Bethune College

PO & CO of Mathematics (PG), OLD

Name of the Programme	Year of Introduction	Status of implementation in CBCS Curriculum (YES/NO)	Programme outcome	Course outcome
M.Sc. in Mathematics	1st July, 2016-30th June, 2017 (autonomus)	NO (we introduced Semester system before the CBCS system introduced by the University of Calcutta. Four Semesters in Two years). Each semester consists of five papers (Modules). Each paper carries 50 marks. In total 20 papers in the 4 semesters. Per semester total marks= 5x 50 =250 marks. In each semester we award students with grade point (out of ten) and grade letter for each paper and the for each semesters also. For the final semester along with the final semester grade point and grade letter , accumulation result of the four semester also published.	1. Students will be equipped with mathematics skills and techniques which can be applied in both academic and non-academic areas of work. 2. Students will have placements scopes in academic areas include jobs as teaching faculties in schools, colleges, business schools, training schools 3. Students will have placements scopes in research positions in different research institutes. 4. Students will have placements scopes in non – academic areas include jobs in sectors like banks, insurance, public services, IT and other technological	**SEMESTER-1:** **Module101: (Group A)-- Abstract Algebra-I& Ring Theory (GroupB)--Linear Algebra** • Foundation courses **Module102: Real Analysis** • Foundation courses **Module 103: Complex Analysis** • Introductory course **Module 104: (GroupA)Functional Analysis-I;(Group B) Topology-I** • Introductory courses on the topics. **Module 105: Classical Mechanics-I & Group-B: Discrete Mathematics-I** • A Foundation coursein mechanics and basics of discrete mathematics and mathematical logic for modelling discrete world. **Semester-II:** **Module201:(GroupA)--Abstract Algebra-II ; (Group B)- Differential Geometry.** • Advanced studies in Abstract Algebra & basics of differential geometry. • Students will be able to learn advance mathematical analysis theoretical concepts necessary for mathematical studies and applications **Module 202: Real Analysis-II** • An advanced course of real analysis. **Module 203: (Group A) Functional Analysis-II & Group-B: Topology -II** Basic courses continued on those topics. **Module 204: Ordinary differential equations & Special functions.** • Students will learn different techniques for solving ordinary differential equation

| | | | | areas. | necessary for different application in dynamical systems. |

Module 205: (Group-A) Classical Mechanics-II;(Group-B): ContinuumMechanics-I/ Operation Research-I:
- These advanced topics in classical mechanics which are required to study dynamical system and some continuum approach for introductory concepts on elasticity & fluid mechanics. An alternating basic Couse is OperationResearch-I also considered for the students..

Semester-III

Module 301: (GroupA) Partial Differential Equations; (Group B) Integral Transform & Integral Equations:
- Linear Partial differential represents the wave equations and diffusion equation and other types of partial differential represents different systems in physical world. On the other hand integral equation helps solving them. Integral equations are the methods for modelling problems in terms of integral terms replacing derivatives . These analytical methods are important for higher studies.

Module 302: (Group-A) Discrete Mathematics-II; (Group-B) Numetical Analysis:
- Now a days discrete mathematical logic is applied in computer science and this coursewas motivated for Formal language and Automata theory learning. Numerical mathematics course gives insight of computation for the students.

Module 303: (Group-A) Control theory; (Group-B) Continuum mechanics-II or Operation

					Research-II.
					• Basics of linear Control theory modelled in terms Matrix for studying optimal of a system. Basics equation of elasticity & fluid mechanics along wth applications are studied in this paper. An alternative option for Operation Research also given as alternative paper for studying replacement theory and different models of Inventory control.
					Module304:(Group-A) Actuarial Sciences; Group-B Stochastic Process.
					• **Different models of statistics are studied here for studying Risk management basics. Markov chains have many uses for time dependent discrete random models like in queuing theory and Brownian motion study. These are the basic model required for the students for their higher studies.**
					Module 305:
					Elective Paper-1: Two elective papers are given in this for 3rd semester. Students werecan givetheir option for choosing anyonepaper from these two,
					i) Advanced Real analysis and Advanced Complex Analysis-I
					ii) Dynamical Systems-I:
					• Advanced Real analysis and Advanced Complex Analysis is for those students who prefer to learn more knowledge in pure mathematics and dynamical systems for those students who prefer application of mathematics in applied fields like physics, chemistry & economics. These papers may help them for further study.
					Semester IV:

					Module 401: (Group-A) Graph Theory; (Group-B) Numerical Analysis-II.
					• Graph theory being a branch of discrete mathematics, it has wonderful application in different applied fields for solving problems. Eulerion and Hamilton graphs are some important graphs which student should know for their future study on the subject. In the numerical part approximation of functions,cubic spline method and numerical integration theory were taught to develop the numerical skill of the students.
					Module 402: Elective Paper-II **i) Advanced Real analysis and Advanced Complex Analysis-II** **ii) Dynamical Systems-II:**
					• Advance level courses are prepared for the students such that they can pursue research work in their higher studies in both pure and applied mathematics.
					Module 403: Elective Paper-III **i) Advanced Real analysis and Advanced Complex Analysis-III** **ii) Dynamical Systems-III:**
					• Advance level courses are prepared for the students such that they can pursue research work in their higher studies in both pure and applied mathematics
					Module404: Computer Programming in C, C++ and MATLAB.
					• For the practice of numerical problems (solution of differential equation & numerical integration by different methods etc.) we introduced computer programming with C, C++ in this paper and then verify the results by MATLAB. This will enhance skill of our students and

				help in professional field. **Module 405: Project work and Comprehensive Viva.** • In this paper every students select their topic for their project and discuss it with their supervisor a faculty member of the department) and prepare four hard copies of the project (one for herself, one for supervisor , one for external expert for viva & one for the Department.) and a soft copy for presentation. Students had to present before external experts,faculty member and other students. Question asked in different angle. Total marks 50 divided as (i) Preparation Project (in hard copy & soft copy)-20 marks. (ii) Presentation (20 minutes): 20 marks And (iii) Viva-10 marks. This paper enhances the skill of the students one step forward for starting research work.