INDEX

2.6.1 Teachers and students are aware of the stated Program and course outcomes of the Programmes offered by the institution. (15)

Circulars and Minutes of Meetings for COs and PSOs Preparation
Advisory Meeting Minutes
Department of Computer Science and Engineering

Jyothi Engineering College
Reaccredited with NAAC (Grade A) and NBA Programmes*
Approved by AICTE and Affiliated to APJ Abdul Kalam Technological University

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
MINUTES OF MEETING – ADVISORY COMMITTEE

Date: 12/7/2023 Time: 10.00 AM
Mode of Meeting: Online
Agenda:

1) Improving academic results
2) Enhancing placement opportunities
3) Increasing GATE exam qualifications
4) Boosting research and publications
5) Securing funded projects
6) Offering skill development programs
7) Strengthening alumni and industry interactions
8) Providing more add-on courses and internships

Discussions:

The advisory committee meeting for the B.Tech Computer Science Department was conducted on 12/7/2023 in online mode. The following points were discussed in the meeting:

1) HOD welcomed the members and started the meeting with a presentation on the following topics:
   1) Results of the current batches
   2) Placement, Entrepreneurship, and Higher Study Details
   3) Competitive Exam Training details conducted in the 2022-2023 academic year
   4) CO, PO, and PSO attainment details of the 2023 outgoing batch
   5) Identified gaps for the coming academic year
2) The committee suggested introducing an academic mentorship program where faculty members mentor small groups of students to provide personalized academic guidance and support.
3) The committee proposed the incorporation of project-based learning throughout the curriculum to enhance practical skills and teamwork among students.
4) Discussions were held on developing MoU with tech startups to provide students with real-world problem-solving experiences through internships and projects.

5) The committee suggested organizing regular industry interaction sessions, including webinars, guest lectures, and panel discussions, to keep students updated on current industry trends.
6) The committee suggested organizing hackathons and coding competitions to foster a competitive and innovative mindset among students.
7) The committee provided additional insights to create an action plan for the upcoming semester, focusing on enhancing student engagement and learning outcomes.
8) The committee suggested creating a dedicated placement cell to focus on enhancing students' employability through soft skills training and interview preparation workshops.
9) The committee presented strategies for implementing interdisciplinary projects involving students from different engineering departments to promote collaborative learning.
10) The committee highlighted the importance of conducting alumni meetups and leveraging alumni networks for mentorship, internships, and placement opportunities.
11) A general discussion was conducted on the importance of mental health and well-being programs for students, including stress management workshops and counseling services.
12) HOD summarized that the focus points for the next academic year are improving academic results, enhancing placement opportunities, increasing GATE exam qualifications, boosting research and publications, securing funded projects, offering skill development programs, strengthening alumni and industry interactions, and providing more add-on courses and internships.

The meeting came to an end at 11.30 a.m.

HEAD DEPT OF CS CHERUTHURUTHY JYOTHI ENG.G COLLEGE

Dr. JOSE P THERATTIL
Principal
Jyothi Engineering College
Cheruthuruthy - 679531

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A CENTRE OF EXCELLENCE IN SCIENCE AND TECHNOLOGY BY THE CATHOLIC ARCHDIOCESE OF TRICHUR
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*NBA accredited BTech Programmes in Civil Engineering, Computer Science and Engineering, Electronics and Communication Engineering, Electrical and Electronics Engineering and Mechanical Engineering valid till 2025, Mechatronics Engineering valid till 2026

Department of Computer Science and Engineering

Date: 28-7-2023

Advisory Committee Meeting

Names of the member	Signature
Dr. Sabu M K, Professor, Department of Computer Applications, Cochin University of Science and Technology.	
Dr. Santhosh Kumar G, Professor, Department of Computer Science and Engineering, Cochin University of Science and Technology.	
Er. George Paul, Former Executive Director -Bharat Petroleum Corporation Ltd. and Director of Cedar Retail Private Ltd.	
Dr. Saju P John, HOD CSE, JECC.	
Dr. Vijayakumar R, Professor, CSE Dept, JECC.	
Dr. Swapna B Sasi, Associate Professor, CSE Dept, JECC.	
Dr. Jarin T, Associate Professor, EEE Dept, JECC.	
Dr. Anoop V, Professor, AD Department, JECC.	

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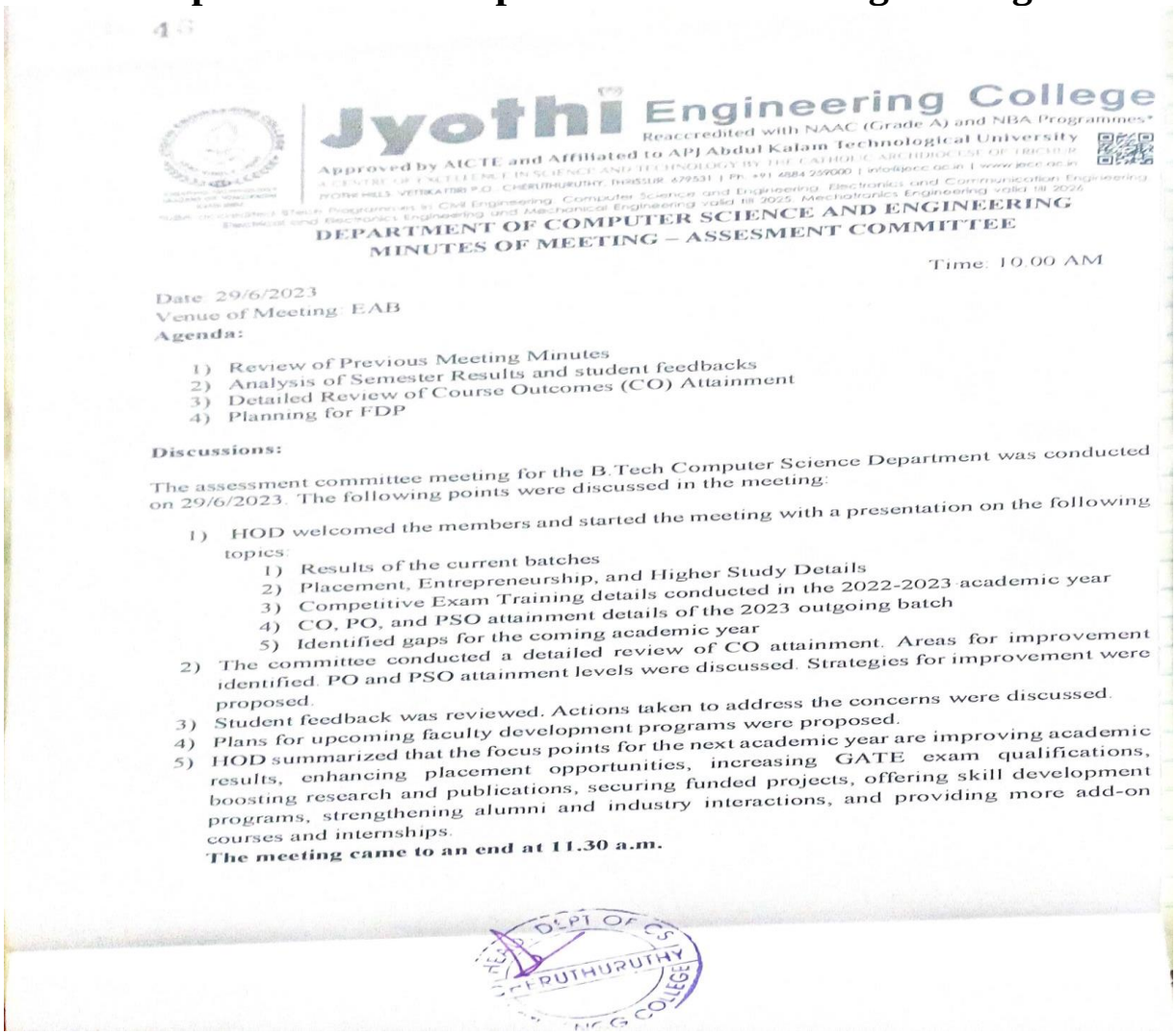
Principal
Jyothi Engineering College
Cheruthuruthy - 679531

Assessment Committee Meeting Minutes
Department of Computer Science and Engineering



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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
MINUTES OF MEETING – ASSESMENT COMMITTEE

Time: 10.00 AM

Date: 29/6/2023
Venue of Meeting: EAB
Agenda:

1) Review of Previous Meeting Minutes
2) Analysis of Semester Results and student feedbacks
3) Detailed Review of Course Outcomes (CO) Attainment
4) Planning for FDP

Discussions:

The assessment committee meeting for the B.Tech Computer Science Department was conducted on 29/6/2023. The following points were discussed in the meeting:

1) HOD welcomed the members and started the meeting with a presentation on the following topics:
   1) Results of the current batches
   2) Placement, Entrepreneurship, and Higher Study Details
   3) Competitive Exam Training details conducted in the 2022-2023 academic year
   4) CO, PO, and PSO attainment details of the 2023 outgoing batch
   5) Identified gaps for the coming academic year
2) The committee conducted a detailed review of CO attainment. Areas for improvement identified. PO and PSO attainment levels were discussed. Strategies for improvement were proposed.
3) Student feedback was reviewed. Actions taken to address the concerns were discussed.
4) Plans for upcoming faculty development programs were proposed.
5) HOD summarized that the focus points for the next academic year are improving academic results, enhancing placement opportunities, increasing GATE exam qualifications, boosting research and publications, securing funded projects, offering skill development programs, strengthening alumni and industry interactions, and providing more add-on courses and internships.

