THE COCHIN COLLEGE
Koovapadam, Kochi-2
Affiliated To Mahatma Gandhi University
Re-accredited by NAAC With B+ Grade

Criterion 2
Teaching-Learning and Evaluation

2.3 - Teaching- Learning Process

Metric No. 2.3.1

Student centric methods, such as experiential learning, participative learning and problem solving methodologies are used for enhancing learning experiences and teachers use ICT- enabled tools including online resources for effective teaching and learning process

Problem Solving Methodologies

Submitted to

National Assessment and Accreditation Council

Problem Solving Methodologies

A self-directed approach to problem-solving is a powerful strategy that empowers individuals to take initiative, think critically, and find solutions independently. This approach is essential in both academic and professional settings, as it cultivates confidence, creativity, and resilience. By adopting a self-directed problem-solving approach, students develop autonomy in their decision-making and gain valuable skills that are applicable in various aspects of life. This method encourages continuous learning and fosters a proactive mindset, which is essential for overcoming challenges and achieving personal and professional goals.

Identify the Problem Clearly:

Start by defining the problem in clear, concise terms. Understanding the core issue is the first step towards finding a solution. Ask yourself questions like: "What exactly is the problem?" and "Why is it a problem?" Break Down the Problem:

Decompose the problem into smaller, manageable parts. This makes it easier to tackle each component step by step and prevents feeling overwhelmed by the complexity of the issue. Gather Relevant Information:

Research and collect all necessary data or resources that pertain to the problem. This could involve reading, observing, or consulting experts. The more informed you are, the better equipped you'll be to devise effective solutions. Explore Multiple Solutions:

Brainstorm a variety of potential solutions. Encourage creative thinking and consider different perspectives. Evaluating multiple options helps in identifying the most viable and efficient solution. Weigh the Pros and Cons:

Analyze the possible outcomes of each solution by considering their advantages and disadvantages. This helps in making informed decisions that minimize risks and maximize benefits. Plan and Implement:

Once you've selected the best solution, develop a step-by-step plan for implementation. Execute your plan systematically, ensuring that you monitor progress and adjust your strategy as needed. Reflect and Learn:

After implementing the solution, take time to reflect on the process. What worked well? What could have been done differently? Learning from each problem-solving experience enhances your skills and prepares you for future challenges. Stay Persistent and Adaptable:

Problem-solving can be challenging, and the first solution may not always work. Stay persistent and be prepared to adapt your approach as new information or obstacles arise.

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1   Problem-Solving Strategies - Self-Directed:

1.1   Quiz

Quizzes serve as an effective and interactive method for reinforcing concepts taught in the classroom. Regular quiz competitions are organized to help students recall and apply the knowledge they've gained, thereby strengthening their understanding of various subjects. The Science and Quiz Club at The Cochin College plays a pivotal role in this process, consistently conducting quizzes for different departments within the college. These quizzes not only encourage healthy competition among students but also enhance their critical thinking and problem-solving skills. Additionally, students from The Cochin College are often sent to participate in quiz competitions at other colleges, providing them with opportunities to showcase their knowledge, represent their institution, and gain exposure to a broader academic community.

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Figure 1: Posters of Quiz Competitions

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Figure 2: Felicitating the winners of quiz competition

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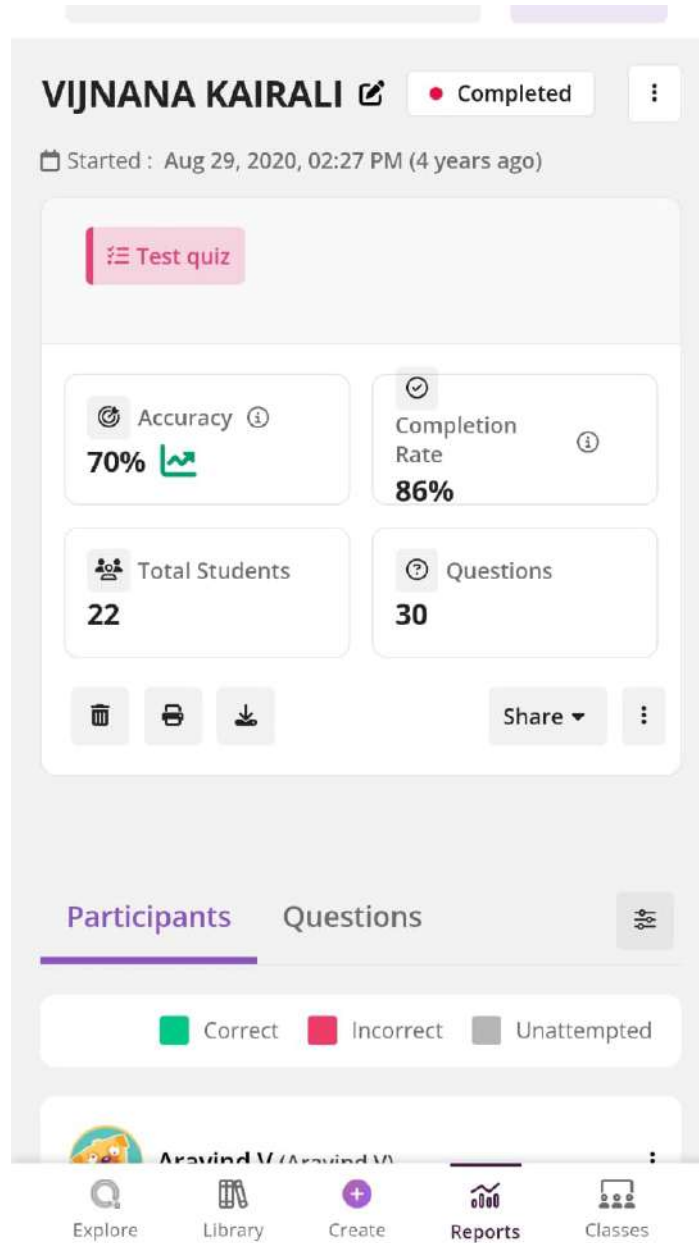
Figure 3: screenshot of Quizizz - Online Quiz

