



# THE COCHIN COLLEGE

Koovapadam, Kochi-2

Affiliated To Mahatma Gandhi University

Re-accredited by NAAC With B+ Grade



Fourth Cycle  
NAAC Accreditation 2024

## 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



# THE COCHIN COLLEGE

KOCHI - 682 002

(Affiliated to Mahatma Gandhi University and Accredited by NAAC)

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## 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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## Contents

<b>1 Problem-Solving Strategies - Self-Directed:</b>	<b>3</b>
1.1 Quiz . . . . .	3
1.2 Career Guidance and Counselling . . . . .	7
1.3 Harnessing Software for enhanced learning experience . . . . .	9
1.4 Regular Assignments on problems . . . . .	16
1.5 Student competitions aligning with recent challenges and special day celebrations . . . . .	18
1.6 E-Content with Instructions . . . . .	22
<b>2 Problem-Solving Strategies - Facilitative</b>	<b>23</b>
2.1 Institution Innovation Council activities (IIC) . . . . .	23
2.2 Skill Development Workshops . . . . .	25
2.3 Competitions and Celebrations Fostering Facilitative Learning . . . . .	27
2.4 Societal Impact Research Projects . . . . .	31
2.5 Debates . . . . .	34
2.6 Scientific deliberations . . . . .	35





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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.

\*മാവേലി നാട് വാണിയും കാലം  
 മാനുഷശൈലിയാണുപോയെ  
 ആരാജനങ്ങൾ വസിക്കും കാലം  
 ആപത്താർക്കുമൊട്ടുമുതും\*

ഈ വരിക്കർ കോളേജങ്ങൾ ഓരോ കേരളിയും വേർതിരിച്ചു നന്നും  
 അറിവുവഹിക്കാൻ - മഹാമാരിയും പ്രകൃതി ദുരന്തങ്ങളും മൂലം  
 അത്യന്തം വീരകരമായ അവസരങ്ങളുടെ ഒരു അനുഭവം വ്യത്യസ്ത കാര്യ  
 പോകുന്ന ഈ അവസരത്തിൽ പാഠവും ധ്യാനമേൽക്കുന്നില്ല  
 മഹാബലിയെക്കുറിച്ചും ശൈലിയെക്കുറിച്ചും സത്യം നാശമു  
 കേളമേൽക്കുന്നില്ല. ഉള്ള ധാരാ അറിവും ആണു നാമകവും  
 ആശ്വാസകരവും പ്രതിജ്ഞാപിക്കേണ്ടതും ആണ്. ധ്യാനമേൽക്കുന്നില്ല  
 നമ്മുടെ സത്യം കേളമേൽക്കുന്നില്ല. ഉള്ള അറിവ്  
 പരസ്യമേൽക്കുന്നതിനായി കോളേജ് കോളേജ് കിന്റീ കൂട്ടും. ഇന്റർ-  
 സ്കൂൾ ചിട്ട് ചർച്ചയും സംഘടനാമായി നികുൾ കോളേജ്  
 വിദ്യാർത്ഥികൾക്കായി ഈ വല്ലാതെ മരിച്ചു മരിച്ചു. മരിച്ചാൽ  
 ഉള്ള അടം 2 മരിച്ച് - വിജ്ഞാന കൈരളി എന്ന പേരിൽ  
 ഓൺലൈൻ പ്രതിജ്ഞാപിക്കേണ്ടതും ഓൺലൈൻ കിന്റീ മത്സരവും  
 കേളമേൽക്കുന്നില്ല. ഏറ്റവും വിദ്യാഭ്യാസ സ്ഥാപനങ്ങളിലെയും 25  
 വയസ്സിനു താഴെയുള്ള ഏറ്റവും വിദ്യാർത്ഥികൾക്കും ഈ മത്സരത്തിൽ  
 പങ്കെടുക്കാവുന്നതാണ്.  
 നികുൾ കോളേജ് വിദ്യാർത്ഥികൾക്ക് പ്രത്യേകം മത്സരവും  
 നമ്മുടെയും 11 : 2 മത്സരങ്ങൾ കൂടാതെ പേരിൽ - സർവ്വീസേറ്റി  
 ഉത്തരവിലേക്കുതന്നെയാണ് പ്രവേശനം സാധ്യമാക്കിയിരിക്കും.  
 ഓരോ വിദ്യാർത്ഥിയും പ്രത്യേകമായി ആണ് മരിച്ചു പോയവർ, ഒരു  
 സ്ഥാപനത്തിൽ നിന്ന് ഏതെങ്കിലും പേരിൽ മത്സരമേൽക്കും  
 പങ്കെടുക്കാവുന്നതാണ്.  
 കൂടുതൽ വിവരങ്ങൾക്ക് വിളിക്കുക - 989611062, 989611063



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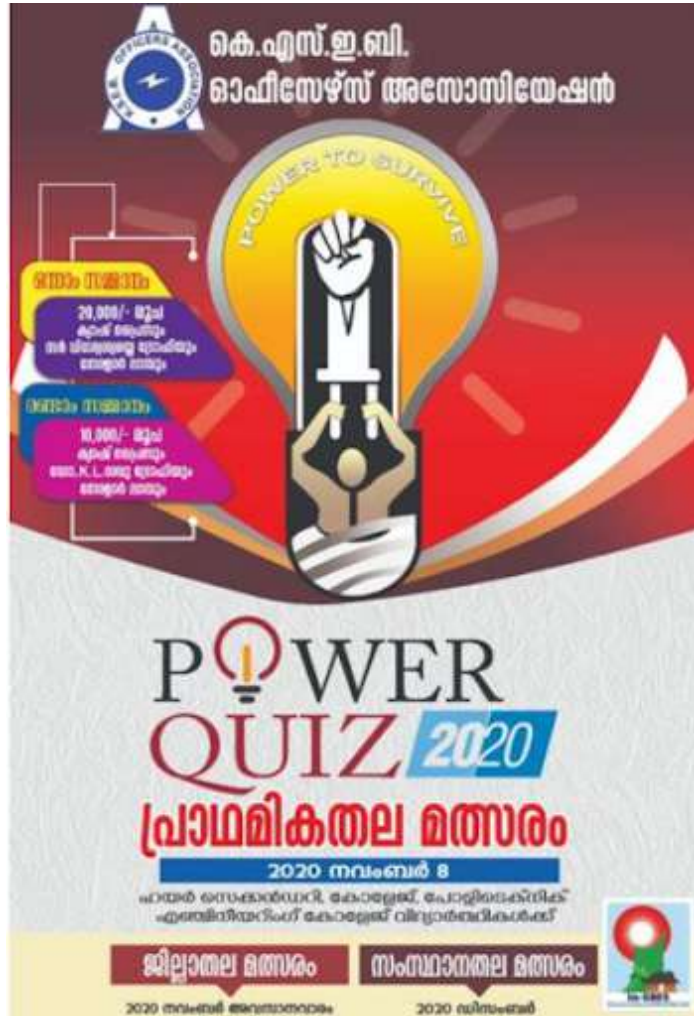