The meeting came to an end at 11.30 a.m.

DEPT OF CS CHERUTHURUTHY

Dr. JOSE P THERATTIL
Principal
Jyothi Engineering College
Cheruthuruthy - 679531

Action Taken Report
Assessment Committee Meeting for B.Tech Computer Science Department on 29/6/2023

1) Identified areas for improvement in CO attainment. Proposed strategies for enhancing PO and PSO levels through bridge identified gaps. The following actions planned:
    1. Faculty members are informed to design and supervise projects that enhance practical skills and teamwork of students.
    2. Memorandums of Understanding (MoUs) have been signed with startups to offer students internships and project opportunities. These partnerships aim to provide real-world problem-solving experiences.
    3. A schedule of regular industry interaction sessions has been created, including webinars, guest lectures, and panel discussions.
    4. Hackathons and coding competitions have been organized and scheduled throughout the academic year.
2) An action plan for the upcoming semester has been developed, focusing on enhancing student engagement and learning outcomes. The plan includes interactive teaching methods, regular feedback sessions, and extracurricular activities.

HEAD, DEPT OF CS CHERUTHURUTHY JYOTHI ENG.G COLLEGE

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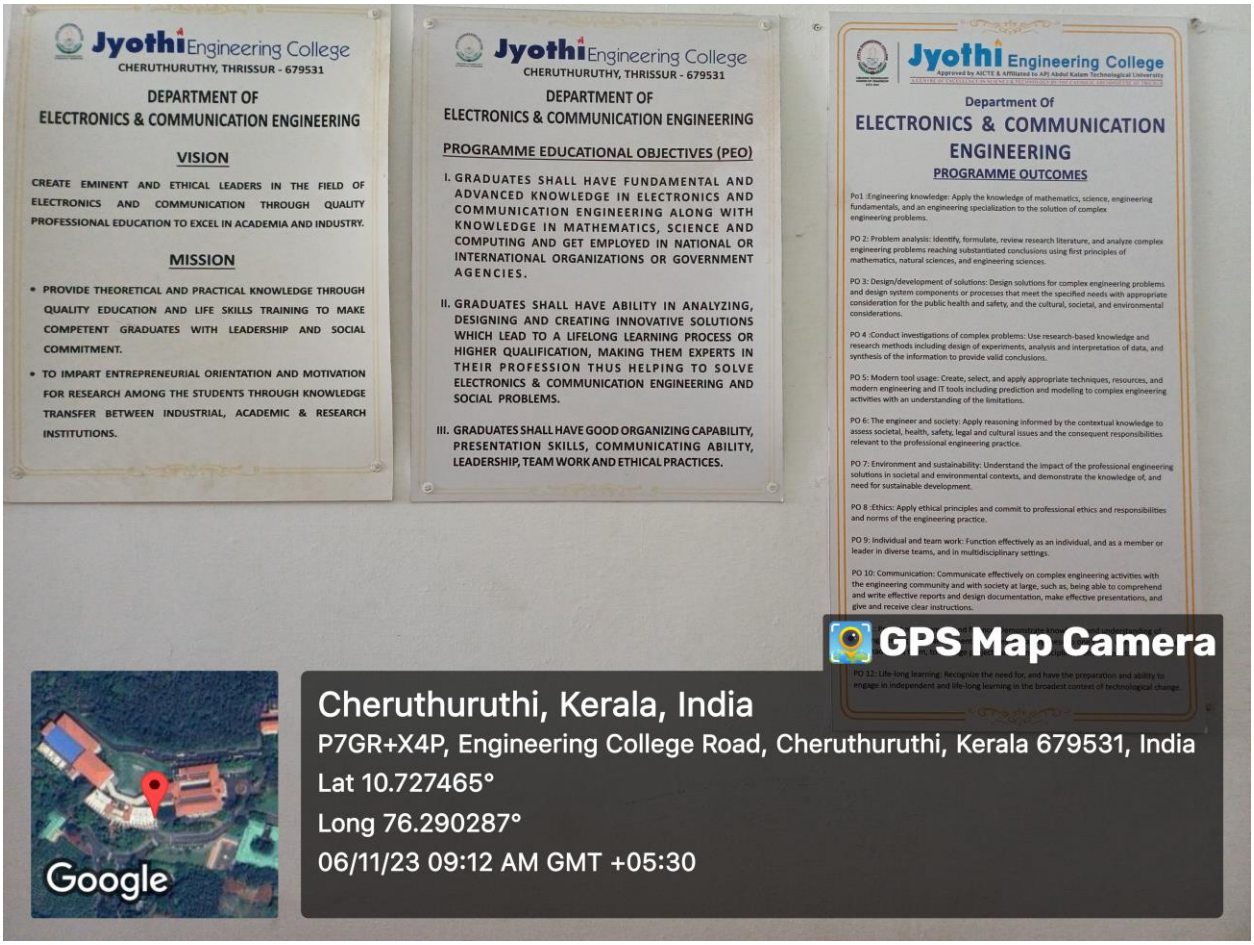
Jyothi Engineering College CHERUTHURUTHY, THRISSUR

Geo Tag Photos for display of POs and PSOs

Electronics and Communication Engineering Department



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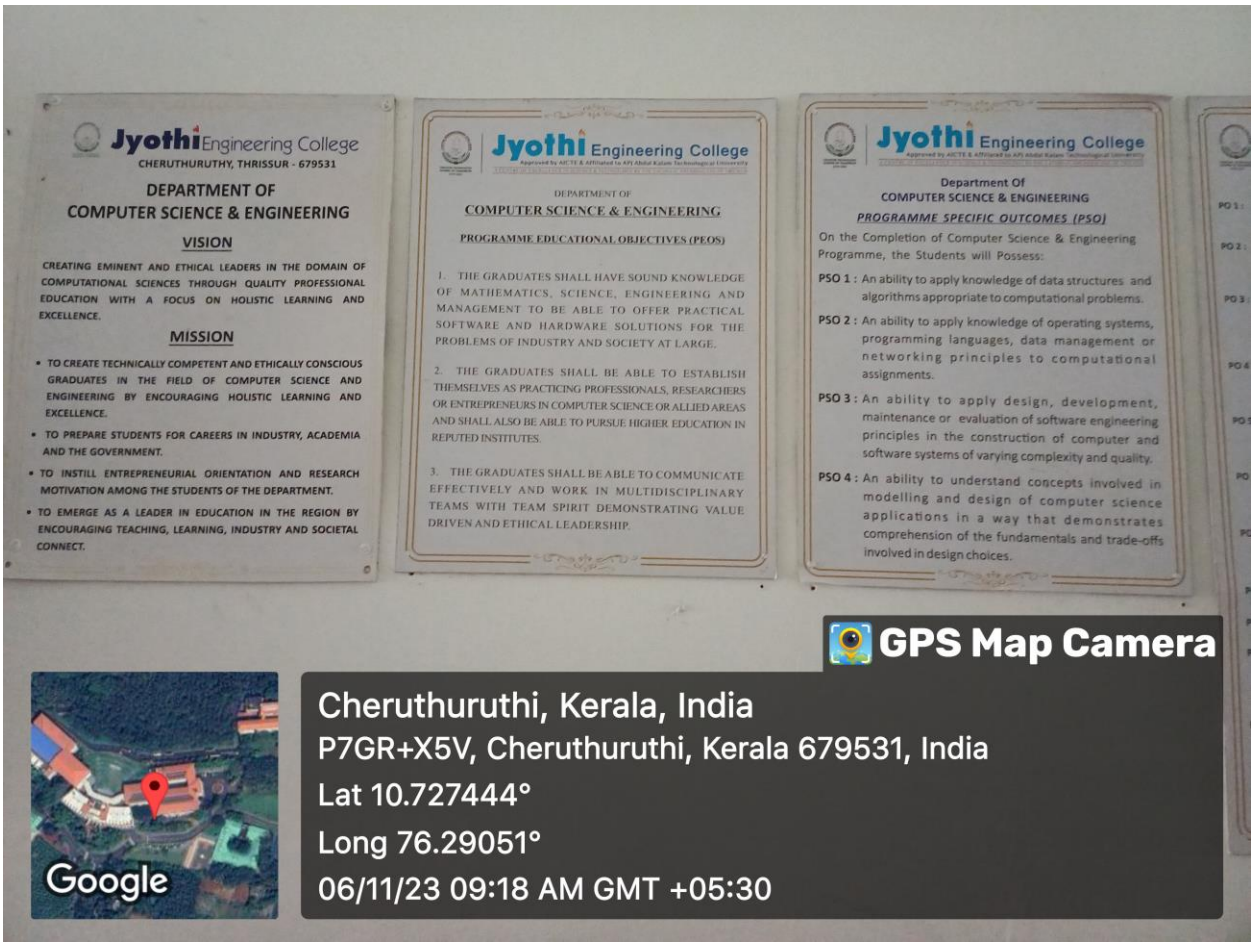
Computer Science and Engineering Department



