DEPARTMENT OF MATHEMATICS
CENTRAL UNIVERSWITY OF KEREALA
PERIYE, KASARAGOD

Minutes of the Third Board of studies meeting held on Thursday, 10t^{h} August 2021 in the Department of Mathematics in in online mode **at 11am.**

Google meet link for the meeting: meet.google.com/cao-fqey-vjm Join by phone (US) +1 401-589-5065 (PIN: 826757401

The following members were present:

1. Prof. Gadadhar Misra,
   Department of Mathematics, Indian Institute of Science, Bangalore
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. Dr. K. A. Germina, Associate Professor & Head,

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

   Department of Mathematics, CU Kerala.
6. Dr. Ali Akbar K, Assistant Professor,

   Department of Mathematics, CU Kerala.

The Meeting started at 11am in online mode. The link for the BoS meeting, **meet.google.com/cao-fqey-vjm** Join by phone (US) +1 401-589-5065 (PIN: 826757401 was circulated among all the members of the BoS.

The Chairperson, Dr. K. A Germina welcomed the members of BoS whole heartedly.

Dr. K. A Germina, informed the members that Honorable Vice Chancellor nominated two Special invitees Prof. V. Balaji, CMI, Chennai and, Prof. U. K. Ananadavardhanan IIT, Bombay, to the Board of Studies of the department of Mathematics and as decided in the F. C meeting held on 9-8-2021, Dr. Germina invited both the professors for the BoS meeting. Prof. U. K. Ananadavardhanan informed his inconvenience to attend the meeting due to other commitments.

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.

She explained the agenda for the meeting as follows:

1. Approval: Course Code MAT 5053 **Mathematical Methods for Science** an Elective offered to other Department
2. To discuss and decide whether we can allow M. Sc students to go for Swayam MOOCs courses in II & III Semester, instead of IV Semester.
3. Any other item

The main decisions of the BoS are:

1. The members opined that the course "MAT 5053 **Mathematical Methods for Science**" submitted for approval is too heavy and it is good for two courses. Hence, it is recommended to split the course into two courses consisting of module 1 and module 2 in course 1, and the other two modules in course 2. The course 1 will be offered in this semester and one of the suggestions was that these two courses can be offered (if possible) alternatively so that every master's student will have an opportunity to get the entire syllabus proposed.

The BoS approved the following, two Elective Courses for other Departments.

1.1. MAT 5053: Mathematical Methods for Science -1.
The syllabus for MAT 5053: Mathematical Methods for Science is submitted for the approval**.**

1.2. MAT 5054: Mathematical Methods for Science –II
The syllabus for MAT 5054: Mathematical Methods for Science –II for Science is submitted for the approval**.**

2. Members opined and recommend that some of the basic courses (Core and Elective) that are useful for students of other departments can be allowed to register along with the students of Mathematics Department. However members remarked that it is to be discussed in the competent forums to reach a decision.

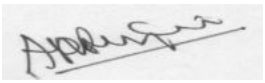
3. It is decided to follow the old Course structure for M. Sc Mathematics Programme. However students may be encouraged to take SWAYAM MOOCs courses during II, III & IV Semesters without affecting the course structure.

The meeting was fruitful and Dr. V. Vilfred thanked the experts for their valuable suggestions and guidance.

The meeting came to a close at 11.55am.

1. Prof. Gadadhar Misra, Gadadhar Misra
(Approved online with digital signature)
Department of Mathematics,
Indian Institute of Science, Bangalore

2. **Prof. A.K. Nandakumaran**, 
   (Approved online with digital signature)
   Department of Mathematics,
   I.I.Sc., Bangalore – 560 012.

3. **Prof. A. R. Rajan**, Emeritus Professor, 
   (Approved online with digital signature)
   Department of Mathematics,
   University of Kerala, Trivandrum, Kerala – 695 581.

4. **Dr. K. A. Germina**, Associate Professor & Head,
   Department of Mathematics, CU Kerala

5. **Dr. V. Vilfred**, Associate Professor, **Approved online on 10-8-2021**
   Department of Mathematics, CU Kerala.