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1.2   Career Guidance and Counselling

The Cochin College places a strong emphasis on the holistic development of its students, recognizing that academic excellence alone is not sufficient for success in today's competitive world. To support students in navigating their career paths and achieving their professional goals, the college offers a comprehensive Career Guidance and Counselling program. This program is designed to equip students with the necessary tools, skills, and knowledge to make informed decisions about their futures.

The Career Guidance and Counselling program at The Cochin College exemplifies the institution's commitment to nurturing well-rounded individuals who are not only academically proficient but also equipped to face the challenges of the modern workplace. By providing comprehensive support and guidance, the college ensures that its students are well-prepared to pursue fulfilling careers and contribute positively to society.

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Figure 4: Career counselling sessions by different departments

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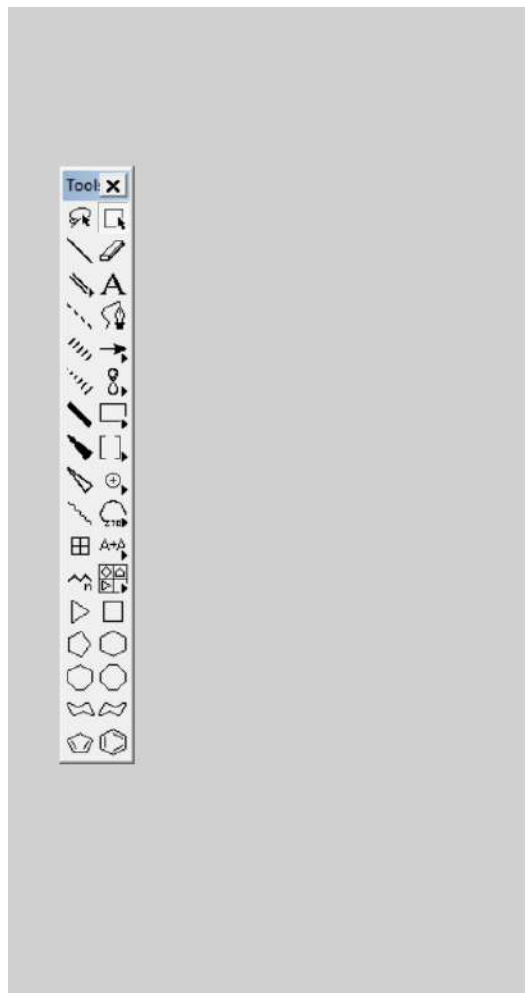**The Cochin College**

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1.3 Harnessing Software for enhanced learning experience

There are a lot of benefits and impacts of incorporating software applications into educational environments, focusing on how these tools can enrich learning experiences, foster engagement, and provide interactive, immersive content for students. Educational software plays a significant role in enhancing learning by providing interactive, personalized, and accessible experiences for students. Here are some of the commonly used software tools in education used for enhancing learning experiences.Teachers encourage students to use educational softwares like Origin, PhysioX, Chemsketch,Chemdraw,RasMol,Arduino IDE, KiCAD, Python, spyder etc for projects and usual curricular activities.

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ChemNMR H-1 Estimation

Estimation Quality: blue = good, magenta = medium, red = rough
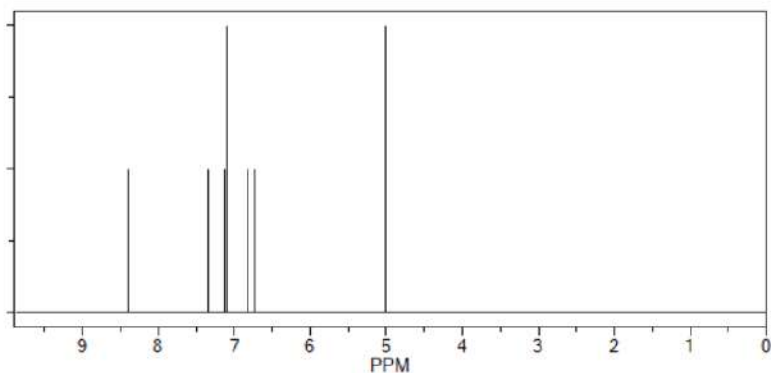
Protocol of the H-1 NMR Prediction:

Node	Shift	Base + Inc.	Comment (ppm rel. to TMS)
CH	7.14	7.29	benzylidenimin
		0.00	1 −1:C*C*C*C*C*C*1
		0.01	1 −Cl from 1−benzene

Figure 5: Screen shot of the software Chemdraw

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Figure 6: Screen shot of the software Arduino IDE

