Hindi Vidya Prachar Samiti's

Ramniranjan Jhunjhunwala College of Arts, Science & Commerce

(Empowered Autonomous Status)

Affiliated to

UNIVERSITY OF MUMBAI

Syllabus for the T.Y.B.Sc. (under NEP)

Program: B.Sc. Mathematics

Program Code: RJSUMAT

Course: On Job Training

Course Code: RJOJTMAT

(REVISED in 2024-2025 in alignment with the NEP 2020 facilitating the inter-and multidisciplinary learning and multiple entry and exit of the students)

(CBCS 2025-2026)

THE PREAMBLE

Why Mathematics?

Mathematics is the language of all Science, Engineering, and Technology. Mathematics is considered the queen of sciences. Without Mathematics, there can be neither science nor engineering. Mathematics occupies a crucial and unique role in human societies and represents a strategic key in the development of the whole of mankind. Mathematics is around us. It is present in different forms; the list is just endless if one goes on to note down the situations when our computational skill or more specifically, simple mathematics comes to play a role, almost every next moment we do the simple calculations at the back of our mind. Of course, these are all done pretty unconsciously without a thought being spared for the use of mathematics on all such occasions. Mathematics helps the man to give exact interpretation to his ideas and conclusions. It is the numerical and calculation part of man's life and knowledge. It plays a predominant role in our everyday life and it has become an indispensable factor for the progress of our present-day world. Further, in modern times, the adoption of mathematical methods in the social, medical and physical sciences has expanded rapidly, confirming mathematics as an indispensable part of undergraduate curricula and creating a great demand for mathematical training. Much of the demand stems directly from the need for mathematical modeling of phenomena. Such modeling is basic to all engineering, plays a vital role in all physical sciences and contributes significantly to the biological sciences, medicine, psychology, economics and commerce. The numerous applications of the subject in almost every field makes mathematics the most versatile subject choice.

Why Mathematics at R J College?

The department of Mathematics of R J College is the department as old as the college itself. It started in 1963, the inception year of the college and since then has remained as the center of academic activities for the subject. With a legacy of more than 6 decades, today the department offers undergraduate programs in the subject of mathematics with more than one discipline-specific elective paper and is affiliated to, and recognized by the University of Mumbai. As an applied component in the final year, mathematics students learn computer programming languages like Java, SQL, and python along with system analysis. Series of guest lectures, Problem-solving sessions, lecture-based learning, bridge courses, institute visits etc. motivate students to explore more in terms of applications of the subject. Under autonomy, the department has made the curriculum more robust by incorporating skill-based learning and value-added course that imparts practical knowledge of the subject to the students. Every year the department organizes a seminar competition on the theme 'Applications of Mathematics' in various areas. Department of Mathematics also runs a value-added course in a year and is able to attract students from other disciplines of science enrolling for these courses. Department of mathematics has received funding from the Department of Biotechnology (DBT), New Delhi to further strengthen our hands in being

able to provide hands-on training to the students to satisfy their curiosity and inculcate research aptitude.

Our Curriculum, Your Strength

The syllabus for mathematics for the total six semesters is meticulously designed so as to make students understand the diversity of subject. From learning elementary calculus and basic algebra, students move on to applied aspects of the subject in terms of Real analysis, multivariable calculus, Complex analysis, abstract algebra. Specialized training in differential equations, numerical methods is a part of the learning process. The teaching staffs of the department of mathematics are highly qualified and are dedicated to their subjects giving a friendly environment for the students. The department always aims to develop skills, ideas and overall progress of the students. Many of our students participate and get awards in various activities like MTTS program, Madhava Mathematics competition and other competitive exams. The environment of the department is very friendly which is useful for the students coming from other colleges also.

