# CO - PO/PSO ASSESSMENT AND ATTAINMENT PROCESS MANUAL

## DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING



## MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

(Autonomous Institution-UGC, Govt. of India)

Accredited by NAAC with 'A+' Grade | Programmes Accredited by NBA National Ranking by NIRF Innovation – Rank band(151-300), MHRD, Govt. of India Approved by AICTE, Affiliated to JNTUH, ISO 9001:2015 Certified Institution Maisammaguda, Dhulapally, Secunderabad 500100

#### PREAMBLE

Overview of Outcome-Based Education (OBE) Outcome-Based Education (OBE) is an educational framework that emphasizes achieving specific learning outcomes. Unlike traditional education systems that focus on input-based methods, OBE shifts the focus to the learner's ability to demonstrate knowledge, skills, and attitudes at the end of a course or program. It ensures that all educational activities are aligned with predefined outcomes, enabling students to meet industry and societal expectations effectively. OBE is structured around three key components: Course Outcomes (COs), Program Outcomes (POs), and Program Specific Outcomes (PSOs).

**Importance of CO-PO-PSO Assessment and Attainment:** CO-PO-PSO assessment and attainment are critical to the success of OBE.

These assessments ensure that:

- Alignment with Stakeholder Expectations: The program aligns with industry requirements, accreditation standards, and societal needs.
- **Quality Assurance:** Institutions can measure the effectiveness of their educational processes and improve continuously.
- Enhanced Learning Experience: Students gain a clear understanding of what is expected of them and work towards specific, measurable goals.
- Accreditation Compliance: It fulfills the requirements of accrediting bodies such as NBA showcasing the institution's commitment to quality education.
- Feedback for Continuous Improvement: Assessment results highlight gaps in teaching-learning processes, allowing for targeted interventions.

**India, OBE and Accreditation:** From 13th June 2014, India has become the permanent signatory member of the Washington Accord. Implementation of OBE in higher technical education also started in India. The National Assessment and Accreditation Council (NAAC) and National Board of Accreditation (NBA) are the autonomous bodies for promoting global quality standards for technical education in India. NBA has started accrediting only the programs running with OBE from 2013. The National Board of Accreditation mandates establishing a culture of outcome based education in institutions that offer Engineering, Pharmacy, Management program. Reports of outcome analysis help to find gaps and carryout continuous improvements in the education system of an Institute, which is very essential.

#### **Objectives of the Manual:**

This manual is designed to:

- Provide a comprehensive understanding of the OBE framework and its implementation.
- Outline the process of defining, mapping, and assessing COs, POs, and PSOs.
- Offer standardized methods for calculating attainment levels.
- Serve as a guide for faculty, administrators, and coordinators involved in the OBE process.
- Facilitate compliance with accreditation and quality assurance standards.
- Promote continuous improvement in educational practices by leveraging data-driven insights.

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#### 1. INSTITUTE VISION, MISSION AND QUALITY POLICY

### VISION

- Visualizing a great future for the intelligentsia by imparting state-of the art Technologies in the field of Engineering and Technology for the bright future and prosperity of the students.
- To offer world class training to the promising Engineers.

## MISSION

- To nurture high level of Decency, Dignity and Discipline in women to attain high intellectual abilities.
- To produce employable students at National and International levels by effective training programmes.
- To create pleasant academic environment for generating high level learning attitudes.

#### QUALITY POLICY

- To undertake Research & Development activities in emerging areas.
- To introduce new innovative courses based on the Industry and societal demands Collaborating with National, International institutions, Research & Development organizations & industries.
- To develop in each student the mastery of fundamentals, motivation for learning, discipline, self-reliance for professional achievement.
- To provide innovative professional education with social responsibilities.

#### 2. DEPARTMENT VISION AND MISSION

#### VISION

To produce globally competent professionals in the field of Computer Science and Engineering To attain academic and research excellence in advanced technologies of Computer Science and Engineering by promoting a creative environment for learning and innovation.

#### MISSION

- To impart holistic technical education using the best of infrastructure, outstanding technical and teaching expertise, training students into competent and confidentengineers with excellent communication skills, to face the global challenges of the future technological advancements
- To evolve into centre of excellence of computer science and engineering through creative and innovative practices in teaching-learning, promoting academic excellence to produce world class professionals, making the students psychologically strong and emotionally balanced with social consciousness, ethical values and trans-disciplinary research capabilities.

# 3. PROCESS FOR DEFINING THE VISION AND MISSION OF THE DEPARTMENT, AND PEOS OF THE PROGRAM

Crafting the vision and mission of the department is a strategic endeavour aimed at aligning them with the overarching goals of the institute while addressing the expectations of all stakeholders. This process involves thorough discussions at the departmental level, and is shaped through a collaborative approach that includes input from stakeholders, consideration of the departments future trajectory, and an understanding of societal needs. This ensures a vision and mission that are both forward-looking and responsive to community and stakeholder expectations.

#### A. The Process for Defining Vision and Mission of the Department

The following steps are followed to establish Vision and Mission of Department.

**Step 1:** Begin with the Vision and Mission of the institute as the foundation and by considering the norms laid by UGC/AICTE/UNIVERSITY.

**Step 2:** The Program Assessment and Quality Improvement Committee (PAQIC) collects the views from internal and external stake holders.

#### **Composition of PAQIC:**

The Program Assessment and Quality Improvement Committee (PAQIC) comprises Head of the Department, Professors and senior faculty members. This diverse group ensures a broad range of perspectives and expertise, enabling effective evaluation and enhancement of academic programs.

Step 3: PAQIC summarizes the recommendations received from stakeholders.

**Step 4:** PAQIC drafts the Institutes Vision and Mission and submits it to the Department Advisory Board (DAB) for review.

**Step 5:** The DAB gives suggestions on the draft of departments Vision and Mission and submits it to Board of Studies (BOS) for review, instructions, and suggestions.

#### **Composition of DAB:**

Department Advisory Board (DAB) comprises Head of the Department, Professors, senior faculty members, one expert member from reputed institution, one industry expert and one Alumni.

**Step 6:** After review and ratification by BOS, on approval of BOS the draft is sent to the Academic Council. If not approved then the entire process starts from Step 3.

#### **Composition of BOS:**

BOS is constituted with University nominated member, Head of the Department, three Academic council Nominee members, one industry nominee, 4 Professors, 2 associate professors and one PG student nominee.

**Step 7:** On Approval of the academic council, the vision and mission of the department are published and disseminated. If the academic council disapproves the entire process starts from step 1.

The process for defining department vision and mission are illustrated in the below Figure



Figure.3.1 Process for defining department vision and mission

## **B.** Description of process involved in defining Programme Educational Objectives (PEOs) of the program:

Program Educational Objectives (PEOs) is a structured process that involves engaging key stakeholders such as students, alumni, faculty, employers, and industry experts. This collaborative approach ensures that the PEOs are relevant and aligned with both stakeholder expectations and the institutional vision and mission.

The process starts with collecting feedback through surveys and meetings, which is then used to draft the initial PEOs. These drafts undergo thorough review and refinement to ensure they meet the programs goals. Once finalized, the PEOs are approved by relevant academic bodies and disseminated through various channels to ensure widespread awareness and understanding.

This comprehensive approach ensures that the PEOs effectively prepare graduates to achieve their career and professional milestones.

#### **Inputs Considered for Establishing PEOs:**

#### **1. Faculty Interaction:**

Teaching faculty, especially course coordinators, play a crucial role in establishing PEOs. They are responsible for generating, modifying, and analyzing activities related to achieving course outcomes.

#### 2. Alumni Feedback:

Alumni possess intimate knowledge of the program and significantly contribute to the assessment of PEOs. Feedback is gathered through alumni surveys and annual alumni meet.

#### **3. Employer Feedback:**

Employers provide valuable insights into the performance of graduates within the organization. This feedback is essential for aligning PEOs with industry expectations.

#### 4. Statutory / Professional Bodies:

PEOs are aligned with the objectives of UGC / AICTE / Affiliating University. Professional societies assist in developing a model curriculum that meets industrial demands and program objectives.

#### 5. Program Assessment and Quality Improvement Committee (PAQIC):

PAQIC collects feedback from stakeholders, reviews, and analyses it to ensure internal quality and achieve departmental goals.

#### 6. Department Advisory Board (DAB):

Department Advisory Board (DAB) comprises Head of the Department, Professors, senior faculty members, one expert member from reputed institution, one industry expert and one Alumni. The DAB evaluates the programs effectiveness and proposes necessary changes

This process ensures that PEOs are relevant, comprehensive, and aligned with the needs of all stake holders.

#### 7. Student Representatives:

Comprising the Student representatives (CR's) the DAB evaluates the program's effectiveness and identifies necessary changes based on their inputs.

#### Process for Defining Program Educational Objectives (PEOs)

#### **Step 1:** Foundation Establishment

Use the Vision and Mission of the institute and department, Graduate Attributes along with the guidelines specified by UGC/AICTE/ JNTUH, as the foundation.

#### Step 2: Draft Preparation

The Program Assessment and Quality Improvement Committee (PAQIC) formulates the draft of the departments PEOs by collecting and summarizing the recommendations from stakeholders.

Step 3: Review and Alignment

The Departmental Advisory Board (DAB) discuss the views to ensure alignment with the departments Vision, Mission and PEO's.

**Step 4:** Submission and Feedback

DAB submits the draft PEOs to the Board of Studies (BOS) for their review, necessary instructions, and suggestions. If not approved by BOS, the entire process is reinitiated from Step 2.

Step 5: Approval and Ratification

After the final review and ratification by BOS, PEOs are approved and published.

Step 6: Dissemination

The approved PEOs are published and disseminated.



Figure: 3.2 Process to Define PEO's of the Department

Malla Reddy Engineering College for Women (Autonomous Institution)

#### **PROGRAM EDUCATIONAL OBJECTIVES**

#### **PEO 1 : Professional Enhancement**

To Provide the students with strong fundamental and advanced knowledge in Mathematics, Science and Engineering with respect to Computer Science and Engineering discipline with an emphasis to solve Engineering problems.

#### **PEO 2: Core Competence**

To Prepare the students through well - designed curriculum to excel in various programmes in Computer Science and Engineering, to meet the needs of the industry and for higher education pursuit.

#### **PEO 3: Technical Accomplishments**

To Train the students with intensive and extensive engineering knowledge and skill to analyze, design and create novel products and solutions in the field of Computer Science and Engineering.

#### **PEO 4: Professionalism**

To inculcate in students professional attitude, multidisciplinary approach, ethics, team work, communication, ability to relate computer engineering issues with societal needs and contribute towards nation building.

#### **PEO 5: Learning Environment**

To provide students with an academic environment that inculcates the spirit of excellence, creativity, innovation, leadership, lifelong learning, ethical codes and guidelines to become a successful professional in Computer Science and Engineering

#### Mapping of PEOs with Mission of the Department:

3 - High, 2-Moderate, 1-Low

<b>PEO Statements</b>	M1	M2
PEO1 - Professional Enhancement	3	2
PEO2 - Core Competence	3	3
PEO3 - Technical Accomplishments	3	3
PEO4 – Professionalism	3	3
PEO5 - Learning Environment	3	3

#### **PROGRAM OUTCOMES**

- Program outcomes describe what students are expected to know and would be able to do by the time of graduation. These relate to the skills, knowledge, and behaviors that students acquire as they progress through the program.
- A Program Learning Outcome is broad in scope and be able to do at the end of the programme. POs are to be in line with the graduate attributes as specified in the Washington Accord. POs are to be specific, measurable and achievable. NBA has defined 12 POs and it is common for all the institutions in India.

PO1	Engineering knowledge	An ability to apply knowledge of mathematics (including probability, statistics and discrete mathematics), science, and engineering for solving Engineering problems and modeling
PO2	Problem analysis	An ability to design, simulate and conduct experiments, as well as to analyze and interpret data including hardware and software components
PO3	Design / development of solutions	An ability to design a complex electronic system or process to meet desired specifications and needs
PO4	Conduct investigations of complex problems	An ability to identify, formulate, comprehend, analyze, design synthesis of the information to solve complex engineering problems and provide valid conclusions.
PO5	Modern tool usage	An ability to use the techniques, skills and modern engineering tools necessary for engineering practice
PO6	The engineer and society	An understanding of professional, health, safety, legal, cultural and social responsibilities
PO7	Environment and sustainability	The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and demonstrate the knowledge need for sustainable development.
PO8	Ethics	Apply ethical principles, responsibility and norms of the engineering practice
PO9	Individual and team work	An ability to function on multi-disciplinary teams.
PO10	Communication	An ability to communicate and present effectively

PO11	Project management and finance	An ability to use the modern engineering tools, techniques, skills and management principles to do work as a member and leader in a team, to manage projects in multi- disciplinary environments
PO12	Life-long learning	A recognition of the need for, and an ability to engage in, to resolve contemporary issues and acquire lifelong learning

#### **Relation between the Program Educational Objectives and the POs:**

PEO's →	PEO1	PEO2	PEO3	PEO4	PEO5
PO's	Professional	Core	Technical	Professionalism	Learning
•	Enhancement	Competence	Accomplishments		Environment
<b>PO1</b>	3	3	3	2	2
PO2	3	3	3	2	2
PO3	3	3	3	2	2
PO4	3	3	3	3	2
PO5	3	3	3	2	2
<b>PO6</b>	3	2	2	3	3
<b>PO7</b>	3	2	2	3	3
<b>PO8</b>	2	2	2	3	3
PO9	2	2	3	3	3
PO10	2	2	2	3	3
PO11	2	2	3	3	3
PO12	2	2	3	3	3

#### 3 - High, 2-Moderate, 1-Low

#### PROGRAM SPECIFIC OUTCOMES

**Program Specific Outcomes (PSOs):** Program Specific Outcomes are statements that describe what the graduates of a specific engineering program should be able to do. A list of PSOs written for the department of Computer Science and Engineering is given below.

The graduates of the department will attain:

**PSO1:** The ability to analyze, design, code and test application specific or complex engineering problems in Cryptography and Network Security, Design and Analysis of Algorithm, Computer Networks, Data Mining, Mobile Computing, Cloud Computing, Internet of Things (IoT), Data Science, Artificial Intelligence, Machine Learning, Cyber Security, Block chain Technology, and Big Data by applying the knowledge of basic sciences, engineering mathematics and engineering fundamentals.

**PSO2**: The ability to adapt for rapid changes in tools and technology with an understanding of societal and ecological issues, relevant to professional engineering practice through life-long learning.

**PSO3:** Excellent adaptability to function in multi-disciplinary work environment, good interpersonal skills as a leader in a team, in appreciation of professional ethics and societal responsibilities.