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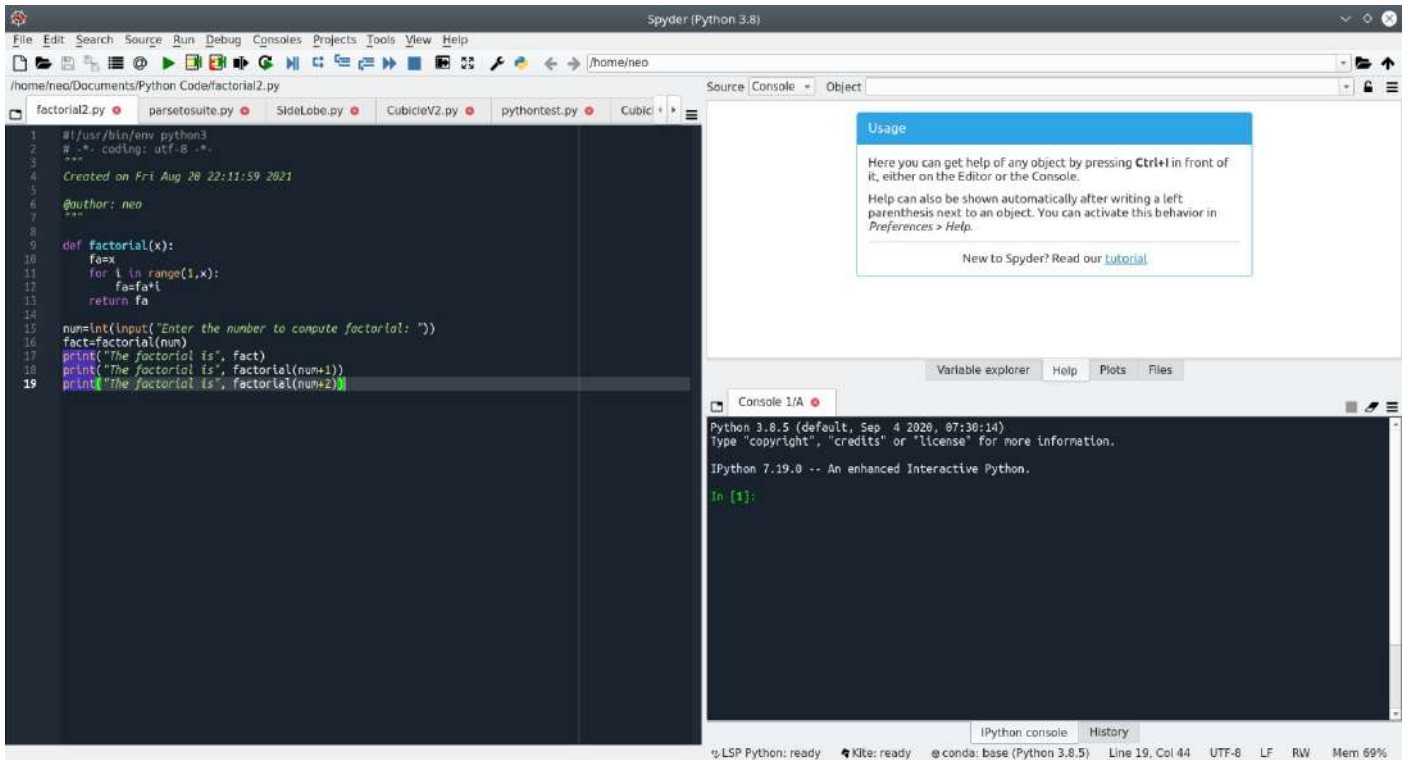
Figure 7: Screen shot of the software python Spyder IDE
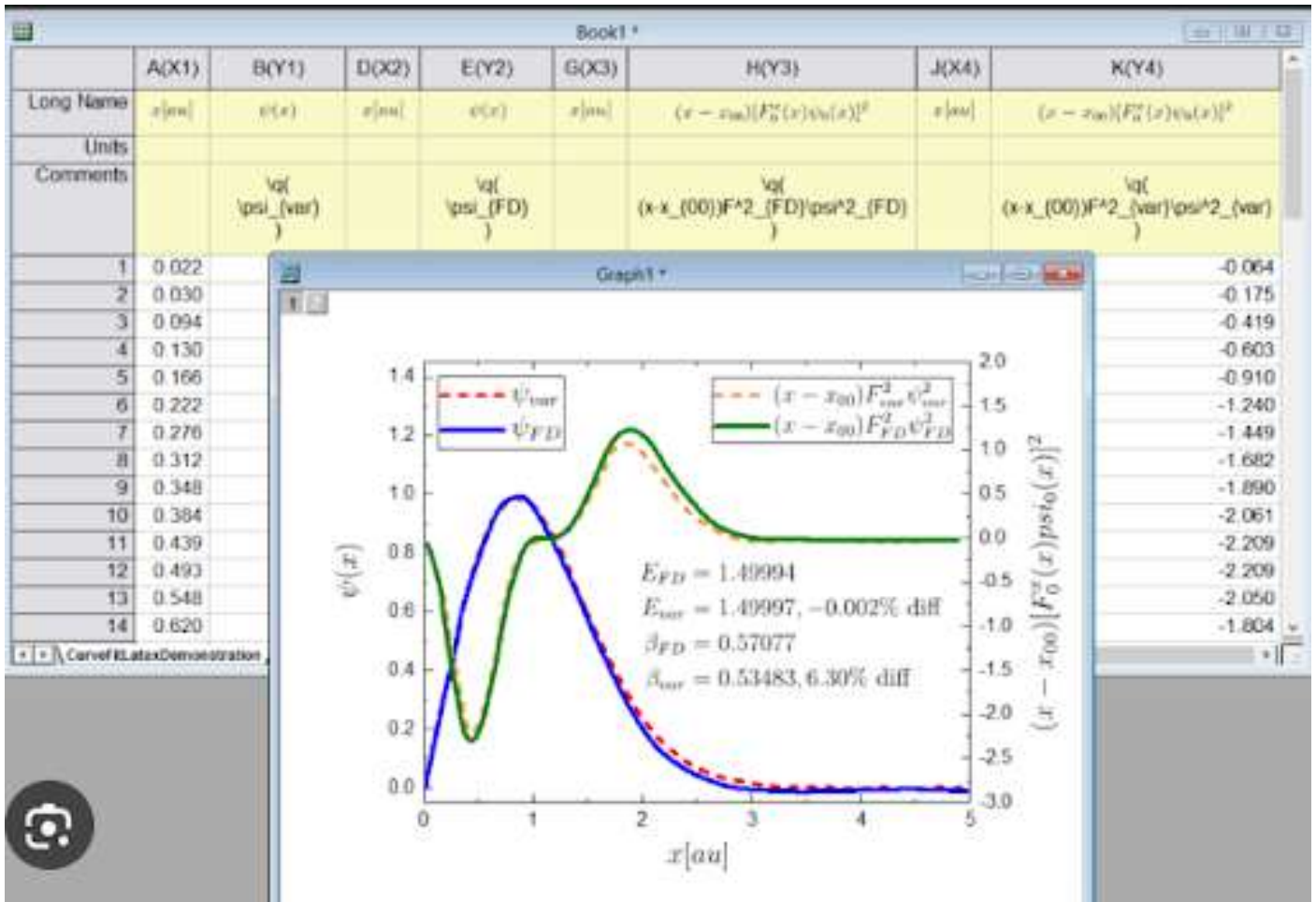
Figure 8: Screen shot of the software Origin

