#### **Department: Mathematics**

**Program: B.Sc. (H) Mathematics** 

#### Semester: 4

## Paper Name: BMATH408: Partial Differential Equations



You have learned to Formulate, classify and transform first order PDEs into canonical form. <sup>51</sup> responses



You have learned about method of characteristics and separation of variables to solve first orderPDE's.

51 responses



You understood to Classify and solve second order linear PDEs. 51 responses



You have learned about Cauchy problem for second order PDE and homogeneous and non-homogeneous wave equation

51 responses



You have learned to Apply the method of separation of variables for solving many well-known second order PDEs.

51 responses



#### **Observations:**

From the given responses, it is observed that around 90% of students strongly agreed and agreed that they got an understanding of formulate, classify and transform first order PDEs into canonical form and around 92% of students strongly agreed and agreed that they got an understanding of method of characteristics and separation of variables to solve first order PDE's, classify and solve second order linear PDEs. and around 82% of students strongly agreed and agreed that they got an understanding about Cauchy problem for second order PDE and homogeneous and non-homogeneous wave equation, and around 86% apply the method of separation of variables for solving many well-known second order PDEs.

It is also observed that students had keen interest in the paper as 94.1% of students had more than 67% of attendance.

#### **Action Taken**

The response to this paper has been encouraging. More efforts will be made to keep students intrigued.

## **Program: B.Sc. (H) Mathematics**

#### Semester: 4

# Paper Name: BMATH409: Riemann Integration & Series of Functions



You have learned about some of the classes and properties of Riemann integrable functions, and the applications of the Fundamental theorems of integration. <sup>51</sup> responses



You have learned about improper integrals including, beta and gamma functions 51 responses



You understood to about Cauchy criterion for uniform convergence and Weierstrass M-test foruniform convergence.

51 responses



You have learned about the constraints for the inter-changeability of differentiability and integrability with infinite sum.

51 responses



You have learned to Approximate transcendental functions in terms of power series as well as, differentiation and integration of power series.





## **Observations:**

From the given responses, it is observed that around 82% of students strongly agreed and agreed that they got an understanding of some of the classes and properties of Riemann integrable functions, and the applications of the Fundamental theorems of integration. It is observed that around 76% of students strongly agreed and agreed that they got an understanding about improper integrals including, beta and gamma function and around 80% of students understood to about Cauchy criterion for uniform convergence and Weierstrass M-test for uniform convergence, and around 80% of students strongly agreed and agreed that they got an understanding about the constraints for the inter-changeability of differentiability and integrability with infinite sum. And 76% students got understanding about approximate transcendental functions in terms of power series as well as, differentiation and integration of power series.

It is also observed that students had keen interest in the paper as 86.3% of students had more than 67% of attendance.

#### **Action Taken**

The response to this paper has been encouraging. More efforts will be made to keep students intrigued.

# Program: B.Sc. (H) Mathematics

#### Semester: 4

## Paper Name: BMATH410: Ring Theory & Linear Algebra



You have learned about the fundamental concept of rings, integral domains and fields. <sup>51</sup> responses



You understood to about the concept of linear independence of vectors over a field, and the dimension of a vector space.

51 responses



You have learned about ring homomorphisms and isomorphisms theorems of rings. <sup>51 responses</sup>



You have learned about the Basic concepts of linear transformations, dimension theorem, matrix representation of a linear transformation, and the change of coordinate matrix. <sup>51</sup> responses



#### **Observations:**

From the given responses, it is observed that around 82% of students strongly agreed and agreed that they got an understanding about the fundamental concept of rings, integral domains and fields and around 90% of students strongly agreed and agreed that they got an understanding about the ring homomorphisms and isomorphisms theorems of rings. Around 88% of students strongly agreed and agreed that they got an understanding the concept of linear independence of vectors over a field, and the dimension of a vector space, and around 82% of students strongly agreed and agreed that they got an understanding the conceptabout the Basic concepts of linear transformations, dimension theorem, matrix representation of a linear transformation, and the change of coordinate matrix. It is observed that around 90% of students strongly agreed and agreed that they got an understandingabout ring homomorphisms and isomorphisms theorems of rings.

It is also observed that students had keen interest in the paper as 92.2% of students had more than 67% of attendance.

#### **Action Taken**

The response to this paper has been encouraging. More efforts will be made to keep students intrigued.

