

KABI JAGADRAM ROY GOVERNMENT GENERAL DEGREE COLLEGE

Department of Mathematics

Programme Outcome, Programme Specific Outcome and Course Outcome for B.Sc. in Mathematics Under CBSC System Affiliated to Bankura University

For UG CBCS syllabus of Mathematics in Bankura University click link below:

<https://www.bankurauniv.ac.in/uploads/tempimagepdflink/1663671822.pdf>

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<https://www.bankurauniv.ac.in/uploads/tempimagepdflink/1649150752.pdf>

Introduction:

- The syllabus for Mathematics at undergraduate level using the Choice Based Credit system has been framed in compliance with model syllabus given by UGC.
- The main objective of framing this new syllabus is to give the students a holistic understanding of the subject giving substantial weightage to both the core content and techniques used in Mathematics. Keeping in mind and in tune with the changing nature of the subject, adequate emphasis has been given on new techniques of mapping and understanding of the subject Mathematics is the study of quantity, structure, space and change. It has very broad scope in science, engineering and social sciences.
- The syllabus has also been framed in such a way that the basic skills of subject are taught to the students, and everyone might not need to go for higher studies and the scope of securing a job after graduation will increase.
- It is essential that students in Mathematics (Honours) select the general electives courses from Physics, Chemistry and/or any branch of Life Sciences, Geology disciplines.
- While the syllabus is in compliance with UGC model curriculum, some changes have been made to ensure all topics are covered and any of the subjects don't become difficult to be completed in one semester. For example, Core course 1 titled "Calculus, Geometry & Vector Analysis" now also has introductory concepts on Geometry and Differential equations and has been renamed accordingly. Similarly, Discipline Specific Electives have been grouped where in student can choose 1 elective from a pool of courses. This has been done to help students learn across the semesters in their inter semesters.
- Dissertation on any topic of Mathematics has been introduced instead of the 4th Elective with a credit of 6 splits into 2 + 4, where 2 credits will be for continuous evaluation and 4 credits reserved for the merit of the dissertation.
- The syllabus of Generic Elective (GE), GE-1, GE-2, GE-3, GE-4 courses are same as of the syllabus of the core courses, C-1, C-2, C-3, C-7, respectively.
- Evaluation process of each course is carried out through Internal Assessment (IA) and End Semester Examination (ESE). Out of full marks 50 of a course, 10 marks is allotted for Internal Assessment and 40 marks is allotted for End Semester Examination. Question paper of each course for End Semester Examination contains three units: Unit I - 05 questions to be answered out of 08 questions carrying 02 marks of each; Unit II - 04 questions to be answered out of 06 questions carrying 05 marks of each and Unit III- 01 question to be answered out of 02 questions carrying 10 marks. Otherwise, the marks distribution of the particular course should be clearly mentioned.
- The Bachelor's Degree in B.A./B.Sc. Mathematics (Hons) is awarded to the students on the basis of knowledge, understanding, skills, attitudes, values and academic achievements



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sought to be acquired by learners at the end of these programmes. Hence, the course objectives and course specific outcomes of mathematics for these courses are aimed at facilitating the learners to acquire these attributes, keeping in view of their preferences and aspirations for knowledge of mathematics.

- The course objectives and course specific outcomes of each course are designed so that these may help learners to understand the main objectives of studying the course. This will enable learners to select elective papers depending on the individual inclinations and contemporary requirements. These syllabi in Mathematics under CBCS are recommended keeping in view of the wide applications of Mathematics in science, engineering, social science, business and a host of other areas. The study of the syllabi will enable the students to be equipped with the state of the art of the subject and will empower them to get jobs in technological and engineering fields as well as in business, education and healthcare sectors. The textbooks mentioned in references are denotative/demonstrative.
- Hence, the programme has been chalked out in such manner that there is scope of flexibility and innovation in modifications of prescribed syllabi, teaching-learning methodology, assessment technique of students and knowledge levels, learning outcomes of courses, inclusion of new elective courses subject to availability of experts across the country.

Programme Objectives (POs):

PO1: Mathematical Reasoning: Applications of the mathematical knowledge to the solutions of more complex problems in academic and in real life.

PO2: Analysing Ability: Identification, formulation and solution of a problem which leads to conclusion using basic principles.

PO3: Developing Confidence: Analysing more complicated problems and getting solutions helps to build up confidence.

PO4: Design/development of more accuracy: Design and development of methods/procedures for solutions of problems which meet the specific queries in industry as well as real life.

PO5: Ability of investigations for more complex problems: Use of research-based knowledge and research methods to handle more complex problems.