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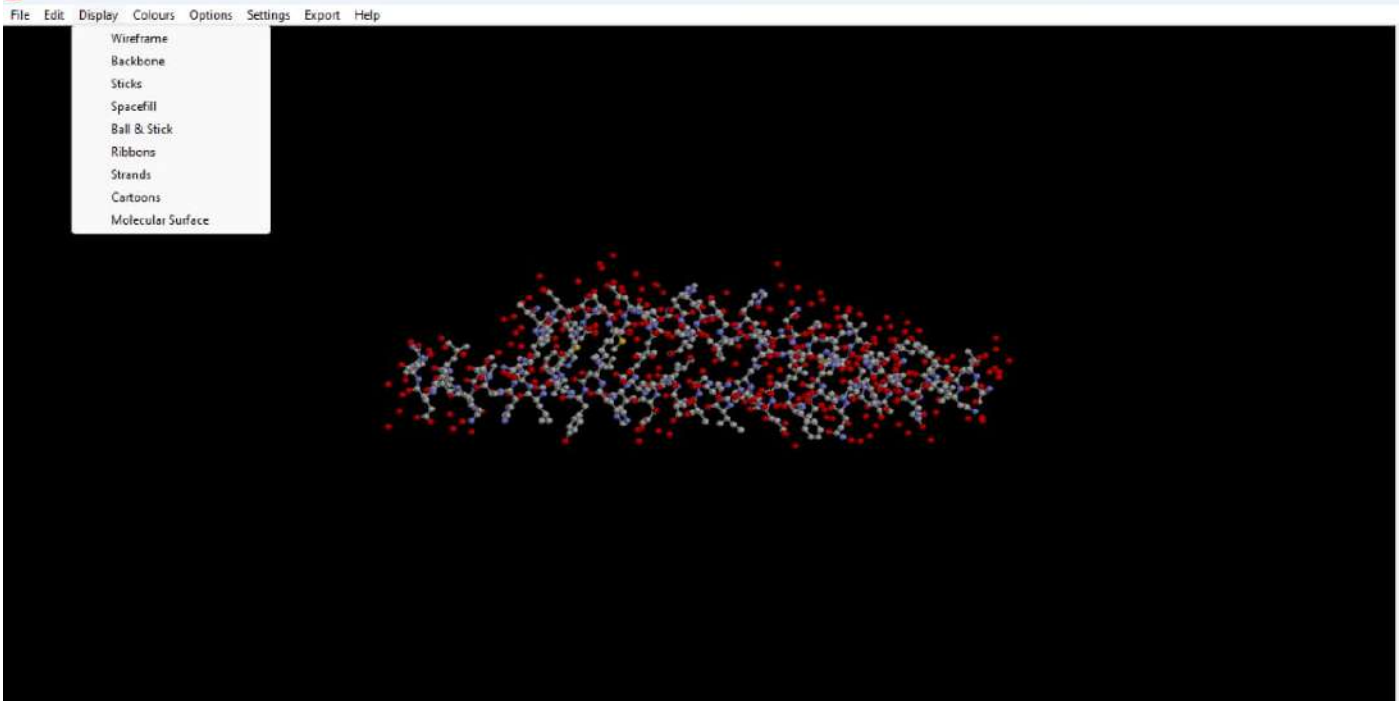
Figure 9: Screen shot of the software Rasmol

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Figure 10: Screen shot of the software PhysioEx

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1.4   Regular Assignments on problems