Relation	between	the ]	Program	Educational	Ob	iectives	and	the	<b>PSOs:</b>
<b>Iteration</b>	See in een			Baacacionai	~~~,	jeeures		VIIV	

PEO's →	PEO1	PEO2	PEO3	PEO4	PEO5
PO's 🛓	Professional	Core	Technical	Professionalism	Learning
V	Enhancement	Competence	Accomplishments		Environment
PSO1	3	3	3	2	2
PSO2	3	3	3	3	2
PSO3	3	3	3	3	3

Dissemination Mechanism of the PEO's, PO's & PSO's:



Figure: 3.3 Decimation mechanism of PEO's, PO's, PSO's & CO's

#### 4. OBE FRAMEWORK OF THE DEPARTMENT



Figure: 4.1 OBE Frame Work of the Department

#### 5. BLOOM'S TAXONOMY

Bloom's Taxonomy was created in 1956 under the leadership of educational psychologist Dr Benjamin Bloom in order to promote higher forms of thinking in education, such as analyzing and evaluating concepts, processes, procedures, and principles, rather than just remembering facts. It is most often used when designing educational, training, and learning processes.



Fig. 5.1 Pictorial representation of Blooms Taxonomy

Level 1, Remembering, is the most basic, requiring the least amount of cognitive rigour. This is about students recalling key information, for example, the meaning of a word.

#### Arrange | Define | Describe | List | Match | Name | Order | Recall | Reproduce

Level 2, Understanding, is to do with students demonstrating an understanding of the facts remembered. At this level, the student who recalls the definition of a word, for example, would also be able to show understanding of the word by using it in the context of different sentences. **Classify | Discuss | Explain | Identify | Report | Summarize** 

Level 3, Applying, is concerned with how students can take their knowledge and understanding, applying it to different situations. This usually involves students answering questions or solving problems.

#### Apply | Calculate | Demonstrate | Interpret | Show | Solve | Suggest

Level 4, Analyzing, is about students being able to draw connections between ideas, thinking critically, to break down information into the sum of its parts.

#### Analyze | Appraise | Compare | Contrast | Distinguish | Explore | Infer | Investigate

Level 5, Evaluating, is reached when students can make accurate assessments or judgements about different concepts. Students can make inferences, find effective solutions to problems and justify conclusions, while drawing on their knowledge and understanding.

#### Argue | Assess | Critique | Defend | Evaluate | Judge | Justify

Level 6, Creating, is the ultimate aim of students' learning journey. At this final level of Bloom's taxonomy, students demonstrate what they have learnt by creating something new, either tangible or conceptual. This might include, for example, writing a report, creating a computer program, or revising a process to improve its results.

#### Compose | Construct | Create | Devise | Generate | Organize | Plan | Produce

#### 6. GUIDELINES FOR WRITING COURSE OUTCOME STATEMENTS

**Course Outcomes (COs)** are specific, measurable statements that describe what learners are expected to know, understand, and be able to do by the end of a particular course. They are essential components of **Outcome Based Education (OBE)** and serve as the foundation for assessing student performance and course effectiveness.

#### **Characteristics of Good Course Outcomes:**

- 1. **Specific**: Clearly defines what students will achieve at the end of the course.
- 2. **Measurable**: Allows the assessment of student achievement through tests, assignments, and projects.
- 3. Achievable: Realistic and achievable within the course duration.
- 4. **Relevant**: Aligned with the broader Program Outcomes (POs) and institutional goals.
- 5. **Time-bound**: Must be completed by the end of the course.

#### **Guidelines for Writing Effective Course Outcomes:**

**1.Use Action Verbs**: Course outcomes should begin with action verbs that are observable and measurable. The **Bloom's Taxonomy** framework is often used to structure COs. Examples include:

- **Remembering**: Define, list, name
- **Understanding**: Explain, describe, summarize
- Applying: Solve, use, implement
- Analyzing: Compare, differentiate, organize
- **Evaluating**: Assess, justify, critique
- **Creating**: Design, formulate, construct

**2.Focus on Student Learning**: Outcomes should describe what the student will learn, not what the teacher will cover. For example:

- Not ideal: "Teach students how to apply machine learning algorithms."
- **Better**: "Students will be able to apply machine learning algorithms to real-world data."

**3.Limit the Number**: Typically, 4–6 well-written COs are sufficient for most courses. Each CO should cover a significant aspect of the course without being too broad.

**4.Align with Program Outcomes**: COs should contribute to the broader **Program Outcomes** (**POs**) and **Program Educational Objectives** (**PEOs**). Mapping the COs to the POs helps ensure that the course supports the overall program's objectives.

**5.Make Outcomes Attainable**: Consider the course duration, student capabilities, and resources when writing COs. Avoid overly ambitious or abstract outcomes.

**6.Assessable**: Ensure that the outcome can be measured through appropriate assessment methods (exams, projects, presentations, or lab work).

#### **Course Outcomes for Design and Analysis of Algorithms:**

	COURSE OUTCOMES	BTL
CO1	Understand algorithm efficiency through time and space complexity analysis	Understand
CO2	Use divide-and-conquer techniques for sorting and matrix multiplication.	Apply
CO3	Able to synthesize disjoint set operations and Understand Tree Traversal method	Understand
CO4	Apply Greedy Algorithms and Dynamic Programming concept to solve various problems	Apply
CO5	Apply Backtracking, Branch and Bound concept to solve various problems	Apply
CO6	Recognize and classify NP-Hard and NP-Complete problems by analyzing non-deterministic algorithms, Cook's theorem, and complexity classes.	Analyze

#### 7. CO-PO/PSO COURSE ARTICULATION MATRIX (CAM) MAPPING:

Course Articulation Matrix shows the educational relationship (Level of Learning achieved) between course outcomes and program outcomes for a course. This matrix strongly indicates whether the students are able to achieve the course learning objectives. The matrix can be used for any course and is a good way to evaluate a course syllabus. The table gives information about the action verbs used in the POs and the nature of POs, stating whether the POs are technical or non-technical. You need to understand the intention of each POs and the Bloom's level to which each of these action verbs in the POs correlates to. Once you have understood the POs then you can write the COs for a course and see to what extent each of those CO's correlate with the POs.

Туре	POs	Action Bloom's Bloom's level(s) for COs					
		Verb(s) in	level(s)				
		POs	for POs				
	PO1	Apply	L3	Bloom's L1 to L4 for theory courses.			
	PO2	Identify	L2	Bloom's L1 to L5 for laboratory courses.			
		Formulate	L6	Bloom's L1 to L6 for project work,			
		Review	L2	experiential learning			
		Design	L6				
Technical	PO3	Develop	L3, L6				
		Analyse	L4				
	PO4	Interpret	L2, L3				
		Design	L6				
		Create	L6				
	PO5	Select	L1, L2,				
			L6				
		Apply	L3				
	PO6	Thumb Rule	:				
	PO7	If Bloom's L	1 Action Ver	bs of a CO: Correlates with any of PO6			
	PO8	to PO12, then	to PO12, then assign 1.				
Non-Technical	PO9	If Bloom's L2	2 to L3 Actio	on Verbs of a CO: Correlates with any of			
	PO10	PO6 to PO12	, then assign	2.			
	PO11	If Bloom's L4	4 to L6 Actio	on Verbs of a CO: Correlates with any of			
	PO12	PO6 to PO12	PO6 to PO12, then assign 3				

Table: Process for mapping the values for CO-PO Matrix

#### NOTE:

- 1. The first five POs are purely of technical in nature, while the other POs are non-technical.
- 2. For the theory courses, while writing the COs, you need to restrict yourself between Blooms Level 1 to Level 4. Again, if it is a programming course, restrict yourself between Blooms Level 1 to Level 3 but for the other courses, you can go up to Blooms Level 4.

- 3. For the laboratory courses, while composing COs, you need to restrict yourself between Blooms Level 1 to Level 5.
- 4. Only for Mini-project and Main project, you may extend up to Blooms Level 6 while composing COs.
- 5. For a given course, the course in-charge has to involve all the other Professors who teach that course and ask them to come up with the CO-PO mapping. The course in-charge has to take the average value of all of these CO-PO mappings and finalize the values or the course in-charge can go with what the majority of the faculty members prefer for. Ensure that none of the Professors who are handling the particular course discuss with each other while marking the CO-PO values.
- 6. If you want to match your COs with non-technical POs, then correlate the action verbs used in the course COs with the thumb rule given in the table and map the values. (Applies only for mapping COs to non-technical POs).

#### Method for Articulation:

1. Identify the key competencies of POs/PSOs to each CO and make a corresponding mapping table with assigning mark at the corresponding cell. One observation to be noted is that the first five POs are purely of technical in nature, while the other POs are non-technical.

2. Justify each CO - PO/PSO mapping with a justification statement and recognize the number of vital features mentioned in the justification statement that are matching with the given Key Attributes for Assessing Program Outcomes. Use a combination of words found in the COs, POs//PSOs and your course syllabus for writing the justification.

3. Make a table with number of key competencies for CO – PO/PSO mapping with reference to the maximum given Key Attributes for Assessing Program Outcomes.

4. Make a table with percentage of key competencies for CO – PO/PSO mapping with reference to the maximum given Key Attributes for Assessing Program Outcomes.

5. Finally, Course Articulation Matrix (CO - PO / PSO Mapping) is prepared with COs and POs and COs and PSOs on the scale of 0 to 3, 0 being no correlation (marked with " - "), 1 being the low/slight correlation, 2 being medium/moderate correlation and 3 being substantial/high correlation based on the following strategy

 $0-0 \leq C \leq 5\%$  - No correlation.

 $1{-}5{\,<\,}C \leqq 40\%$  - Low / Slight.

2--40% < C < 60% - Moderate

 $3-60\% \leq C < 100\%$  - Substantial / High

Key Competencies for Assessing Program Outcomes:

#### **Program Outcomes – Competencies**

**PO 1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization for the solution of complex engineering problems.** (No. of Competencies = 4)

1.1 Demonstrate competence in mathematical modelling

1.2 Demonstrate competence in basic sciences

1.3 Demonstrate competence in engineering fundamentals

1.4 Demonstrate competence in specialized engineering knowledge to the program

**PO 2:** Problem analysis: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. (No. of Competencies = 4)

2.1 Demonstrate an ability to identify and formulate complex engineering problem

2.2 Demonstrate an ability to formulate a solution plan and methodology for an engineering problem

2.3 Demonstrate an ability to formulate and interpret a model

2.4 Demonstrate an ability to execute a solution process and analyze results

PO 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 public health and safety, and cultural, societal, and environmental considerations (No. of Competencies = 4)

3.1 Demonstrate an ability to define a complex/ open-ended problem in engineering terms

3.2 Demonstrate an ability to generate a diverse set of alternative design solutions

3.3 Demonstrate an ability to select an optimal design scheme for further development

3.4 Demonstrate an ability to advance an engineering design to defined end state

**PO 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.** (No. of Competencies = 3)

4.1 Demonstrate an ability to conduct investigations of technical issues consistent with their level of knowledge and understanding

4.2 Demonstrate an ability to design experiments to solve open-ended problems

4.3 Demonstrate an ability to analyze data and reach a valid conclusion

**PO 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.** (No. of Competencies = 3)

5.1 Demonstrate an ability to identify/ create modern engineering tools, techniques and resources

5.2 Demonstrate an ability to select and apply discipline specific tools, techniques and resources

5.3 Demonstrate an ability to evaluate the suitability and limitations of tools used to solve an engineering problem

# **PO 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. (No. of Competencies = 2)

6.1 Demonstrate an ability to describe engineering roles in a broader context, e.g. pertaining to the environment, health, safety, legal and public welfare

6.2 Demonstrate an understanding of professional engineering regulations, legislation and standards

**PO 7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and the need for sustainable development.** (No. of Competencies = 2)

7.1 Demonstrate an understanding of the impact of engineering and industrial practices on social, environmental and in economic contexts

7.2 Demonstrate an ability to apply principles of sustainable design and development

# **PO 8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.** (No. of Competencies = 2)

8.1 Demonstrate an ability to recognize ethical dilemmas

8.2 Demonstrate an ability to apply the Code of Ethics

**PO 9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.** (No. of Competencies = 3)

9.1 Demonstrate an ability to form a team and define a role for each member

9.2 Demonstrate effective individual and team operations-- communication, problem solving, conflict resolution and leadership skills

9.3 Demonstrate success in a team-based project

**PO 10:** Communication: Communicate effectively on complex engineering activities with the engineering community and with the 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 (No. of Competencies = 3)

10.1 Demonstrate an ability to comprehend technical literature and document project work

10.2 Demonstrate competence in listening, speaking, and presentation

10.3 Demonstrate the ability to integrate different modes of communication

**PO 11:** Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's work, as a member and leader in a team, to manage projects and in multidisciplinary environments. (No. of Competencies = 3)

11.1 Demonstrate an ability to evaluate the economic and financial performance of an engineering activity

11.2 Demonstrate an ability to compare and contrast the costs/benefits of alternate proposals for an engineering activity

11.3 Demonstrate an ability to plan/manage an engineering activity within time and budget constraints

**PO 12: Life-long learning: Recognise the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.** (No. of Competencies = 3)

12.1 Demonstrate an ability to identify gaps in knowledge and a strategy to close these gaps

12.2 Demonstrate an ability to identify changing trends in engineering knowledge and practice

12.3Demonstrate an ability to identify and access sources for new information

PSO1: The ability to analyze, design, code and test application specific or complex engineering problems in Cryptography and Network Security, Design and Analysis of Algorithm, Computer Networks, Data Mining, Cloud Computing, Mobile Computing, Cloud Computing, Internet of Things (IoT), Data Science, Artificial Intelligence, Machine Learning, Cyber Security, Block chain Technology, and Big Data by applying the knowledge of basic sciences, engineering mathematics and engineering fundamentals. (No. of Competencies = 6)

1.1. Analyze engineering problems in Cryptography, Network Security, Design, and Algorithm to identify complex computational challenges.

1.2. Design algorithms and systems for problem-solving in areas like Computer Networks, Data Mining, Cloud Computing, and Mobile Computing.

1.3. Apply coding practices to solve complex engineering tasks related to the Internet of Things (IoT), Artificial Intelligence (AI), and Machine Learning.

1.4. Test and validate the effectiveness of solutions in Cyber Security, Blockchain Technology, and Big Data using knowledge of basic sciences, engineering mathematics, and engineering fundamentals.

1.5. Employ systematic approaches to the design and development of applications and technologies within Data Science, Cloud Computing, and IoT environments.

1.6. Use engineering fundamentals to address interdisciplinary problems in advanced computing and emerging technologies such as AI, Cyber Security, and Blockchain Technology.

**PSO2:** The ability to adapt for rapid changes in tools and technology with an understanding of societal and ecological issues, relevant to professional engineering practice through life-long learning. (No. of Competencies = 4)

2.1. Exhibit flexibility in learning new programming languages, frameworks, and development environments to stay updated with industry trends.

2.2. Engage in continuous professional development through certifications, courses, and training programs to meet evolving industry standards.

2.3. Evaluate the societal, environmental, and ethical implications of technological innovations in professional engineering and life-long learning to enhance problem-solving capabilities in dynamic and complex engineering environments.

2.4. Collaborate with multidisciplinary teams to address societal challenges using emerging technologies and sustainable practices.