PO6: Applications of theory-based knowledge: Ability to apply the theoretical knowledge including theory, experiment and computational data; analysis and interpretation of data, to get the definite conclusions.

PO7: Ability of Modern tool usage: Application of appropriate techniques, resources, updated software and modern mathematical tools to solve mathematical activities with a good understanding of their limitations.

PO8: Team work practice: Collective efforts for functioning effectively as a member or leader in diverse teams, and/or in multidisciplinary settings.

PO9: Communication skill: Effective Communication skill for scientific activities helps to establish a good researcher with popular face in the scientific community.

PO10: Ability of presentation: Writing the effective reports and design document to give and receive clear instructions/limitations/restrictions for good presentations.

PO11: Life-long learning process: Recognize the needs, proper learning and ability to engage in lifelong learning in the broadest context of scientific & technological changes.

PO12: Students undergoing this programme learn to logically question assertions, to recognise patterns and to distinguish between essential and irrelevant aspects of problems. They also share ideas and insights while seeking and benefitting from knowledge and insight of others. This helps them to behave responsibly in a rapidly changing interdependent society.



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Programme Specific Outcomes (PSOs):

The Department of Mathematics offers exciting opportunities to talented students holding a Bachelor's degree for acquiring a rigorous and modern education in mathematics and for pursuing master's degree in both pure and applied mathematics as well as higher studies based on Mathematics. As a part of this Programme, the student has to complete 148 credits of courses including a "Dissertation", whose major part is kind of academic research (and does not involve classroom teaching), in a chosen area of mathematics. This Program will introduce the classical topics of mathematics, which helps in acquiring thinking skills to undertake cutting-edge research in a higher education programme.

Programme Career Opportunities:

This program will enable the students to take part and qualify for the state and national level examinations such as JAM, NBHM, etc. After completion of this programme, the students are well prepared for higher studies such as M. Sc. and Integrated Ph.D. program in Mathematics. This programme will also help students to enhance their employability for government jobs, jobs in banking, insurance and investment sectors, data analyst jobs and jobs in various other public and private enterprises. Completion of this programme will also enable the learners to join teaching profession in primary and secondary schools. The skills and knowledge gained has intrinsic beauty, which also leads to proficiency in analytical reasoning which also helps them to become more professional.

Note: In our college, the department of mathematics running the generic paper in two semesters (III & IV) for Geology(H) students. Hence, there is no scope to implement the PO and PSO mentioned above.

Course Outcomes for the Academic Year 2022-2023:

Semester-III	
Course Title and Course Code	Course Outcomes
Real Analysis (SH/MTH/ 304/GE-3)	After completion of this course a student would have 1. A vast knowledge of Real analysis which they can use for their further study. 2. A clear idea of Sets in $\mathbb{R}$ and limit point, interior point and also acquired the concepts of sequence and series of real numbers. 3. Also, they are able to find sum of the different type of series.
Semester-IV	
ODE & Multivariate Calculus-I (SH/MTH/ 04/GE-4)	After completion of this course a student would have 1. a clear concept of ODE and its applications. 2. Students are knowing the different technique to solve the differential equation. 3. Also, they can use this technique in future study. 4. Learn double and triple integrals along with various applications. 5. Learn the derivative of vector function line integrals with applications.




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Course Outcomes for the Academic Year 2018-2019 to 2021-2022:

Semester-III	
Course Title and Course Code	Course Outcomes
Algebra (SH/MTH/304/GE-3)	After successful completion of this course students will be able to 1. Learn elementary complex numbers and its properties, theory of equations along with solving techniques of cubic & bi-quadratic algebraic equation and inequality with special emphasis on the relation AM, GM & HM. 2. Learn the integers in detail along with the elementary principles such as 'well ordering principle', 'principle of induction', 'division algorithm' etc. and also some important concepts such as congruence, properties of prime numbers, fundamental theorem of arithmetic etc. 3. Learn relations and mapping along with the concept of equipotent sets and cardinality. 4. Learn matrix, its inverse, rank of the matrix, concept of eigen value and eigen vectors. 5. Learn to solve a system of linear equations: homogeneous as well as non-homogeneous and also the consistency in terms of linear independence and dependence.
Semester-IV	
Differential Equations and Vector Calculus (SH/MTH/04/GE-4)	After completion of this course a student would have 1. a clear concept of ODE and its applications. 2. Students are knowing the different technique to solve the differential equation. 3. Also, they can use this technique in future study. 4. Learn double and triple integrals along with various applications. 5. Learn the derivative of vector function line integrals with applications.




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