CREDIT STRUCTURE FOR SEMESTER VI

Course	Nomenclature	Credits	Topics
ON JOB TRAINING			
RJOJTMAT361	On Job Training	04	Mathematics

T.Y.B.Sc. Semester VI Mathematics (Major)

On Job Training (OJT)

Title: On Job Training **Course code: RJOJTMAT361**

Credits: 04

Guidelines for Undergraduate Students for On Job Training activities

The following guidelines for OJT of TYBSc (Mathematics) align with the requirement that each teacher supervises a batch of 10-15 students.

1. **Scope:** The OJT program typically spans 8-12 weeks, requiring a minimum of 120 hours of physical presence at the organization. Students are encouraged to secure their OJT placements, with support and guidance available from the department. OJT is expected to take place outside the academic institution to expose students to real-world work environments. The scope of OJT covers a wide range of sectors, allowing students to align their experiences with their academic interests. Flexibility is provided to accommodate changing dynamics, including the option for online OJT sessions.

2. **Objective:** The On Job Training aims to:
   - Provide hands-on experience in the application of theoretical concepts of mathematics to real life.
   - Enhance skills in applying acquired domain knowledge, analytical skills, and scientific inquiry.
   - Promote teamwork and independent research, teaching, other related capabilities.

3. **Structure and Framework:**
   Batch Size
   - Each batch will consist of 15 students from TYBSc (Mathematics class), supervised by one teacher.
   - Students will work collaboratively but must submit individual reports.
   - Each group may comprise of 3-5 students.

   Duration
   - Projects should be spread throughout the semester comprising of minimum 120 hours.
   - Weekly progress reviews should be conducted by the teacher-in-charge.

4. Suggested Sector: Topics should align with the mathematics curriculum and include practical, real-world applications. The following job sectors are suggested:

- **Maths Tutor / Teaching Assistant:** Positions in schools (Assisting school teachers) or as private tutors.
- **Subject Matter Expert:** To teach Quantitative Aptitude to students aspiring for various competitive exams.
- **Academic Research:** To assist with active researchers (in HEI) on mathematics projects in performing computations, data collections, data analysis, document preparations in LaTeX, etc.
- **Online Learning Platforms:** Help in designing Maths learning modules, quizzes or tutoring support on online learning platforms.
- **Finance & Banking:** Work on risk analysis, investment modeling, and financial forecasting in banks or financial firms.
- **Software Development:** Contribute to algorithm development and backend systems in tech companies.
- **Cryptography & Cyber Security:** Apply mathematical theories in encryption-decryption, network security, and secure communications.
- **Mathematics AI Trainer:** Roles involving training AI models on mathematical concepts. Development with mathematical models, algorithms, etc.
- **Economics Research:** Collaborate with researchers on dynamic economic modelling, empirical analysis, and simulations, etc.

5. Roles and Responsibilities

Students

- Actively participate in all phases of the OJT course.
- Collect, analyse, and interpret data using appropriate methodologies.
- Maintain proper records and submit a detailed report at the end of the OJT course.

Teacher-in-Charge

- Guide students in selection of sector, planning, and execution.
- Ensure ethical and safety standards are met during fieldwork.
- Review weekly progress and provide constructive feedback.
- Evaluate reports and presentations.

6. Illustrative Evaluation Criteria

- Execution (40%): Timeliness, teamwork, and innovation.
- Report (30%): Presentation, accuracy, and depth of analysis.
- Presentation (30%): Clarity, confidence, and ability to answer questions.

7. Safety and Ethical Considerations

- Adhere to all safety protocols for field and laboratory work.
- Obtain necessary permissions for field studies (e.g., working in protected areas).
- Ensure ethical treatment of living organisms, if applicable.
- Avoid plagiarism in reporting.
- Avoid use of artificial intelligence (AI).

8. Expected Deliverables

- Proposal: Outline of project goals, methodology, and expected outcomes.
- Weekly Progress Reports: Brief updates shared during supervisory meetings with teacher-in-charge.
- Final Report: Comprehensive documentation of the project.
- Presentation: Oral presentation supported by slides, videos, or demonstrations.