**PSO3:** Excellent adaptability to function in multi-disciplinary work environment, good interpersonal skills as a leader in a team, in appreciation of professional ethics and societal responsibilities. (No. of Competencies = 3)

3.1. Display leadership qualities by guiding and motivating team members toward common goals in collaborative projects and Exhibit effective communication skills to interact with team members from diverse professional backgrounds.

3.2. Apply ethical principles and demonstrate integrity in decision-making processes in both individual and team environments.

3.3. Manage conflicts and foster a positive team environment through strong interpersonal and negotiation skills and Maintain professional conduct and respect for diversity, contributing to ethical and responsible engineering practices in a societal context.

#### SAMPLE EXPLANATION:

#### **COURSE NAME: Design and Analysis of Algorithms**

#### I. COURSE OVERVIEW:

Equip students with the skills to analyze algorithm performance, choose appropriate data structures, and apply algorithm design techniques like greedy method, divide and conquer, and dynamic programming. This knowledge enables them to solve complex problems efficiently. Ultimately, it emphasizes how design choices impact the performance of software applications.

#### **II. COURSE PRE-REQUISITES:**

- Data Structures and Algorithms
- Discrete Mathematics

#### **III. MARKS DISTRIBUTION:**

Mode	Marks
Internal Examination	30
PPT/Case Study	5
Assignment	5
External Examination	60
Total	100

#### **IV. COURSE OBJECTIVES:**

- > To analyze performance of algorithms.
- To choose the appropriate data structure and algorithm design method for a specified application.
- To understand how the choice of data structures and algorithm design methods impacts the performance of programs.
- To solve problems using algorithm design methods such as the greedy method, divide and conquer, dynamic programming, backtracking and branch and bound.

#### V. COURSE OUTCOMES:

- > Understand algorithm efficiency through time and space complexity analysis
- > Use divide-and-conquer techniques for sorting and matrix multiplication
- > Able to synthesize disjoint set operations and Understand Tree Traversal method
- > Apply Greedy Algorithms and Dynamic Programming concept to solve various problems
- > Apply Backtracking, Branch and Bound concept to solve various problems.
- Recognize and classify NP-Hard and NP-Complete problems by analyzing nondeterministic algorithms, Cook's theorem, and complexity classes.

CO STAT	TEMENTS	BTL
CO1	Understand algorithm efficiency through time and space complexity analysis	Understand
CO2	Use divide-and-conquer techniques for sorting and matrix multiplication.	Apply
CO3	Able to synthesize disjoint set operations and Understand Tree Traversal method	Understand
CO4	Apply Greedy Algorithms and Dynamic Programming concept to solve various problems	Apply
CO5	Apply Backtracking, Branch and Bound concept to solve various problems	Apply
CO6	Recognize and classify NP-Hard and NP-Complete problems by analyzing non-deterministic algorithms, Cook's theorem, and complexity classes.	Analyze

#### VI. PROGRAM OUTCOMES-Pos

PO1	Engineering knowledge	An ability to apply knowledge of mathematics (including probability, statistics and discrete mathematics), science, and engineering for solving Engineering problems and modeling
PO2	Problem analysis	An ability to design, simulate and conduct experiments, as well as to analyze and interpret data including hardware and software components

PO3	Design / development of solutions	An ability to design a complex electronic system or process to meet desired specifications and needs
PO4	Conduct investigations of complex problems	An ability to identify, formulate, comprehend, analyze, design synthesis of the information to solve complex engineering problems and provide valid conclusions.
PO5	Modern tool usage	An ability to use the techniques, skills and modern engineering tools necessary for engineering practice
PO6	The engineer and society	An understanding of professional, health, safety, legal, cultural and social responsibilities
PO7	Environment and sustainability	The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and demonstrate the knowledge need for sustainable development.
PO8	Ethics	Apply ethical principles, responsibility and norms of the engineering practice
PO9	Individual and team work	An ability to function on multi-disciplinary teams.
PO10	Communication	An ability to communicate and present effectively
PO11	Project management and finance	An ability to use the modern engineering tools, techniques, skills and management principles to do work as a member and leader in a team, to manage projects in multi-disciplinary environments
PO12	Life-long learning	A recognition of the need for, and an ability to engage in, to resolve contemporary issues and acquire lifelong learning

#### VII. PROGRAMME SPECIFIC OUTCOMES-PSO's

**PSO 1:** The ability to analyze, design, code and test application specific or complex engineering problems in Cryptography and Network Security, Design and Analysis of Algorithm, Computer Networks, Data Mining, Cloud Computing, Mobile Computing, Cloud Computing, Internet of Things (IoT), Data Science, Artificial Intelligence, Machine Learning, Cyber Security, Block

chain Technology, and Big Data by applying the knowledge of basic sciences, engineering mathematics and engineering fundamentals.

**PSO 2:** The ability to adapt for rapid changes in tools and technology with an understanding of societal and ecological issues, relevant to professional engineering practice through life-long learning.

**PSO 3**: Excellent adaptability to function in multi-disciplinary work environment, good interpersonal skills as a leader in a team, in appreciation of professional ethics and societal responsibilities.

	<b>PO1</b>	PO2	PO3	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	PO11	<b>PO12</b>	PSO1	PSO2	PSO3
CO1	$\checkmark$	$\checkmark$		$\checkmark$									$\checkmark$		
CO2	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$									$\checkmark$		
CO3	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$								$\checkmark$		
CO4	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$								$\checkmark$		
CO5	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$							$\checkmark$	$\checkmark$	$\checkmark$	
<b>CO6</b>	$\checkmark$	$\checkmark$		$\checkmark$				$\checkmark$					$\checkmark$	$\checkmark$	

#### VIII. MAPPING OF EACH CO WITH PO'S, PSO'S (Use Tick Mark)

#### IX. JUSTIFICATION FOR CO-PO/PSO MAPPING:

Course Outcome	PO/PSO	Justification for Mapping	No. of Key competencies matched								
	PO1	Demonstrates foundational knowledge required for PO1.	3								
	PO2	Incorporates skills relevant to PO2 in assignments.	3								
CO1	PO4	Students will be able to calculate the performance of the Complex Problems.	2								
	PSO1	<b>PSO1</b> Aligns with specific objectives outlined in PSO1.									
	PO1	PO1Engages students in critical thinking for PO1.									
	PO2	Covers essential concepts that support PO2.	3								
	PO3	Introduces methods relevant to achieving PO3.	2								
CO2	PO4	Students will be able to solve the Complex Problems using disjoint set operations and Understand Tree Traversal method	2								
	PSO1	Students will be able to analyze, design, code and test application specific or complex engineering problems in Design and Analysis of Algorithm by applying the knowledge of basic sciences, engineering mathematics and engineering fundamentals.	3								

	PO1	Strengthens analytical skills essential for PO1.	3
	PO2	Emphasizes application of knowledge relevant to PO2.	3
	PO3	Provides practice for competencies tied to PO3.	2
C03	PO4	Students will be able to solve the Complex Problems using disjoint sets and Tree traversal techniques	2
	PO5	Explores advanced topics relevant to PO5	2
	PSO1	Directly addresses objectives stated in PSO1.	3
	PO1	Enhances understanding of key concepts for PO1.	3
	PO2	Prepares students for advanced skills outlined in PO2.	3
	PO3	Students will be able to design and solve the new problems using greedy and dynamic programming methods.	3
C04	PO4	Addresses collaborative skills necessary for PO4.	3
001	PO5	Explores advanced topics relevant to PO5.	3
	PSO1	Students will be able to analyze, design, code and test application specific or complex engineering problems in Design and Analysis of Algorithm by applying the knowledge of basic sciences, engineering mathematics and engineering fundamentals.	3
	PO1	Students will be able to gain the knowledge of Backtracking, Branch and Bound concept to solve various problems	3
	PO2	Understand the given problem and develop the solution for Backtracking, Branch and Bound concept to solve various problems	3
	PO3	Students will be able to design and solve the new problems using Backtracking, Branch and Bound concept to solve various problems.	3
CO5	PO4	Students will be able to solve the Complex Problems using Backtracking, Branch and Bound concept to solve various problems	3
	PO5	Explores advanced topics relevant to PO5.	2
	PO12	Students will be able to use the gained knowledge lifelong.	2
	PSO1	Students will be able to analyze, design, code and test application specific or complex engineering problems in Design and Analysis of Algorithm by applying the knowledge of basic sciences, engineering mathematics and engineering fundamentals.	3
	PSO2	The ability to adapt for rapid changes in tools and technology with an understanding of societal and ecological issues, relevant to professional engineering practice through life-long learning.	3

	PO1	students will be able to gain knowledge to solve certain NP	3
		Complete problems	
	PO2	Understand the given problem and develop the solution for NP	3
		Complete problems	
	PO4	Students will be able to solve the Complex Problems using	2
		Backtracking, Branch and Bound concept to solve various	
		problems	
CO6	PSO1	Students will be able to analyze, design, code and test	3
		application specific or complex engineering problems in Design	
		and Analysis of Algorithm by applying the knowledge of basic	
		sciences, engineering mathematics and engineering	
		fundamentals.	
	PSO2	The ability to adapt for rapid changes in tools and technology	3
		with an understanding of societal and ecological issues, relevant	
		to professional engineering practice through life-long learning.	

#### X. TOTAL COUNT OF KEY COMPETENCIES FOR CO-PO/PSO MAPPING:

	<b>PO1</b>	<b>PO2</b>	PO3	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO1</b> 0	PO11	<b>PO12</b>	PSO1	PSO <sub>2</sub>	PSO3
CO1	3	3		2									3		
CO2	3	3	2	2									3		
CO3	3	3	2	2	2								3		
CO4	3	3	3	3	2								3		
CO5	3	3	3	3	2							2	3	3	
CO6	3	3		2									3	3	

#### XI. PERCENTAGE OF KEY COMPETENCIES FOR CO-PO/PSO MAPPING

	<b>PO1</b>	PO2	PO3	PO4	PO5	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	PO1	<b>PO1</b>	PO12	PSO1	PSO2	PSO3
CO1	75	75		66.67									50		
CO2	75	75	50	66.67									50		
CO3	75	75	50	66.67									50		
<b>CO4</b>	75	75	75	100									50		
CO5	75	75	75	100	66.67							66.67	50	75	
CO6	75	75		66.67									50	75	

#### XII. COURSE ARTICULATION MATRIX (PO/PSO MAPPING)

CO's and PO's and CO's and PSO's on the scale of **0** to **3**, **0** being no correlation, **1** being the low correlation, **2** being medium correlation and **3** being high correlation.

#### 0 – No correlation

- 1 Low/Slight
- 2 Moderate
- 3 Substantial/High

	PROGRAM OUTCOMES(PO)													Program Specific Outcomes(PSO)			
	PO1	<b>PO2</b>	PO3	PO4	PO5	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	PO10	PO11	<b>PO12</b>	PSO1	PSO2	PSO3		
CO1	3	3		2									2				
CO2	3	3	2	2									2				
CO3	3	3	2	2									2				
<b>CO4</b>	3	3	3	3									2				
CO5	3	3	3	3	2							2	2	3			
CO6	3	3		2									2	3			
Avg.	3	3	2.5	2.3	-	-	-	-	-	-	-	2	2	3	-		

# 8. STRUCTURED APPROACH TO CO-PO MAPPING AND CONTINUOUS IMPROVEMENT



#### 1. Course Coordinator (CO-PO Mapping)

**Role**: The Course Coordinator is the foundational role in this process. They are responsible for writing appropriate Course Outcomes (COs) for the course they oversee.

**Task**: The Course Coordinator ensures that the COs are properly mapped to the **Program Outcomes** (**POs**) by identifying how each CO contributes to the achievement of various POs.

This involves using a CO-PO mapping matrix to determine the level of contribution (low, medium, high) of each CO to each PO.

**Finalization**: Once the CO-PO mapping is complete, the Course Experts Group finalizes the mapping and prepares the relevant documents for submission to the Year-Wise Coordinator.

#### 2. Year-Wise Coordinator (Consolidation of CO Attainment)

**Role**: The Year-Wise Coordinator is responsible for consolidating the CO attainment for all courses offered in a particular academic year.

**Task**: They collect and compile CO attainment data from each Course Coordinator. This typically involves calculating the average CO attainment for each course based on student performance data (exams, assignments, projects) and ensuring that all course-specific CO attainment is accurately reported.

**Output**: The consolidated CO attainment for each year is then submitted to the **Program Assessment Committee**.

#### 3. Program Assessment Committee (CO & PO Attainment Consolidation)

**Role**: The Program Assessment Committee is responsible for consolidating both the **CO attainment** and **PO attainment** for the entire program.

**Task**: This step involves taking the CO attainment data provided by the Year-Wise Coordinators and mapping it to the Program Outcomes (POs). The committee analyzes how well the COs contribute to the achievement of the POs, based on the CO-PO mapping matrix created by the Course Coordinators.

**PO Attainment**: The committee ensures that the CO-PO mappings are used to calculate overall PO attainment for the program. The attainment levels (often expressed as percentages) are used to determine how well the program's learning outcomes are being met.

**Feedback**: If necessary, the committee may provide feedback on improving CO-PO alignment or suggest changes to COs to better meet PO targets.

#### 4. Program Coordinator (Monitoring & Guidance)

**Role**: The Program Coordinator oversees the entire process and provides guidance to the Program Assessment Committee.

**Task**: They monitor the attainment levels of COs and POs and ensure that the assessment methods are in line with the program's educational objectives. The Program Coordinator may intervene if there are gaps between the expected and achieved outcomes.

**Strategic Role**: They ensure the continuous improvement of the program by suggesting updates to the curriculum, teaching methods, or assessment tools based on CO and PO attainment data.

#### 5. Department Advisory Board (Oversight)

Role: The Department Advisory Board provides high-level oversight of the entire process.

**Task**: They review the CO and PO attainment reports and offer strategic advice on how the program can evolve to better meet industry standards, societal needs, and academic goals. They may also recommend adjustments to the learning outcomes or suggest additional resources to improve the overall educational experience.

**Final Review**: The Advisory Board ensures that the program aligns with both internal and external benchmarks, contributing to the program's continuous improvement and relevance in the field.

#### 9. CO-PO/PSO ASSESSMENT PROCESS & TOOLS:

#### A. ASSESSMENT PROCESSES

Course outcomes are evaluated based on two approaches namely direct and indirect assessment methods. The direct assessment methods are based on the Continuous Internal Assessment (CIA) and Semester End Examination (SEE) whereas the indirect assessment methods are based on the course end survey which will be taken after completion of the course.

In the assessment process for course outcomes, each course is mapped to specific course outcomes and program outcomes & program specific outcomes with designated weight. The students' performance in these courses is then analyzed in detail to assess the degree of Program Outcome/Program Specific attainment.

For all courses, performance is evaluated based on marks obtained in Continuous Internal Assessment (CIA) and Semester End Examinations (SEE). CIA exams are held twice per semester, while the SEE is conducted at the end of the semester.

