

**University of Kerala**

COMPLEMENTARY COURSE IN MATHEMATICS FOR FIRST DEGREE PROGRAMME IN ECONOMICS

**SEMESTER I**

**MATHEMATICS FOR ECONOMICS - I**

**CODE :MM 1131.5**

INSTRUCTIONAL HOURS PER WEEK: 3

NO.OF CREDITS:2

**Overview of the course:**

The complementary course intended for Economics students lays emphasis on the increased use of Mathematical methods in Economics. It is expected that this course will substantially contribute to improving the problem solving skills and numerical aptitudes of students.

**Module 1: Theory of Sets**

Finite and infinite sets, set operations- ordered pairs, De Morgan's rule(statement only),cartesian products, Relations, Functional Relations and Functions.

**Chapter 1: 1.1 to 1.9 and 1.14 to 1.17 of Text 1**

1. Example 33 in page number 12,Example 49 in page number 32, Example 51 and 52 in page number 33, Example 54 in page number 35, Example 55 in page number 36 omitted.
2. **Exercise-1.4:-** Q4,Q5,Q7,Q8,Q9,Q10,Q15,Q22,Q23,Q25 omitted.

**Module 2: Equations**

Equations and identities:- Linear quadratic equations, solutions of equations, solutions of quadratic equations, simultaneous equations, solutions of simultaneous equations, Applications in Economics (simple problems only).

**Chapter 3: 3.1 of Text 1**

1. **Exercise 3.1:-** Q16,Q17,Q19,Q33,Q34 omitted.

**Text.1** Mehta Madnani, Mathematics for Economics, 9th Revised Edition, Sultan Chand and Sons Educational Publishers, New Delhi, 2020.

References

1. Knut Sydsaeter and Peter Hammond with Arne Strom, Essential Mathematics for Economic Analysis, Fourth Edition, Pearson Education limited.
2. Allen.R.G.D, Mathematical Analysis for Economics, Mc Millan Press, London
3. Chiang.A.C, Fundamental Methods of Mathematical Economics, Mc Graw Hill, New Delhi.

**Distribution of Instructional Hours:**

Module 1:- 27 hours, Module 2:- 27 hours

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COMPLEMENTARY COURSE IN MATHEMATICS FOR FIRST DEGREE PROGRAMME IN ECONOMICS

**SEMESTER II**

**MATHEMATICS FOR ECONOMICS - II**

**CODE :MM 1231.5**

INSTRUCTIONAL HOURS PER WEEK: 3

NO.OF CREDITS:3

**Module 1: Differential Calculus:- One variable**

Basic definition, Rules of differentiation, some standard results(without proof- except trigonometric and logarithmic functions), derivatives of higher order with simple problems involving polynomial functions (except trigonometric and logarithmic functions.)

**Chapter 6: 6.4, 6.5 of Text 1**

1. **Section 6.4:-** Example 7 to Example 15 and Example 18 omitted.
2. **Exercise-6.1:-** Simple problems from A and B only.
3. **Exercise-6.2:-** Q6 to Q18 omitted.

**Module 2: Differentiation II**

Sign of differential coefficient, second derivative and nature of curve, maximum and minimum value of a function, order condition for maximum-minimum(extreme) values (simple questions only).

**Chapter 6: 6.6 to 6.9 of Text 1**

1. **Exercise 6.3:-** Only discuss Q1 to Q11.

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References

1. Knut Sydsaeter and Peter Hammond with Arne Strom, Essential Mathematics for Economic Analysis, Fourth Edition, Pearson Education limited.
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**Distribution of Instructional Hours:**

Module 1:- 27 hours, Module 2:- 27 hours

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COMPLEMENTARY COURSE IN MATHEMATICS FOR FIRST DEGREE PROGRAMME IN ECONOMICS  
**SEMESTER III**  
**MATHEMATICS FOR ECONOMICS - III**

CODE :MM 1331.5

INSTRUCTIONAL HOURS PER WEEK: 3  
NO.OF CREDITS:3

**Module 1: Simple Integration**

Basic definition, constant of integration, basic rules of integration (except Rule-3), standard results(without proof- except trigonometric and logarithmic functions), methods of integration (substitution method only with simple problems except trigonometric functions and logarithmic functions), integration by parts (except trigonometric functions and logarithmic functions), definite integral (general introduction with simple problems such as Exercise 13.1:- Q1,Q18(i),(ii),Q19), Applications of definite integrals.

