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

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE – 638 107.

M.Sc. MATHEMATICS

(For the candidates admitted during the academic year 2017 – 2018 and onwards)

SCHEME OF EXAMINATION – CBCS PATTERN

Course Code	Course	Hrs/Week	T/P	Exam Duration	CIA	ESE	Total Marks	Credits
SEMESTER I								
17PBECT101	Algebra	7	T	3	25	75	100	4
17PBECT102	Real Analysis	7	T	3	25	75	100	4
17PBECT103	Advanced Differential Equations	6	T	3	25	75	100	4
17PBECT104	Applied Numerical Analysis	6	T	3	25	75	100	4
17PBEET105/ 17PBEET106	Elective - I	4	T	3	25	75	100	4
	Total						500	20
SEMESTER II								
17PBECT201	Complex Analysis	6	T	3	25	75	100	4
17PBECT202	Measure Theory and Integration	7	T	3	25	75	100	4
17PBECT203	Partial Differential Equations	7	T	3	25	75	100	4
17PBECT204	Classical Dynamics	6	T	3	25	75	100	4
17PBEEP205/ 17PBEET206	Elective - II	4	T/P	3	25/40	75/60	100	4
	Total						500	20
SEMESTER III								
17PBECT301	Topology	7	T	3	25	75	100	4
17PBECT302	Advanced Fluid Dynamics	6	T	3	25	75	100	4
17PBECT303	Mathematical Statistics	6	T	3	25	75	100	4
17PBECT304	Graph Theory	6	T	3	25	75	100	4
17PBEET305/ 17PBEET306/ 17PBEET307	Elective - III	5	T	3	25	75	100	4
17PBEIT01	Institutional Training*		Completed / Not Completed					
	Total						500	20

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SEMESTER IV								
17PBECT401	Functional Analysis	5	T	3	25	75	100	4
17PBECT402	Mathematical Methods	6	T	3	25	75	100	4
17PBECT403	Programming Math with Python (Theory)	4	T	3	25	75	100	4
17PBECP404	Programming Math with Python (Practical)	4	P	3	40	60	100	4
17PBECT405	Algebraic Number Theory	5	T	3	25	75	100	4
17PBEET406/ 17PBEET407/ 17PBEET408	Elective - IV	4	T	3	25	75	100	4
17PBECV409	Project Work	2			40	160	200**	6
	Total						800	30
	Total						2300	90

* Candidates have to go for teaching practice as an Institutional Training for 15 days and the training report has to be submitted. Completion of training is mandatory to get a degree.

**** GUIDELINES FOR PROJECT WORK**

- A supervisor has been allotted to each candidate by the department.
- Candidate can select the broad field and the topic of the project in discussion with the supervisor.
- Candidates should maintain a work diary wherein weekly work carried out has to be written which will be reviewed by the supervisor.
- A minimum of three reviews have to be done.
  - In the first review, the candidate has to submit the basic materials which are needed for the project.
  - During the second review, the progress of the project will be monitored.
  - In the final review, the candidate has to submit the rough copy of the project.
- They should be asked to present the work done to the respective supervisor during the reviews.
- The candidates should submit a rough copy of the project to their supervisor before the final copy.
- The work diary along with project report should be submitted at the time of viva voce.

CIA Marks Distribution:

The supervisor will give the marks for CIA as per the norms stated below:

First Review	10 Marks
Second Review	10 Marks
Final Review	15 Marks
Attendance	5 Marks
Total	40 Marks

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End Semester Examination:

The evaluation for the End Semester Examination should be as per the norms given below:

Project Report	120	Marks
Viva-Voce Examination	40	Marks (Jointly given by the External and Internal Examiner)
Total	160	Marks

List of Electives			
	Group	**Course Code**	**Subjects**
ELECTIVE –I	A	17PBEET105	LATEX and MATLAB
	B	17PBEET106	Operations Research
ELECTIVE -II	A	17PBEEP205	LATEX and MATLAB Practical
	B	17PBEET206	Mathematical Modelling
ELECTIVE -III	A	17PBEET305	Fuzzy Mathematics
	B	17PBEET306	Mathematical Physics
	C	17PBEET307	Differential Geometry
ELECTIVE -IV	A	17PBEET406	Neural Networks
	B	17PBEET407	Control Theory
	C	17PBEET408	Stochastic Differential Equations

Advanced Learners Courses		
S. No	**Course code**	**Course**
1.	17PBEAL308	Difference Equations
2.	17PBEAL309	Cryptography

- This course is offered to the PG students who have secured 7.5 and above CGPA upto II Semester only.
- The students can choose any one of the above mentioned Course.
- Only **External** Assessment for **100 marks.**
- **2 Credits** allotted for ALC.
- This course is purely a **Self Study Course** and will not be considered for computation of Cumulative Grade Point Average (CGPA).

Total Marks : 2300

Total Credits: 90

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Dr.S.Nagarajan
Chairman
Board of Studies
Department of Mathematics

Dr. N. RAMAN
PRINCIPAL,
KONGU ARTS AND SCIENCE COLLEGE
(AUTONOMOUS)
KONGU NILAYAM, ERODE - 638 107

Sem	Course Code	Core Paper – II	Total Marks :100		Hours Per Week	Credits
I	17PBECT102	REAL ANALYSIS	CIA : 25	ESE :75	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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Dr. N. RAMAN
PRINCIPAL,
KONGU ARTS AND SCIENCE COLLEGE
(AUTONOMOUS)
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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 Wily 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	Total Marks :100		Hours Per Week	Credits
II	17PBECT202	MEASURE THEORY AND INTEGRATION	CIA : 25	ESE :75	7	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.

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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PRINCIPAL,
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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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PRINCIPAL,
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Sem	Course Code	Core Paper VIII	Total Marks :100		Hours Per Week	Credits
II	17PBECT204	CLASSICAL DYNAMICS	CIA : 25	ESE :75	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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PRINCIPAL,
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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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PRINCIPAL,
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Sem	Course Code	Elective Paper II(A)	Total Marks :100		Hours Per Week	Credits
II	17PBEEP205	LATEX AND MATLAB PRACTICAL	CIA : 25	ESE :75	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.

Dr. N. RAMAN
PRINCIPAL,
KONGU ARTS AND SCIENCE COLLEGE
(AUTONOMOUS)
ERODE - 638 107.

Ltd., New Delhi, 2007.

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

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