#### **Program: B.Sc. (H) Mathematics**

#### Semester: 4

## Paper Name: SEC-2: Computer Algebra Systems and Related Software



You have learned to Use of computer algebra systems (Mathematica/MATLAB/Maxima/Maple etc.) as a calculator, for plotting functions and animations <sup>51</sup> responses



You have learned to Use of CAS for various applications of matrices such as solving system of equations and finding eigenvalues and eigenvectors. <sup>51</sup> responses



You understood to Analyze, test, and interpret technical arguments on the basis of geometry. <sup>51</sup> responses



You have learned the use of R in summary calculation, pictorial representation of data and exploring relationship between data

51 responses



You have learned the use of the statistical software R as calculator and learn to read and get data into R.

51 responses



#### **Observations:**

From the given responses, it is observed that around 92% of students strongly agreed and agreed that they got an understanding about to Use of computer algebra systems (Mathematica /MATLAB/Maxima/Maple etc.) as a calculator, for plotting functions and animations, 82% have learned to Use of CAS for various applications of matrices such as solving system of equations and finding eigenvalues and eigenvectors, 76% understood to Analyze, test, and interpret technical arguments on the basis of geometry, 88% have learned the use of R in summary calculation, pictorial representation of data and exploring relationship between data, 86% have learned to use of the statistical software R as calculator and learn to read and get data into R.

It is also observed that students had keen interest in the paper as 92.2% of students had more than 67% of attendance.

#### **Action Taken**

The response to this paper has been encouraging. More efforts will be made to keep students intrigued.

**Department: Mathematics** 

**Program: B.Sc.(H) Mathematics** 

## Semester: 3

## 1. Paper Name: BMATH305: Theory of Real Functions

You got a rigorous understanding of the concept of limit of a function. <sup>55 responses</sup>



You have learned about continuity and uniform continuity of functions defined on intervals. <sup>55 responses</sup>



You understood geometrical properties of continuous functions on closed and bounded intervals. <sup>55 responses</sup>



You were able to learn extensively about the concept of differentiability using limits, leading to a better understanding for applications. <sup>55 responses</sup>



You got to know about applications of mean value theorems and Taylor's theorem. <sup>55 responses</sup>



**Observations:** From the given responses, it is observed that around 80-95 % of students strongly agreed or agreed that they got a rigorous understanding of the concept of limit of a function and learned about continuity and uniform continuity of functions defined on intervals. They understood geometrical properties of continuous functions on closed and bounded intervals and were able to learn extensively about the concept of differentiability using limits. Students also agreed that they got to know about applications of mean value theorems and Taylor's theorem. It is also observed that students had an interest in the paper as 90.9% of students had more than 67% of attendance.

Action Taken: For the moderate responses, topics will be discussed more with the students in tutorials. For the weak students, special classes will be held to discuss important questions with tutorials. Assessments would also be done at regular intervals.

# 2. Paper Name: BMATH306: Group Theory-I

You were able to recognized the mathematical objects that are groups, and classify them as abelian, cyclic and permutation groups, etc. <sup>55 responses</sup>



You were able to link the fundamental concepts of groups and symmetrical figures. <sup>55 responses</sup>



You were able to analyze the subgroups of cyclic groups and classify subgroups of cyclic groups. <sup>55 responses</sup>



You were able to explain the significance of the notion of cosets, normal subgroups and factor groups. 55 responses



You got to know about Lagrange's theorem and Fermat's Little theorem. <sup>55 responses</sup>



You got to know about group homomorphisms and group isomorphisms. <sup>55 responses</sup>



**Observations:** From the given responses, it is observed that around 80-93 % of students strongly agreed or agreed that they were able to recognized the mathematical objects that are groups, and classify them as abelian, cyclic and permutation groups, etc and were able to link the fundamental concepts of groups and symmetrical figures. They were also able to analyze the subgroups of cyclic groups and classify subgroups of cyclic groups and understood the significance of the notion of cosets, normal subgroups and factor groups. Students also agreed that they got to know about Lagrange's theorem, Fermat's Little theorem and group homomorphisms and group isomorphisms. It is also observed that students had an interest in the paper as 87.3% of students had more than 67% of attendance.

Action Taken: For the moderate responses, topics will be discussed more with the students in tutorials. For the weak students, special classes will be held to discuss important questions with tutorials. Measures will be taken to make the subject more interesting. Assessments would also be done at regular intervals.

## 3. Paper Name: BMATH307: Multivariate Calculus

You were able to learn the conceptual variations when advancing in calculus from one variable to multivariable discussion.

