DEPARTMENT OF MATHEMATICS
CHAUDHARY RANBIR SINGH UNIVERSITY

Part A - Introduction	
Subject	Mathematics
Semester	IV
Name of the Course	**Foundations of Applied Mathematics**
Course Code	B25-MAT-V406
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/SEC/VAC)	VOC
Level of the course	100-199
Pre-requisite for the course (if any)	NA
Course Learning Outcomes(CLO):	After completing this course, the leaner will be able to: 1.Understand basic algebraic concepts, equations and functions and apply them to solve simple real-life problems. 2.Apply elementary calculus techniques such as limits, differentiation and integration in practical situations. 3,Use matrices and determinants to solve systems of linear equations. 4.Develop analytical and problem-solving skills required for vocational and allied disciplines.
CLO 5 is related to the practical components of the course.	5 Attain cognitive and technical skills required formulating and solving practical problems involving Linear and quadratic equations, factorization, inequalities, algebraic identities.

differentiation, integration, standard integrals, matrices, determinants.

	Theory		Practical	Total
Credits	2		2	4
Contact Hours	2		4	6
Internal Assessment Marks	15		15	30
External Assessment Marks	35		35	70
Examination Time	3Hrs		3Hrs	

Max. Marks:100

Part B- Contents of the Course

Instructions for Paper- Setter

The examiner will set 9 questions asking two questions from each unit and one compulsory question by taking course learning outcomes (CLOs) into consideration. The compulsory question (Question No. 1) will contain 5 parts covering entire syllabus. The examinee will be required to attempt 5 questions, selecting one question from each unit and the compulsory question.

Unit	Topics	Contact Hours
I	Linear and quadratic equations, factorization, inequalities, algebraic identities and their applications in solving real-life problems. Concept of functions and elementary graphs.	8
II	Types of functions, graphical representation, limits of simple functions, differentiation and its applications.	7
III	Elementary integration, standard integrals and applications of integration in area calculation and practical situations.	7
IV	Types of matrices, determinants, inverse of matrix and solution of simultaneous linear equations using matrices.	8

Practical

	The examiner will set 4 questions at the time of practical examination	60

	by taking course learning outcomes (CLOs) into consideration. The examinee will be required to solve 2 questions. The evaluation will be done on the basis of practical record, viva-voce and written examination.	
	Problem Solving- Questions related to the practical problems based on following topics will be worked out and record of those will be maintained in the Practical Note Book: 1.Problem to find solution of linear and quadratic equations. 2.Problem to find graphical representation of functions and inequalities. 3.Problem to solve numerical examples based on limits and differentiation. 4.Problem to find simple integration and its applications. 5.Problem to find matrix operations and solution of linear equations. 6.Problem to solve application-based algebraic and calculus problems. 7.Problem to perform computational work using basic digital tools.	

Suggested Evaluation Methods

Internal Assessment: ➢ **Theory :15** • Class Participation: 4 • Seminar/presentation/assignment/quiz/class test etc.: 4 • Mid-Term Exam: 7 ➢ **Practicum :15** • Class Participation:**5** • Seminar/Demonstration/Viva-voce/Lab records etc.: 10 • Mid-Term Exam:**Nil**	**End Term Examination:** **Theory 35** Written Examination **Practicum 35** Lab record, viva-voce, written examination.

Part C-Learning Resources.

Recommended Books

1. Kreyszig, E. (2011). *Advanced Engineering Mathematics* (10th ed.). Wiley India.
2. Grewal, B. S. (2014). *Higher Engineering Mathematics*. Khanna Publishers, New Delhi.

3. Dutta, K. B. (2004). *Matrix and Linear Algebra*. Prentice Hall of India Pvt. Ltd.
4. Lipschutz, S., & Lipson, M. (2009). *Linear Algebra* (Schaum's Outline Series). McGra Hill.
5. Strang, G. (2016). *Introduction to Linear Algebra*. Wellesley-Cambridge Press.

Part A - Introduction			
Subject	Mathematics		
Semester	V		
Name of the Course	**Statistical & Quantitative Techniques**		
Course Code	B25-MAT-V507		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/SEC/VAC)	VOC		
Level of the course	100-199		
Pre-requisite for the course (if any)	NA		
Course Learning Outcomes(CLO): CLO 5 is related to the practical components of the course.	**After completing this course, the learner will be able to:** 1.Collect, classify and present data systematically and construct frequency distribution tables for real-life situations. 2. Represent data graphically using bar diagrams, histograms and pie charts, and interpret graphical information effectively. 3.Compute measures of central tendency (mean, median and mode) and apply these concepts in real-life data analysis. 4.Understand the concept and importance of dispersion and calculate range, variance and standard deviation to interpret variability in data. 5 Attain cognitive and technical skills required formulating and solving practical problems' involving classification and presentation of data, mean, median and mode with applications, dispersion, range, variance		
Credits	Theory	Practical	Total
	2	2	4

Contact Hours	2	4	6
Internal Assessment Marks	15	15	30
External Assessment Marks	35	35	70
Examination Time	3Hrs	3Hrs	

Max. Marks:100

Part B- Contents of the Course

Instructions for Paper- Setter

Theory Paper: The examiner will set 9 questions asking two questions from each unit and one compulsory question by taking course outcomes (CLOs) into consideration. The compulsory question (Question No.1) will contain 5 parts covering entire syllabus. The examinee will be required to attempt 5 questions, selecting one question from each unit and the compulsory question.