Figure 1: Posters of Quiz Competitions



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Figure 2: Felicitating the winners of quiz competition





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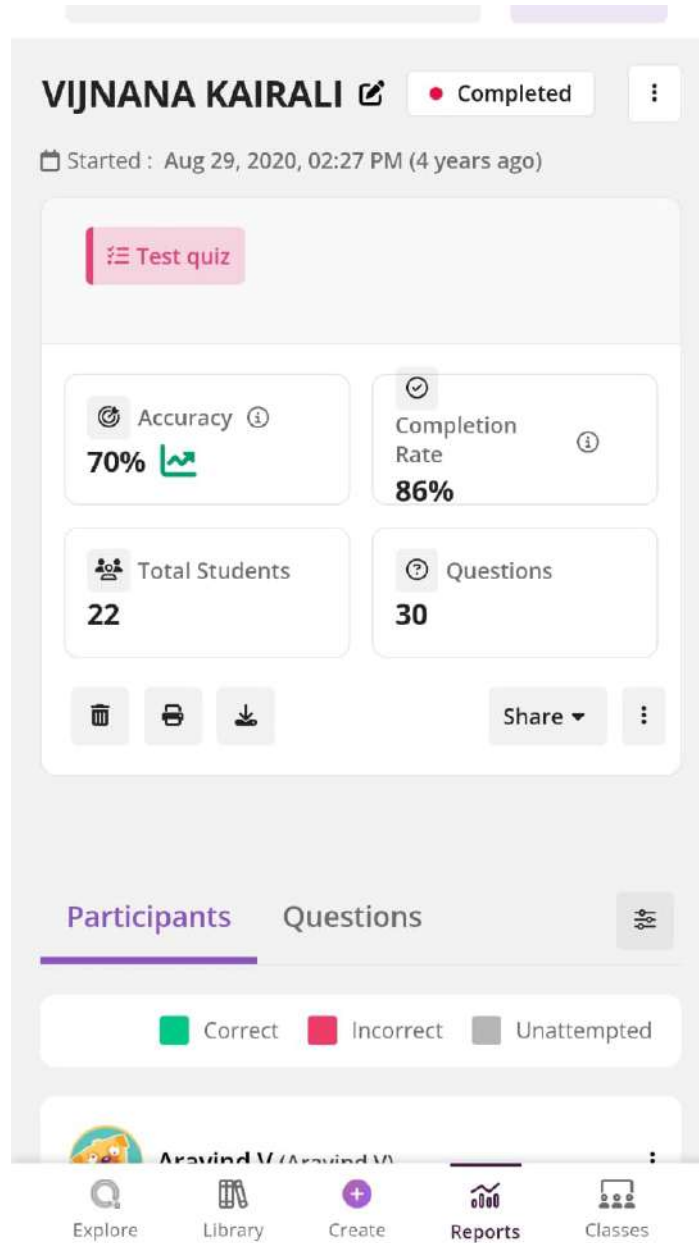


Figure 3: screenshot of Quizizz - Online Quiz





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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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## 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, Chems-ketch, Chemdraw, RasMol, Arduino IDE, KiCAD, Python, spyder etc for projects and usual curricular activities.





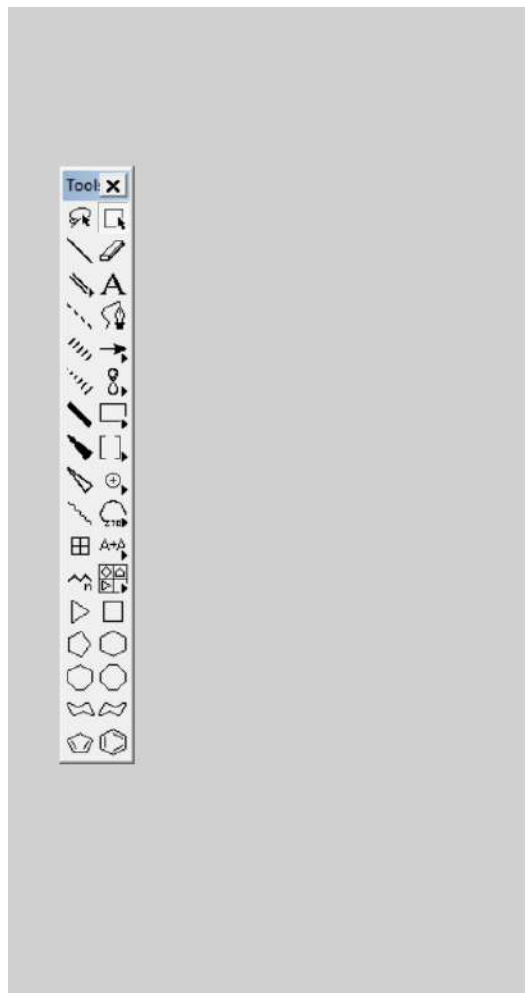
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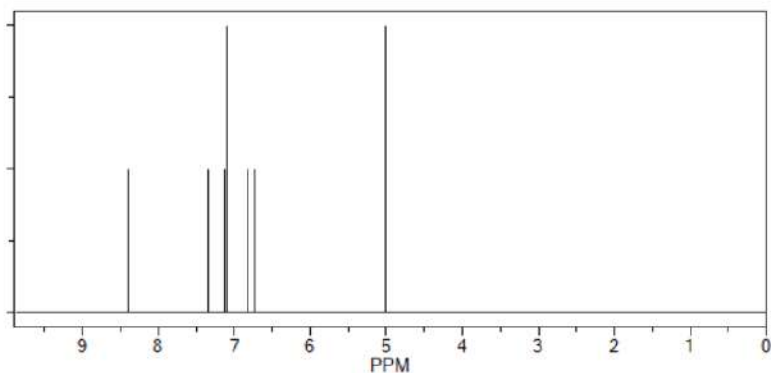
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## ChemNMR H-1 Estimation



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*1
		0.01	1 -Cl from 1-benzene

Figure 5: Screen shot of the software Chemdraw





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```

Arrays | Arduino 1.8.16
File Edit Sketch Tools Help
Arrays
Demonstrates the use of an array to hold pin numbers in order to iterate over
the pins in a sequence. Lights multiple LEDs in sequence, then in reverse.