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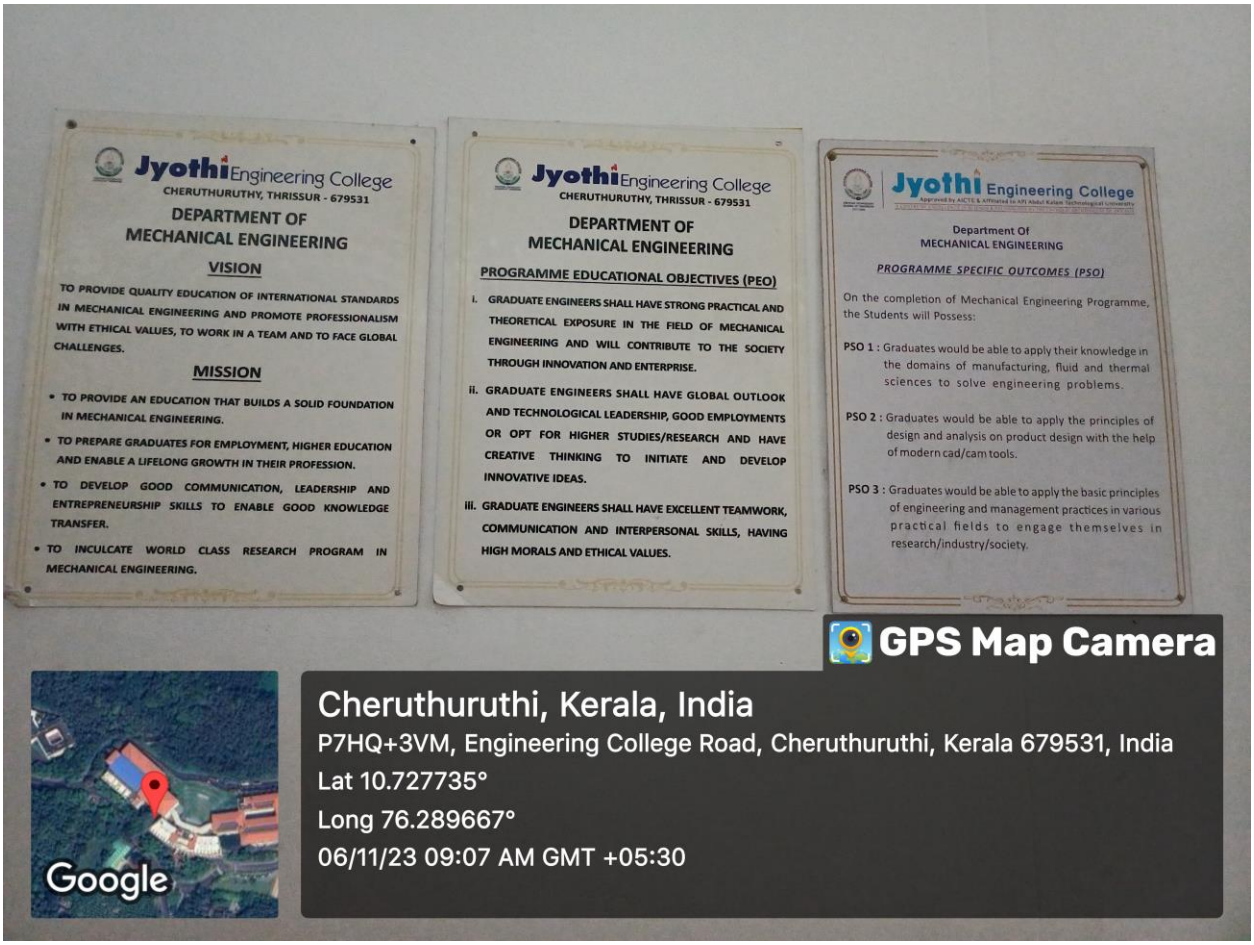
Mechanical Engineering Department



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COs, POs, PSOs In Course Information Sheet

JYOTHI ENGINEERING COLLEGE

JYOTHI HILLS, PANJAL ROAD, VETTIKATTIRI PO, CHERUTHURUTHY THRISSUR, KERALA 679531
PH: 04884259000

COURSE DIARY

Subject	EST102 - PROGRAMMING IN C
Subject Type	Theory
Batch	CS 2K23A
Semester	IInd Semester
Academic Year	2023-2024
Total Hours	58
Name of Teacher	Mrs. SOBHA XAVIER P
Designation	Assistant Professor
Department	Computer Science & Engineering

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VISION OF THE COLLEGE

"Creating eminent and ethical leaders through quality professional education with emphasis on holistic excellence."

MISSION OF THE COLLEGE

- To emerge as an institution par excellence of global standards by imparting quality engineering and other professional programmes with state-of- the-art facilities.
- To equip the students with appropriate skills for a meaningful career in the global scenario.
- To inculcate ethical values among students and ignite their passion for holistic excellence through social initiatives.
- To participate in the development of society through technology incubation, entrepreneurship and industry interaction.

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PROGRAM OUTCOME

PO Number	PO Statement
PO1	**Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	**Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	**Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	**Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	**Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	**The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	**Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	**Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	**Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	**Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

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CS 2K23A

EST102 - PROGRAMMING IN C

COURSE OUTCOME

CO	Description	Bloom's taxonomy level
CO1	Analyze a computational problem and develop an algorithm/flowchart to find its solution	Applying(P),Analyzing(A)
CO2	Develop readable* C programs with branching and looping statements, which uses Arithmetic, Logical, Relational or Bitwise operators.	Applying(P)
CO3	Write readable C programs with arrays, structure or union for storing the data to be processed	Applying(P)
CO4	Divide a given computational problem into a number of modules and develop a readable multi-function C program by using recursion if required, to find the solution to the computational problem	Analyzing(A)
CO5	Write readable C programs which use pointers for array processing and parameter passing	Applying(P)
CO6	Develop readable C programs with files for reading input and storing output	Understanding(U),Analyzing(A)

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PROGRAM EDUCATIONAL OBJECTIVES

PEO Number	PEO Statement
PEO1	The graduates shall have sound knowledge of Mathematics, Science, Engineering, and Management to be able to offer practical software and hardware solutions for the problems of industry and society at large.
PEO2	The graduates shall be able to establish themselves as practicing professionals, researchers, or Entrepreneurs in computer science or allied areas and shall also be able to pursue higher education in reputed institutes.
PEO3	The graduates shall be able to communicate effectively and work in multidisciplinary teams with team spirit demonstrating value-driven and ethical leadership.

PROGRAM SPECIFIC OUTCOMES

PSO Number	PSO Statement
PSO1	An ability to apply knowledge of data structures and algorithms appropriate to computational problems.
PSO1	Possess ability to formulate solutions by applying the suitable fundamental principles and concepts of various domains of Computer Science to Computational problems in different disciplines.
PSO2	An ability to apply knowledge of operating systems, programming languages, data management, or networking principles to computational assignments.
PSO2	Gain ability to explore and understand frontier level developments in Computer Science and engage in life long learning.
PSO3	An ability to apply design, development, maintenance, or evaluation of software engineering principles in the construction of computer and software systems of varying complexity and quality.
PSO3	Gain ability to apply software engineering principles to develop robust software that meet industry standards.
PSO4	An ability to understand concepts involved in modeling and design of computer science applications in a way that demonstrates comprehension of the fundamentals and trade-offs involved in design choices.
PSO4	An ability to understand concepts involved in modeling and design of computer science applications in a way that demonstrates comprehension of the fundamentals and trade-offs involved in design choices.