#### Weightage for CO Attainment

Assessment Method	Assessment Tool	Weightage in CO Attainment		
Direct Assessment	Continuous Internal Assessment(CIA)	80%		
	Semester End Examination (SEE)	0070		
Indirect Assessment	Course End Survey	20%		

The attainment of Course Outcomes (COs) is systematically determined through a **Question-wise Analysis** approach. The process begins with calculating the class average marks for a subject, which is then converted into a target percentage. This target is applied to the maximum marks of each question to establish specific benchmark values for attainment. Each question is mapped to relevant Course Outcomes, ensuring a direct link between assessments and learning objectives. Student performance is evaluated against these targets, and the attainment for each question is aggregated based on the CO mapping. Finally, the calculated CO attainment values are integrated into Program Outcomes (POs) and Program Specific Outcomes (PSOs), providing a comprehensive evaluation that aligns course-level assessments with broader program-level goals.

#### **RUBRICS FOR CO ATTAINMENT R24/R22 REGULATION**



Malla Reddy Engineering College for Women (Autonomous Institution)

#### **R20/R18 REGULATION**



#### **CO** Assessment and Attainment Process:


# DIRECT ASSESSMENT (DA):

The attainment is calculated by evaluating:

- Continuous Internal Assessment (CIA): Periodic assessments such as mid-term tests and assignments.
- Semester End Examination (SEE): Final examination at the end of the course. The direct attainment is computed as weighted sum of Internal and semester end examination.

# **Course Outcome Attainment through Question-Wise Analysis**

In our Outcome-Based Education (OBE) framework, a structured question-wise analysis approach is used to determine the attainment of Course Outcomes (COs). The process is outlined below:

# **Target Setting:**

Initially, the class average marks for the specific subject are calculated. These average marks are then converted into a percentage, which serves as the benchmark or target percentage for all questions. For each question, this target percentage is applied to its maximum marks to establish a specific target value for attainment.

#### For example:

If the target percentage is 70% and a question's maximum marks are 6, the target value for that question is  $70\% \times 6=4.2$ .

This method ensures consistency and fairness in determining attainment thresholds across all questions.

# **Course Outcome Mapping:**

Each question is mapped to one or more specific Course Outcomes (COs). This mapping ensures that each assessment item contributes explicitly to the evaluation of defined learning outcomes.

#### **Attainment Calculation:**

The attainment level for each question is calculated by comparing the student performance against the established target value. The question-wise attainment values are then aggregated based on the CO mapping to determine the overall attainment for each Course Outcome.

# Integration into Program Outcomes (POs) and Program Specific Outcomes (PSOs):

The calculated Course Outcome attainment values are further integrated into the evaluation of Program Outcomes (POs) and Program Specific Outcomes (PSOs). This step ensures alignment

between course-level assessments and program-level objectives, fostering a coherent and systematic approach to educational quality enhancement.

# INDIRECT ASSESSMENT (IDA):

Feedback is collected from students through a Course End Survey, which evaluates the effectiveness of the course in meeting the outcomes.

# FINAL CO ATTAINMENT CALCULATION:

The final attainment score is determined using a weighted formula:

- 80% from Direct Assessment (DA)
- 20% from Indirect Assessment (IDA)

# **COMPARISON WITH TARGET:**

If the calculated CO attainment meets or exceeds the target, the outcomes are considered achieved. If not, improvement actions are initiated to address the deficiencies.

This framework ensures a balanced approach to measuring and improving course-level learning outcomes. In each course, the level of attainment of each CO is compared with the targets, if is not the course coordinator takes necessary steps for the improvement to reach the target. With the help of CO against PO/PSO mapping, the PO/PSO attainment is calculated by the programme coordinator.

# **B. THE QUALITY/RELEVANCE OF ASSESSMENT PROCESSES & TOOLS USED**

# **B.1 Direct Assessment Tools:**

# **R24 REGULATION:**

SI. NO	Course Type	Assessment Tool	Description	Evaluation of course outcomes	Frequency of Assessment
1	Theory	Theory internal examinations (30M)	Two written examinations are conducted and its average marks are considered Two assignments are for each course for	The questions for continuous internal assessment and end semester examination are framed in such a way that each question is mapped to the appropriate course outcome of the respective course.	Twice in a semester
	Courses	Assignments c (5M) a c Case Study/Project ( (5M) c	continuous assessment and average marks are considered Case Study/Project is	Attainment of Course Outcome is assessed based on student performance during the continuous internal assessment and end semester- examination.	Twice in a semester
			for each course for continuous		Twice in a semester

			assessment and average marks are considered		
		Semester End Examination (60M)	End Examination is conducted		Once per semester
		Day to day evaluation in Laboratory (10M)	The day to day evaluation is considered		continuous
2		Internal Practical Examination (10M)	Internal examination is conducted	The Internal attainment for each CO is calculated by taking average of the %	Once per semester
	Laboratory Courses	Project(10M)	Project related to Lab demonstration is conducted	attainment from Viva/Case Study/Poster Presentation	Once per semester
		Viva/Case Study/ Poster (10M)	Based on Laboratory course, the Viva/Case Study/Poster Presentation is conducted	is calculated by taking attainment from Experiment Write up, Execution, Results/Output and Viva-Voce	Once per semester
		External Practical Examination (60M)	External examination is conducted		Once per semester
		Innovative Product Development – I, II III, IV & V (100M) Internal = 40M External = 60M	Student has to work for implementation of their innovative idea, prepare a technical report and submit it to the department.	Three internal IPD reviews are conducted and the external examiner assessment is considered as another assessment tool for IPD and Final CO attainment is calculated.	Once per semester from II Year I Sem. to IV Year I Sem.
3	Project Courses	Industry oriented Mini Project/Summer Internship (100M) Internal = 40M External = 60M	To test students concepts in independent analysis. Three project reviews are conducted	Three internal project reviews are conducted and Continuous assessment is carried by the project review committee first review emphasizes on literature survey and problem	Mini Project Review in VII Semester
		Research Project I (100M) Internal = 40M External = 60M & Research Project II(150M) Internal = 50M External = 100M	To test students concepts in design creative thinking and independent analysis three project reviews are conducted	methodology and the third review on design the validation of the model and documentation. The external examiner assessment is considered as another assessment tool for Final CO attainment.	Research project I -VII semester & Research Project II- VIII semester
		Innovation- Start- Up & Entrepreneurship	Student has to work for implementation of their innovative idea,	Continuous assessment is carried by the review committee emphasizes on Innovative Idea and Scope, Cost	IV Year II Semester

		(100M)	prepare a technical	Analysis, Usability, Presentation,	
		Mentor Marks =	report and submit it to	Documentation and Viva-voce. The	
		30M	the department	external examiner assessment is	
		Dept. Committee		considered as another assessment tool	
		Marks = 70M		for Final CO attainment.	
			To Test the students		
4		cal ar Technical Seminar (100M) Internal	in knowledge in	At end of semester a student has to Present the seminar and submit the	
	Technical		Recent Technical		IV Year II
	Seminar		advancements and	report	Semester
			their Presentation	report	
			Skills		

# **R22 REGULATION:**

SI. NO	Course Type	Assessment Tool	Description	Evaluation of course outcomes	Frequency of Assessment
		Theory internal examinations (30M)	Two written examinations are conducted and its average marks are considered		Twice in a semester
1	Theory Courses	Assignments (5M)	Two assignments are for each course for continuous assessment and average marks are considered	The questions for continuous internal assessment and end semester examination are framed in such a way that each question is mapped to the appropriate course outcome of the respective course. Attainment of Course Outcome is assessed based on student performance during the continuous internal assessment and end semester examination.	Twice in a semester
		Case Study/PPT (5M)	Case Study/PPT is for each course for continuous assessment and average marks are considered		Twice in a semester
		Semester End Examination (60M)	End Examination is conducted		Once per semester
		Day to day evaluation in Laboratory (10M)	The day to day evaluation is considered	The Internal attainment for each CO is calculated by taking average of the % attainment from day to day evaluation,	continuous
2	Laboratory Courses	Internal Practical Examination (10M)	Internal examination is conducted	internal lab examination, Project related to lab and Viva/Case Study/Poster Presentation	Once per semester
		Project(10M)	Project related to Lab demonstration is conducted	The External attainment for each CO is calculated by taking attainment from Experiment Write up Execution	Once per semester
		Viva/Case	Based on Laboratory	nom Experiment write up, Execution,	Once per

		Study/Poster	course, the Viva/Case	Results/Output and Viva-Voce	semester
		( <b>10M</b> )	Study/Poster		
			Presentation is		
			conducted		
		External Practical Examination	External examination		Once per
		(60M)			semester
		Innovative Product Development – I, II	Student has to work for implementation of	Three internal IPD reviews are	Once per
		III, IV & V	their innovative idea,	conducted and the external examiner	semester from
		( <b>100M</b> )	prepare a technical	assessment is considered as another	II Year I Sem.
		Internal $= 40M$	report and submit it to	assessment tool for IPD and Final CO	to IV Year I
		External = 60M	the department.	attainment is calculated.	Sem.
		Industry oriented			
		Mini	To test students		
		Project/Summer	concepts in	Infee internal project reviews are	Mini Project
		Internship	independent analysis. Three project reviews are conducted	is somial by the project review	Review in VII
		( <b>100M</b> )		as carried by the project review	Semester
		Internal $= 40M$		literature survey and problem	
		External = 60M		identification second review on design	
2	Project Courses	Research Project I	To test students concepts in design creative thinking and independent analysis three project reviews	methodology and the third review on design methodology and the third review on the validation of the model and documentation. The external examiner assessment is considered as another assessment tool for Final CO attainment.	Research
č		Internal = 40M			project I -VII
		External = 60M			semester &
		Research Project			Research
		II(150M)			Project II- VIII
		Internal $= 50M$			semester
		External = 100M	are conducted		
		Innovation- Start-		Continuous assessment is carried by	
		Up &	Student has to work	the review committee emphasizes on	
		Entrepreneurship	for implementation of	Innovative Idea and Scope, Cost	
		( <b>100M</b> )	their innovative idea,	Analysis, Usability, Presentation,	IV Year II
		Mentor Marks =	prepare a technical	Documentation and Viva-voce. The	Semester
		30M	report and submit it to	external examiner assessment is	
		Dept. Committee	the department	considered as another assessment tool	
		Marks = 70M		for Final CO attainment.	
			To Test the students		
		Technical Seminar	in knowledge in	At end of semester a student has to	
4	Technical	(100M)	Recent Technical	Present the seminar and submit the	IV Year II
-	Seminar	Internal = $100M$	advancements and	report	Semester
			their Presentation		
			Skills		

# **R20 REGULATION:**

SI. NO	Course Type	Assessment Tool	Description	Evaluation of course outcomes	Frequency of Assessment
	Theory Courses	Theory internal examinations (25M)	Two written examinations are conducted and its average marks are considered	The questions for continuous internal assessment and end semester examination are framed in such a way that each question is mapped to	Twice in a semester
1		Assignments (5M)	Two assignments are for each given course for continuous assessment average marks are considered	the appropriate course outcome of the respective course. Attainment of Course Outcome is assessed based on student performance during the continuous	Twice in a semester
		Semester End Examination (70M)	End Examination is conducted	internal assessment and end semester examination.	Once per semester
	Laboratory Courses	Day to day Evaluation in Laboratory (15M)	The day to day evaluation is considered	The final attainment for each CO is calculated by taking average of the % attainment from day to day	continuous
2		Internal Practical Examination (15M)	Internal examination is conducted	examination and internal hab examination The final attainment for each CO is calculated by taking attainment from Experiment Write up, Execution, Results/Output and Viva-Voce	Once per semester
		External Practical Examination (70M)	External examination is conducted		Once per semester
		Innovative Product Development – I, II & III (100M) Internal = 30M External = 70M	Student has to work for implementation of their innovative idea, prepare a technical report and submit it to the department.	Three internal IPD reviews are conducted and the external examiner assessment is considered as another assessment tool for IPD and Final CO attainment is calculated.	IPD-I during III Year I semester, IPD-II during III Year II semester, IPD-III during IV Year I semester
3	Project Courses	Industry oriented Mini Project/Summer Internship (100M) Internal = 30M External = 70M Project-I (100M) Internal = 30M External = 70M Research	To test students concepts in independent analysis. Three project reviews are conducted To test students concepts in design creative thinking and	Three internal project reviews are conducted and Continuous assessment is carried by the project review committee first review emphasizes on literature survey and problem identification, second review on design methodology and the third review on the validation of the model and documentation. The external examiner assessment is considered as another assessment tool for Final CO	Mini Project Review in VII Semester project I -VII semester & Project II- VIII semester

		Project(150M)	independent analysis	attainment.	
		Internal $= 50M$	three project reviews		
		External = 100M	are conducted		
		Innovation- Start-		Continuous assessment is carried by	
		Up &	Student has to work	the review committee emphasizes on	
		Entrepreneurship	for implementation of	Innovative Idea and Scope, Cost	
		( <b>100M</b> )	their innovative idea,	Analysis, Usability, Presentation,	IV Year II
		Mentor Marks =	prepare a technical	Documentation and Viva-voce. The	Semester
		30M	report and submit it	external examiner assessment is	
		Dept. Committee	to the department	considered as another assessment tool	
		Marks = 70M		for Final CO attainment.	
			To Test the students		
		Tachnical Saminar	in knowledge in	At and of semaster a student has to	
1	Technical	(100M)	Recent Technical	Present the seminar and submit the	IV Year II
4	Seminar	(100NI)	advancements and	riesent the seminar and submit the	Semester
		internal – 100M	their Presentation		
			Skills		

# **R18 REGULATION:**

SI. NO	Course Type	Assessment Tool	Description	Evaluation of course outcomes	Frequency of Assessment
1	Theory Courses	Theory internal examinations (25M)	Two written examinations are conducted and its average marks are considered	The questions for continuous internal assessment and end semester examination are framed in such a way that each question is mapped to the appropriate course outcome of the respective course. Attainment of Course Outcome is assessed based on student performance during the continuous internal assessment and end semester examination.	Twice in a semester
		Assignments (5M)	Two assignments are for each given course for continuous assessment average marks are considered		Twice in a semester
		Semester End Examination (70M)	End Examination is conducted		Once per semester
		Day to day evaluation in Laboratory (15M)	The day to day evaluation is considered	The final attainment for each CO is calculated by taking average of the % attainment from day to day evaluation	continuous
2	Laboratory Courses	Internal Practical Examination (15M)	Internal examination is conducted	The final attainment for each CO is	Once per semester
		External Practical Examination (70M)	External examination is conducted	calculated by taking attainment from Experiment Write up, Execution, Results/Output and Viva-Voce	Once per semester

3	Project Courses	Industry oriented Mini Project/Summer Internship (100M) Internal = 30M External = 70M Internal = 30M External = 70M Project-II (150M) Internal = 50M External = 100M	To test students concepts in independent analysis. Three project reviews are conducted To test students concepts in design creative thinking and independent analysis three project reviews are conducted	Three internal project reviews are conducted and Continuous assessment is carried by the project review committee first review emphasizes on literature survey and problem identification, second review on design methodology and the third review on the validation of the model and documentation. The external examiner assessment is considered as another assessment tool for Final CO attainment.	Mini Project Review in VII Semester project I -VII semester & Project II- VIII semester
4	Technical Seminar	<b>Technical Seminar</b> ( <b>100M</b> ) Internal = 100M	To Test the students in knowledge in Recent Technical advancements and their Presentation Skills	At end of semester a student has to Present the seminar and submit the report	IV Year II Semester

# **1. Theory Courses:**

# **R24** Regulation



For theory courses, during a semester there shall be 2 mid-term examinations. Each mid- term examination consists of one descriptive paper with Objective Questions in Part-A and Descriptive Questions in Part-B. The descriptive paper shall be for 30 marks. The Descriptive

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part shall contain 6 full questions out of which, the student has to answer 4 questions, each carrying 5 marks. The objective part shall be for Five (10) marks contain (10) objective questions - each carries one mark and no choice, with a total duration of 2 hours. Five (5) marks are allocated for Assignments (as specified by the subject teacher concerned) and Five(5) marks for Case Study/Project (as specified by the subject teacher concerned). The first Assignment and Case Study/Project should be submitted before the conduct of the first mid-examination and the second Assignment and Case Study/Project should be submitted before the conduct of the second mid-examination. While the first mid-term examination shall be conducted from 1 to 2 1/2 units of the syllabus, the second mid-term examination shall be conducted for 40 marks and the average of the two mid-term examinations shall be taken as the final marks secured by each candidate.