Problem-solving is a critical skill that is essential for students across various disciplines. Regular assignments focused on problem-solving not only enhance students' analytical abilities but also prepare them to tackle real-world challenges effectively. This report outlines the importance of problem-solving assignments, their implementation, and the outcomes observed from such educational practices.
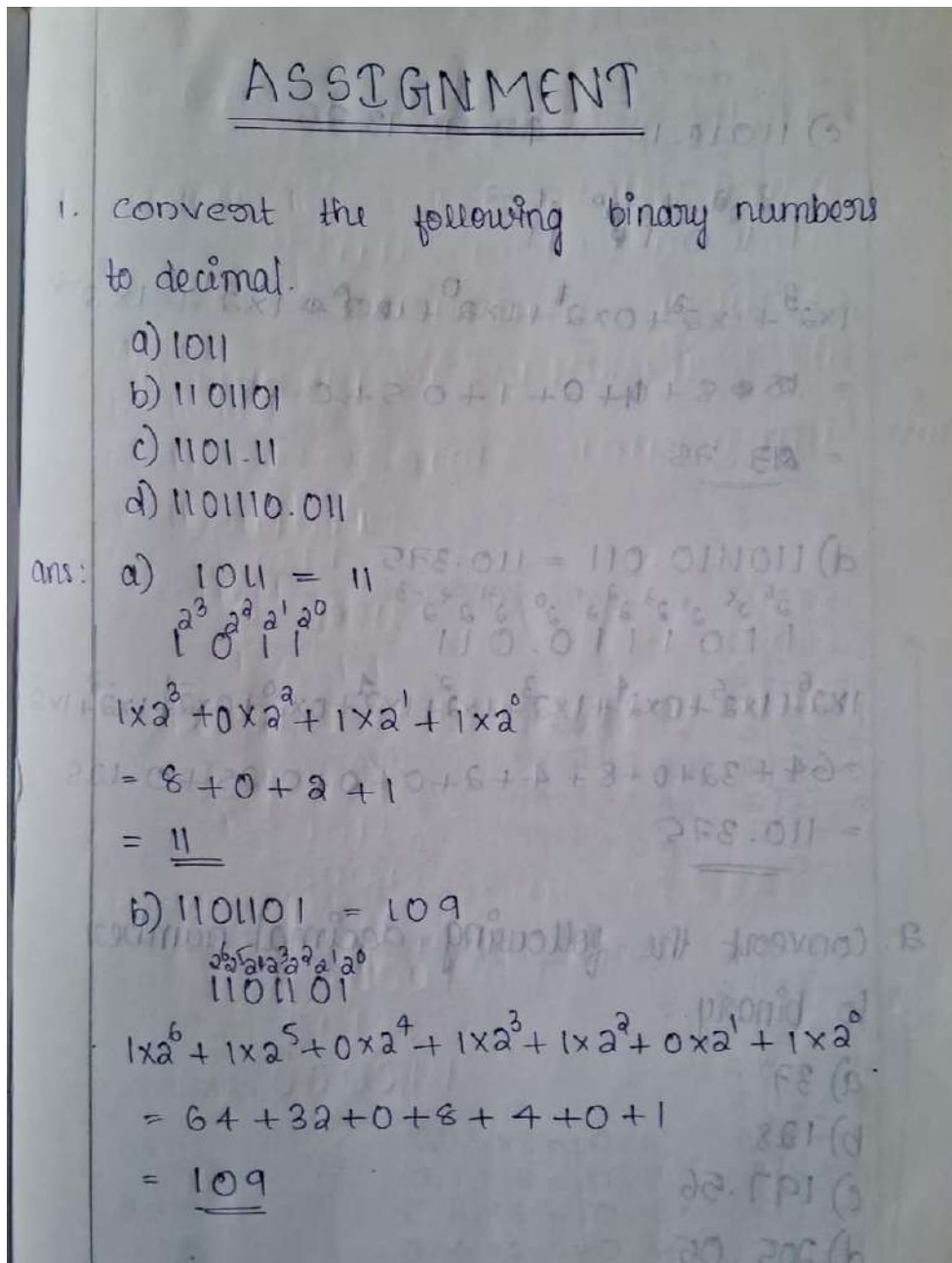

Figure 11: Assignment on problems submitted by a student

Substituting eq (2) into (1)

$$M(2\pi R)^2 = 12$$
$$M 4\pi^2 R^2 = 12$$
$$M\pi^2 R^2 = 3$$
$$MR^2 = \frac{3}{\pi^2}$$

The moment of inertia of a thin circular ring of mass M and radius R about an axis $\perp$ to its plane (passing through its center) is,

$$I_{ring} = MR^2$$
$$= \frac{3}{\pi^2}$$

Using perpendicular axis theorem, the moment of inertia about its diameter is,

$$I_{diameter} = \frac{1}{2} I_{ring}$$
$$= \frac{1}{2}\left(\frac{3}{\pi^2}\right) = \frac{3}{2\pi^2} = \underline{0.15213 \ kgm^2}$$

4. Assuming the earth to be a perfect sphere, Calculate the angular momentum about the axis of rotation Given that, mass of the earth $= 5.98 \times 10^{24}$ kg radius of the earth $= 6371$ km

ans: Moment of inertia of a solid sphere rotating about its axis is given by,

$$I = \frac{2}{5} MR^2$$

$$M = 5.98 \times 10^{24} \ kg \ , \ R = 6371 \ Km = 6371 \times 10^3 \ m$$

$$I = \frac{2}{5} \times (5.98 \times 10^{24}) \times (6731 \times 10^3)^2 = 9.676443 \times 10^{37} \ kg \ m^2$$

Figure 12: Assignment on problems submitted by a student

1.5 Student competitions aligning with recent challenges and special day celebrations

Organizing student competitions that align with recent challenges and special day celebrations, plays a crucial role in fostering environmental consciousness and social responsibility among students. These competitions, which include activities like poster-making, essay writing, debates, and innovative project challenges, are designed to engage students in meaningful ways, encouraging them to apply their knowledge and creativity to real-world issues. Through these events, students develop critical skills such as research, teamwork, and problem-solving, while also raising awareness within their communities about important global and local issues.