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VISION OF COMPUTER SCIENCE & ENGINEERING DEPARTMENT

"Creating ethical leaders in the domain of Computational Sciences through quality professional education with a focus on holistic learning and excellence"

MISSION OF COMPUTER SCIENCE & ENGINEERING DEPARTMENT

"To create technically competent and ethically conscious graduates in the field of Computer Science and Engineering by encouraging holistic learning and excellence. To prepare students for careers in Industry, Academia and the Government. To instill Entrepreneurial Orientation and research motivation among the students of the department. To emerge as a leader in education in the region by encouraging teaching, learning, industry and societal connect."

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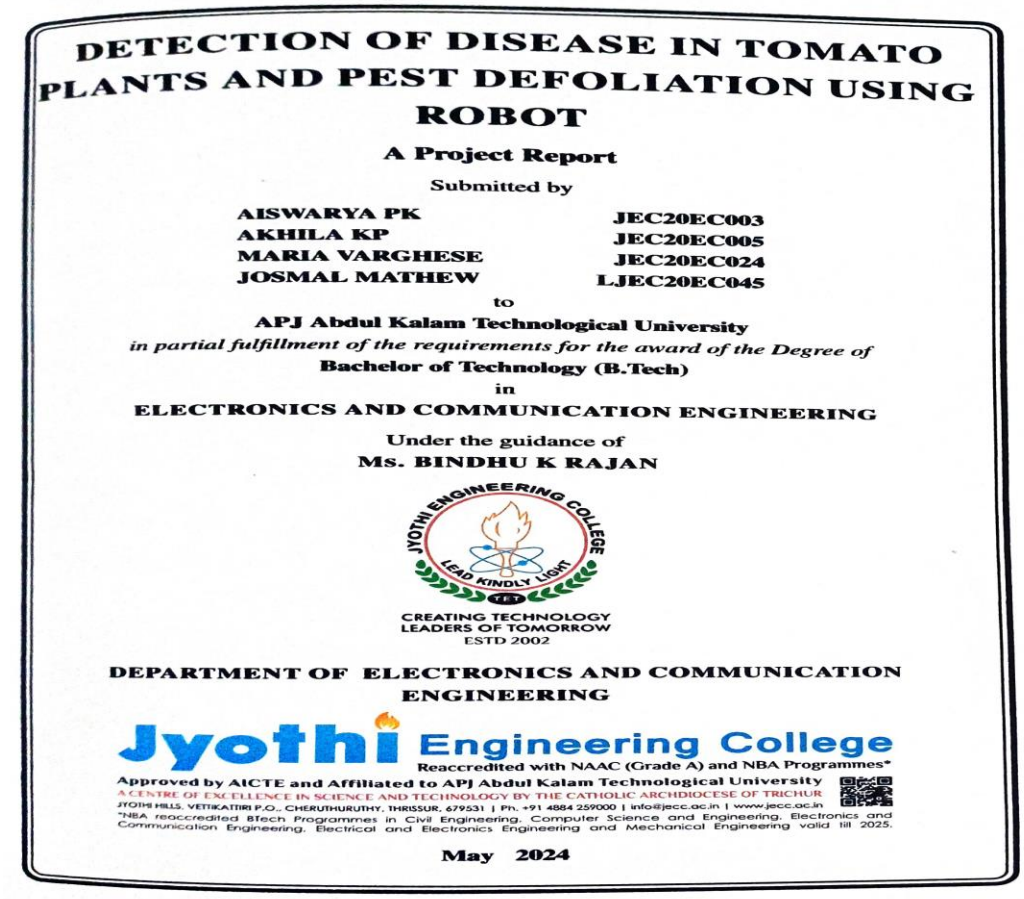
PROJECT DIARY WITH POs



DETECTION OF DISEASE IN TOMATO PLANTS AND PEST DEFOLIATION USING ROBOT

A Project Report

Submitted by

AISWARYA PK	JEC20EC003
AKHILA KP	JEC20EC005
MARIA VARGHESE	JEC20EC024
JOSMAL MATHEW	LJEC20EC045

to

APJ Abdul Kalam Technological University

in partial fulfillment of the requirements for the award of the Degree of

Bachelor of Technology (B.Tech)

in

ELECTRONICS AND COMMUNICATION ENGINEERING

Under the guidance of

Ms. BINDHU K RAJAN

CREATING TECHNOLOGY LEADERS OF TOMORROW
ESTD 2002

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

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*NBA reaccredited BTech Programmes in Civil Engineering, Computer Science and Engineering, Electronics and Communication Engineering, Electrical and Electronics Engineering and Mechanical Engineering valid till 2025.

May 2024

Dr. JOSE P THERATTIL
Principal
Jyothi Engineering College
Cheruthuruthy - 679531

DECLARATION

We the undersigned hereby declare that the project report " Detection of Disease in Tomato Plants and Pest Defoliation using Robot", submitted for partial fulfillment of the requirements for the award of degree of Bachelor of Technology of the APJ Abdul Kalam Technological University, Kerala is a bonafide work done by us under supervision of Ms. Bindhu K Rajan. This submission represents our ideas in our own words and where ideas or words of others have been included, we have adequately and accurately cited and referenced the original sources. We also declare that we have adhered to ethics of academic honesty and integrity and have not misrepresented or fabricated any data or idea or fact or source in this submission. We understand that any violation of the above will be a cause for disciplinary action by the institute and/or the University and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been obtained. This report has not been previously used by anybody as a basis for the award of any degree, diploma or similar title of any other University.

AISWARYA P K (JEC20EC003)
AKHILA K P (JEC20EC005)
MARIA VARGHESE (JEC20EC024)
JOSMAL MATHEW (LJEC20EC045)

Place:
Date:

Dr. JOSE P THERATTIL
Principal
Jyothi Engineering College
Cheruthuruthy - 679531

Jyothi Engineering College

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

CREATING TECHNOLOGY LEADERS OF TOMORROW ESTD 2002

CERTIFICATE

This is to certify that the report entitled " **DETECTION OF DISEASE IN TOMATO PLANTS AND PEST DEFOLIATION USING ROBOT** " submitted by AISWARYA P K (JEC20EC003), AKHILA K P (JEC20EC005), MARIA VARGHESE (JEC20EC024), JOSMAL MATHEW (LJEC20EC045) to the APJ Abdul Kalam Technological University in partial fulfillment of the requirements for the award of the Degree in Bachelor of Technology in **Electronics and Communication Engineering** is a bonafide record of the project work carried out by them under my/our guidance and supervision. This report in any form has not been submitted to any other University or Institute for any purpose.

Ms. Sindhu K Rajan
Assistant Professor
Internal Supervisor

Dr. Sindhu S
Associate Professor
Head of the Department

Dr. JOSE P THERATTIL
Principal
Jyothi Engineering College
Cheruthuruthy - 679531

ACKNOWLEDGEMENT

We take this opportunity to thank everyone who helped us profusely, for the successful completion of our project work. With prayers, we thank **God Almighty** for his grace and blessings, for without his unseen guidance, this project would have remained only in our dreams.

We thank the **Management** of Jyothi Engineering College and our Principal, **Dr. Jose P. Therattil** for providing all the facilities to carry out this project work. We are grateful to the Head of the Department **Dr. Sindhu S** for her valuable suggestions and encouragement to carry out this project work.

We would like to express our wholehearted gratitude to the project guide **Ms. Bindhu K Rajan** for her encouragement, support and guidance in the right direction during the entire project work.

We thank our Project Coordinators **Fr. David Nettikadan, Ms. Drisya M K & Ms. Neethu Rose Thomas** for their constant encouragement during the entire project work. We extend our gratefulness to all teaching and non teaching staff members who directly or indirectly involved in the successful completion of this project work.

Finally, we take this opportunity to express our gratitude to the parents for their love, care and support and also to our friends who have been constant sources of support and inspiration for completing this project work.

AISWARYA P K (JEC20EC003)
AKHILA K P (JEC20EC005)
MARIA VARGHESE (JEC20EC024)
JOSMAL MATHEW (LJEC20EC045)

Dr. JOSE P THERATTIL
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VISION OF THE INSTITUTE

Creating eminent and ethical leaders through quality professional education with emphasis on holistic excellence.