Unlike the For loop tutorial, where the pins have to be contiguous, here the
pins can be in any random order.

The circuit:
- LEDs from pins 2 through 7 to ground.

created 2008
by David A. Mellis
modified 30 Aug 2011
by Tom Igoe

This example code is in the public domain.

https://www.arduino.cc/en/Tutorial/BuildInExamples/Arrays
*/

int timer = 100; // The higher the number, the slower the timing.
int ledPins[] = {
  2, 7, 4, 6, 5, 3
}; // an array of pin numbers to which LEDs are attached
int pinCount = 0; // the number of pins (i.e. the length of the array)

void setup() {
  // the array elements are numbered from 0 to (pinCount - 1).
  // use a for loop to initialize each pin as an output:
  for (int thisPin = 0; thisPin < pinCount; thisPin++) {
    pinMode(ledPins[thisPin], OUTPUT);
  }
}

void loop() {
  // loop from the lowest pin to the highest:
  for (int thisPin = 0; thisPin < pinCount; thisPin++) {
    // turn the pin on:
    digitalWrite(ledPins[thisPin], HIGH);
    delay(timer);
  }
}

```

Figure 6: Screen shot of the software Arduino IDE





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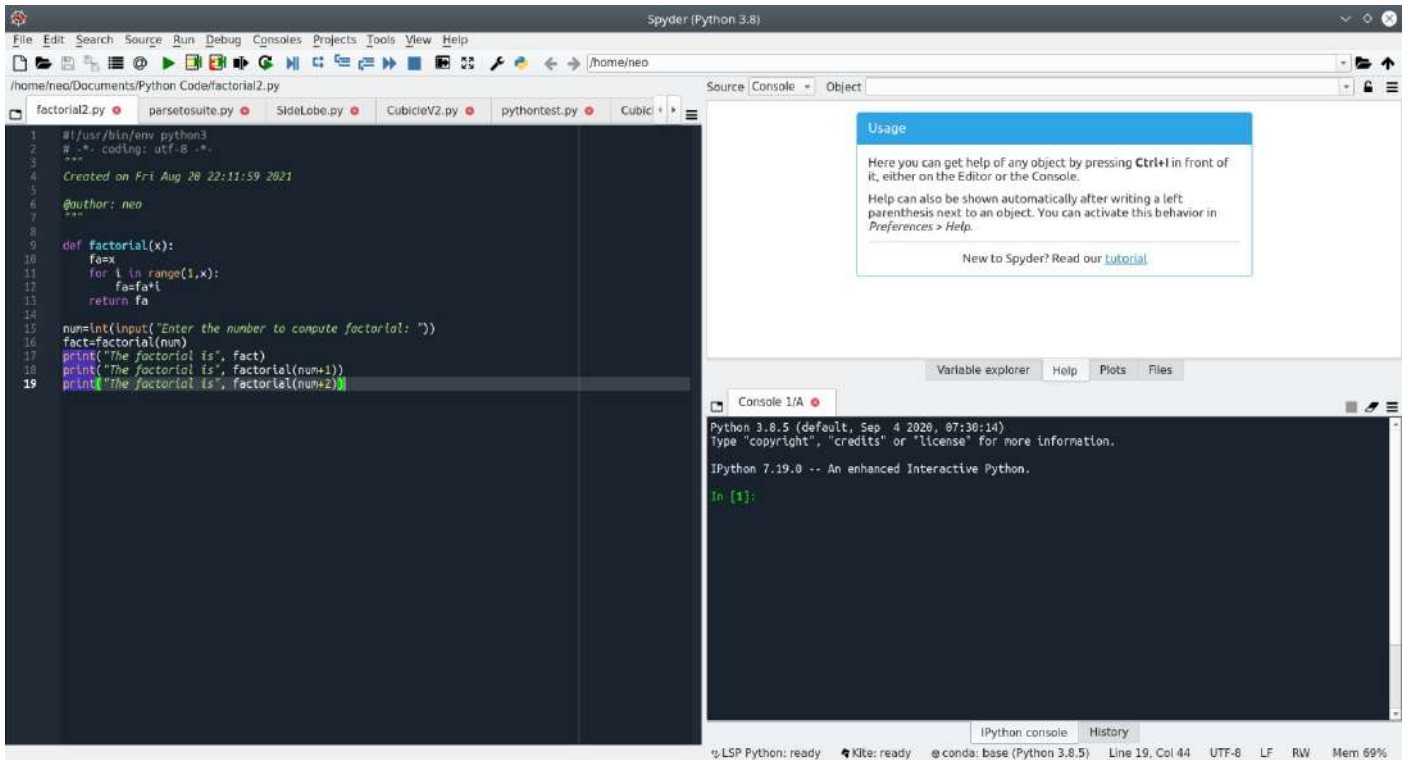


Figure 7: Screen shot of the software python Spyder IDE







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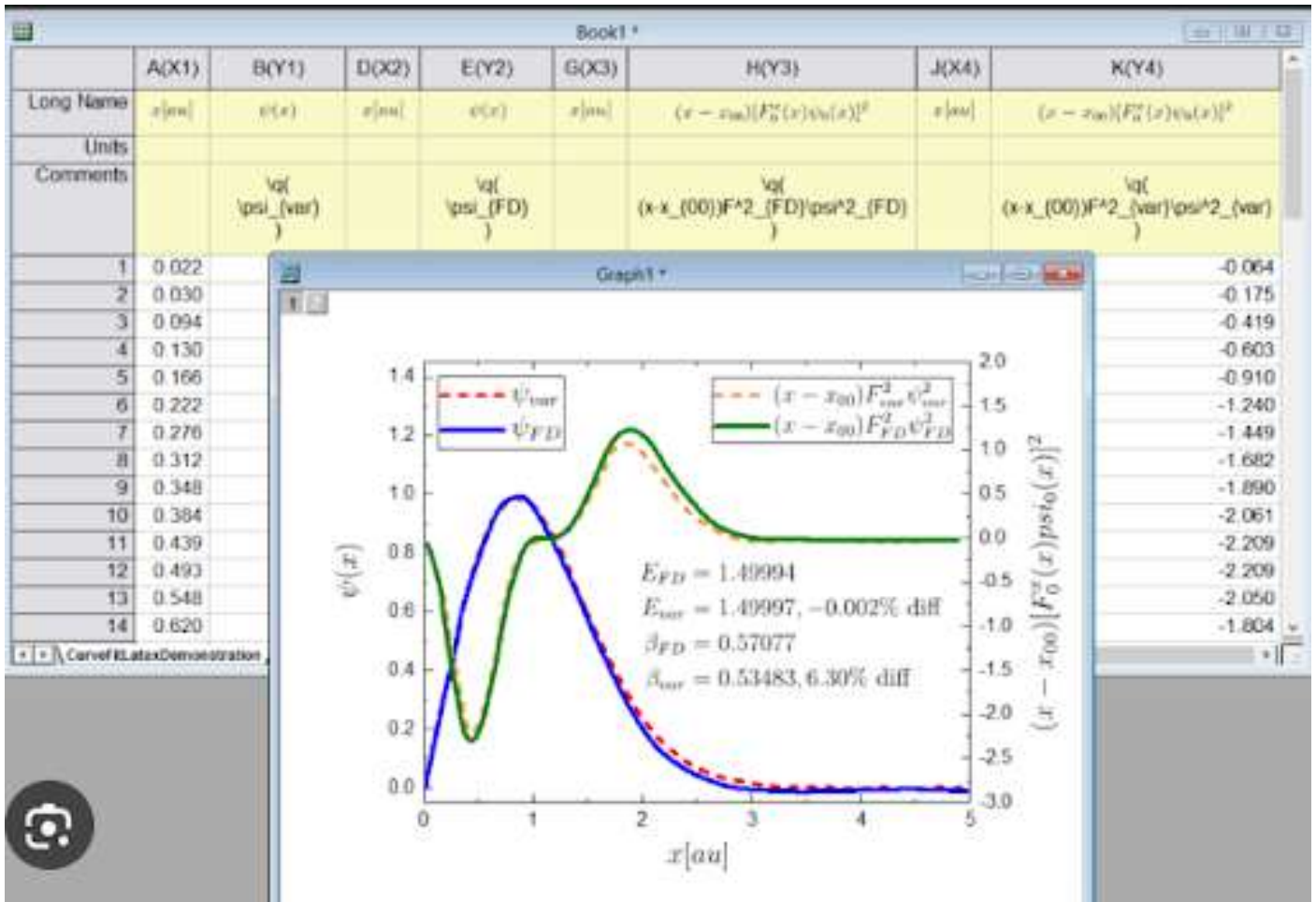


Figure 8: Screen shot of the software Origin





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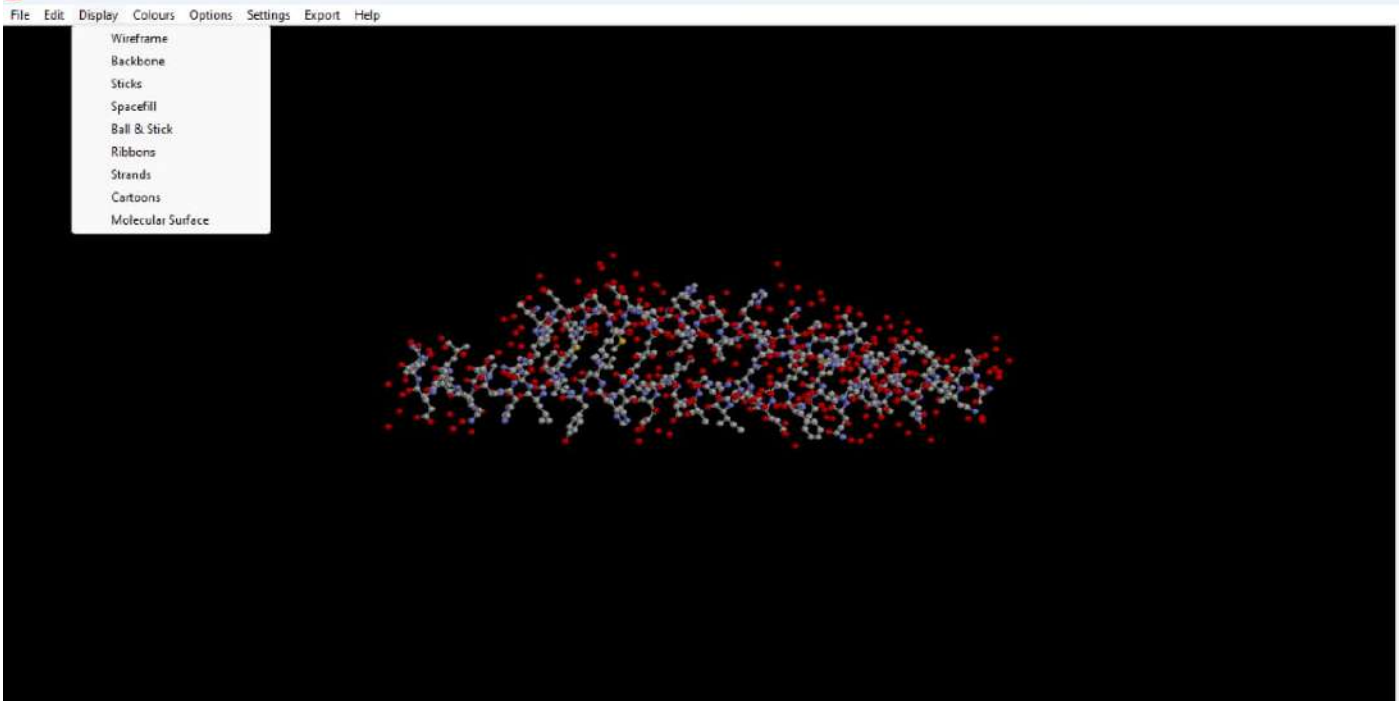


Figure 9: Screen shot of the software Rasmol





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PEx Exercise 3: Neurophysiology of Nerve Impulses > Activity 3: The Action Potential: Threshold

Overview Objectives Introduction Pre-lab Quiz Experiment Post-lab Quiz Review Sheet Lab Report

