



KONGU ARTS AND SCIENCE COLLEGE

(An Autonomous Institution, Affiliated to Bharathiar University, Coimbatore)

ERODE – 638 107

M.Sc (Mathematics)



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2017-2018



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SYLLABUS

Sem	Course Code	Core Paper – II	Total Marks :100		Hours Per Week	Credits
			CIA : 25	ESE :75		
I	17PBECT102	REAL ANALYSIS			7	4

OBJECTIVE:

To give a systematic study of various aspects of Real Line and Metric Spaces, Riemann Stieltjes Integral and Linear Transformations.

UNIT I

Basic Topology: Finite, Countable and Uncountable Sets – Metric Spaces – Compact Sets – Perfect Sets – Connected Sets.

Numerical Sequences and Series: Convergent Sequences – Subsequences – Cauchy Sequences – Upper and Lower Limits - Some Special Sequences – Series – Series of Nonnegative Terms – The Number e – The Root and Ratio Tests – Power Series – Summation by Parts – Absolute Convergence – Addition and Multiplication of Series – Rearrangements.

UNIT II

Continuity: Limits of Functions – Continuous Functions – Continuity and Compactness – Continuity and Connectedness – Discontinuities-Monotonic Functions – Infinite Limits and Limits as Infinity.

Differentiation: The Derivative of a Real Function – Mean Value Theorems – The Continuity of Derivatives – L'Hospital's Rule – Derivatives of Higher Order – Taylor's Theorem – Differentiation of Vector-Valued Functions.

UNIT III

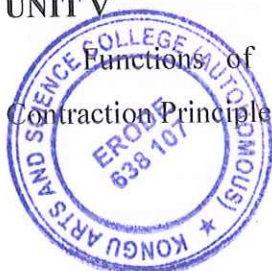
The Riemann-Stieltjes Integral: Definition and Existence of the Integral – Properties of the Integral – Integration and Differentiation – Integration of Vector Valued Functions – Rectifiable Curves.

UNIT IV

Sequences and Series of Functions: Uniform Convergence - Uniform Convergence and Continuity – Uniform Convergence and Integration - Uniform Convergence and Differentiation- Equicontinuous Families of Functions – The Stone Weierstrass Theorem.

UNIT V

Functions of Several Variables: Linear Transformations - Differentiation– The Contraction Principle – The Inverse Function Theorem–The Implicit Function Theorem.



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TEXT BOOK:

W. Rudin, "Principles of Mathematical Analysis", 3rd Edition, McGraw Hill Book Company, New Delhi, 1976.

Unit I : Chapters 2 and 3

Unit II : Chapters 4 and 5

Unit III: Chapter 6

Unit IV: Chapter 7 (Pages 147 to 160)

Unit V : Chapter 9 (Pages 204 to 227)


BOOKS FOR REFERENCE:

1. R.G.Bartle, "Elements of Real Analysis", 2nd Edition, John Wiley and Sons, New York, 1976.
2. W.Rudin, "Real and Complex Analysis", 3rd Edition, McGraw-Hill, New York, 1986.
3. Charalambos D.Aliprantis and Owen Burkinshaw, "Principles of Real Analysis", Harcourt Asia Pvt. Ltd, Singapore, 1998.
4. J.N.Sharma and A.R.Vasishtha, "Real Analysis", KRISHNA Prakashan Media Pvt. Ltd., India, 2002.
5. T.M.Apostol, "Mathematical Analysis", 2nd Edition, Narosa Publishing Company, Chennai, 1990.

QUESTION PAPER PATTERN		
SECTION – A	SECTION – B	SECTION – C
10x1=10 Marks (Multiple choice, Four options) Two questions from each unit	5 x 7 = 35 Marks (Either or choice) Two questions from each unit	3x10 = 30 Marks (Answer any three questions) One question from each unit



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Sem	Course Code	Core Paper VI MEASURE THEORY AND INTEGRATION	Total Marks :100		Hours Per Week	Credits
			CIA : 25	ESE :75	7	
II	17PBECT202					4

OBJECTIVE:

To enable the students to understand the concepts of Lebesgue Measure, Lebesgue Integral, Riemann Integral, Differentiation of monotone functions and Outer Measure.

UNIT I

Lebesgue Measure: Introduction – Outer measure – Measurable sets and Lebesgue measure – Measurable functions – Little woods’ three principles.

UNIT II

Lebesgue Integral :Lebesgue integral – The Riemann integral – Lebesgue integral of a bounded function over a set of finite measure – The integral of a nonnegative function – The general Lebesgue integral.

UNIT III

Differentiation and Integration : Differentiation of monotone functions – Functions of bounded variation – Differentiation of an integral – Absolute Continuity.

UNIT IV

General Measure and Integration : General Measure and Integration – Measure spaces – Measurable functions – Integration – Signed measures – The Radon – Nikodym Theorem.

UNIT V

Measure and Outer Measure: Measure and Outer Measure – Outer measure and measurability – The Extension Theorem – Product measures.

TEXT BOOK:

H.L.Royden, “Real Analysis”, Mc Millian Publ. Co, New York, 1993.