The end examination will be conducted for 60 marks with Part A & B. Part-A consisting of 10 short answer questions with no choice, each question carries 1 marks. Part-B consisting of two parts each (a) and (b), out of which the student has to answer (a) or (b), not both and each question carrying 10 marks



# **R22** Regulation

For theory courses, during a semester there shall be 2 mid-term examinations. Each mid- term examination consists of one descriptive paper with Objective Questions in Part-A and Descriptive Questions in Part-B. The descriptive paper shall be for 30 marks. The Descriptive part shall contain 6 full questions out of which, the student has to answer 4 questions, each carrying 5 marks. The objective part shall be for Five (10) marks contain (10) objective questions

- each carries one mark and no choice, with a total duration of 2 hours. Five (5) marks are allocated for Assignments (as specified by the subject teacher concerned) and Five(5) marks for Case Study/Project (as specified by the subject teacher concerned). The first Assignment and Case Study/PPT should be submitted before the conduct of the first mid-examination and the second Assignment and Case Study/PPT should be submitted before the conduct of the second mid-examination. While the first mid-term examination shall be conducted from 1 to 2 1/2 units of the syllabus, the second mid-term examination shall be conducted from 2 1/2 to 5 units. The total marks secured by the student in each midterm examination are evaluated for 40 marks and the average of the two mid-term examinations shall be taken as the final marks secured by each candidate.

The end examination will be conducted for 60 marks with Part A & B. Part-A consisting of 10 short answer questions with no choice, each question carries 1 marks. Part-B consisting of two parts each (a) and (b), out of which the student has to answer (a) or (b), not both and each question carrying 10 marks



# R20/R18 Regulation

For theory courses, during a semester there shall be 2 mid-term examinations. Each mid- term examination consists of one descriptive paper, one objective paper and assignment. The descriptive paper shall be for 20 marks. The descriptive paper shall contain 6 full questions out of which, the student has to answer 4 questions, each carrying 5 marks. The objective paper shall be for Five (5) marks contain (10) objective questions - each carries half mark and no choice, with a total duration of 2 hours. Five (5) marks are allocated for Assignments (as specified by the subject teacher concerned). The first Assignment should be submitted before the conduct of the first mid-examination and the second Assignment should be submitted before the conduct of the second mid-examination. While the first mid-term examination shall be conducted from 1 to 2 1/2 units of the syllabus, the second mid-term examination shall be conducted from 2 1/2 to 5

units. The total marks secured by the student in each midterm examination are evaluated for 30 marks and the average of the two mid-term examinations shall be taken as the final marks secured by each candidate.

The end examination will be conducted for 70 marks with Part A & B. Part-A consisting of 8 short answer questions out of which 5 question need to be answered, each question carries 2 marks. Part-B consisting of two parts each (a) and (b), out of which the student has to answer (a) or (b), not both and each question carrying 12 marks

# 2. Laboratory Courses:

# **R24/R22** Regulation



For Laboratory courses, there shall be a continuous evaluation during a semester for 40 internal marks and 60 end semester examination marks. Out of the 40 marks for internal evaluation, day-to-day work(10M), Internal Lab Test(10M), Project(10M) and Viva/Case study/Poster Presentation (10M) conducted by the laboratory teacher concerned. The end semester examination shall be conducted with an external examiner and the laboratory teacher. The external examiner shall be appointed from the clusters of colleges which are decided by the Principal of the College

# **R20/R18 Regulation**



For Laboratory courses, there shall be a continuous evaluation during a semester for 30 internal marks and 70 end semester examination marks. Out of the 30 marks for internal evaluation, day-to-day work in the laboratory shall be evaluated for 15 marks and internal practical examination shall be evaluated for 15 marks conducted by the laboratory teacher concerned. The end semester examination shall be conducted with an external examiner and the laboratory teacher. The external examiner shall be appointed from the clusters of colleges which are decided by the Principal of the College

# 3. Project Courses:

The department has introduced Project-Based Learning (PBL) starting from the second year, incorporating Innovative Product Development (IPD) course and Research-Based Projects starting in the seventh semester. To gain greater practical experience, students are required to complete two research projects: one in the first semester of their fourth year (IV B.Tech – I Sem) and another in the second semester of their fourth year (IV B.Tech – I Sem). Research Project- I shall be evaluated for 100 marks and Research Project - II shall be evaluated for 150 marks. This approach helps students gain hands-on experience and enhances their technical and problemsolving skills through research mindset. As project enables the department to assess the knowledge and competency of the students, the student's projects are selected in line with department vision, mission and program outcomes. Before starting the project work students are provided with brief idea of various emerging fields for selecting the project ideas. We encourage

the students to take up the projects on most innovative technologies which have a demand in present day market. The department emphasizes the students, the importance of excelling in project work, where student apply the theoretical knowledge gained during undergraduate program and develop an engineering project as a team. This not only provides good insight into the knowledge gained but also develops soft skills of the students and prepares them well for job in the industry or higher studies.

# Initiatives taken by department for improving the quality of students Projects

- Conducting workshops on core subjects like Cloud Computing, Grid Computing, Blockchain Technology, Computer Vision, Robotics, Cyber Security, Artificial Intelligence, and Machine Learning from the second year onward, enabling students to apply these concepts in their project development.
- Promoting in-house projects by encouraging students to use campus facilities and work under faculty guidance.
- Supporting students in publishing their completed project work in national and international journals and conferences.

# **Project Review Committee:**

To monitor continuously the progress of individual project work students, Head of the Department forms the Project Review Committee (PRC) before the commencement of semester. The main objective of PRC is to monitor, guide and review the progress of student projects. The committee members are as follows

- 1. Head of The Department
- 2. Coordinators 2 Senior Faculty members
- 3. Project Internal Guide

The following systematic approach is adapted to improve the quality of the projects

# A) Identification of Projects and Allocation of Guides

The project coordinator addresses the importance of project course work and the evaluation guidelines to students at the beginning of the seventh semester. She/He will be given guidance about the various domains, technology, type of project (application, product, research etc.) to be carried out as project course work to attain the Program Outcomes (POs). The below figure shows the complete process of identification of project and allocation of internal guides



Fig. Process for identification of Project and allocation of Project Guides

# **B.** Project Proposal by Students:

Students are encouraged to refer the various peer review journals for selection of project proposal. In this regard to help the students the college library provides free access to various peer review journals and e-resources through K-Nimbus platform. Each student is facilitated to free access to IEEE / Scopus journals both on and off campus. Students are required to discuss their project proposals with their assigned internal guide and prepare an abstract, which is then submitted to the Project Review Committee (PRC) for approval. The PRC reviews each proposal and provides feedback. Based on the PRC's comments, students may need to revise and resubmit their proposals. If the PRC finds the proposal unsatisfactory, the student must review the project area with their internal guide and submit a new proposal for PRC approval. Once approved, the proposal is signed by the internal guide and submitted to the Project Coordinator. The Project Coordinator then compiles a PRC-ratified list of approved projects, including student and internal guide details, which is displayed on the departmental notice board. During the approval process, the PRC evaluates projects based on:

- **Project feasibility** (time, supervision, cost implications, equipment availability, access to necessary literature, and data availability)
- Academic challenge

# C. Process of Monitoring and Evaluation

# **C.1. Process of Monitoring**

Once the project title is confirmed and an internal guide is appointed, students are officially approved to commence their project work. The internal guide plays a crucial role in overseeing the project's development, ensuring that students are consistently aligned with their objectives and maintaining steady progress.

As part of this process, students are required to submit weekly progress reports detailing their activities, challenges faced, solutions attempted, and any key insights gained. These reports provide a structured account of the project's advancement, allowing the guide to track each phase of the work comprehensively. By reviewing these reports, the guide evaluates both the technical quality of the work and the students understanding of the project.

The guide provides constructive feedback on each report, addressing any gaps or potential issues, and offering recommendations to keep the project on course. The following corrective measures are suggested by internal guide for underperforming students in project work. These measures are expected to incorporate and make necessary revisions, and refine their project as they proceed to the next phase.

- **Identify Root Causes:** Assess skill gaps, team dynamics, interest levels, or personal challenges affecting performance.
- **Provide Focused Support:** Offer mentoring, technical workshops, and resources to address specific difficulties.
- Set Clear Milestones: Break the project into smaller tasks with deadlines and monitor progress regularly.
- Enhance Team Collaboration: Reassign roles based on strengths, resolve conflicts, and ensure balanced contributions.
- **Incorporate Continuous Feedback:** Conduct regular reviews and provide constructive, actionable guidance.
- **Motivate and Recognize Efforts:** Celebrate small achievements and highlight the projects relevance to career growth.
- **Offer Remedial Support:** Assign simpler tasks or mini-projects to build confidence and foundational skills.

In addition, the guide holds regular discussions with the students, offering technical insights, resources, and solutions to any specific challenges that may arise. This ongoing support not only ensures that the project adheres to its planned objectives and timelines but also helps students build problem-solving skills and technical knowledge through hands-on guidance. The collaborative process reinforces a strong foundation, enabling students to achieve a high-quality outcome that reflects both practical experience and academic rigor. The following figure shows the process of project monitoring. The entire process of Project monitoring is summarized in the



figure below.



# C.1. Process of Project Evaluation

Research Project - I is evaluated for a total of 100 marks, while Research Project - II is evaluated for 150 marks. For Research Project - I, the 100 marks are distributed as follows: 30 marks for Continuous Internal Evaluation (CIE) and 70 marks for the End Semester Viva-Voce Examination (SEE). Similarly, for Research Project - II, the 150 marks are allocated with 50 marks for CIE and 100 marks for the SEE.

The Continuous Internal Evaluation process for student projects is structured around a series of department reviews conducted by members of the Project Review Committee (PRC). To ensure a transparent and objective evaluation, students are given detailed evaluation guidelines at the start of each review. These guidelines outline specific criteria for assessment, helping students understand expectations and prepare thoroughly.

The PRC conducts three formal review sessions as per the following schedule. Each review is allotted 30 marks for Research Project - I and 50 marks for Research Project - II. The total marks secured by the student in each review are evaluated based on the respective marks for Research Project - I (30 marks) and Research Project - II (50 marks). The final internal marks for each candidate are determined by calculating the average of the three review scores.

S.No	Review	Time
1	<b>Guide Allotment and Finalization of Title and Abstract</b> Title finalization and Abstract submission, Guide allocation	1 <sup>st</sup> week after commencement of
2	<b>Review</b> – <b>I</b> Presentation on problem identification, literature survey, partial implementation	semester 2 <sup>nd</sup> week after commencement of semester
3	<b>Review – II</b> Progress of Project work, Challenges during implementation	7 <sup>th</sup> week after commencement of semester
4	<b>Review – III</b> Complete Project Demonstration with complete module along with Project Documentation	13 <sup>th</sup> week after commencement of semester

# Schedule of project reviews

# Table: Schedule of Project Reviews

During these reviews, the PRC closely examines the project's alignment with the proposed objectives, ensuring that it progresses in the right direction. Committee members also evaluate each student's depth of understanding of the project, their problem-solving abilities, and their individual contributions. This helps assess both the technical knowledge and teamwork skills essential for project success.

The PRC provides constructive feedback to guide students, highlighting any deficiencies, technical adjustments, or areas for improvement. This iterative feedback process not only improves the quality of the project but also fosters critical thinking, adaptability, and a hands-on approach to problem-solving. After successfully completing the three mandatory review

sessions, students proceed to the final stage of the project assessment, which involves the preparation and submission of a comprehensive project report. This report serves as a detailed documentation of the entire project, including the background research, objectives, methodology, technical implementation, results, analysis, and conclusions drawn from the work. It is essential that the report reflects both the technical rigor and depth of understanding gained through the project.



Figure: Process of Project Evaluation

Once project report preparation is completed, the report is submitted to an examiner committee for evaluation during the Project Viva Voce. During the Viva, students deliver an in-depth presentation of their project work using a PowerPoint presentation. This presentation covers all aspects of the project—from initial planning and design to the challenges faced, solutions implemented, and final outcomes. Students are expected to provide a thorough explanation of their project findings and justify their approach and decisions, demonstrating both technical and practical understanding.

The examiner committee evaluates the project based on several criteria, including the technical quality of the work, the student's depth of knowledge, problem-solving abilities, and the overall coherence and execution of the project. The committee also assesses the student's ability to clearly communicate and defend their work during the Viva. Based on this comprehensive evaluation, the committee assigns the final marks for the project, reflecting the student's performance, effort, and achievements in completing the project successfully.