4. You will now continue to observe the effects of incremental increases of the stimulus voltage.

Increase the voltage by 10 mV by clicking the + button beside the voltage display and then click **Single Stimulus**.

Repeat this step until you stimulate the axon at 50 mV and then click **Record Data** to display your results in the grid.

Stimulus Voltage (mV)	Peak Value at R1 (µV)	Peak Value at R2 (µV)	Action Potential
10	0	0	No
20	100	100	Yes

Record Data

Undo Reset

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.

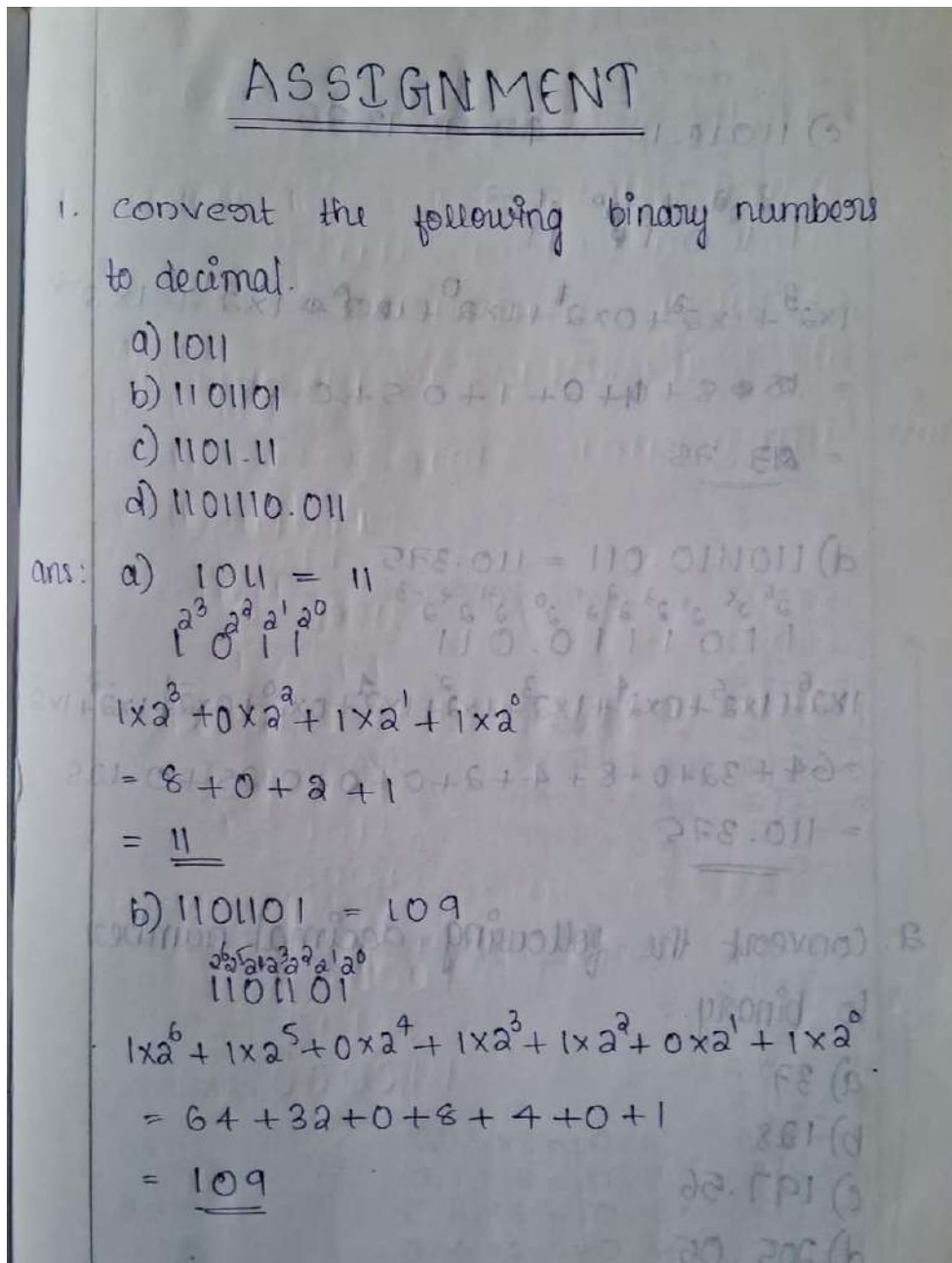


Figure 11: Assignment on problems submitted by a student







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Substituting eq (2) into (1)

$$M(2\pi R)^2 = 12$$

$$M4\pi^2 R^2 = 12$$

$$M\pi^2 R^2 = 3$$

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

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,

$$I_{\text{ring}} = MR^2$$

$$= \frac{3}{\pi^2}$$

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

$$I_{\text{diameter}} = \frac{1}{2} I_{\text{ring}}$$

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

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

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

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

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

$$I = \frac{2}{5} \times (5.98 \times 10^{24}) \times (6371 \times 10^3)^2 = 9.676443 \times 10^{37} \text{ kgm}^2$$

Figure 12: Assignment on problems submitted by a student







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## 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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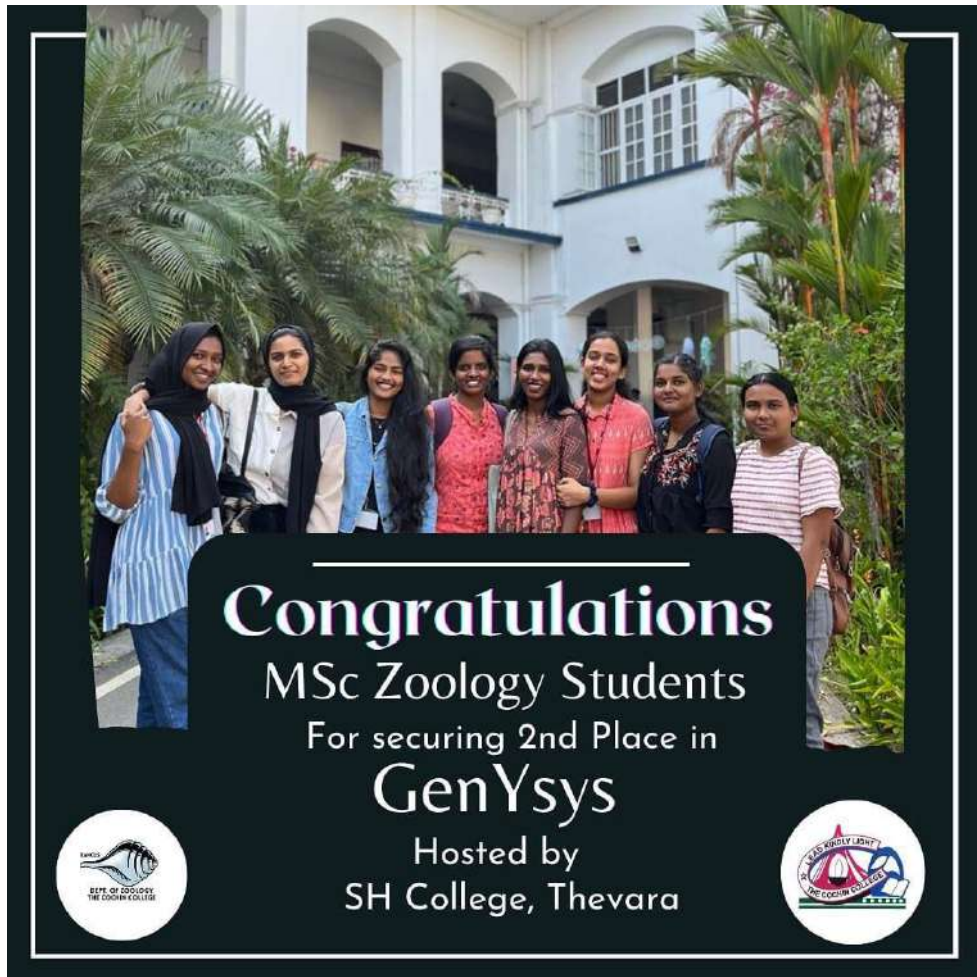


Figure 14: GenYsys- Competitions







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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