55 responses



You were able to understand the maximization and minimization of multivariable functions subject to the given constraints on variables. <sup>55</sup> responses



You were able to learn about inter-relationship amongst the line integral, double and triple integral formulations. <sup>55</sup> responses



You were able to familiarize with Green's, Stokes' and Gauss divergence theorems. <sup>55 responses</sup>





**Observations:** From the given responses, it is observed that around 95 % of students strongly agreed or agreed that they were able to learn the conceptual variations when advancing in calculus from one variable to multivariable discussion and also learned about inter-relationship amongst the line integral, double and triple integral formulations. Around 80-90 % of students strongly agreed or agreed that they were able to understand the maximization and minimization of multivariable functions subject to the given constraints on variables and were also able to familiarize with Green's, Stokes' and Gauss divergence theorems. It is also observed that students had an interest in the paper as 90.9% of students had more than 67% of attendance.

Action Taken: For the moderate responses, topics will be discussed more with the students in tutorials. For the weak students, special classes will be held to discuss important questions with tutorials. Assessments would also be done at regular intervals.

# 4. Paper Name:SEC-1: LaTeX and HTML

You were able to create and typeset a LaTeX document. <sup>55 responses</sup>



You were able to typeset a mathematical document using LaTex <sup>55</sup> responses



You were able to learn about pictures and graphics in LaTex. <sup>55 responses</sup>



You were able to create beamer presentations. <sup>55</sup> responses



You were able to create web page using HTML 55 responses



#### Percentage of Classes Attended 55 responses



**Observations:** From the given responses, it is observed that around 95 % of students strongly agreed or agreed that they were able to create and typeset a LaTeX document and typeset a mathematical document using LaTex. They learned about pictures and graphics in LaTex. Students were also able to create beamer presentations and web page using HTML. It is also observed that students had an interest in the paper as 94.5% of students had more than 67% of attendance.

Action Taken: For the moderate responses, topics will be discussed more with the students in tutorials. For the weak students, special classes will be held to discuss important questions with tutorials. Assessments would also be done at regular intervals.

## **Department: Mathematics**

**Program: B.Sc.(H) Mathematics** 

## Semester: 2

## 1. Paper Name: BMATH203: Real Analysis



You have learned many properties of the real line R including completeness and Archimedean properties.

4 responses



You are able to define sequences in terms of functions from the set of natural numbers to a subset of R.

4 responses



You are able to recognize bounded, convergent, divergent, Cauchy and monotonic sequences and are able to calculate limit superior, limit inferior and the limit of a bounded sequence. 4 responses



You are able to apply the ratio, root, alternating series and limit comparison tests for convergence and absolute convergence of an infinite series of real numbers. 4 responses



**Observations:** From the given responses, it is observed that around 100 % of students strongly agreed or agreed that they have learned many properties of the real line R including completeness and Archimedean properties, are able to define sequences in terms of functions from the set of natural numbers to a subset of R, are able to recognize bounded, convergent, divergent, Cauchy and monotonic sequences and are able to calculate limit superior, limit inferior and the limit of a bounded sequence. They are able to apply the ratio, root, and alternating series and limit comparison tests for convergence and absolute convergence of an infinite series of real numbers. It is also observed that students had an interest in the paper as 100% of students had more than 67% of attendance.

Action Taken: For the moderate responses, topics will be discussed more with the students in tutorials. For the weak students, special classes will be held to discuss important questions with tutorials. Assessments would also be done at regular intervals.

# 2. Paper Name: BMATH204: Differential Equations



You have learned basics of differential equations and mathematical modeling. <sup>4</sup> responses



You have learned the formulation of differential equations for various mathematical models. <sup>4</sup> responses



You are able to solve first order non-linear differential equations and linear differential equations of higher order using various techniques.

4 responses



You are able to apply various techniques to solve and analyze different mathematical models. <sup>4</sup> responses



**Observations:** From the given responses, it is observed that around 100 % of students strongly agreed or agreed that they have learned the basics of differential equations and mathematical modelling, and have learned the formulation of differential equations for various mathematical models. They are able to solve first order non-linear differential equations and linear differential equations of higher order using various techniques. They are able to apply various techniques to solve and analyse different mathematical models. It is also observed that students had an interest in the paper as 100% of students had more than 67% of attendance.

Action Taken: For the moderate responses, topics will be discussed more with the students in tutorials. For the weak students, special classes will be held to discuss important questions with tutorials. Measures will be taken to make the subject more interesting. Assessments would also be done at regular intervals.

**Department: Mathematics** 

**Program: B.Sc.(H) Mathematics** 

Semester: 1

Paper Name: BMATH101:Calculus





**Observations:** From the given responses, it is observed that around 88.2% of students strongly agreed or agreed that they have learned first and second derivative tests for relative extrema and were able apply the knowledge in problems in business, economics and life sciences,85.3% are able to sketch curves in a plane using its mathematical properties in the different coordinate systems of reference,82.4% are able to compute area of surfaces of revolution and the volume of solids by integrating over cross-sectional areas and 82.4% are able to understand the calculus of vector functions and its use to develop the basic principles of planetary motion. It is also observed that students had an interest in the paper as 94.1% of students had more than 67% of attendance.

