DEPARTMENT OF MATHEMATICS

CENTRAL UNIVERSWITY OF KEREALA

PERIYE, KASARAGOD

Minutes of the Second Board of studies meeting held on Thursday, 7th February, 2019 in the Department of Mathematics in Room No. 28 at 2.30 p.m.

The following members were present:

1. *Prof. Gadadhar Misra,*

   Department of Mathematics,
   Indian Institute of Science, Bangalore – 560 012.

2. *Prof. A.K. Nandakumaran,*

   Department of Mathematics,
   Indian Institute of Science, Bangalore – 560 012.

3. *Prof. A. R. Rajan, Emeritus Professor,*

   Department of Mathematics, University of Kerala,
   Thiruvananthapuram, Kerala – 695 581.

4. *Mr. V. Kumar, Assistant Professor,*

   Department of Computer Science, CU Kerala.

5. *Dr. V. Vilfred, Associate Professor & Head,*

   Department of Mathematics, CU Kerala.

6. *Dr. K. A. Germina, Associate Professor,*

   Department of Mathematics, CU Kerala.

7. *Dr.* Ali Akbar K, Assistant Professor,

   Department of Mathematics, CU Kerala.

The Meeting started at 2.30 p.m. The Chairperson Dr. V. Vilfred welcomed the members and submitted the modified Course Structure and Syllabus approved by the Faculty Council, Department of Mathematics, CU Kerala. Then, he briefed how and what modifications were done in the communicated Course Structure and Syllabus.

With the permission of the experts in the Board of Studies, the convenor invited Dr. Shaini P, Dr. S. Gnanavel and Dr. Manikandan Rangaswamy to join the BoS Meeting. The committee commended on each and every paper and also on the course structure. The whole structure and Syllabus was thoroughly discussed. The revised version of the same was prepared and submitted for the approval. The Members of the Board of Studies approved the revised Course Structure and Syllabus. (A copy of the approved Course structure and Syllabus is attached herewith.) The committee decided to implement the revised course structure and syllabus from the academic year 2019 - 20 onwards.

The members also commented on the Method of Evaluation of M.Sc. Mathematics Programme and requested to include the same in the minutes. The experts strongly recommended that the mode of evaluation of examinations should be strictly internal.

The members of the BoS seriously noted the current strength of intake at CU Kerala to M.Sc. Maths programme that is increased to fourty seats and strongly recommend that for quality teaching the number of teaching faculty in the Department of Mathematics should be increased sufficiently since present strength of seven faculty is quiet insufficient.

The meeting was fruitful and Dr. K.A. Germina thanked the experts for their valuable suggestions and guidance.

The meeting came to a close at 5.00 p.m.

1. Prof. Gadadhar Misra,
   Department of Mathematics,
   I.I.Sc., Bangalore – 560 012.

2. Prof. A.K. Nandakumaran,
   Department of Mathematics,
   I.I.Sc., Bangalore – 560 012.

3. Prof. A. R. Rajan, Emeritus Professor,
   Department of Mathematics,
   University of Kerala, Trivandrum, Kerala – 695 581.

4. Mr. V. Kumar, Assistant Professor,
   Department of Computer Science, CU Kerala.

5. Dr. V. Vilfred, Associate Professor & Head,
   Department of Mathematics, CU Kerala. 07.02.2019

6. Dr. K. A. Germina, Associate Professor,
   Department of Mathematics, CU Kerala. 7/2/2019

7. Dr. Ali Akbar K, Assistant Professor,
   Department of Mathematics, CU Kerala. 7/02/2019

Course Objective	This course presents a rigorous treatment of fundamental concepts in analysis. To introduce students to the fundamentals of mathematical analysis and reading and writing mathematical proofs. The course objective is to understand the axiomatic foundation of the real number system, in particular the notion of completeness and some of its consequences; understand the concepts of limits, continuity, compactness, differentiability, and integrability, rigorously defined; Students should also have attained a basic level of competency in developing their own mathematical arguments and communicating them to others in writing.
Course Outcome(s)	Describe the fundamental properties of the real numbers that underpin the formal development of real analysis; demonstrate an understanding of the theory of sequences and series, continuity, differentiation and integration; Demonstrate skills in constructing rigorous mathematical arguments; Apply the theory in the course to solve a variety of problems at an appropriate level of difficulty.