Assessi	ment Tool – R24/R22 Regulation	Evaluator
<b>Continuous Internal</b> <b>Evaluation (CIE)</b> Research Project –I : 40 marks Research Project -II: 50 marks	Review I : 40 Marks (Research Project –I) 50 Marks (Research Project-II) Review II : 40 Marks (Research Project –I) 50 Marks (Research Project-II) Review III : 40 Marks (Research Project –I) 50 Marks (Research Project –I) 50 Marks (Research Project-II)	Project Review Committee
Semester End Examination (SEE) Research Project –I: 60 marks Research Project-II : 100 marks	Power Point Presentation / working model demonstration and Viva Voce 60 marks (Research Project –I) 100 Marks (Research Project –II)	Project Review Committee and External Examiner

Table: Project Assessment Tool-R24/R22 Regulation

A	Evaluator	
Continuous Internal	Review I : 30 Marks (Project-I)	
Evaluation (CIE)	50 Marks (Research Project)	Project Review

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Project –I : 30 marks	Review II: 30 Marks (Project-I)	Committee
Research Project : 50	50 Marks (Research Project)	
marks	Review III : 30 Marks (Project-I)	
	50 Marks (Research Project)	
	Final Marks : Average of (Review1, Review2, Review3)	
Semester End Examination (SEE) Project –I : 70 marks Research Project : 100 marks	Power Point Presentation / working model demonstration and Viva Voce 70 marks (Project-I) 100 Marks ( Research Project)	Project Review Committee and External Examiner

Table: Project Assessment Tool-R20 Regulation

Α	Evaluator	
<b>Continuous Internal Evaluation (CIE)</b> Project –I : 30 marks Project –II: 50 marks	Review I : 30 Marks (Project-I) 50 Marks (Project-II) Review II : 30 Marks (Project-I) 50 Marks (Project-II) Review III : 30 Marks (Project-I) 50 Marks (Project-II)	Project Review Committee
	Final Marks : Average of (Review1, Review2, Review3)	
	Power Point Presentation / working model	
Semester End	demonstration and Viva Voce	Project Review
Examination (SEE)	70 model (Broinst I)	Committee and
Project –I : 70 marks	/0 marks (Project-1)	External
Project-II: 100 marks	100 Marks (Project-II)	Examiner

Table: Project Assessment Tool-R18 Regulation

# **MODEL EVALUATION SHEETS DURING REVIEWS**



#### DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING PROJECT EVALUATION FORM <u>Project Work</u>

#### **ECE-IV B.Tech-II Semester**

**Review No: I** 

#### **Project Title:**

	Problem Statement and Literature Survey (15M)	Proposed Solution (15M)
Hall Ticket No	CO1	CO2

CO1: Independently carry out literature survey in identified domain, and consolidate it to formulate a problem statement

CO2: Apply identified knowledge to solve a complex engineering problem and design a solution, implement and test the proposed solution

**Internal Guide** 

Faculty -1

Faculty -2

H.O.D



# DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING PROJECT EVALUATION FORM

# **Project Work**

# **ECE-IV B.Tech-II Semester**

**Review No: II** 

#### **Project Title:**

	Implementation of Project (15M)	Social Impact of Project (15M)
Hall Ticket No	CO3	CO4

CO3: Use synthesis/modeling to simulate and solve a problem or apply appropriate method of analysis to draw valid conclusions and present, demonstrate, execute final version of project

CO4: Incorporate the social, environmental and ethical issues effectively into solution of an engineering problem

**Internal Guide** 

Faculty -1

Faculty -2

H.O.D



# DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING PROJECT EVALUATIONFORM

# **Project Work**

#### ECE-IV B. Tech-II Semester

**Review No: III** 

#### **Project Title:**

Hall Ticket No	Individual Contribution in Project Work (15M)	Project Documentation and Presentation (15M)			
	CO5	CO6			
CO5: Contribute effectively as a team member or leader to manage the project timeline					
CO6: Write pertinent project reports and make effective Project Presentations					

**Internal Guide** 

Faculty -1

Faculty -2

H.O.D

# C. Types and relevance of the projects and their contribution toward attainment of POs and PSOs

Projects are carefully selected to align with the Program Outcomes (POs) and Program Specific Outcomes (PSOs), ensuring that they provide students with the necessary skills and knowledge to succeed in both industry and academic research fields. By integrating real-world challenges with theoretical learning, these projects act as a pivotal foundation for students future careers.

Through these projects, students are encouraged to apply the academic concepts and principles they have learned throughout their coursework to identify and tackle problems in various domains of Electronics and Communication. This practical experience is crucial for bridging the gap between theory and practice, allowing students to develop solutions that are both technically sound and aligned with the needs of the industry. By working on these projects, students gain invaluable insights into the complexities of real-world challenges, preparing them to enter the workforce or pursue higher studies with confidence. The projects also cultivate teamwork, communication, and project management skills, which are essential for success in both industry and academic research. Ultimately, these projects serve as a stepping stone, equipping students with the skills and experience needed to excel in their chosen career paths.

The following are the outcomes of Project Work

CO1:	Independently carry out literature survey in identified domain, and consolidate it to formulate a problem statement
CO2:	Apply identified knowledge to solve a complex engineering problem and design a solution, implement and test the proposed solution
CO3:	Use synthesis/modeling to simulate and solve a problem or apply appropriate method of analysis to draw valid conclusions and present, demonstrate, execute final version of project
CO4:	Incorporate the social, environmental and ethical issues effectively into solution of an engineering problem
CO5:	Contribute effectively as a team member or leader to manage the project timeline
CO6:	Write pertinent project reports and make effective Project Presentations

The following Table shows the relevance of the projects and the attainment of POs and PSOs.

# **CO-PO-PSO Mapping:**

	PO1	PO2	PO3	PO4	PO5	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	PO10	PO11	PO12	PSO1	PSO2	PSO3
<b>CO1</b>		3										3	3	3	
<b>CO2</b>	3		3										3	3	
<b>CO3</b>				3	3								3	3	
<b>CO4</b>						3	3	3							3
CO5									3		3				3
CO6										3		3			3
Avg.	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

Table: CO-PO-PSO Mapping of Project Work

# **Innovative Product Development:**

# **R22 Regulations:**

Innovative Product Development shall be carried out in Three (5) stages: Innovative Product Development-I during II Year I semester, Innovative Product Development-II during II Year I semester, Innovative Product Development-IV during III Year I semester and Innovative Product Development-V during IV Year I Semester. Each stage will be evaluated for 100 marks. Student has to work for implementation of their innovative idea, prepare a technical report and submit it to the department. Out of a total of 100 marks for the Innovative Product Development in each stage,40 marks shall be for internal and 60 marks shall be for external end semester examination (Viva – Voce). The Internal marks evaluation shall be evaluated by the departmental committee consisting of Head of the Department, mentor and a senior faculty member. External marks shall be evaluated by the committee consisting of an external examiner from Industry; Head of the Department and mentor based on the work carried out in Innovative Product Development.

A	Evaluator	
<b>Continuous Internal</b> <b>Evaluation (CIE)</b> 40 Marks	Review - I Review - II Review - III Final Marks :Average of (Review1, Review2, Review3)	IPD Review Committee
Semester End Examination (SEE) 60 Marks	Power Point Presentation / working model demonstration and Viva Voce	IPD Review Committee and External Examiner

Table: Innovative Product Development Assessment Tool

# **R20 Regulations:**

Innovative Product Development shall be carried out in Three (3) stages: Innovative Product Development-I during III Year I semester, Innovative Product Development-II during III Year II semester, Innovative Product Development-III during IV Year I semester. Each stage will be evaluated for 100 marks. Student has to work for implementation of their innovative idea, prepare a technical report and submit it to the department. Out of a total of 100 marks for the Innovative Product Development in each stage,30 marks shall be for internal and 70 marks shall be for external end semester examination (Viva – Voce). The Internal marks evaluation shall be evaluated by the departmental committee consisting of Head of the Department, mentor and a senior faculty member. External marks shall be evaluated by the committee consisting of an

external examiner from Industry; Head of the Department and mentor based on the work carried out in Innovative Product Development.

Α	Evaluator	
<b>Continuous Internal</b> <b>Evaluation (CIE)</b> 30 Marks	Review - I Review - II Review - III Final Marks :Average of (Review1, Review2, Review3)	IPD Review Committee
Semester End Examination (SEE) 70 Marks	Power Point Presentation / working model demonstration and Viva Voce	IPD Review Committee and External Examiner

Table: Innovative Product Development Assessment Tool

# Innovation- Start-Up & Entrepreneurship:

Innovation Startup & Entrepreneurship work shall be carried out in IV Year II Semester. Each Student shall start the Innovation Startup & Entrepreneurship Work as per the instructions of the mentor assigned by the Head of Department. Student has to work for implementation of their innovative idea, prepare a technical report and submit it to the department. The technical report shall be evaluated for 100 internal marks. It shall be evaluated for 30 marks by mentor and the other 70 marks shall be awarded by a Departmental Committee consisting of Head of the Department, Senior faculty member and mentor based on the work carried out. A student shall acquire 3 credits assigned to the Innovation Startup & Entrepreneurship, when she secures 40% or more marks for the total of 100 marks. Semester End Examination for The Innovation Startup & Entrepreneurship shall be completed before the commencement of Semester End Theory examinations. There shall be no external evaluation for Innovation Startup & Entrepreneurship.

Mentor Valuation (30 Marks)	Innovative Idea and Scope (5M)	Cost Analysis (5M)	Usability (5M)	Presentation (5M)	Documentation (5M)	Viva- voce (5M)
Dept. Committee Valuation (70 Marks)	Innovative Idea and Scope (10M)	Usability (10M)	Presentation (25M)	Documentation (15M)	Viva-voce (10M)	Total (70M)

# **Technical Seminar:**

There shall be a Technical Seminar presentation in IV year II semester. For the seminar, the student shall collect the information on a specialized topic, prepare a technical report, and submit

it to the department. It shall be evaluated by the departmental committee consisting of Head of the Department, seminar supervisor and a senior faculty member. The seminar report shall be evaluated for 100 internal marks. There shall be no external evaluation for the Technical Seminar.

## **B.2 Indirect Assessment Tools:**

Mode of Assessment	Assessment Tool	Description	Evaluation of course outcomes	Frequency of Assessment
Indirect	Course End Survey	This survey gives the opinion of the student on the attainment of course outcomes	At the end of the Course, Course End Survey is collected from Individual Student and considered for the CO attainment under indirect assessment	At the end of the Course

# SAMPLE COURSE END SURVEY FORM



MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

(Autonomous Institution-UGC, Govt. of India) Accredited by NAAC with 'A+' Grade | Programmes Accredited by NBA National Ranking by NIRF Innovation – Rank band(151-300), MHRD, Govt. of India Approved by AICTE, Affiliated to JNTUH, ISO 9001:2015 Certified Institution Maisammaguda, Dhulapally, Secunderabad 500100.

#### COURSE END SURVEY BATCH:2020-24

Name(in Full): Roll No: Branch: Year/Sem: II/I

# **Course Name: Design and Analysis of Algorithms**

Rate the following Course Outcomes fulfillment as per given criteria

3-Extreemly Achieved 2-Moderately Achieved 1-Slightly Achieved

#### **Course Outcomes:**

	CO Statement	Rating
CO1	Understand algorithm efficiency through time and space complexity analysis	
CO2	Use divide-and-conquer techniques for sorting and matrix multiplication.	
CO3	Able to synthesize disjoint set operations and Understand Tree Traversal method	
CO4	Apply Greedy Algorithms and Dynamic Programming concept to solve various problems	
CO5	Apply Backtracking, Branch and Bound concept to solve various problems	
CO6	Recognize and classify NP-Hard and NP-Complete problems by analyzing non- deterministic algorithms, Cook's theorem, and complexity classes.	

SIGN

The following criteria are considered in Question wise Attainment:

**Step 1:** The Target level for the attainment of COs is based on the class average value of that course in CIA/SEE examinations.

Step 2: Identify the number of students obtained marks more than the target value, N1.

**Step 3:** Identified the number of attempted students (N2) the questions in CIA/SEE examinations for a particular CO

Step 4: Calculate the percentage of the students, (N1/N2) \*100

Step 5: The level of attainment is based on the percentage as illustrated in Table

Level	Level Percentage of students achieved threshold value	
3(High)	>=70%	
2(Moderate)	>=50% and <70%	
1(Low)	>0% and <50%	

# **Indirect Attainment of COs:**

In this method, the students are asked to submit the course end surveys at the completion of course. The questionnaires are marked on a scale of 3. In this survey, the threshold values are fixed based on the student's average feedback.

The components of COs attainment are set as given in the table

Level	Percentage of students reached expected level of answering the Survey	
3(High)	>=70%	
2(Moderate)	>=50% and <70%	
1(Low)	>0% and <50%	

# Calculation for the attainments of CO and PO/PSO:

The student performance in Continuous Internal Examination is verified in each question.

$$CO \ Attainment(Direct) = \frac{No. of \ Students \ reached \ (threshold) in \ answering \ the \ question}{No. of \ students \ attempted} * 100$$

CO Attainment(Indirect) =   

$$\frac{Sum \ of \ Students \ responses \ reached \ expected \ level \ in \ answering \ the \ survey}{No. \ of \ students \ responded} * 100$$

Weightage of attainment level calculation is 80% of direct level and 20% of indirect level of that CO.

# Therefore, **Overall CO Attainment = 0.8 \* CO attainment (Direct) + 0.2 \* CO attainment (indirect)**

Based on the CO attainments, action plan will be prepared for addressing the compliances in non-attainment of CO's.

# 10. ATTAINMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

#### A. PO/PSO - ASSESSMENT TOOLS AND PROCESSES:

The institute has the following methods for assessing attainment of POs/PSOs.

- 1. Direct method
- 2. Indirect method

The attainment levels of course outcomes help in computing the PO/PSO based upon the mapping done.

The CO values of both theory and laboratory courses with appropriate Weightage as per CO-PO mapping, as per Program Articulation Matrix are considered for calculation of direct attainment of PO/PSOs.

PO Direct Attainment = (Strength of CO-PO)\*CO attainment / Sum of CO-PO strength. The below rubrics represents the evaluation process of POs/PSOs attainment through course outcome attainment



# **PO/PSO's Assessment Process:**



#### **Direct Assessment (DA):**

The attainment is calculated as the average of all course-level PO/PSO attainments, derived from evaluations such as exams, assignments, and projects within the curriculum.

#### **Indirect** Assessment (IDA):

Feedback is collected from stakeholders through:

- Graduate Exit Surveys (feedback from final-year students),
- Alumni Surveys (feedback from alumni on the relevance of their learning), and
- Employer Surveys (feedback from employers on graduates' performance).
   The IDA is the average of these survey results.

#### Final PO/PSO Attainment Calculation:

The final attainment score is determined by a weighted formula:

- 80% from Direct Assessment
- 20% from Indirect Assessment

#### **Comparison with Target:**

If the calculated attainment meets or exceeds the set target, the program outcomes are considered achieved. Otherwise, improvement actions are initiated to address the gaps.

This process ensures a systematic evaluation of learning outcomes, enabling continuous improvement in the education program.