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Figure 13: Poster Competition Associated With Wetland Day Celebration

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Figure 14: GenYsys- Competitions

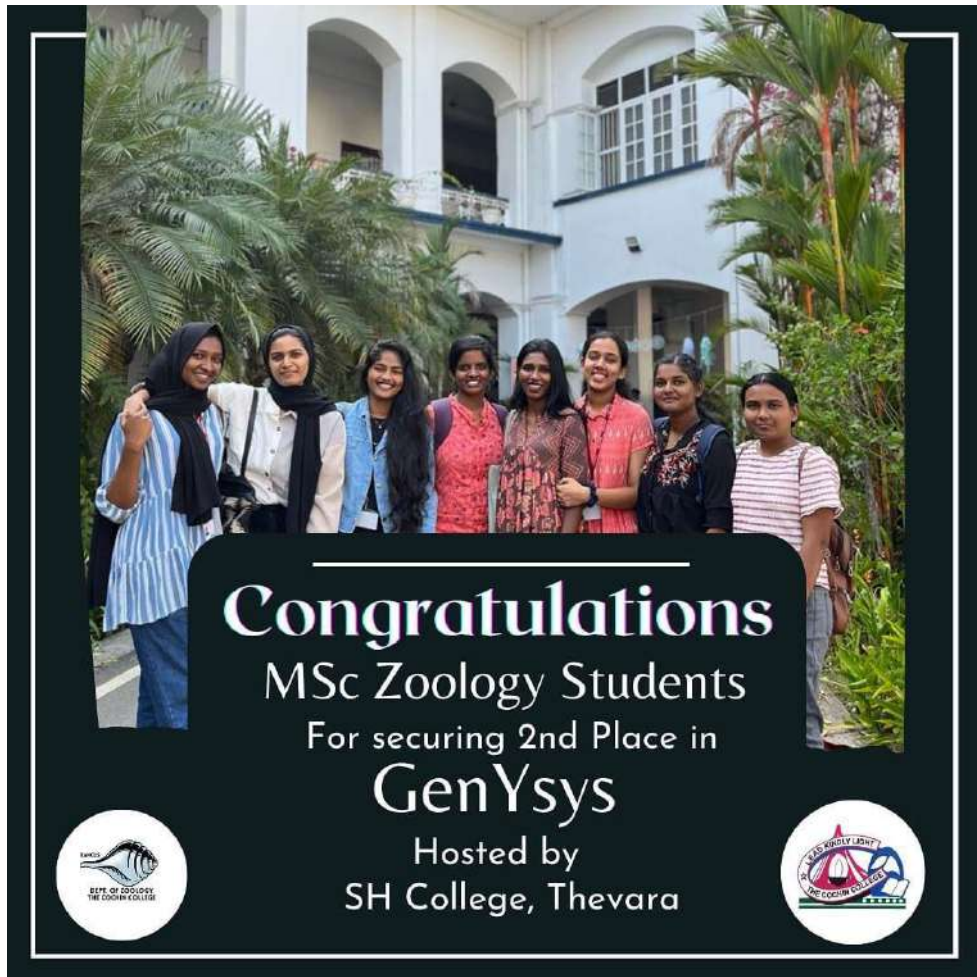Mrudula Menon V.
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Figure 15: Mobile Photography Competition Associated With Biodiversity

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1.6 E-Content with Instructions

Combines traditional face-to-face teaching with online learning activities and resources which can boost student engagement by incorporating interactive and multimedia elements into the curriculum

Figure 16: E-Content with Instructionsl

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2   Problem-Solving Strategies - Facilitative

2.1   Institution Innovation Council activities (IIC)

The Institution Innovation Council (IIC) at The Cochin College actively conducts programs aimed at fostering innovation and entrepreneurship among students. These programs include Intellectual Property Rights Awareness, Awareness Program on World Intellectual Property Day, and sessions on the Patent Filing Process in India. Additionally, the IIC emphasizes social entrepreneurship, offering solutions to societal problems through innovative approaches. These initiatives equip students with essential knowledge and skills, enabling them to navigate the complexities of intellectual property, promote innovation, and contribute meaningfully to society.

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Figure 17: Spectrum of activities under IIC

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2.2   Skill Development Workshops

The Skill Development Workshops at The Cochin College are designed to equip students with practical skills that have real-world applications. These workshops cover a diverse range of activities, including shooting practice, LED bulb assembling, vermicompost production, aquaponics, and the use of LaTeX for scientific writing. Additionally, students learn paper bag manufacturing, promoting environmental sustainability. By engaging in these hands-on activities, students not only develop specific technical skills but also enhance their problem-solving abilities, fostering innovation and practical thinking in addressing real-life challenges.