Syllabus:

Real number system and its order completeness. Sequences and series of real numbers. Metric spaces: Basic concepts, continuous functions, Intermediate Value Theorem, Compactness, Heine-Borel Theorem.

Differentiation, Taylor's theorem, Riemann Integral, Improper integrals, Sequences and series of functions, Uniform convergence, power series, Fourier series, Weierstrass approximation theorem, equicontinuity, Arzela-Ascoli theorem.

Text books:

1. W. Rudin, Principles of Mathematical Analysis, McGraw-Hill, 1976.
2. Robert Gardner Bartle and Donald R. Sherbert, Introduction to Real Analysis, 4^{th} Edition,Wiley, 2011.

References:

1. C.C. Pugh, Real Mathematical Analysis, Springer, 2002.
2. T. M. Apostol, Mathematical Analysis, 2nd Edition, Narosa, 2002.
3. G. F. Simmons, Introduction to Topology and Modern Analysis, McGraw-Hill, 1963. 4. Stephen Abbot, Understanding Analysis, Springer, New York, NY, 2015

Code:MAT5102: Elementary Number Theory and Basic Algebra Prerequisites: Number systems.	L	T	P	Credit
	4	1	0	4

Course Category	Core
Course Type	Theory
Course Objective	Introduce the basic concepts of Number theory such as Divisibility, Congruences, Congruences with Prime Modulus, Quadratic reciprocity and some functions of Number Theory; introduce basic structures of algebra like groups, rings, fields and vector spaces which are the main pillars of modern mathematics.
Course Outcome(s)	Generate facility in working with situations involving commutative rings, in particular monogenic algebras of matrices a concept that finds a large number of applications. Students will see and understand the connection and transition between previously studied mathematics and more advanced mathematics. The students will actively participate in the transition of important concepts such homomorphisms & isomorphisms from discrete mathematics to advanced abstract mathematics. The course gives the student a good mathematical maturity and enables to build mathematical thinking and problem solving skill.

Syllabus:

Basic representation theorem, the fundamental theorem of arithmetic; Combinatorial and Computational number theory. Permutations and combinations, Fermat's little theorem, Wilson's theorem. Generating functions; Fundamentals of congruences – Residue systems, Ring; Solving congruences – Linear congruences, Chinese remainder theorem, Polynomial congruences.

Plane Isometries, Direct products & finitely generated Abelian Groups, Binary Linear Codes, Factor Groups, Factor-Group Computations and Simple Groups, Series of groups. Group action on a set, Applications of G-set to counting, Isomorphism theorems: Proof of the Jordan-Holder Theorem, Sylow theorems, Applications of the Sylow theory, Free Groups, Group representations.

Text books:

1. Thomas Koshy, Elementary Number Theory with Applications, Elsevier, 2007. 2.
Joseph Gallian, Contemporary Abstract Algebra, 7th Edition, Cengage Learning, 2009.

References:

1. George E. Andrews: Number Theory, Dover Publications, New York,
1971. 2. Tom M. Apostol, Introduction to Analytic Number Theory,
Springer, 1998. 3. M. Artin: Algebra, Prentice Hall, 1991.
4. I. N. Herstein, Topics in Algebra, John Wiley & Sons; 2nd Edition, 1975.
5. Thomas W. Hungerford, Algebra ,Springer, 2003.

6. John B. Fraleigh, A First Course in Abstract Algebra, 7th Edition, 2002.

Code:MAT5103: Linear Algebra Prerequisites: **Basics in Matrix Theory:**	L	T	P	Credit
	4	1	0	4

Course Category	Core
Course Type	Theory
Course Objective	To provide a solid foundation in the mathematics of linear algebra. To develop problem solving skills To prepare the students for advanced level of Mathematics To discuss some of the applications of linear algebra