6. **Dr. Ali Akbar K**., Assistant Professor, **Approved online on 10-8-2021**
   Department of Mathematics, CU Kerala.

Code:MAT5023: Introduction to Distribution Theory Prerequisites:	L	T	P	Credit
	3	2	0	4

Course Category	Elective
Course Type	Theory
Course Objective	The aim of the course is to introduce distribution theory, and its importace in solving for the theory of partial differential equations.

Course Outcome(s)	The students get familiarize with foundations of distribution theory: test functions, the concept of a distribution, distributions with compact support, operations on distributions, convolution, homogeneous distributions and the Fourier transform. Application of distribution theory with examples

Syllabus:

Test Function and Distributions: Introduction, Test Functions, Convergence in test function, Distribution, Operations on Distributions, Multiplication and Division of Distributions, Local properties of Distributions , A Boundedness property.

Convergence of Distributions: Introduction, Convergence of a sequence of Distributions, Convergence of a series of Distributions. Differentiation of Distributions, Introduction, Distributional Derivative, Derivative of the product, Derivative of a locally Integrable f unction. Convolution of Distributions: Introduction, Distribution of Compact Support, Direct Product of Distributions, Some Properties of the Direct product, Convolution , Properties of Convolution, Regularization of Distributions, Fundamental Solutions of Linear Differential Operators. Tempered Distribution and Fourier transforms: Introduction, The Space of Rapidly Decreasing Functions, The Space of Tempered Distributions, Multipliers in $S'(R^n)$, The Fourier Transform on L^1(Rn),The Fourier Transform on $S(R^n)$, The Fourier Transform on S0(Rn) , Properties of the Fourier Transform on S'(Rn) , Convolution Theorem in S'(Rn) , The Fourier Transform on E'(Rn), Applications

Sobolev Spaces: Introduction, Hilbert Space, The Sobolev Sapace $H^{m,p}$(Omega), The Sobolev Space $H^s(R^n)$ Product and Convolution in $H^s(R^n)$, The Space $H^{-s}(R^n)$, The Sobolev Space H^1, Sobolev Space of Order s. Extension theorem, Imbedding and completeness theorem, trace theory. Fundamental solution and Application to Elliptic Problems: Weak solution of elliptic boundary value problem (BVP),regularity of weak solutions, maximum principle, eigenvalue problems.

Text books:

1. F.G. Friedlander, Introduction to the theory of distributions,Cambridge University Press, Cambridge, (1998).
2. Robert A. Adams, John J. F. Fournier, Sobolev spaces, Elsevier,2003.
3. J.J. Duistermaat, Johan A.C. Kolk, Distributions: Theory and Applications, Springer Science & Business Media (2010).
4. Ram P. Kanwal,Generalized Functions: Theory and Applications, Springer Science & Business Media, (2004)
5. Svetlin G. Georgiev,Theory of Distributions, Springer (2010)

References:

1 L.C. Evans, Partial Di_erential Equations, AMS,(2010)

2. W. Rudin, Functional Analysis, Mc Graw Hill, New York, (1973).
3. E. DiBenedetto, Real Analysis, Birkhauser, Boston, (2002)
4. S. Kesavan, Topics in Functional Analysis and Applications
5. S. Salsa, Partial Di_erential Equations in Action. From Modelling to Theory, 2nd Edition, Springer- Verlag Italia, (2015).
6. A.H.Zemanian, Distribution Theory and Transform Analysis

Code:MAT5051: Probability Theory Prerequisites:	L	T	P	Credit
	3	2	0	**4**

Course Category	Elective
Course Type	Theory
Course Objective	This course will lay the foundation to probability theory and statistical modelling of outcomes of real life random experiments through various statistical distributions.
Course Outcome(s)	To know different ways to describe the distribution of a random variable; to know methods for treating and describing limits of sequences of random variables; to be familiar with how filtrations and conditional expectations are used to represent information and can work with discrete time martingales; know the construction of Brownian motions and some of their most important properties.