#### **B. THE QUALITY/RELEVANCE OF ASSESSMENT TOOLS/PROCESSES USED**

#### **R24 Regulation:**

#### **R24 REGULATION:**

SI. NO	Mode of Assessment	Course Type	Assessment Tool	Frequency of Assessment	Relevance with PO/PSO
	Direct Assessment	Direct ssessment	Theory internal examinations	Twice in a semester	PO1 to PO12 &
1			Assignments (5M)	Twice in a semester	PO1 to PO12 & PSO1 to PSO3
			Case Study/Project (5M)	Twice in a semester	PO1 to PO12 & PSO1 to PSO3
			Semester End Examination (60M)	Once per semester	PO1 to PO12 & PSO1 to PSO3
2		Laboratory	Day to day evaluation in Laboratory (10M)	continuous	PO1 to PO12 & PSO1 to PSO3
		Courses	Internal Practical Examination (10M)	Once per semester	PO1 to PO12 & PSO1 to PSO3

				_	PO1 to PO12 &
			Project(10M)	Once per semester	PSO1 to PSO3
					PO1 to PO12 &
			Viva/Case Study/ Poster	Once per semester	PSO1 to PSO3
			External Practical Examination	Once per semester	PO1 to PO12 & $PSO1 \leftarrow PSO2$
			(60M)	Once per semester	PS01 to PS03
			Innovative Product Development – I,		PO1 to PO12 &
			II III, IV & V	Once per semester	PSO1 to PSO3
			(100M)	from II Year I Sem.	
			Internal $= 40 M$	to IV Year I Sem.	
			External = 60M		
			Industry oriented Mini		PO1 to PO12 &
			Project/Summer Internship	Mini Duciaat Daviaw	PSO1 to PSO3
			(100M)	in VII Somoston	
			Internal $= 40M$	III VII Semester	
		Ducient	External = 60M		
3		Courses	Research Project I (100M)		PO1 to PO12 &
		Courses	Internal $= 40M$	Research project I -	PSO1 to PSO3
			External = 60M	VII semester &	
			& Research Project II(150M)	Research Project II-	
			Internal = 50M	VIII semester	
			External = 100M		
			Innovation- Start-Up &		PO1 to PO12 &
			Entrepreneurship		PSO1 to PSO3
			(100M)	IV Year II Semester	
			Mentor Marks = 30M		
			Dept. Committee Marks = 70M		
		Technical	Technical Seminar		PO1 to PO12 &
4		Seminor	(100M)	IV Year II Semester	PSO1 to PSO3
		Seminar	Internal		
_		~	_	At end of every	PO1 to PO12 &
5		Course End	Survey	course	PSO1 to PSO3
					PO1 to PO12 &
6		Graduate Ex	it Survey	Once per Batch	PSO1 to PSO3
v	Indirect	Gruudute EA	it Survey	once per Baten	1301 10 1303
7	Assessment			On ee nen Detek	PO1 to PO12 &
		Alumni Surv	ey	Once per Batch	PSO1 to PSO3
		<b>.</b>		Once per Batch	PO1 to PO12 &
8		Employer Su	irvey	r r Dutti	PSO1 to PSO3
				1	1

# **R22 REGULATION:**

SI.	Mode of	Course Type	Assessment Tool	Frequency of Assessment	Relevance with PO/PSO
no					
			Theory internal examinations (30M)	Twice in a semester	PO1 to PO12 & PSO1 to PSO3
		Theory	Assignments(5M)	Twice in a semester	PO1 to PO12 & PSO1 to PSO3
1		Courses	Case Study/PPT (5M)	Twice in a semester	PO1 to PO12 & PSO1 to PSO3
			Semester End Examination (60M)	Once per semester	PO1 to PO12 & PSO1 to PSO3
			Day to day evaluation in Laboratory (10M)	continuous	PO1 to PO12 & PSO1 to PSO3
			Internal Practical Examination (10M)	Once per semester	PO1 to PO12 & PSO1 to PSO3
2	Direct Assessment	Laboratory Courses t ient	Project(10M)	Once per semester	PO1 to PO12 & PSO1 to PSO3
			Viva/Case Study/Poster (10M)	Once per semester	PO1 to PO12 & PSO1 to PSO3
			External Practical Examination (60M)	Once per semester	PO1 to PO12 & PSO1 to PSO3
			Innovative Product Development – I, II III, IV & V(100M) Internal = 40M,External = 60M	Once per semester from II Year I Sem. to IV Year I Sem.	PO1 to PO12 & PSO1 to PSO3
3			Industry oriented Mini Project/Summer Internship(100M) Internal = 40M External = 60M	Mini Project Review in VII Semester	PO1 to PO12 & PSO1 to PSO3
		Project Course	Project Courses	Research Project I (100M) Internal = 40M External = 60M Research Project II(150M) Internal = 50M External = 100M	Research project I - VII semester & Research Project II- VIII semester
			Innovation- Start-Up & Entrepreneurship(100M) Mentor Marks = 30M Dept. Committee Marks = 70M	IV Year II Semester	PO1 to PO12 & PSO1 to PSO3
4		Technical Seminar	<b>Technical Seminar(100M)</b> Internal = 100M	IV Year II Semester	PO1 to PO12 & PSO1 PSO3
5	Indirect Assessment	Course End <b>S</b>	Survey	At end of every course	PO1 to PO12 & PSO1 to PSO3

Malla Reddy Engineering College for Women (Autonomous)

6		Graduate Exit Survey	Once per Batch	PO1 to PO12 & PSO1 to PSO3
7		Alumni Survey	Once per Batch	PO1 to PO12 & PSO1 to PSO3
8		Employer Survey	Once per Batch	PO1 to PO12 & PSO1 to PSO3

# **R20 REGULATION:**

SI.	Mode of	Course Tune	Assessment Teel	Frequency of	Relevance with
NO	Assessment	t Course Type	Assessment 1 001	Assessment	PO/PSO
		Theory Courses	Theory internal examinations(25M)	Twice in a semester	PO1 to PO12 & PSO1 to PSO3
1	1		Assignments(5M)	Twice in a semester	PO1 to PO12 & PSO1 to PSO3
			Semester End Examination(70M)	Once per semester	PO1 to PO12 & PSO1 to PSO3
	l		Day to day Evaluation in Laboratory (15M)	continuous	PO1 to PO12 & PSO1 to PSO3
2	l	Laboratory Courses	Internal Practical Examination(15M)	Once per semester	PO1 to PO12 & PSO1 to PSO3
			External Practical Examination(70M)	Once per semester	PO1 to PO12 & PSO1 to PSO3
	Direct Assessment	Direct ssessment Project Courses	Innovative Product Development – I, II & III (100M) Internal = 30M, External = 70M	IPD-I during III Year I semester, IPD-II during III Year II semester, IPD-III during IV Year I semester	PO1 to PO12 & PSO1 to PSO3
			<b>Industry oriented Mini Project/Summer</b> <b>Internship (100M)</b> Internal = 30M, External = 70M	Mini Project Review in VII Semester	PO1 to PO12 & PSO1 to PSO3
3	4		Project-I (100M) Internal = 30M, External = 70M Research Project(150M) Internal = 50M, External = 100M	project I -VII semester & Project II- VIII semester	PO1 to PO12 & PSO1 to PSO3
			Innovation- Start-Up & Entrepreneurship (100M) Mentor Marks = 30M Dept. Committee Marks = 70M	IV Year II Semester	PO1 to PO12 & PSO1 to PSO3
4		Technical Seminar	<b>Fechnical Seminar</b> ( <b>100M</b> ) Internal = 100M	IV Year II Semester	PO1 to PO12 & PSO1 to PSO3
5	Indirect	Course End S	Survey	At end of every course	PO1 to PO12 & PSO1

	Assessment			to PSO3
6	-	Graduate Exit Survey	Once per Batch	PO1 to PO12 & PSO1 to PSO3
7		Alumni Survey	Once per Batch	PO1 to PO12 & PSO1 to PSO3
8		Employer Survey	Once per Batch	PO1 to PO12 & PSO1 to PSO3

## **R18 REGULATION:**

SI. NO	Mode of Assessment	Course Type	Assessment Tool	Frequency of Assessment	Relevance with PO/PSO
		Theory Courses	Theory internal examinations (25M)	Twice in a semester	PO1 to PO12 & PSO1 to PSO3
1			Assignments (5M)	Twice in a semester	PO1 to PO12 & PSO1 to PSO3
			Semester End Examination (70M)	Once per semester	PO1 to PO12 & PSO1 to PSO3
			Day to day evaluation in Laboratory (15M)	continuous	PO1 to PO12 & PSO1 to PSO3
2	Direct Assessment	Laboratory Courses ect sment	Internal Practical Examination (15M)	Once per semester	PO1 to PO12 & PSO1 to PSO3
			External Practical Examination (70M)	Once per semester	PO1 to PO12 & PSO1 to PSO3
		Project	<b>Industry oriented Mini</b> <b>Project/Summer Internship (100M)</b> Internal = 30M External = 70M	Mini Project Review in VII Semester	PO1 to PO12 & PSO1 to PSO3
3		Courses	<b>Project-I (100M)</b> Internal = 30M, External = 70M <b>Project-II (150M)</b> Internal = 50M, External = 100M	project I -VII semester & Project II- VIII semester	PO1 to PO12 & PSO1 to PSO3
4		Technical Seminar	<b>Technical Seminar (100M)</b> Internal = 100M	IV Year II Semester	PO1 to PO12 & PSO1 to PSO3
5	Indirect Assessment	Course End Su	irvey	At end of every course	PO1 to PO12 & PSO1 to PSO3
6		Graduate Exit	Survey	Once per Batch	PO1 to PO12 & PSO1 to PSO3
7	Alumni Survey	Once per Batch	PO1 to PO12 & PSO1 to PSO3		
---	-----------------	----------------	-------------------------------		
8	Employer Survey	Once per Batch	PO1 to PO12 & PSO1 to PSO3		

### Average of direct attainments of PO<sub>i</sub> obtained for all Courses:

POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Direct	<b>D</b> 1	<b>D</b> <sub>2</sub>	<b>D</b> <sub>3</sub>	<b>D</b> 4	<b>D</b> 5	<b>D</b> <sub>6</sub>	<b>D</b> 7	<b>D</b> 8	D9	D <sub>10</sub>	D <sub>11</sub>	D <sub>12</sub>
Attainment												

Direct Attainment D<sub>i</sub> = Average of direct attainments of PO<sub>i</sub> obtained for all Courses.

### **Indirect Attainment:**

POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Graduate Exit Survey		Attainment values of Graduate Exit Survey										
Alumni	Attainment values of Alumni Survey											
Survey												
Employer				Attai	nment	values	s of En	nploye	r Surv	ey		
Survey												
Overall	I <sub>1</sub>	$I_2$	I <sub>3</sub>	I4	<b>I</b> 5	I <sub>6</sub>	I7	<b>I</b> 8	I9	I <sub>10</sub>	<b>I</b> 11	<b>I</b> <sub>12</sub>
Attainment												

Indirect assessment is done through Calculation of Average value of Graduate exit survey, Alumni survey and Employer Survey.

#### **Graduate Exit Survey:**

A exit survey is conducted for students who have graduated out of the department for that year. Relevant questionnaire in exit survey form to evaluate attainment of POs and PSOs is given in below sections

### Alumni Survey:

Feedback is taken from alumni. Relevant questionnaire in alumni survey form to evaluate attainment of POs and PSOs

### **Employer Survey:**

Feedback is taken from Employers. Relevant questionnaire in Employer survey form to evaluate attainment of POs and PSOs

### **Evaluation Process:**

The questionnaire consists of 12 questions which is relevant for assessing each PO and 3 questions for assessing each PSO. Each question is having 3 options namely Excellent, Very Good and satisfactory which is given marks 3,2,1 respectively. These survey results are tabulated and the average values corresponding to each PO and PSO are determined

# Indirect Attainment Ii= Average of attainment of [Graduate Exit survey + Alumni survey + Employer Survey].

POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Direct	<b>D</b> 1	<b>D</b> 2	<b>D</b> 3	<b>D</b> 4	D5	<b>D</b> 6	<b>D</b> 7	<b>D</b> 8	D9	D <sub>10</sub>	D <sub>11</sub>	D <sub>12</sub>
Attainment												
Indirect	I1	I2	I3	I4	I5	I <sub>6</sub>	<b>I</b> 7	<b>I</b> 8	I9	I <sub>10</sub>	I <sub>11</sub>	I <sub>12</sub>
Attainment												
Overall	<b>O</b> 1	<b>O</b> <sub>2</sub>	<b>O</b> <sub>3</sub>	<b>O</b> 4	<b>O</b> 5	<b>O</b> 6	<b>O</b> 7	<b>O</b> 8	<b>O</b> 9	O <sub>10</sub>	011	0 <sub>12</sub>
Attainment												

### **Overall PO and PSO attainment**

Overall Attainment of PO<sub>i</sub>;

 $O_i = 80\%$  of  $D_i + 20\%$  of  $I_i$ 

where  $D_i$  – Direct Attainment of each PO  $I_i$  – Indirect Attainment of each PO

Similarly PSO attainment is also evaluated

POs	PSO1	PSO2	PSO3
Direct Attainment	$\mathbf{D}_1$	$\mathbf{D}_2$	<b>D</b> <sub>3</sub>
Indirect Attainment	$I_1$	$I_2$	I <sub>3</sub>
Overall Attainment	<b>O</b> 1	O <sub>2</sub>	<b>O</b> 3

Overall Attainment of PSOi; Oi = 80% of Di + 20% of Ii

where Di – Direct Attainment of each PSO Ii – Indirect Attainment of each PSO



# MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

(Autonomous Institution-UGC, Govt. of India) Accredited by NAAC with 'A+' Grade | Programmes Accredited by NBA National Ranking by NIRF Innovation – Rank band(151-300), MHRD, Govt. of India Approved by AICTE, Affiliated to JNTUH, ISO 9001:2015 Certified Institution Maisammaguda, Dhulapally, Secunderabad 500100.

### GRADUATE EXIT SURVEY Academic Year: 2024-25

Name(in Full):	
Roll No:	
Branch:	
Mail-id:	
Densell A second state D Test (COE) Consideration Details for the full second in a second	

Overall Assessment of the B.Tech (CSE) Curriculum: Rate the following depending on your satisfaction with the program curriculum and education you received on following fields.

### Assessment of Program Outcomes (PO's & PSO's):

Rate the following Program Outcomes: These outcomes are the abilities/attributes expected by engineering professionals upon completion of their program.

#### Excellent (3), Very Good (2), Satisfactory (1)

POs	Program Outcomes(POs)	3	2	1
PO1	I have gained knowledge of mathematics, science, and engineering for solving Engineering problems and modeling			
PO2	I have an ability to design, simulate and conduct experiments, as well as to analyze and interpret data including hardware and software components			
PO3	I am able to apply engineering knowledge to design a complex electronic system or process to meet desired specifications and needs			
PO4	I am able to identify, formulate, comprehend, analyze, design synthesis of the information to solve complex engineering problems and provide valid conclusions.			
PO5	I have the opportunity to use the techniques, skills and modern engineering tools necessary for engineering practice			
PO6	Able to show the understanding of professional, health, safety, legal, cultural and social responsibilities			
<b>PO7</b>	I am able to understand the impact of engineering solutions in a global, economic, environmental and demonstrate the knowledge need for			

	sustainable development		
PO8	I am able to apply ethical principles, responsibility and norms of the engineering practice		
PO9	I can able to function on multi-disciplinary teams.		
PO10	I can able to communicate and present effectively		
PO11	I am able to use the modern engineering tools, techniques, skills and management principles to do work as a member and leader in a team, to manage projects in multi-disciplinary environments		
PO12	I have an ability to engage in, to resolve contemporary issues and lifelong learning		

Rate the following Program Specific Outcomes: These outcomes are the abilities/attributes exhibited by graduates of CSE Department of MRECW after completion of their program.