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|----------|---|--------------------------------------|
| UNIT I | - | Chapter 3: Sections 1 to 3, 5 and 6 |
| UNIT II | - | Chapter 4: Sections 1 to 4 |
| UNIT III | - | Chapter 5: Sections 1 to 4 |
| UNIT IV | - | Chapter 11: Sections 1 to 3, 5 and 6 |
| UNIT V | - | Chapter 12: Sections 1, 2 and 4 |



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BOOKS FOR REFERENCE:

1. De Barra.G. "Measure Theory and Integration", Wiley Eastern Limited, 1991 Edition.
2. M.E.Munroe, Measure and Integration, Addition-Wesley Publishing Company, second edition, 1971.
3. P.K.Jain, V.K.Gupta, "Lebesque Measure and Integration", New Age International Pvt. Ltd. Publishers, New Delhi, 1986, Reprint 2000.
4. Richard L. Wheeden and Antoni Zygmund, "Measure and Integral: An Introduction to Real Analysis", Marcel Dekker Inc., 1977.
5. Inder, K.Rana, "An Introduction to Measure and Integration", Narosa Publishing House, New Delhi, 1997.

QUESTION PAPER PATTERN		
SECTION – A	SECTION – B	SECTION – C
10x1=10 Marks (Multiple choice, Four options) Two questions from each unit	5 x 7 = 35 Marks (Either or choice) Two questions from each unit	3x10 = 30 Marks (Answer any three questions) One question from each unit



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Sem	Course Code	Core Paper VIII	Total Marks :100		Hours Per Week	Credits
			CIA : 25	ESE :75		
II	17PBECT204	CLASSICAL DYNAMICS			6	4

OBJECTIVE:

To enable the students to understand the concepts of D'Alembert principle, Lagrange's equations, Hamilton equations of motion, Canonical transformations and Hamilton Jacobi theory.

UNIT-I

Introductory Concepts: The Mechanical System–Generalized Coordinates–Constraints–Virtual Work –Energy and Momentum.

UNIT-II

Lagrange's Equations: Derivation of Lagrange's Equations –Examples –Integrals of Motion.

UNIT-III

Hamilton's Equations: Hamilton's Principle –Hamilton's equations.

UNIT-IV

Hamilton–Jacobi Theory: Hamilton's Principle Function–The Hamilton –Jacobi Equation–Separability.

UNIT-V

Canonical Transformations: Differential Forms and Generating Functions – Principal Forms of Generating Functions -Lagrange and Poisson Brackets.

TEXT BOOK:

Donald T.Greenwood, "Classical Dynamics", Dover Publication, New York, 1977.

Unit-I : Chapter 1 :Sections 1.1 –1.5

Unit-II : Chapter 2 :Sections 2.1 –2.3

Unit-III : Chapter 4 :Sections 4.1 –4.2

Unit-IV : Chapter 5 :Sections 5.1–5.3

Unit-V : Chapter 6 :Sections 6.1, 6.3

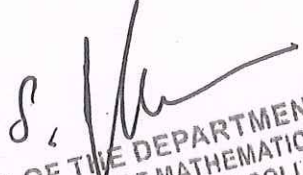


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BOOKS FOR REFERENCE:

1. F. Gantmacher, "Lectures in Analytic Mechanics", MIR Publishers, Moscow, 1975.
2. I.M. Gelfand and S.V. Fomin, "Calculus of Variations", Prentice Hall, 1963.
3. S.L. Loney, "An Elementary Treatise on Statics", Kalyani Publishers, New Delhi, 1979.
4. S.G.Venkatachalapathy, "Classical Mechanics (for M.Sc. Mathematics)", Margham Publications, Chennai, 2006.
5. Gupta, Kumar and Sharma, "Classical Mechanics", Pragati Prakashan Publishers, Meerut, 2013.

QUESTION PAPER PATTERN		
SECTION – A	SECTION – B	SECTION – C
10x1=10 Marks (Multiple choice, Four options) Two questions from each unit	5 x 7 = 35 Marks (Either or choice) Two questions from each unit	3x10 = 30 Marks (Answer any three questions) One question from each unit


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Sem	Course Code	Elective Paper II(A) LATEX AND MATLAB PRACTICAL	Total Marks :100		Hours Per Week	Credits
			CIA : 25	ESE :75		
II	17PBEEP205				4	4

OBJECTIVES:

To introduce the practical oriented concept of Mathematical Softwares using LATEX and printing the page layout and document setting for various mathematical notations and to solve various types of mathematical and scientific problems using MATLAB built-in functions.

List of Programmes**LATEX**

1. Display matrix operation.
2. Print line, area and volume integral.
3. Create table.
4. Prepare a question paper.
5. Draw two dimensional graphs.
6. Draw three dimensional graphs.

MATLAB

7. Write a program to convert Cartesian coordinates to polar coordinates.
8. Write a program to compute the value of the integrand at $2\pi/3$.
9. Write a program to compute Mean, Median and Mode.
10. Write a program to draw a 2D graph using simulink tool.
11. Write a program to draw a 3D graph using simulink tool.
12. Write a program to sort a list of numbers.

Books for Study:

1. H. Kopka and P.W. Daly, "A Guide to LATEX", Third Edition, Addison – Wesley, London, 1999.
2. RUDRA PRATAP, "Getting Started with MATLAB-A Quick Introduction for Scientists and Engineers", Oxford University Press, 2003.

Books for Reference:

1. Donald E. Knuth, "The TeXbook" 1st Edition, 2006.
2. Dolores M. Etter and David C. Kuncicky, "Introduction to MATLAB 7", Prentice Hall, 2004.
3. Stephen J. Chapman, "MATLAB Programming for Engineers" 3rd Edition, Eastern Press, 2007.
4. Y.Kirani Singh and B.B. Chaudhuri, "MATLAB Programming", Prentice-Hall of India Pvt.



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Ltd., New Delhi, 2007.

5. Duane Hanselman and Bruce Little field, "Mastering MATLAB 7", Baba Barkha Nath Printers, 2007.



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