MISSION OF THE INSTITUTE

- To emerge as an institution par excellence of global standards by imparting quality Engineering and other professional programmes with state-of-the-art facilities.
- To equip the students with appropriate skills for a meaningful career in the global scenario.
- To inculcate ethical values among students and ignite their passion for holistic excellence through social initiatives.
- To participate in the development of society through technology incubation, entrepreneurship and industry interaction.

VISION OF THE DEPARTMENT

Create eminent and ethical leaders in the field of Electronics and Communication through quality professional education to excel in academia and industry.

MISSION OF THE DEPARTMENT

Provide theoretical and practical knowledge through quality education and life skills training to make competent graduates with leadership and social commitment.To impart entrepreneurial orientation and motivation for research among the students through knowledge transfer between industrial, academic research institutions.

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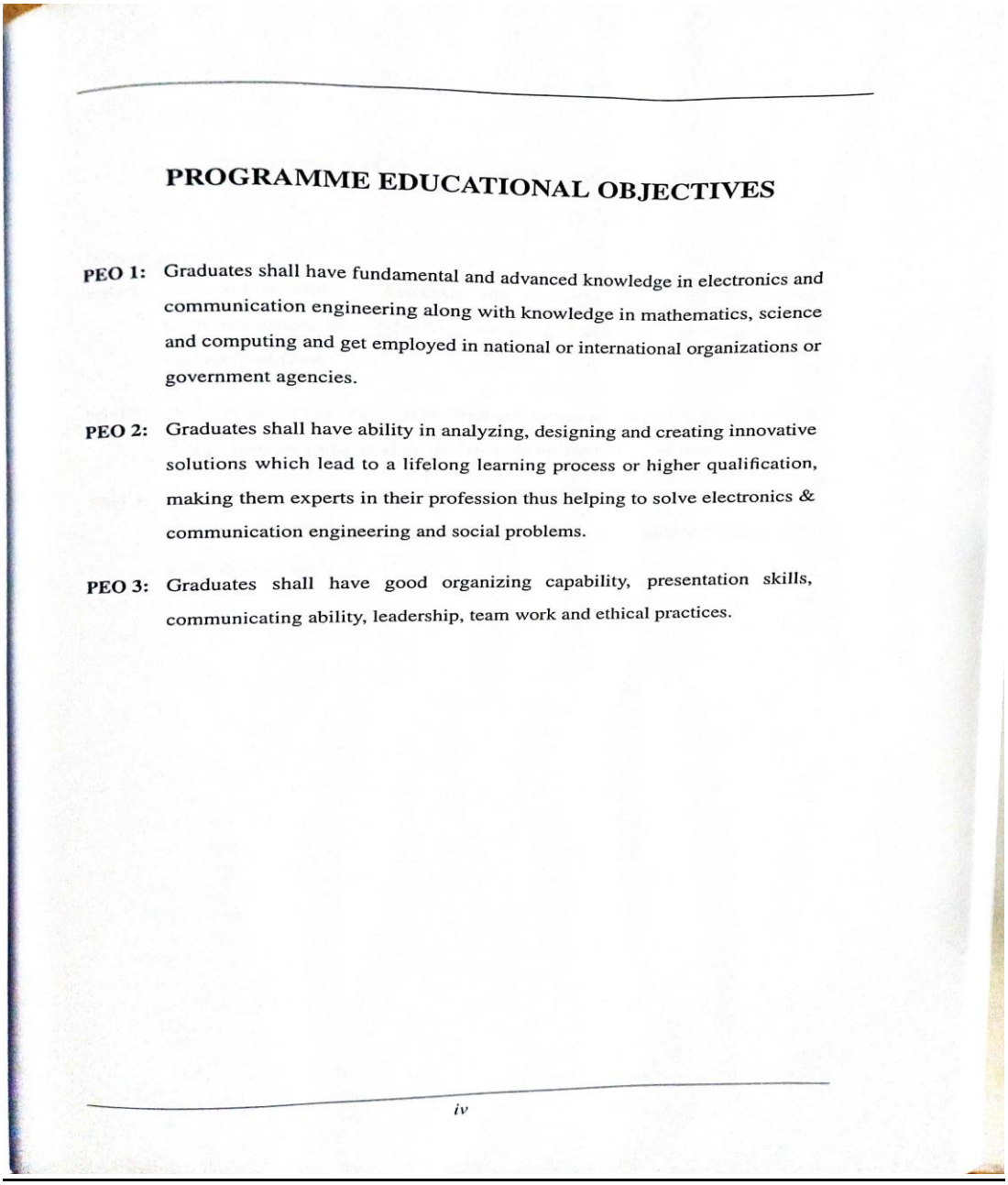

PROGRAMME EDUCATIONAL OBJECTIVES

PEO 1: Graduates shall have fundamental and advanced knowledge in electronics and communication engineering along with knowledge in mathematics, science and computing and get employed in national or international organizations or government agencies.

PEO 2: Graduates shall have ability in analyzing, designing and creating innovative solutions which lead to a lifelong learning process or higher qualification, making them experts in their profession thus helping to solve electronics & communication engineering and social problems.

PEO 3: Graduates shall have good organizing capability, presentation skills, communicating ability, leadership, team work and ethical practices.

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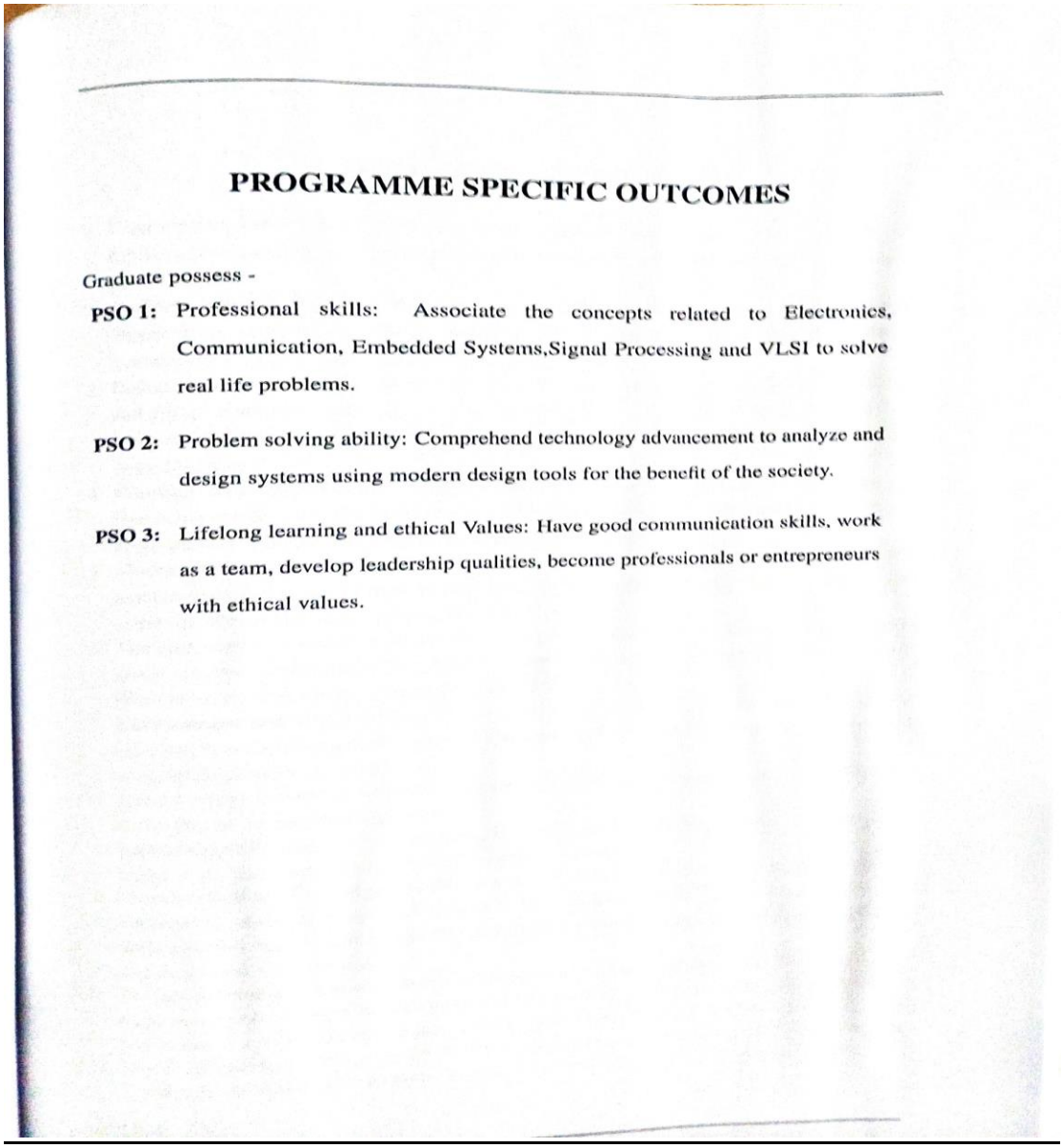

PROGRAMME SPECIFIC OUTCOMES

Graduate possess -

PSO 1: Professional skills: Associate the concepts related to Electronics, Communication, Embedded Systems,Signal Processing and VLSI to solve real life problems.