Unit	Topics	Contact Hours
I	Collection, classification and presentation of data. Frequency distribution, graphical representation of data (bar diagram, histogram, pie chart).	8
II	Measures of central tendency: mean, median and mode with applications in real life data analysis.	7
III	Concept and importance of dispersion. Range, variance and standard deviation Interpretation of variability in data .	7
IV	Formulation of linear programming problems, graphical solution of LPP, feasible region and optimal solution.	8
	Practical	
	The examiner will set 4 questions at the time of practical examination by taking course learning outcomes (CLOs) into consideration. The examinee will be required to solve 2 questions. The evaluation will be done on the basis of practical	60
	record, viva-voce, written examination.	

Problem Solving: Questions related to the following problems will be solved and record of those will be maintained in the Practical Note Book:

1. Problem to collect, classify and present data in tabular form and construct frequency distribution tables.
2. Problem to draw graphical representation of data using bar diagram, histogram and pie chart.
3. Problem to find measures of central tendency (mean, median and mode) from given data and interpret results in real-life situations.
4. Problem to find measures of dispersion including range, variance and standard deviation and analyze variability of data.
5. Problem to formulate linear programming problems from practical situations.
6. Problem to solve linear programming problems using graphical method, identify feasible region and determine optimal solution.

Suggested Evaluation Methods

Internal Assessment:

- **Theory :15**
  - Class Participation: 4
  - Seminar/presentation/assignment/quiz/class test etc.: 4
  - Mid-Term Exam: 7
- **Practicum :15**
  - Class Participation:**5**
  - Seminar/Demonstration/Viva-voce/Lab records etc.: 10
  - Mid-Term Exam:**Nil**

End Term Examination:

Theory 35

Written Examination

Practicum 35

Lab record, viva-voce, written examination.

Part C-Learning Resources

Recommended Books:

1. Gupta, S. C., & Kapoor, V. K. (2014). *Fundamentals of Mathematical Statistics*. Sultan Chand & Sons, New Delhi.
2. Spiegel, M. R., Schiller, J. J., & Srinivasan, R. A. (2013). *Schaum's Outline of Probability*

and Statistics (4th ed.). McGraw-Hill Education.
3. Goon, A. M., Gupta, M. K., & Dasgupta, B. (2011). *Fundamentals of Statistics* (Vol. I & II). World Press, Kolkata.
4. Taha, H. A. (2017). *Operations Research: An Introduction* (10th ed.). Pearson Education.
5. Anderson, D. R., Sweeney, D. J., & Williams, T. A. (2016). *Statistics for Business and Economics*. Cengage Learning.

Subject	Mathematics
Semester	VI
Name of the Course	**Financial and Computational Skills**
Course Code	B25-MAT-V607
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/SEC/VAC)	VOC
Level of the course	100-199
Pre-requisite for the course (if any)	NA
Course Learning Outcomes(CLO):	**After completing this course, the learner will be able to:** 1. Apply concepts of simple interest, compound interest, present value, future value of money, annuities and instalments in solving practical financial problems. 2. Understand applications of financial mathematics in banking and personal financial planning and solve problems related to depreciation, sinking fund, appreciation and growth models. 3. Solve practical numerical problems related to assets, investments and business applications using appropriate mathematical techniques. 4. Use basic numerical approximation techniques to obtain solutions of applied computational problems.
CLO 5 is related to the practical components of the course.	5. Attain cognitive and technical skills required formulating and solving practical problems involving simple interest and compound interest, annuities, sinking fund, appreciation and growth models, data organization,graphical representation.

Credits	Theory	Practical	Total

	2	2	4
Contact Hours	2	4	6
Internal Assessment Marks	15	15	30
External Assessment Marks	35	35	70
Examination Time	3Hrs	3Hrs	

Max. Marks:100

Part B- Contents of the Course

Instructions for Paper- Setter

Theory Paper: The examiner will set 9 questions asking two questions from each unit and one compulsory question by taking course outcomes (CLOs) into consideration. The compulsory question (Question No. 1) will contain 5 parts covering entire syllabus. The examinee will be required to attempt 5 questions, selecting one question from each unit and the compulsory question.

Unit	Topics	Contact Hours
I	Concept of simple interest and compound interest, present value and future value of money, annuities and instalments.	7
II	Applications of financial mathematics in banking and personal financial planning. Methods of depreciation, sinking fund, appreciation and growth models.	8
III	Practical numerical problems related to assets, investment and business applications. Introduction to numerical approximation techniques.	7
IV	Basic spreadsheet operations, use of formulas and functions, data organization, graphical representation and interpretation of results.	8
	Practical	
	The examiner will set 4 questions at the time of practical examination by taking course learning outcomes (CLOs) into consideration. The examinee will be required to solve 2 questions. The evaluation will be done on the basis of practical	60