**Chapter 12: 12.1 to 12.5 and 12.7 of Text 1**

**Chapter 13: 13.4 of Text 1**

1. Example 9, Example 10, Example 12, Example 14, Example 16 to Example 19, Example 21 to Example 26 omitted.
2. **Exercise 12.2:-** Simple problems except trigonometric and logarithmic functions.
3. **Exercise 12.2:-** Q65 to Q78 omitted.
4. **Section 12.7:-** Example 36 to Example 45 omitted.
5. **Exercise 12.4:-** Q2 to Q8, Q10 to Q14, Q16 to Q20, Q23 to Q25, Q27 to Q48 omitted.

**Module 2: Matrices and Determinants**

Addition and subtraction of matrices, matrix multiplication, transpose of a matrix, properties of transpose of a matrix(without problems), some special form of square matrices, determinants (without properties of determinants), inverse of a matrix (cofactor method only), solutions of simultaneous equations by determinants- Cramer's rule (simple questions only).

**Chapter 5: 5.1 to 5.3, 5.5 to 5.7, 5.10, 5.13, 5.15 of Text 1**

1. **Section 5.10:-** Example 27 to Example 32 and Exercise 5.3 omitted.
2. **Exercise 5.5:-** Q3 (page number 231) and Q3 (page number 232) omitted.
3. **Exercise 5.6:-** Q11 to Q24 omitted.

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References

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**Distribution of Instructional Hours:**

Module 1:- 27 hours, Module 2:- 27 hours

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COMPLEMENTARY COURSE IN MATHEMATICS FOR FIRST DEGREE PROGRAMME IN ECONOMICS

**SEMESTER IV**

**MATHEMATICS FOR ECONOMICS - IV**

**CODE :MM 1431.5**

INSTRUCTIONAL HOURS PER WEEK: 3

NO.OF CREDITS:3

**Module 1: Partial Derivatives**

Technique of partial differentiation, partial differentiation of second order, cross partial differentiation, partial derivatives of functions of more than two variables (simple problems with polynomial functions and exponential functions only), maxima and minima of a function of two variables (simple problems with polynomial functions and exponential functions only), maxima and minima under given condition (constrained extreme values) use of Lagrange multiplier (first order condition).

**Chapter 8: 8.2 to 8.5, 8.10, 8.12**

1. **Exercise 8.1:-** Q9, Q10 omitted.

**Module 2: Differential Equations**

Definition, kinds of differential equation, order and degree of differential equations, solutions of differential equations, variable separable form(except integrals involving logarithmic functions and trigonometric functions), general first order linear differential equation(except integrals involving logarithmic functions and trigonometric functions), Second order linear differential equation with constant coefficients, Rules for finding particular integral (involving  $e^x$  only).

**Chapter 14: 14.1 to 14.6, 14.10, 14.12**

1. **Section 14.6:-** Example 3 to Example 5 omitted.
2. **Section 14.10:-** Example 14 and Example 16 omitted.
3. **Section 14.12:-** Example 24 and Example 25 omitted.

**Text.1** Mehta Madnani, Mathematics for Economics, 9th Revised Edition, Sultan Chand and Sons Educational Publishers, New Delhi, 2020.

**References**

1. Knut Sydsaeter and Peter Hammond with Arne Strom, Essential Mathematics for Economic Analysis, Fourth Edition, Pearson Education limited.
2. Allen.R.G.D, Mathematical Analysis for Economics, Mc Millan Press, London
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**Distribution of Instructional Hours:**

Module 1:- 27 hours, Module 2:- 27 hours