PSO 2: Problem solving ability: Comprehend technology advancement to analyze and design systems using modern design tools for the benefit of the society.

PSO 3: Lifelong learning and ethical Values: Have good communication skills, work as a team, develop leadership qualities, become professionals or entrepreneurs with ethical values.

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PROGRAMME OUTCOMES

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
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COURSE OUTCOMES

COs	Description
CO1	Model and solve real world problems by applying knowledge across domains
CO2	Develop products, processes or technologies for sustainable and socially relevant applications
CO3	Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks
CO4	Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms
CO5	Identify technology/research gaps and propose innovative/creative solutions
CO6	Organize and communicate technical and scientific findings effectively in written and oral forms

CO MAPPING TO POs

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C414.1	2	2	2	1	2	2	2	1	1	1	1	2
C414.2	2	2	2		1	3	3	1	1		1	1
C414.3									3	2	2	1
C414.4					2			3	2	2	3	2
C414.5	2	3	3	1	2					1		1
C414.6					2			2	2	3	1	1
Average	2	2.33	2.33	1	1.8	2.5	2.5	1.75	1.8	1.8	1.6	1.33

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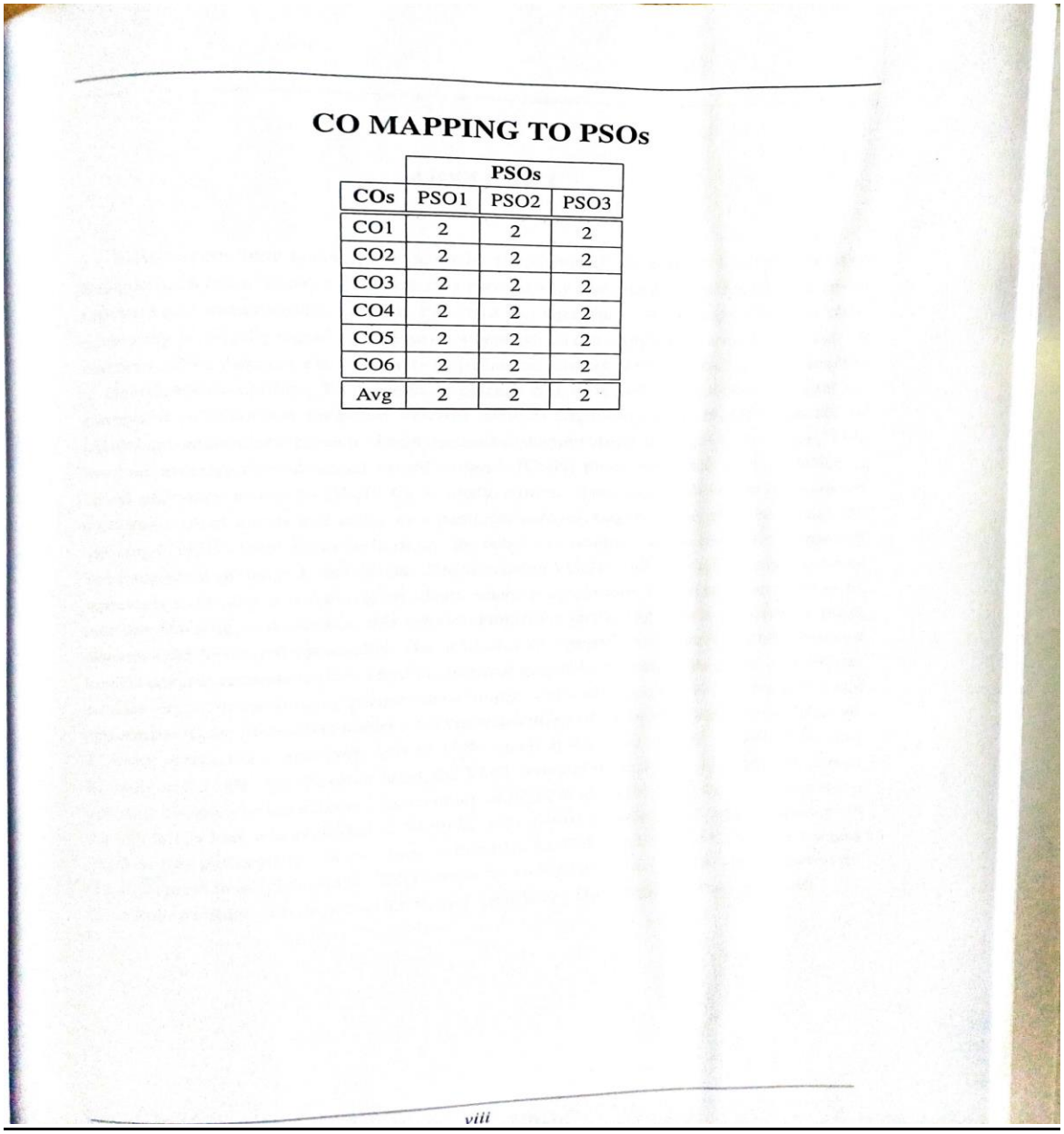

CO MAPPING TO PSOs

	PSOs		
COs	PSO1	PSO2	PSO3
CO1	2	2	2
CO2	2	2	2
CO3	2	2	2
CO4	2	2	2
CO5	2	2	2
CO6	2	2	2
Avg	2	2	2

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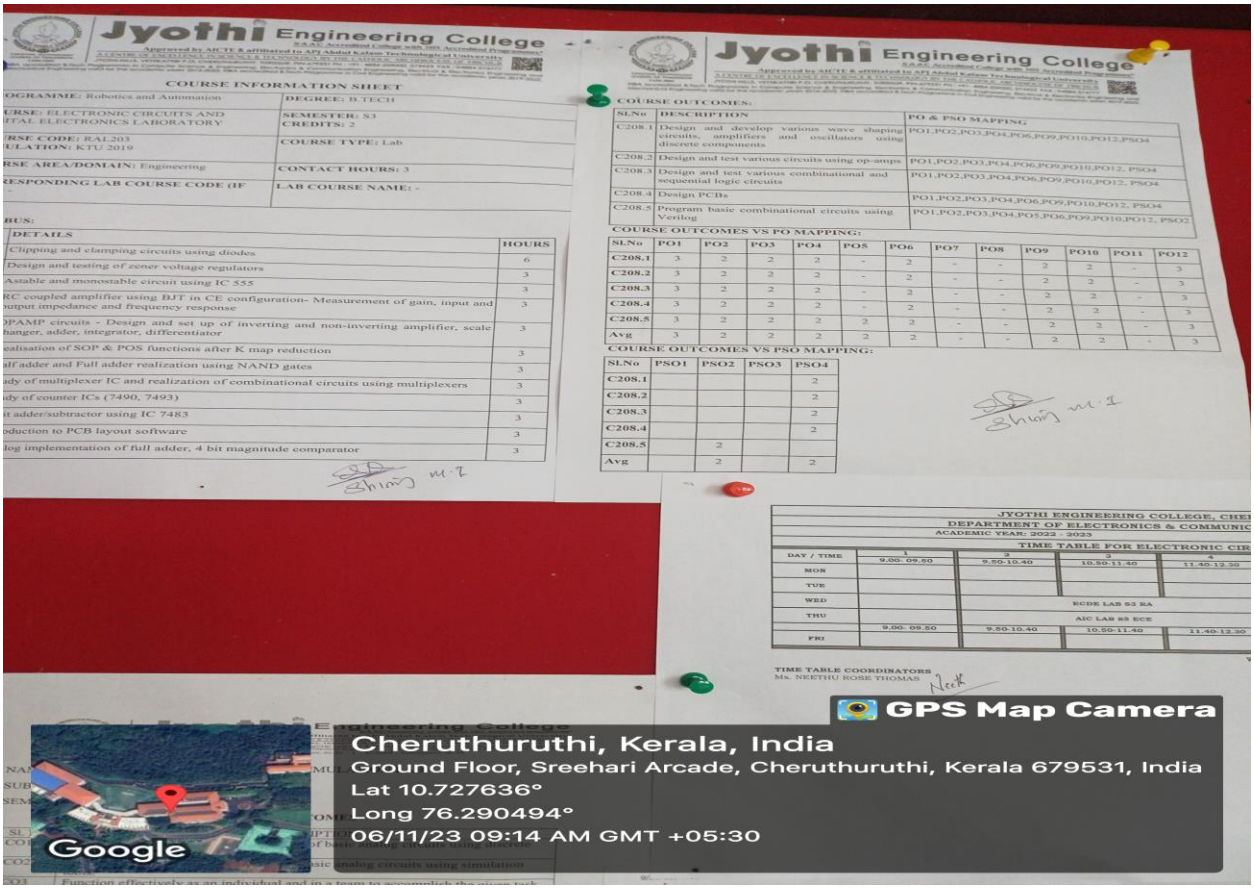
COURSE OUTCOMES DISPLAY IN LAB NOTICE BOARDELECTRONICS CIRCUITS LAB



