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

Syllabus:

Review of Riemann Integral, Lebesgue Measure; Lebesgue Outer Measure; Lebesgue Measurable Sets. Measure on an Arbitrary Sigma- Algebra; Measurable Functions; Integral of a Simple Measurable Function; Integral of Positive Measurable Functions.

Lebesgue's Monotone Convergence Theorem; Integrability; Dominated Convergence Theorem; Lp- Spaces. Signed Measures and the Hahn -Jordan Decomposition- Radon-Nikodym theorem and its applications. Differentiation and Fundamental theorem for Lebesgue integration Product measure; Fubini's theorem

Text books:

1. G. de Barra, Measure and Integration, 2nd Edition, New Age International publications, 2013. 2. H.L. Royden, Real Analysis, 3rd Edition, Prentice-Hall of India, 1995.

References:

1. W. Rudin, Real and Complex Analysis, Third edition, McGraw-Hill, International Editions, 1987.
2. Inder K. Rana, An Introduction to Measure and Integration, American Mathematical Society, 2005.
3. P. R. Halmos, Measure Theory, Van Nostrand, 1950.
4. D.L. Cohn, Measure Theory, Birkhauser, 1997.
5. P.K. Jain and V.P. Gupta, Lebesgue Measure and Integration, New Age International, 2006.

Code:MAT5204: Multivariable Calculus Prerequisites: Linear Algebra, Single variable Calculus	L	T	P	Credit
	4	1	0	4

Course Category	Core
Course Type	Theory
Course Objective	The objective is to enable the students to develop a clear understanding of the fundamental concepts of multivariable calculus and a range of skills such as the ability to compute derivatives using the chain rule, ability to set up and solve optimization problems involving several variables, with or without constraints, ability to set up and compute multiple integrals in rectangular, polar, cylindrical and spherical coordinates, allowing them to work effectively

	with the concepts.). This course also envisages to enable the students to understand the major theorems: the Green's, Stokes' and the Gauss' theorems of the course and some physical applications of these theorems.
Course Outcome(s)	Understand the basic concepts and know the basic techniques of differential and integral calculus of functions of several variables; Apply the theory to calculate the gradients, directional derivatives, arc length of curves, area of surfaces, and volume of solids; Solve problems involving maxima and minima, line integral and surface integral and understand the major theorems: the Green's, Stokes' and the Gauss' theorems of the course and some physical applications of these theorems. Develop mathematical maturity to undertake higher level studies in mathematics and related fields.

Syllabus:

Functions of several variables, Directional derivative, Partial derivative, Total derivative, Jacobian, Chain rule and Mean value theorems, Interchange of order of differentiation, Higher derivatives, Taylor's theorem, Inverse mapping theorem, Implicit function theorem, Extremum problems, Extremum problems with constraints, Lagrange's multiplier method.

Multiple integrals, Properties of integrals, Existence of integrals, iterated integrals, change of variables.

Curl, gradient, divergence, Laplacian. Cylindrical and spherical coordinates. Line integrals, surface integrals, Theorems of Green, Gauss and Stokes.

Text books:

1. C.H. Edwards Jr., Advanced Calculus of Several Variables, Academic Press,
1973. 2. Apostol T.M., Calculus-II - Part-2, Non-Linear Analysis

References:

1. Apostol T.M., Mathematical Analysis, Original Edition .
2. Apostol T.M., Calculus-II - Part-2,Non-Linear Analysis.

Code:MAT5205: Ordinary Differential Equations Prerequisites: Knowledge of ordinary differential equations of first order and second order	L	T	P	Credit
	4	1	0	4