The screenshot shows a Google Classroom page for the course "Environmental Biology & Human rights, Sem 5, Batch 2022-25". The "Classwork" tab is active, displaying a "SEMINAR" assignment. The assignment details include:

- Assignment Title:** Seminar Topics (Posted 4 Jul)
- Instructions:** prepare a ppt on the topics assigned to u and upload on or before 30th July
- Material:** A PDF titled "Environmental Biology Se..." is attached.
- Action:** A "View material" link is provided.
- Due Date:** Seminar (Due 8 Aug)
- Section:** Syllabus

The left sidebar shows a list of courses, with "Environmental Biology & Hum..." selected.

Figure 16: E-Content with Instructions







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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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**Impact Lecture Series 2022-2023**  
TCC-ICC & IQAC  
The Cochin College  
Friday 1 July 2022

Session 1 (10.00 am) Social Entrepreneurship: Offering Solutions to Problems  
Sooraj Abraham, Social Entrepreneur, Plan@earth, NGO, Aluva, Cochin

Session 2 (2.00 pm) Patent filing process in India: An Overview  
Dr. Asha R, Research Officer, Inter University Centre for IPR Studies, CUSAT, Cochin

IPR Awareness sessions being conducted as part of the National Intellectual Property Awareness Mission (NIPAM) by the Patent Office, Chennai, in collaboration with KSCSTE-IPRICK and IQAC, The Cochin College

Resource Person  
**Devika R. Nair**  
NIPAM officer & Examiner of Patents and Designs  
Patent Office, Chennai

Click the link below to join the meet  
<https://meet.google.com/rms-vekk-zjg>