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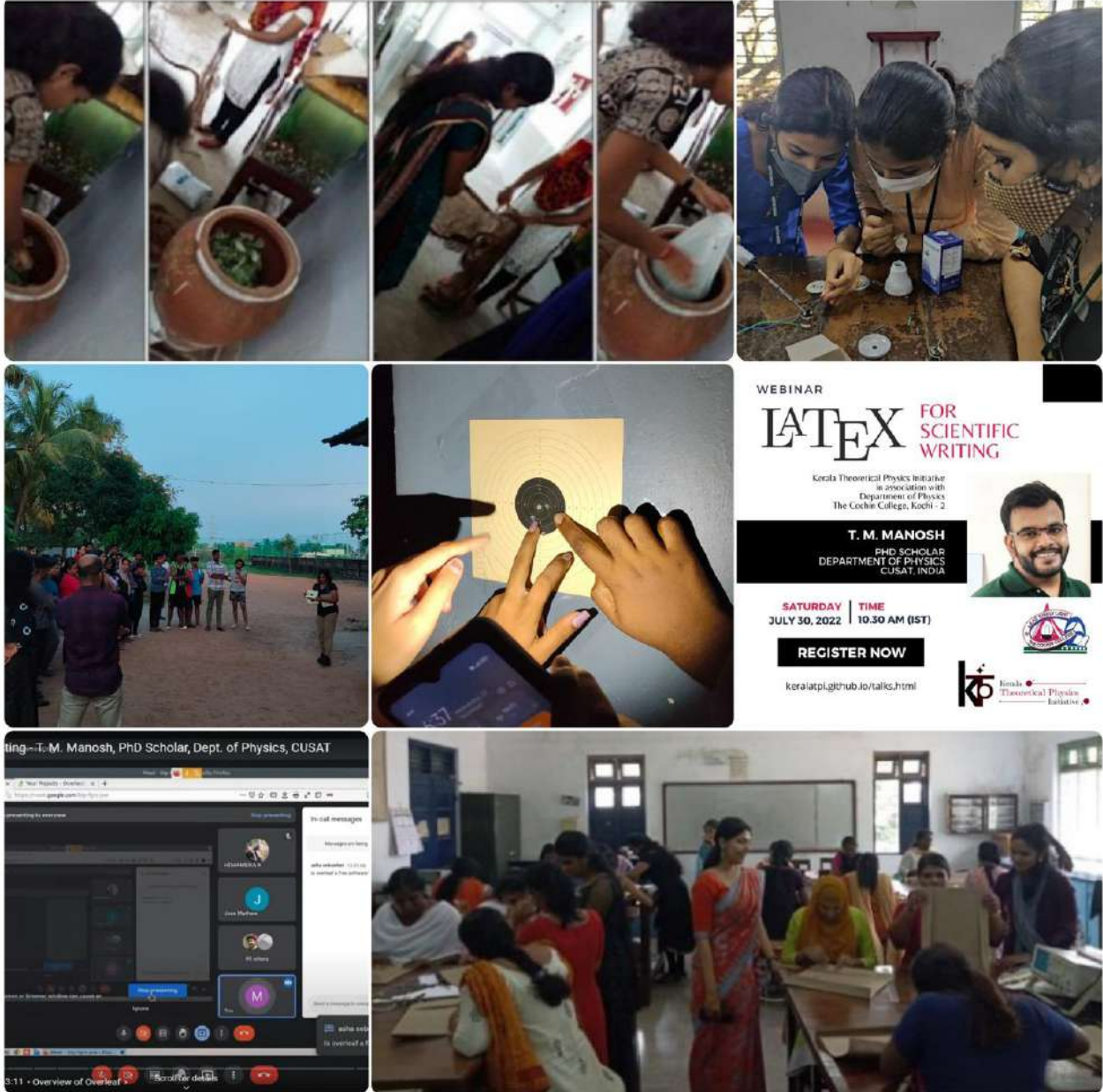
Figure 18: Various Skill Development Workshops

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2.3   Competitions and Celebrations Fostering Facilitative Learning

Competitions and celebrations at The Cochin College play a crucial role in fostering a facilitative learning environment. These events provide students with opportunities to showcase their talents, creativity, and knowledge in a supportive and encouraging setting. Through various academic and cultural competitions, students engage in healthy competition, which not only boosts their confidence but also enhances their critical thinking and problem-solving skills. Together, these activities create a dynamic and interactive learning atmosphere, where students are motivated to excel and grow both academically and personally.
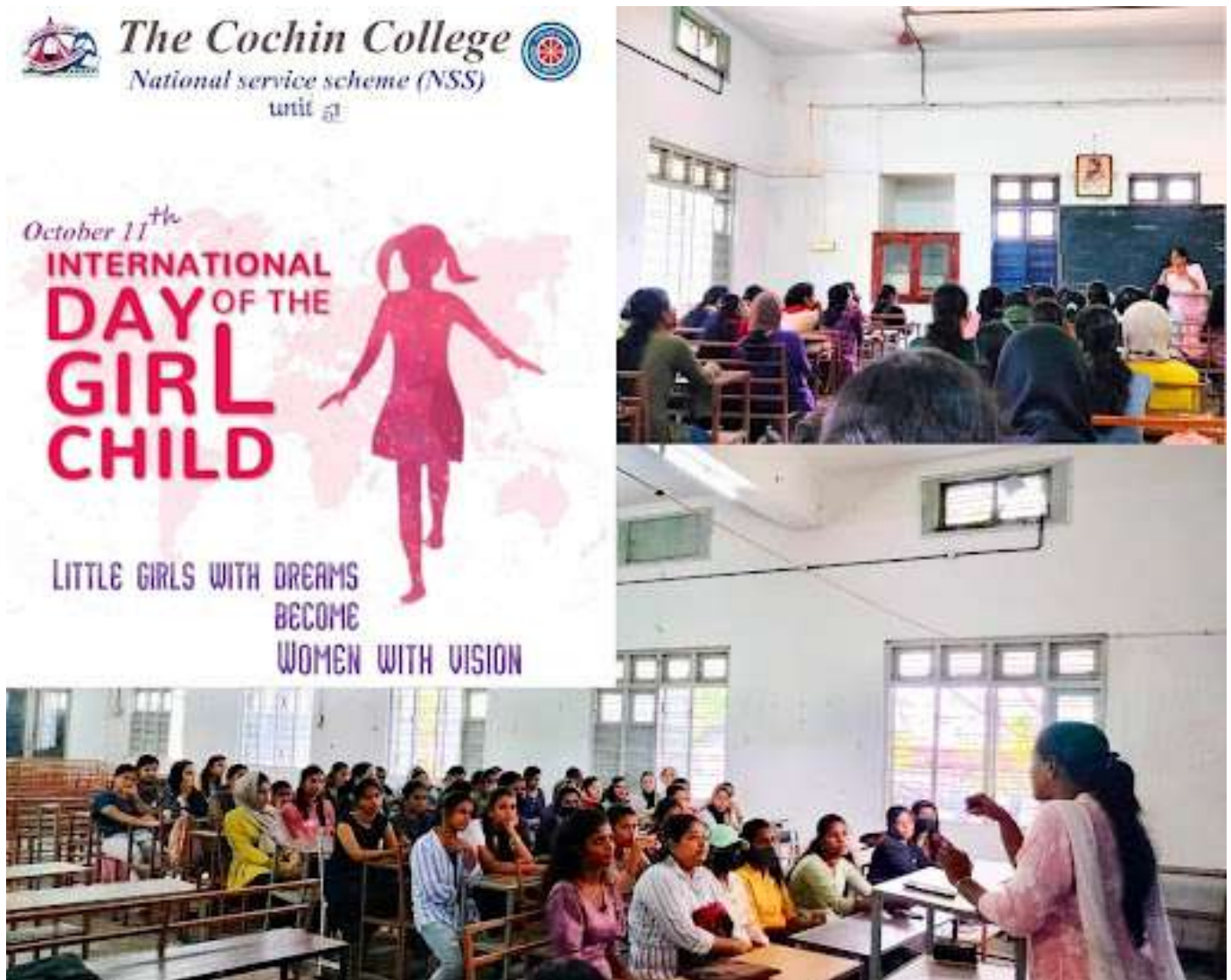

