms.

UNIT – II : Simplex Method

(12 Hours)

Simplex Method– Basic Definitions - Simplex Method Algorithm - Simplex Method for less than or equal to (\leq), equal to ($=$) and greater than or equal to (\geq) constraints – Big M Method - Big M Method Algorithm – Problems.

UNIT –III : Transportation Problem and Assignment problem

(13 Hours)

Transportation Problem –Introduction and mathematical formulation of Transportation Problem – To find the initial basic feasible solution using (i) North West Corner Method (ii) Least Cost Method (iii) Vogel's Approximation Method –To find the optimum basic feasible solution using Modified Distribution (MODI) Method - Unbalanced Transportation problem- Assignment Algorithm – Formulation of Assignment Problem - Unbalanced Assignment problem.

UNIT –IV : Sequencing Problem

(11 Hours)

Sequencing Problem– Definition - Processing of n jobs through two machines – Processing of n jobs through two machines algorithm - Processing of n jobs through three machines – Processing of two jobs through n machines –Processing of n jobs through three machines – Processing of two jobs through n machines algorithm - Related Problems in all the above.

UNIT –V : Networks

(12 Hours)

Networks – Immediate Predecessor -Immediate Successor– Dummy activity – Critical Path - Fulkerson’s rule - Measure of activity –PERT computation –Earliest Time – Latest Time - Total Float – Free Float – Independent Float - CPM computation - Resource scheduling.

Total Lecture Hours – 60

COURSE OUTCOME

The students will be able to

1. Understand the advantages and limitations of operation research, and also understand the role operation research and solve the mathematical formulation of Linear Programming Problem.
2. Acquire knowledge on the simplex method and algorithms.
3. Understand the concepts of transportation and assignment problems, and find solution through the formulation of transportation problems.
4. Learn about the sequencing problems.
5. Assimilate the concept of Network scheduling by CPM and PERT.

TEXT BOOKS

1. Kalavathy S. 2013. Operations Research, Fourth Edition. Vikas Publishing House Pvt. Ltd, Chennai.

UNIT -I	Chapter 1	Full
	Chapter 2	: Sec. 2.1, 2.2
	Chapter 3	Full
UNIT -II	Chapter 4	Full
	Chapter 5	: Sec. 5.1, 5.2
UNIT –III	Chapter 8	: Sec. 8.1 to 8.5
	Chapter 9	: Sec. 9.3 to 9.5
UNIT –IV	Chapter 14	: Sec. 14.1 to 14.3, 14.5
UNIT –V	Chapter15	: Sec. 15.1 to 15.8

REFERENCE BOOK(S)

1. Hamdy A. Taha. 2005. Operations Research, 7thEdition. Prentice Hall of India Private Limited, New Delhi.
2. Kanti Swarup, Gupta P.K, Man Mohan. 2014. Operations Research, Fourteenth Edition. Sultan Chand & Sons, New Delhi.
3. Prem Kumar Gupta and Hira D.S. 1976. Operations Research - An Introduction. Sultan Chand, New Delhi.
4. Sharma J.K. 2001. Operations Research. MacMillan India Ltd, New Delhi.
5. Sundaresan V, Ganapathy Subramanian. K.S and Ganesan K. 2002. Resource Management Techniques. A.R.Publications, Chennai.

E_RESOURCES

1. http://ebooks.lpude.in/commerce/bcom/term_5/DCOM303_DMGT504_OPERATION_RESEARC H.pdf
2. <http://www.ggu.ac.in/download/class-note14/operation%20research%2007.04.14.pdf>
3. [file:///C:/Users/Commerce2/Downloads/Operations%20Research%20\(%20PDFDrive%20\).pdf](file:///C:/Users/Commerce2/Downloads/Operations%20Research%20(%20PDFDrive%20).pdf)
4. https://www.google.co.in/books/edition/_/6khDDAAQBAJ?hl=en
5. https://www.researchgate.net/publication/333748649_Chapter_-1_Operations_Research