**WORLD INTELLECTUAL PROPERTY DAY April 26**

World Intellectual Property Day is observed on April 26th each year. It is a day dedicated to raising awareness about the importance of intellectual property rights (IPR) and celebrating the role of creativity, innovation, and intellectual property in promoting cultural and technological advancements.

**Impact Lecture Series 2022-2023**  
IIC- The Cochin College, Cochin  
Certificate

This is to certify that **AFSUNA QUNDIRI**, The Cochin college has participated in the Impact Lecture Series, Session 2, Patent filing process in India: An Overview organised by IIC/The Cochin College, Cochin on 1<sup>st</sup> July 2022

Dr. Paulbert Thomas, Program Coordinator  
Dr. M Geetha, Principal  
Dr. Vineeth Kumar T V, IIC President

**Workshop on Intellectual Property Rights (IPRs) and IP management for start up**  
COPYRIGHT PROTECTION  
Ms. Nisha M, Assistant Professor, Commerce Department, The Cochin College, Cochin  
17 August 2023, 11am Seminar Room

Figure 17: Spectrum of activities under IIC



*Mrudula Menon V.*  
**Mrudula Menon V.**  
Principal-in-Charge  
The Cochin College



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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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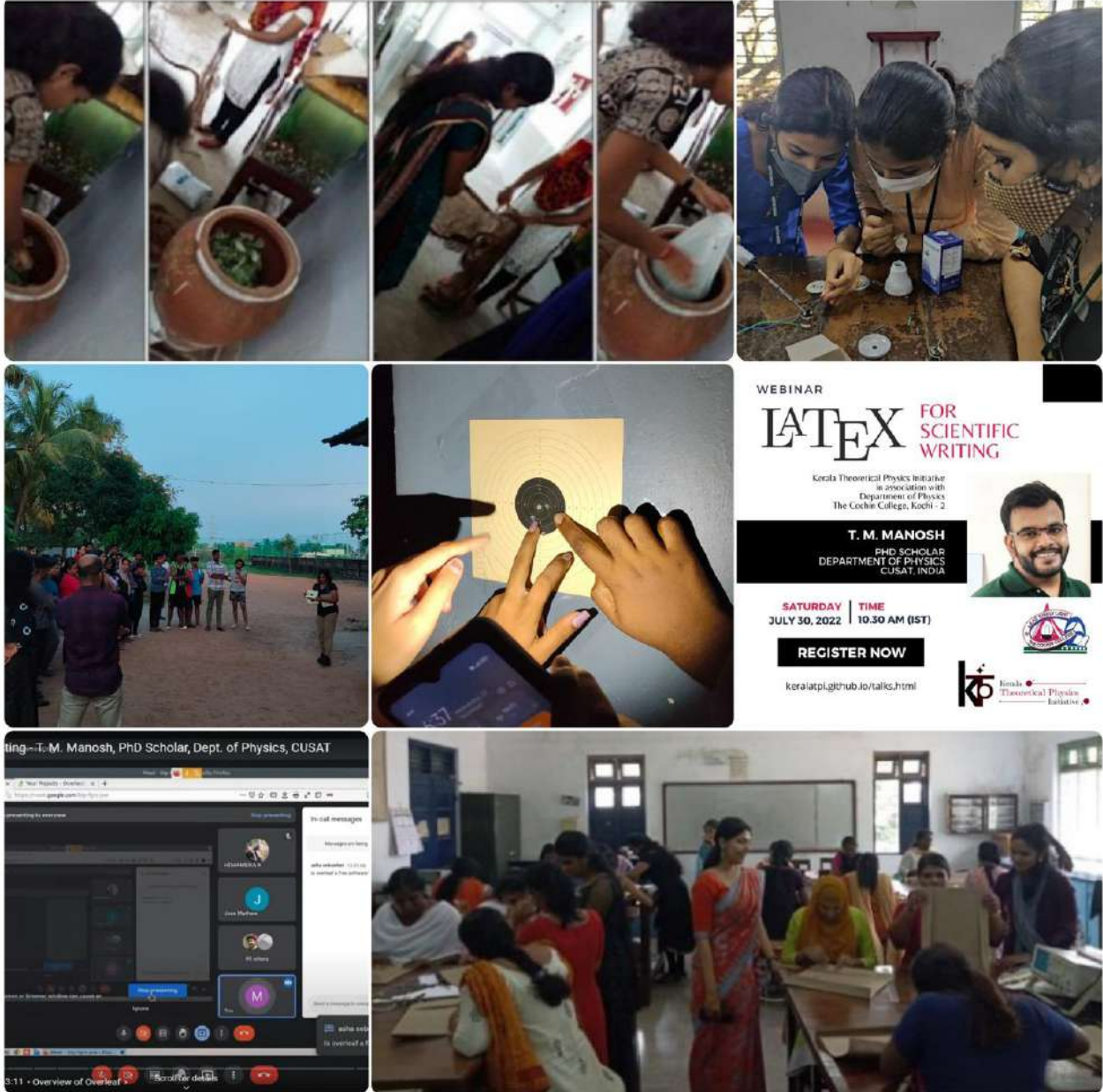


Figure 18: Various Skill Development Workshops





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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.

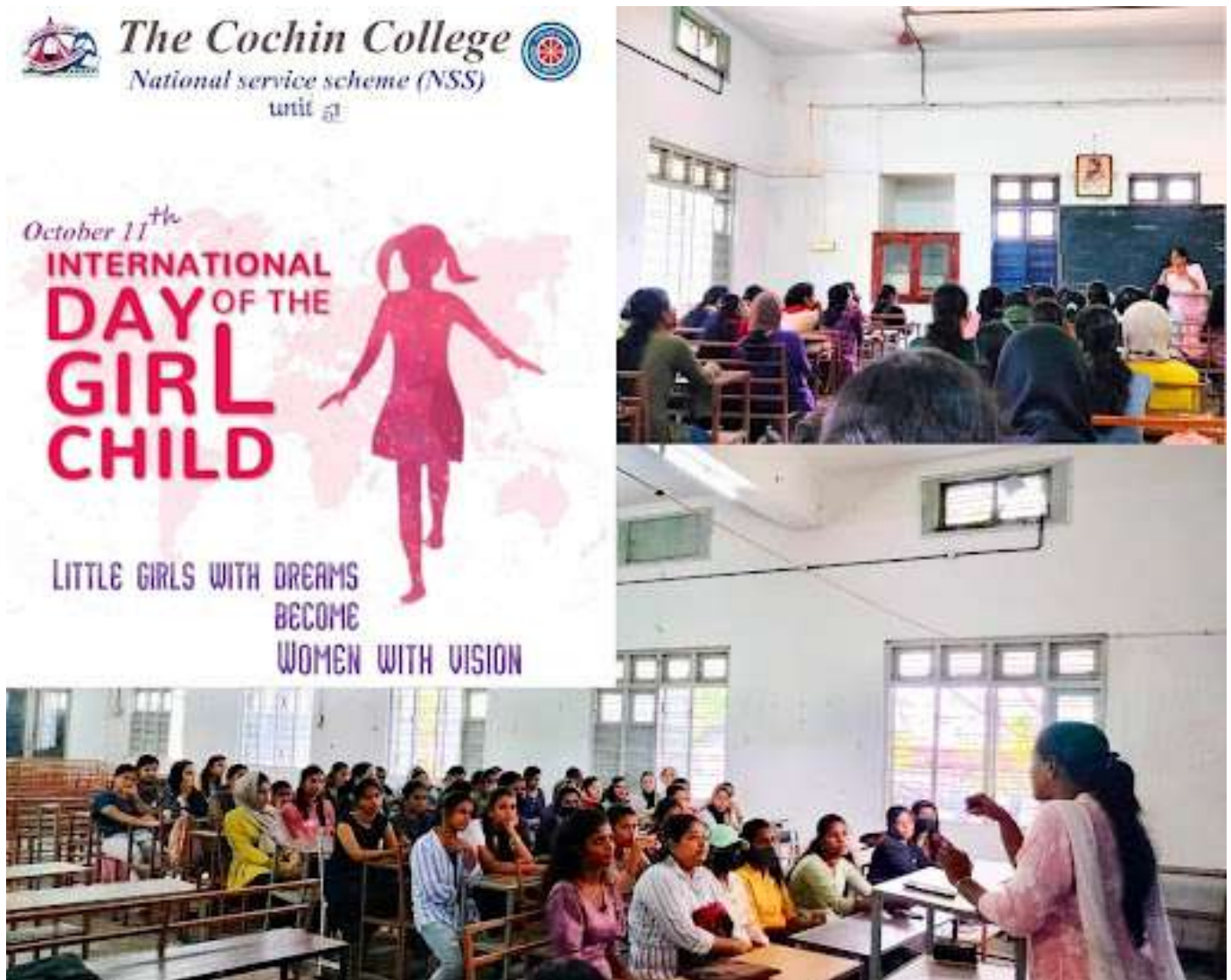


Figure 19: Brochure and photos of International Day Of The Girl Child







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**THE COCHIN COLLEGE**  
NATIONAL SERVICE SCHEME  
UNIT - 51 &  
RED RIBBON CLUB

**NATIONAL YOUTH DAY CELEBRATION 2023**

**POSTER DESIGNING COMPETITION**  
4x 622 PAPER WILL BE PROVIDED & OTHER MATERIALS REQUIRED MUST BE TAKEN WITH YOU!

EXCITING CASH PRIZES!