## **Action Taken:**

For the moderate responses, topics will be discussed more with the students in tutorials. For the weak students, special classes will be held to discuss important questions with them. Measures will be taken to make the subject more engaging and appealing to the students in order to ensure higher attendance on their part. Assessments like quiz, presentations would also be done at regular intervals.





**Observations:** From the given responses, it is observed that around 70.6-91.1% of students strongly agreed or agreed that they have learned the basics of algebra and have learned to Employ De Moivre's theorem in a number of applications to solve numerical problems, equivalent classes and cardinality of a set, Use modular arithmetic and basic properties of congruences, learned to Recognize consistent and inconsistent systems of linear equations by the row echelon form of the augmented matrix, to find eigenvalues and corresponding eigenvectors for a square matrix. It is also observed that students had an interest in the paper as 91.2 % of students had more than 67% of attendance.

## **Action Taken:**

For the moderate responses, topics will be discussed more with the students in tutorials. For the weak students, special classes will be held to discuss important questions with them. Measures will be taken to make the subject more engaging and appealing to the students in order to ensure higher attendance on their part. Assessments like quiz, presentations would also be done at regular intervals.

#### **Department: Mathematics**

#### **Program: B.A. Prog**

#### Semester: 6

## Paper Name: Transportation and Network Flow Problems

Percentage of classes attended in this course <sup>3</sup> responses



# You were able to Formulate and solve transportation problems. <sup>3</sup> responses



You were able to Learn to solve assignment problems using Hungarian method. <sup>3</sup> responses



You were able to Solve travelling salesman problem. <sup>3</sup> responses



You were able to Learn about network models, CPM and PERT. 3 responses



**Observations:** From the given responses, it is observed that around 100 % of students strongly agreed or agreed that they were able to Formulate and solve transportation problems, assignment problems using the Hungarian method. Students also understood the Travelling salesman Problems and the applications of PERT and CPM. It is also observed that students need to be motivated to attend the course.

Action Taken: For the moderate responses, topics will be discussed more with the students in tutorials. For the weak students, special classes will be held to discuss important questions with tutorials. Measures will be taken to make the subject more interesting to the students in order to ensure higher attendance on their part. Assessments would also be done at regular intervals.

**Department: Mathematics** 

Program: B.A. Program

Semester: 4

Paper Name: Analysis (UPC- 62354443)

You understood basic properties of the field of real numbers.



You were able to examine continuity and uniform continuity of functions using sequential criterion.



You were able to test convergence of sequence and series of real numbers.



You were able to distinguish between the notion of integral as anti-derivative and Riemann integral.



Percentage of classes attended in this course

More than 67 percent



**Observations:** From the given responses, it is observed that around 100 % of students strongly agreed or agreed that they understood basic properties of the field of real numbers and were able to test convergence of sequence and series of real numbers. Around 50-75% students strongly agreed or agreed that they were able to examine continuity and uniform continuity of functions using sequential criterion and were able to distinguish between the notion of integral as anti-derivative and Riemann integral. It is also observed that students had an interest in the paper as 100% of students had more than 67% of attendance.

Action Taken: For the moderate responses, topics will be discussed more with the students in tutorials. For the weak students, special classes will be held to discuss important questions with tutorials. Assessments would also be done at regular intervals.

## **Department: Mathematics**

Program: B.A. Prog

Semester: 1

**Paper Name: Calculus** 

Percentage of classes attended in this course 6 responses



You understood the concept of continuity and differentiability of functions <sup>6</sup> responses



You have learned about tracing of curves 6 responses





You were able to understand an overview of Mean Value Theorems and its applications 6 responses

**Observations:** From the given responses, it is observed that around 100 % of students strongly agreed or agreed that they were able to learn the concept of continuity and differentiability of functions, tracing of curves, Mean Value Theorems and its applications.

It is also observed that students need to be motivated to attend the course as 33.3% students had more than 67% of attendance.

Action Taken: Measures will be taken to make the subject more interesting to the students in order to ensure higher attendance on their part. Assessments would also be done at regular intervals.

**Department: Mathematics** 

**Program: B.A. Prog** 

Semester: 3

Paper Name: SEC-1: Computer Algebra Systems (UPC- 62353327)

You were able to use CAS(Mathematica) as a calculator and for plotting functions. <sup>6</sup> responses



You understood the role of CAS finding roots of polynomials and solving general equations. <sup>6</sup> responses



You were able to employ CAS for computing limits, derivatives, and computing definite and indefinite integrals.