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COURSE OUTCOMES IN IA QUESTION PAPER

Reg No.: _____ Name : _____

Jyothi Engineering College
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
IIIrd Semester - B.Tech
Series Exam 2
09:30 18-Dec-2023
Course : CST201 - DATA STRUCTURES

Total Mark: 100 **CODE: CSEU3X181223F** **Total Time: 3 Hrs**

CO1	Design an algorithm for a computational task and calculate the time/space complexities of that algorithm.	Applying(P)
CO2	Identify the suitable data structure (array or linked list) to represent a data item required to be processed to solve a given computational problem and write an algorithm to find the solution of the computational problem	Applying(P)
CO3	Write an algorithm to find the solution of a computational problem by selecting an appropriate data structure (binary tree/graph) to represent a data item to be processed	Applying(P)
CO4	Store a given dataset using an appropriate Hash Function to enable efficient access of data in the given set	Applying(P)
CO5	Select appropriate sorting algorithms to be used in specific circumstances	Analyzing(A)

CO BL MARK

PART A

Answer ALL Questions

1. Explain space complexity with the help of examples. CO1 2 (3)

2. Find the time complexity of the following code using freequecy count. CO1 4 (3)

```
int sum(int A[], int n)
{
   int sum = 0, i;
   for(i = 0; i < n; i++)
      sum = sum + A[i];
   return sum;
}
```

3. Write the array of structures representation of the following polynomial. CO2 3 (3)

$$P(X,Y) = 10X^7Y^7+5X^6Y^5+4X^4Y^2+8X^2+25$$

4. Write Enqueue and Dequeue algorithm of a queue CO2 1 (3)

5. Memory blocks of size 202,302 and 101 are allocated for programs of size 150,100, 125, 100 and 100. Which allocation method is better in this case and why? CO3 2 (3)

6. Write procedures to push and pop elements from a Linked List Stack CO3 3 (3)

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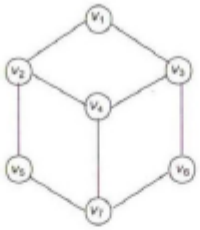

G2

8.	Create a Binary Search Tree for the following values 62, 14, 96, 12, 105, 3, 75, 22, 87, 32, 20, 13, 102, 68, 125	CO4	2 (3)
9.	Write an algorithm to sort a set of numbers using insertion sort.	CO5	2 (3)
10.	Explain the following terms a) Overflow b) Collision	CO5	2 (3)

PART B

11. a)	How the performance of an algorithm is evaluated? Explain the best, worst and average case analysis of an algorithm with the help of an example.	CO1	2 (10)
b)	What are asymptotic notations? Give examples.	CO1	2 (4)

OR

12. a)	Explain the system life cycle in detail.	CO1	2 (10)
b)	Compare Top-down approach with Bottom-Up approach.	CO1	2 (4)
13. a)	Explain the data Structure Stack in detail. Display the status of a stack with maximum capacity 5.on the following operations (in order) on it. Pop( ), Push(5), push(4), Pop(	CO2	3 (10)

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b) Compare Top-down approach with Bottom-Up approach. CO1 2 (4)

13. a) Explain the data Structure Stack in detail. Display the status of a stack with maximum capacity 5.on the following operations (in order) on it. Pop( ), Push(5), push(4), Pop( ), Push(9) CO2 3 (10)

b) Discuss an algorithm to convert an infix expression to a postfix expression. CO2 2 (4)

OR

14. a) Write the tuple form of the following sparse matrix. Also, write an algorithm to represent a sparse matrix in tuple form. CO2 3 (10)

b) Write the algorithm to insert elements to a circular Queue CO2 1 (4)

15. a) Write the algorithm for best fit memory allocation. Given five memory partitions of 300Kb, 700Kb, 400Kb, 500Kb, 800Kb (in order), how would the first-fit, best-fit, and worst-fit algorithms place processes of 412 Kb, 617 Kb, 112 Kb, and 626 Kb (in order)? CO3 3 (10)

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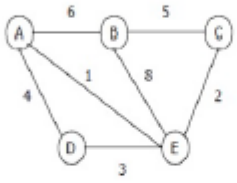
b) Write an algorithm /pseudocode to count the number of nodes in a singly linked list — CO3 3 (4)

OR

16. a) Write an algorithm to add two polynomials represented using linked list. — CO3 2 (10)

b) Write algorithm to delete an element from the end of singly linked list. — CO3 1 (4)

17. a) Write Breadth First Search algorithm. Illustrate BFS and DFS traversal order on the below graph. — CO4 2 (10)



b) Compare complete binary tree and full binary tree — CO4 1 (4)

OR

18. a) What do you mean by a BST?. Write an algorithm to remove an element from a Binary Search Tree. Demonstrate each cases with the following example (Delete 10 , Delete 70 and delete 60) . — CO4 2 (10)

b) How to represent a binary tree using Arrays ? Construct a binary tree from the following elements arranged in an array A[1:15] as: — CO4 2 (4)

I	2	3	4	5	6	7	8	9	10	11	12	13	14	15
A	B	C	D			E			F		G	H		

19. a) Explain with examples the different techniques for open addressing — CO5 2 (10)

b) Show all the passes using insertion sort for the following list: — CO5 3 (4)

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PROGRAM OUTCOMES, PROGRAM SPECIFIC OUTCOMES, PROGRAM EDUCATIONAL OBJECTIVES

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Vision of the Department

Creating eminent and ethical leaders in the domain of Computational Sciences through quality professional education with a focus on holistic learning and excellence.

Mission of the Department

- To create technically competent and ethically conscious graduates in the field of Computer Science and Engineering by encouraging holistic learning and excellence.
- To prepare students for careers in Industry, Academia and the Government.
- To instill Entrepreneurial Orientation and research motivation among the students of the department.
- To emerge as a leader in education in the region by encouraging teaching, learning, industry and societal connect.

Programme Educational Objectives (PEOs)

1. The graduates shall have sound knowledge of Mathematics, Science, Engineering and Management to be able to offer practical software and hardware solutions for the problems of industry and society at large.
2. The graduates shall be able to establish themselves as practicing professionals, researchers or Entrepreneurs in computer science or allied areas and shall also be able to pursue higher education in reputed institutes.
3. The graduates shall be able to communicate effectively and work in multidisciplinary teams with team spirit demonstrating value driven and ethical leadership.

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Programme Outcomes

Engineering Graduates will be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes (PSOs)

On the completion of Computer Science & Engineering program, the students will possess:

1. An ability to apply knowledge of data structures and algorithms appropriate to computational problems.
2. An ability to apply knowledge of operating systems, programming languages, data management, or networking principles to computational assignments.
3. An ability to apply design, development, maintenance or evaluation of software engineering principles in the construction of computer and software systems of varying complexity and quality.

4. An ability to understand concepts involved in modeling and design of computer science applications in a way that demonstrates comprehension of the fundamentals and trade-offs involved in design choices.