Theme : Youth & Progressive India

13 JAN 7.50 AM

Room No: 10

**TALK ON "POWER OF WORDS, TRANSFORM YOUR LIFE"**

BY: AMERZIN LOUIS LIFE COACH

13 Jan 2.30 PM Seminar Hall



Figure 20: Brochure and photos of National Youth day Celebration





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**THE COCHIN COLLEGE**  
NATIONAL SERVICE SCHEME UNIT-51

*In association with KSACS & Red Ribbon Club*  
**WORLD AIDS DAY 2022**

**PROGRAMME SCHEDULE**

1st DEC { Pledge (by Kerala State Aids Control Society)  
Light up the candles with THQH Fortkochi  
(Resource person :Nikhila Divega, ICTC  
Counsellor, THQH Fortkochi

3rd DEC {

**Kochi, Kerala, India**  
2/592, TM Muhammad Rd, Kunnumupuram, Fort Kochi,  
Kochi, Kerala 682001, India  
Lat 9.966181\*

NIS PROGRAMME OFFICERS: MENON SUPREMANJAN, KENNEDY SRI KUMARAN  
NIS VOLUNTEER SECRETARIES: ASHA, IJYAN, ERIN, I RAO

**Kochi, Kerala, India**  
2/592, TM Muhammad Rd, Kunnumupuram, Fort Kochi,  
Kochi, Kerala 682001, India

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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THE COCHIN COLLEGE  
COCHIN-682002



**CERTIFICATE**

This is to certify that the project work entitled "GRAVITATIONAL THREE BODY PROBLEM AND LAGRANGE POINT" is a side 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. Vijayash?







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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

*Handwritten signature*





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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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**WHAT IS ECHO?**  
An annual innovation platform that empowers interdisciplinary teams of students to explore, ideate and pilot innovative solutions to develop entrepreneurial ventures to support environmental conservation efforts.