6 responses



You were able to use CAS to understand matrix operations and to find eigenvalues of matrices <sup>6</sup> responses



**Observations:** From the given responses, it is observed that around 83 % of students strongly agreed or agreed that they were able to use CAS as a calculator and for plotting functions. They understood the role of CAS finding roots of polynomials, solving general equations and were able to employ CAS for computing limits, derivatives, and computing definite and indefinite integrals. Students also agreed that they were able to use CAS to understand matrix operations and to find eigenvalues of matrices. It is also observed that students need to be motivated to attend the course as 50% students had more than 67% of attendance.

Action Taken: For the moderate responses, topics will be discussed more with the students in tutorials. For the weak students, special classes will be held to discuss important questions with tutorials. Measures will be taken to make the subject more interesting to the students in order to ensure higher attendance on their part. Assessments would also be done at regular intervals.

## **Department: Mathematics**

# Program: B.A. Program

# Semester: 3

# Paper Name: Analytic Geometry and Applied Algebra

\*8 responses



You were able to identify and sketch conics namely, ellipse, parabola and hyperbola.



You learned about three-dimensional objects such as spheres, conicoids, straight lines and planes using vectors.



Count of You understood various applications of algebra in design of experiments, modelling of matching jobs, checking...





Percentage of classes attended in this course

**Observations:** From the given responses, it is observed that around 63-88 % of students strongly agreed or agreed that they were able to learn concepts in twodimensional geometry and identify and sketch conics namely, ellipse, parabola and hyperbola. They learned about three-dimensional objects such as spheres, conicoids, straight lines and planes using vectors. Students also understood various applications of algebra in design of experiments, modelling of matching jobs, checking spellings, network reliability and scheduling of meetings. It is also observed that students need to be motivated to attend the course as 62.5% students had more than 67% of attendance.

Action Taken: For the moderate responses, topics will be discussed more with the students in tutorials. For the weak students, special classes will be held to discuss important questions with tutorials. Measures will be taken to make the subject more interesting to the students in order to ensure higher attendance on their part. Assessments would also be done at regular intervals.

## **Department: Mathematics**

# Program: B.A. Program

# Semester: 3

# Paper Name: Analytic Geometry and Applied Algebra

You learned concepts in two-dimensional geometry



You were able to identify and sketch conics namely, ellipse, parabola and hyperbola.



You learned about three-dimensional objects such as spheres, conicoids, straight lines and planes using vectors.



Count of You understood various applications of algebra in design of experiments, modelling of matching jobs, checking...





Percentage of classes attended in this course

**Observations:** From the given responses, it is observed that around 63-88 % of students strongly agreed or agreed that they were able to learn concepts in twodimensional geometry and identify and sketch conics namely, ellipse, parabola and hyperbola. They learned about three-dimensional objects such as spheres, conicoids, straight lines and planes using vectors. Students also understood various applications of algebra in design of experiments, modelling of matching jobs, checking spellings, network reliability and scheduling of meetings. It is also observed that students need to be motivated to attend the course as 62.5% students had more than 67% of attendance.

Action Taken: For the moderate responses, topics will be discussed more with the students in tutorials. For the weak students, special classes will be held to discuss important questions with tutorials. Measures will be taken to make the subject more interesting to the students in order to ensure higher attendance on their part. Assessments would also be done at regular intervals.

## **Department: Mathematics**

## Program: B.A. (H) & B.Com

#### Semester: 4

#### 1. Paper Name: Elements of Analysis

Percentage of Classes Attended for this course

14 responses



Year in which you studied this course

#### 14 responses



You were able to learn real numbers and their basic properties

14 responses



You were able to be familiar with convergent and Cauchy sequences.

14 responses



You learned about the test of convergence and divergence of infinite series of real numbers

14 responses



You learned about power series expansion of some elementary functions 14 responses



## **Observations:**

From the given responses, it is observed that around 93 % of students strongly agreed and agreed that they are able to learn real numbers and their basic properties as well as learn convergence of Cauchy sequences. They have understood the concept of test of convergence and divergence of infinite series of real numbers and power series expansion of elementary functions.

## **Action Taken:**

For the moderate responses, topics will be discussed more with the students in tutorials. For the weak students, special classes will be held to discuss important questions with them. Measures will be taken to make the subject more engaging and appealing to the students in order to ensure higher attendance on their part. Assessments like quiz, presentations would also be done at regular intervals.