COs of First year (Common to ALL Branches)

Course Code	Course Name	Course Outcome - On completion of this course the students will be able to	
C101	CALCULUS	C101.1	Acquire the knowledge of analysis compounds using various spectroscopic methods.
		C101.2	To acquire the knowledge about energy efficient batteries
		C101.3	Apply the knowledge in the analysis and separation of complex organic compounds, using modern instrumentation like TGA,DTA,HPLC,GC
		C101.4	To design and synthesis nano materials and polymers which are essential to human life.
		C101.5	Knowledge of methods to determine the calorific value of fuels and detailed knowledge about petroleum products and its application
		C101.6	Develop innovative methods to produce soft water for industrial use and different methods to purify waste wate
C102	ENGINEERING PHYSICS	C102.1	Students will be able to familiarise with the basic concepts of oscillations snd waves.
		C102.2	Students will be able to know the various phenomena of interference and diffraction of light.
		C102.3	Students will be able to study the wonderful aspects of polarization of light and superconductivity

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		C102.4	Students will be able to develop the basic concepts of Quantum Mechanics and statistical mechanics
		C102.5	Students will be able to familiarise with the applications of acoustics and ultrasonics.
		C102.6	Students will be able to understand the concepts of lasers , optical fibres and solid state devices.
C103	**ENGINEERING GRAPHICS**	**C103.1**	Ability to know the fundamentals of Engineering Drawing Standards.
		C103.2	Able to prepare the orthographic projections of points and straight lines placed in various quadrants.
		C103.3	Demonstrate the ability to draw orthographic projections of various solids, sectioned views of solids, developments of solids, perspective projection and intersection of solids.
		C103.4	Ability to prepare neat drawings and proper dimensioning.
		C103.5	Able to understand the features of CAD software and preparation of Isometric and free hand sketching.
C104	**INTRODUCTION TO COMPUTING & PROBLEM SOLVING**	**C104.1**	Ability to identify different components of a computer
		C104.2	Ability to design algorithmic solution to problems.
		C104.3	Ability to convert algorithms to Python programs.
		C104.4	Ability to solve problems using object-oriented concept.
		C104.5	Ability to design modular Python programs using functions.
		C104.6	Ability to develop recursive solutions

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C105	**INTRODUCTION TO SUSTAINABLE ENGINEERING**	**C105.1**	Student will be able to understand the different types of environmental pollution problems and their sustainable solutions
		C105.2	Student will be able to work in the area of sustainability for research and education
		C105.3	Student will have a broader perspective in thinking for sustainable practices by utilizing the engineering knowledge and principles
C106	**BASICS OF ELECTRONICS ENGG**	**C106.1**	Acquire the knowledge of analysis compounds using various spectroscopic methods.
		C106.2	To acquire the knowledge about energy efficient batteries
		C106.3	Apply the knowledge in the analysis and separation of complex organic compounds, using modern instrumentation like TGA,DTA,HPLC,GC
		C106.4	To design and synthesis nano materials and polymers which are essential to human life.
		C106.5	Knowledge of methods to determine the calorific value of fuels and detailed knowledge about petroleum products and its application
		C106.6	Develop innovative methods to produce soft water for industrial use and different methods to purify waste wate
C107	**ENGINEERING PHYSICS LAB**	**C107.1**	Students will be able to develop skills to impart practical knowledge in real time solution about some of the phenomena they have studied in the Engineering Physics course.
		C107.2	Students will be able to conduct, analyze and interpret experiments in Engineering Physics.
		C107.3	Students will be able to understand measurement technology and real time applications in engineering studies.

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		C107.4	Students will be able to communicate verbally and graphically.
		C107.5	Students will be able to write the results of calculations in a clear and concise manner.
		C107.6	Students will be able to understand principle, concept, working and application of new technology.
C108	**COMPUTER PROGRAMMING LAB**	**C108.1**	To familarize the students with basic hardware & Software tools
		C108.2	To implement algorithms studied in the course ICPS
		C108.3	To learn the implementation of control strctures , Iterations, and recursive functions , Lists & Tuples & Dictinories
		C108.4	To implement operation on files
		C108.5	To implement a small micro project using python
C109	**Basic Engineering Workshop(EC)**	**C109.1**	Students will gain knowledge of standard voltages and their tolerances, safety aspects of electrical systems and importance of protective measures in wiring systems.
		C109.2	Students will be familiarized with the types of wires, cables and other accessories used in wiring.
		C109.3	Students should be able to wire simple lighting circuits for domestic buildings.
		C109.4	Students should be able to distinguish between light and power circuits.
C110	**DIFFERENTIAL EQUATIONS**	**C110.1**	Students can form and solve homogenous differential equations
		C110.2	Students can apply solution of homogeneous differential equations to form general solution
		C110.3	Students can analyze periodic functions in terms of their frequency components.

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		C110.4	Students can identify and solve various partial differential equations
		C110.5	Students can form Wave equation and physically interpret the solutions.
		C110.6	Students can conclude quantitative statements about the physical meaning of the solution of heat equations related to engineering process.
C111	**ENGINEERING CHEMISTRY**	**C111.1**	Acquire the knowledge of analysis compounds using various spectroscopic methods
		C111.2	To acquire the knowledge about energy efficient batteries.
		C111.3	Apply the knowledge in the analysis and separation of complex organic compounds, using modern instrumentation like TGA,DTA,HPLC,GC
		C111.4	To design and synthesis nano materials and polymers which are essential to human life.
		C111.5	Knowledge of methods to determine the calorific value of fuels and detailed knowledge about petroleum products and its application
		C111.6	Develop innovative methods to produce soft water for industrial use and different methods to purify waste water.
C112	**BE100: MECHANICS**	**C112.1**	Students will be able to apply and demonstrate the concepts of mechanics to practical engineering problems.
		C112.2	Students will be able to determine the properties of planes and solids.
		C112.3	Students will be able to apply fundamental concepts of dynamics to practical problems
		C112.2	Students will able to understand different types of Vibration and solve problems

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		C112.5	Ability of the students to solve mechanics problems associated with friction forces
		C112.6	Students will be able to find out centre of mass and Momemnt of inertia of different geometry.
C113	**BE102: DESIGN ENGINEERING**	**C113.1**	Able to appreciate the different elements involved in good designs and to apply them in practice when called for
		C113.2	Aware of the product oriented and user oriented aspects that make the design a success.
		C113.3	Will be capable to think of innovative designs incorporating different segments of knowledge gained in the course
		C113.4	Students will have a broader perspective of design covering function, cost, environmental sensitivity, safety and other factors other than engineering analysis.
C114	**CS100 : COMPUTER PROGRAMMING**	**C114.1**	Students will be able to identify appropriate C language constructs to solve problems.
		C114.2	Students will be able to analyze problems, identify subtasks and implement them as functions/procedures.
		C114.3	Students will be able to implement algorithms using efficient C-programming techniques
		C114.4	Students will be able to explain the concept of file system for handling data storage and apply it for solving problems
		C114.5	Students will be able to apply sorting & searching techniques to solve application programs.
C115	**EC100 : BASICS OF ELECTRONICS ENGINEERING**	**C115.1**	Student can identify the active and passive electronic components, Will be able to know various types of components Understand its specfications.
		C115.2	Student can familiarize the working of diodes,

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			transistors, and integrated circuits.
		C115.3	Student can understand the working of rectifiers, amplifiers and oscillators.
		C115.4	Student can have a basic knowledge about measuring instruments
		C115.5	Student can get a fundamental idea of basic communication systems.
		C115.6	Student can get a basic idea of Entertainment systems.
C116	**CY110:ENGINEERING CHEMISTRY LAB**	**C116.1**	An ability to gain knowledge about different types of qualitative and quantitative estimation
		C116.2	An ability to understand, explain and use instrumental techniques for chemical analysis
		C116.3	Students will be able to apply and demonstrate the theoretical concepts of engineering chemistry and to develop scientific attitude
		C116.4	Students will be able to analyze the quality of water by determining its chemical parameters
		C116.5	Students will be able to measure chemical parameters to solve problems both individually as well as in team by analyzing and interpreting data from arrange of sources.
		C116.6	To acquire the skill for the preparation of engineering materials like polymers.
C117	**CS120 : COMPUTER PROGRAMMING LAB**	**C117.1**	Students will be able to analyse a problem, find appropriate programming language construct should be used and implement C program for the problem.
		C117.2	Develop C programs involving functions, recursion, pointers, and structures.
		C117.3	Design applications using sequential and random access file processing.

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		C117.4	Develop C programs for simple applications making use of basic constructs, arrays and strings
		C117.5	Write programs that perform operations using derived data types
C118	**EC110: BASIC ENGINEERING WORKSHOP - EC**	**C118.1**	Graduates will be able to identify electronics components like Resistors, Capacitors, Diodes,Transistors and UJT
		C118.2	Graduates will be able to use measuring instruments like the multimeter , Function generator,Power supply & DSO.
		C118.3	Graduates will be able to test all Active and Passive Components
		C118.4	Graduates will be able to assemble circuits on a breadboard.
		C118.5	Graduates will be able to Understand PCB fabrication process, assembling, dismantling systems.
		C118.6	Graduates understand soldering and desoldering skills, useful in electronic circuit interconnections

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