**YOUTH FOR EARTH**

Unveil your potential to become an environmental entrepreneur  
OR  
Enter a green workforce with ECHO

Know more about ECHO  
<https://academy.wwfindia.org/echo/>

Contact us  
youth@wwfindia.net  
02 2226449 / 0484 2224954

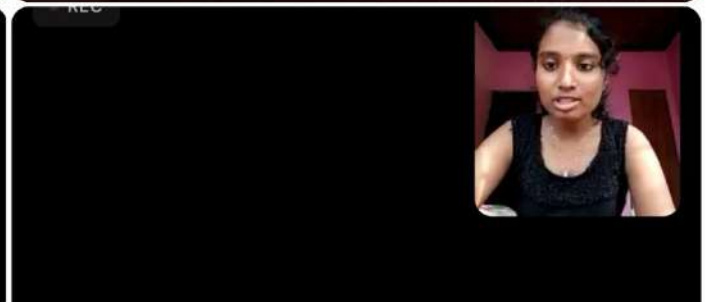
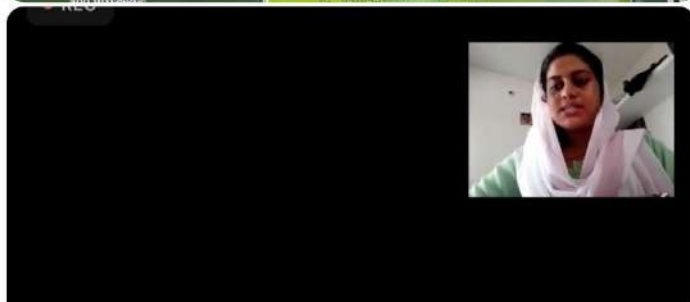
**CERTIFICATE OF APPRECIATION**

This certificate is awarded to

Nihala P.A.

for pilot testing an environmental conservation idea as part of WWF-India's ECHO - Building Environment Conservation Heroes Programme 2023-24.

*Neha Raghav*  
Neha Raghav  
Director, Environment Education,  
WWF-India



**PROJECT IMPACT**

**Analysis of Survey Results**

- Of the 137 families, >71% use detergents/cleaning agents more than 5 times a day
- Being an Urban society with space limitations all the houses (100%) discard the grey water into the common sewage.
- About 55% individuals experience skin dryness, redness, burning sensation while using detergents
- About 92% has agreed to test the bio-detergent.

**STRATEGIES WE FOLLOWED**

**Key Strategies**  
Capacity Building – skill development  
Community Engagement and Education

**Mode of Implementation**

- 1. Initial Survey and Data Collection**
  - Conducted door-to-door surveys and online questionnaires among 137 families in the neighbouring community.
  - Collected data on current cleaning practices, health issues related to detergent use, and willingness to try bio-cleaners.
- 2. Training and Preparation**
  - Organized training workshops, covering the theory and practice of bio-detergent preparation.

Figure 24: ECHO Project Presentation and Certificate of Appreciation



*Mendula Menon*  
Mrudula Menon V.  
Principal-in-Charge  
The Cochin College