Figure 19: Brochure and photos of International Day Of The Girl Child

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Figure 20: Brochure and photos of National Youth day Celebration

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Figure 21: Brochure and photos of World's AIDS Day

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Figure 22: Brochure and photos of National Constitution Day

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2.4   Societal Impact Research Projects

In the end-semester projects at The Cochin College, students tackle various societal problems, conducting thorough investigations to understand these issues in depth. Their research often leads to practical solutions that either solve the problem, mitigate its effects, or uncover the underlying causes. This approach not only enhances their academic experience but also instills a sense of responsibility toward societal betterment, encouraging them to contribute meaningfully to the community. At The Cochin College, student research projects are designed not only to fulfill academic requirements but also to make a meaningful contribution to society. Across various departments, students engage in research that addresses critical social, environmental, and public health issues. These projects, rooted in local and global challenges, empower students to apply their academic knowledge to real-world problems, thereby fostering a sense of civic responsibility and social impact.

A hallmark of the societal impact projects is the active involvement of the local community. Students collaborate with community members, local NGOs, government agencies, and industry partners to ensure that their research addresses relevant societal needs and contributes to tangible outcomes. This engagement not only enriches the research process but also ensures that the benefits of the projects are widely shared.

The societal impact of these research projects is significant and varied:

Policy Influence: Several student projects have influenced local policy decisions, particularly in areas such as environmental conservation, public health, and education. Community Empowerment: By involving community members in the research process, these projects have empowered individuals with the knowledge and skills to address their own challenges. Sustainable Practices: The adoption of sustainable practices in areas such as waste management, agriculture, and conservation is a direct result of the research conducted by students, leading to long-term benefits for the local ecosystem and economy.

The societal impact research projects conducted by students at The Cochin College exemplify the institution's commitment to using education as a tool for positive social change. These projects not only enhance the academic experience of the students but also contribute to the betterment of society, aligning with the college's mission to develop responsible and impactful citizens.

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CERTIFICATE

This is to certify that the project work entitled "GRAVITATIONAL THREE BODY PROBLEM AND LAGRANGE POINT" bonafide piece of study done by **NANDANA SURESH** under the guidance supervision of **DR.JOSE MATHEW**, Assistant Professor, Post Graduate and Research Department of Physics, and also no part has been presented for any other degree. The study was undertaken for a period of six months.

Name of the guide   : DR. JOSE MATHEW

Signature of the guide   :

Name of the Head of Department   :

Signature of the Head of Department   :

Name and signature of external expert   :

Dr. Ganesh Chandra pashu

Dr. Vijeesh P

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PHARMACOLOGICAL, PHYTOCHEMICAL AND ANTIBACTERIAL STUDY OF SAPTASARAM KASHAYAM

DISSERTATION SUBMITTED TO
THE MAHATMA GANDHI UNIVERSITY, KOTTAYAM
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE
DEGREE OF BACHELOR OF SCIENCE IN BOTANY

BY

CHRIS LONAPPAN
REG NO: 210021039881

DEPARTMENT OF BOTANY

THE COCHIN COLLEGE

COCHIN -2

APRIL 2024

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2.5   Debates

The Literary and Debate Club at The Cochin College provides an enriching platform for students to hone their oratory, analytical, and literary skills. Through a series of debates, discussions, and literary activities, the club fosters a culture of intellectual exchange and critical thinking among students.

Figure 23: Debate at International Peace 20 Youth Summit 2023

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2.6   Scientific deliberations

Scientific deliberations and presentations by students are academic activities where students engage in discussions and share their research findings or ideas on scientific topics. These activities are crucial for developing students' critical thinking, communication skills, and understanding of scientific concepts.

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Figure 24: ECHO Project Presentation and Certificate of Appreciation

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