Excellent (3), Very Good (2), Satisfactory (1)

PSOs	Program Specific Outcomes(POs)	3	2	1
PSO1	I am able to analyze, design, code and test application specific or complex engineering problems in Cryptography and Network Security, Design and Analysis of Algorithm, Computer Networks, Data Mining, Cloud Computing, Mobile Computing, Cloud Computing, Internet of Things (IoT), Data Science, Artificial Intelligence, Machine Learning, Cyber Security, Block chain Technology, and Big Data by applying the knowledge of basic sciences, engineering mathematics and engineering fundamentals.			
PSO2	I am able to adapt for rapid changes in tools and technology with an understanding of societal and ecological issues, relevant to professional engineering practice through life-long learning.			
PSO3	I am able to function in multi-disciplinary work environment, good interpersonal skills as a leader in a team, in appreciation of professional ethics and societal responsibilities.			

**Signature of Student** 



ALUMNI SURVEY

A.Y:2024-25	
ame of the Alumni:	
atch:	
ranch:	
lail-id:	
Vorking Organization:	
osition:	

### Assessment of Program Outcomes (PO's & PSO's):

Rate the following Program Outcomes: These outcomes are the abilities/attributes expected by engineering professionals upon completion of their program

Kindly rate the following criteria on a scale of given below. Your genuine response will be helpful for the continuous quality improvement of our UG programme in CSE.

### 3. Excellent 2. Very Good 1. Good

S.No	Program Outcomes(POs)	POs	Rating
1.	How do you rate the engineering knowledge obtained during course period?	PO1	
2.	How do you find the programme related to problem analysis?	PO2	
3.	Were able to design solutions for complex engineering problems?	PO3	
4.	Did you use research based knowledge for interpreting your data during project work?	PO4	
5.	How this programme helped in applying modern tool usage for your problems?	PO5	
6.	How do you rate your understanding of impact of engineering solutions in a global on the society, economic, environmental aspects?	PO6	
7.	Did you understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.	PO7	

8.	Were you able to apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice?	PO8	
9.	Did you have opportunity to function as an individual or in a team?	PO9	
10	How do you rate your skill of communicating effectively in speech and in writing, including documentation of hardware and software systems?	PO10	
11	Were you able to manage project and finance aspects effectively in your work environment?	PO11	
12	How far this programme helped you to acquire new knowledge in the engineering discipline and to engage in life- long learning?	PO12	

# Rate the following Program Specific Outcomes: These outcomes are the abilities/attributes exhibited by graduates of CSE Department of MRECW after completion of their program.

S.No	Program Specific Outcomes(PSOs)	PSOs	Rating
1.	Are our graduates are able to analyze, design, code and test application specific or complex engineering problems in Cryptography and Network Security, Design and Analysis of Algorithm, Computer Networks, Data Mining, Cloud Computing, Mobile Computing, Cloud Computing, Internet of Things (IoT), Data Science, Artificial Intelligence, Machine Learning, Cyber Security, Block chain Technology, and Big Data by applying the knowledge of basic sciences, engineering mathematics and engineering fundamentals?	PSO1	
2.	Are our graduates are able to adapt for rapid changes in tools and technology with an understanding of societal and ecological issues, relevant to professional engineering practice through life-long learning?	PSO2	
3.	Are our graduates are able to function in multi-disciplinary work environment, good interpersonal skills as a leader in a team, in appreciation of professional ethics and societal responsibilities?	PSO3	

Any Suggestions:

## **Signature of Alumni**



# **EMPLOYER SURVEY**

### A.Y:2024-25

Name of the Company: Type of Company:

Name of the Employer:

Mail-id:

### Assessment of Program Outcomes (PO's & PSO's):

Rate the following Program Outcomes: These outcomes are the abilities/attributes expected by engineering professionals upon completion of their program

# Indicate how well do you agree with each Program Outcomes (PO)s as a predicted accomplishment for this program as per below given criterion.

3- Extremely Relevant 2-Moderately Relevant 1-Slightly Relevant

S. No	Programme Outcome	Rating
1	<b>PO1: Engineering knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization for the solution of complex engineering problems.	
2	<b>PO2: Problem analysis:</b> Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.	
3	<b>PO3: Design/Development of Solutions</b> : Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety, and cultural, societal, and environmental considerations.	
4	<b>PO4: Conduct investigations of complex problems:</b> 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	<b>PO5: Modern tool usage:</b> 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	<b>PO6: The engineer and society</b> : 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	<b>PO7: Environment and sustainability:</b> Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.	
8	<b>PO8: Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.	
9	<b>PO9: Individual and team work:</b> Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	
10	<b>PO10: Communication:</b> 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	<b>PO11 - Project management and finance:</b> 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	<b>PO12 - Life-long learning:</b> 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.	

# Indicate how well do you agree with each Program Specific Outcomes PSOs as a predicted accomplishment for this program as per below given criterion

3- Extremely Relevant 2-Moderately Relevant 1-Slightly Relevant

S.No	Program Specific Outcomes(PSOs)	Rating
1.	<b>PSO1:</b> The ability to analyze, design, code and test application specific or complex engineering problems in Cryptography and Network Security, Design and Analysis of Algorithm, Computer Networks, Data Mining, Cloud Computing, Mobile Computing, Cloud Computing, Internet of Things (IoT), Data Science, Artificial Intelligence, Machine Learning, Cyber Security, Block chain Technology and Big Data by applying the knowledge of basic sciences	

	engineering mathematics and engineering fundamentals.	
2.	<b>PSO2:</b> The ability to adapt for rapid changes in tools and technology with an understanding of societal and ecological issues, relevant to professional	
	engineering practice through life-long learning.	
2	PSO3: Excellent adaptability to function in multi-disciplinary work	
5.	environment, good interpersonal skills as a leader in a team, in appreciation	
	of professional ethics and societal responsibilities.	

Any Suggestions:

Signature of Employer

#### 11. CONTINUOUS IMPROVEMENTS OF PO'S & PSO'S

Continuous Improvement is one of the major aspects in the progress of the Institution. As Program Outcomes and Program Specific Outcomes are the expected attribute of the student immediately after completion of the program. Hence there should be a mechanism in the program to fix the targets for POs and PSOs at the beginning of the academic year for continuous improvement and check the attainment of the PO & PSOs at the after completion of the academic year. In case if the major POs/PSOs were attained higher level to be fixed for the next academic year and in case of any PO or PSO were not attained corrective action should be planned and executed.

- 1. After finalizing the CO PO, CO PSO mapping, additional activities to fill the gaps in the curriculum, by assessment committee, maximum attainment level of all POs & PSOs shall be obtained by taking the average of all the courses mapped as per the CO PO, PSO table through direct assessments.
- 2. Target attainment level of individual PO & PSO shall be fixed by the Department Advisory Board by taking average value of previous batch attainments and current batch result analysis.
- 3. As the PO & PSO were attainted through courses, and assessment committee have grouping of courses into Science & Humanities, Basic Engineering, Core Engineering, Allied Engineering, Management, Project & Seminar, they may fix varied targets for the groups with proper justification without any disturbance to the overall target attainment at PO & PSO level.
- 4. Assessment committee shall also fix the target attainment level of all the courses being run for the program as per the targets fixed for different groups of courses and forward a copy to department committee for circulation among course coordinators.
- 5. After completion of the course and announcement of result assessment committee coordinator shall collect Course wise attainment sheet from the course coordinator duly verified & signed by the head of the department, along with attainment analysis and course end suggestions in the stipulated time as instructed by head of the department.
- 6. After obtaining all the attainments from individual course coordinators and committee members they need to consolidate and arrive the direct attainment level of each PO and PSO. Also inputs for indirect attainment to be collected from Department Committee from the respective stake holders. As per the weightages they need to finalize the overall attainment of POS and PSOS for the program. Non attained POS and PSOS to be listed out and mark a copy to Department Committee.
- 7. Reasons for non-attainment of POs and PSOs if any has to be thoroughly discussed in the assessment committee meeting inviting respective course coordinators whose courses were not attained. Head of the department may seek explanation along with difficulties faced during the course and suggestion for improvement when handled next in document form

- 8. Assessment committee needs to document the attainment analysis of all POs and need to propose corrective action plan for the next academic year.
- 9. Based on the attainment levels of POs & PSOs in the current year targets shall be fixed for the next academic year with increased levels.

### PO and PSO attainment Batch Wise Analysis

PO's	Target Level	Attainment Level	Observation
POx: Statement			
POx	Target Value	Attainment Value	Remarks
Action-1: Action-2: Action-3:			

### Sample:

POs	Target	Attainment	Observation								
	Level	Level									
PO1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering											
fundamentals, and an engineering specialization to the solution of complex engineering problems.											
PO1	1.82	1.53	Requires awareness of Mathematics and Engineering fundamentals in Engineering problems.								
Action 1: Extra classes	to be conducted f	or slow learners	beyond the regular planned classes.								
Action 2: Additional M	laths classes are c	onducted during	the semester after every internal based								

Action 2: Additional Maths classes are conducted during the semester after every internal based on the performance.

Action 3: Additional topic specific tests have been conducted.

### **12. SAMPLE CO-PO/PSO COMPUTATION**

### **Course: Design and Analysis of Algorithms**

### DIRECT ASSESSMENT

### **CONTINUOUS INTERNAL ASSESSMENT-1**

					D	<b>ESCRIP</b>	TIVE						
S.No	QUESTION NO.	Q1(A)	Q1(B)	Q2(A)	Q2(B)	Q3(A)	Q3(B)	Q4(A)	Q4(B)	Q5(A)	Q5(B)	Q6(A)	Q6(B)
	ENTER MAX. MARKS	5		5		5		5		5		5	
	HT. NO.												
1	19RH1A05K9	5		5						5		5	
2	20RH1A0501					5		5		5		5	
3	20RH1A0502	5				4				5		5	
4	20RH1A0503			5		5		5				5	
5	20RH1A0504			5		5		5				4	
6	20RH1A0505			5				5		5		5	
7	20RH1A0506					5		5		5		5	
8	20RH1A0507	5		5		5		5					
9	20RH1A0509	5				5				5		5	
10	20RH1A0510	5				5		5		5			
11	20RH1A0511			5		5		5				4	
12	20RH1A0512	5		5				5				5	
13	20RH1A0513	5		5						5		5	
14	20RH1A0514			5		5		5		4			
15	20RH1A0515			5		5		5				5	
16	20RH1A0516			5		5		5				5	
17	20RH1A0517			5				5		5		4	
18	20RH1A0518					4		5		5		5	
19	20RH1A0519	5				5				5		5	
20	20RH1A0520			4		5		5				5	
21	20RH1A0521	5		5				4				5	
22	20RH1A0522			5				5		5		4	
23	20RH1A0523			5		5		5				5	
24	20RH1A0524	5				5				5		5	
25	20RH1A0525	5				4		5		4			
26	20RH1A0526	5		4				5				5	
27	20RH1A0527			5				5		5		5	
28	20RH1A0528	5				4		5		4			
29	20RH1A0529	5				5				5		5	
30	20RH1A0530	5				4		5		4			

31	20RH1A0531	5				4		5		4			
32	20RH1A0532			4		5		5		4			
33	20RH1A0533	5		5		4				5			
34	20RH1A0534	5						5		5		5	
35	20RH1A0535			5		4				3		2	
36	20RH1A0536			4		5		5		4			
37	20RH1A0537					5		4		5		5	
38	20RH1A0538			5				5		5		4	
39	20RH1A0539			5				5		5		4	
40	20RH1A0540	5		5						5		5	
41	20RH1A0541			5		4				3		2	
42	20RH1A0542			5				5		5		4	
43	20RH1A0543					4		5		5		5	
44	20RH1A0544			4		5		5		4			
45	20RH1A0545	5		5		5		5					
46	20RH1A0546			4		5		5		4			
47	20RH1A0547					4		5		5		5	
48	20RH1A0548			5		5		5				5	
49	20RH1A0549			5		5		5				5	
50	20RH1A0550	4		5		5		5					
51	20RH1A0551	5				5				5		5	
52	20RH1A0552			4		5		5		4			
53	20RH1A0553	4		5		5		5					
54	20RH1A0554			5				5		5		4	
55	20RH1A0555			5				4		5		5	
56	20RH1A0556					5		5		5		5	
57	20RH1A0557			4		5		5		4			
58	20RH1A0558	5		5						4		5	
59	20RH1A0559					4		5		5		5	
60	20RH1A0560			4		5		5				5	
Targe	t Marks	3.0	0.0	3.0	0.0	3.0	0.0	3.0	0.0	3.0	0.0	3.0	0.0
No. of Achiev Marks	Students ved Target s	24	0	40	0	43	0	47	0	43	0	41	0
% of S achiev Marks	Students /ed Target s	100.0	0	100.0	0	100.0	0	100.0	0	100.0	0	95.4	0
Quest Attain	ion wise ment Level	3	0	3	0	3	0	3	0	3	0	3	0
CO M	APPING	CO1	CO1	CO1	CO1	CO2	CO2	CO2	CO2	CO3	CO3	CO3	CO3
Final ATTA	CO INMENT	CO1	CO2	CO3	CO4	CO5	CO6						
PERC	CENTAGE	100.0	100.0	99.1									

**Target Marks for Question** =  $\left[\frac{Class Average Marks}{Maximum marks}\right] \times Maximum marks of the Question$ 

**Percentage of Students Achieved Target Marks**=  $\left[\frac{No.of Students reached Target Marks}{No.of Students attempted the Question}\right] \times 100$ 

DESCRIPTIVE OBJECTIVE												Α	TOTAL MARKS
S.No	QUESTION NO.	1	2	3	4	5	6	7	8	9	10		
	ENTER MAX. MARKS	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	30
	HT. NO.												
1	19RH1A05K9	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	30
2	20RH1A0501	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	30
3	20RH1A0502	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	29
4	20RH1A0503	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	30
5	20RH1A0504	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	29
6	20RH1A0505	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	30
7	20RH1A0506	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	30
8	20RH1A0507	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	30
9	20RH1A0509	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	30
10	20RH1A0510	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	30
11	20RH1A0511	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	29
12	20RH1A0512	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	30
13	20RH1A0513	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	30
14	20RH1A0514	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	29
15	20RH1A0515	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	30
16	20RH1A0516	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	30
17	20RH1A0517	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	29
18	20RH1A0518	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	29
19	20RH1A0519	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	30
20	20RH1A0520	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	29
21	20RH1A0521	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	29
22	20RH1A0522	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	29
23	20RH1A0523	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	30
24	20RH1A0524	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	30
25	20RH1A0525	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	28
26	20RH1A0526	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	29
27	20RH1A0527	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	30
28	20RH1A0528	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	28
29	20RH1A0529	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	30
30	20RH1A0530	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	28
31	20RH1A0531	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	28

со м	APPING	C01	CO1	CO1	C01	CO2	CO2	CO2	СОЗ	СОЗ	СОЗ		
Questi	ion wise Attainment Level	3	3	3	3	3	3	3	3	3	3	3	1
% of S Marks	Students achieved Target	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	40.0
No. of Targe	Students Achieved t Marks	60	60	60	60	60	60	60	60	60	60	60	24
Target Marks		0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	3.9	29.07
60	20RH1A0560	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	29
59	20RH1A0559	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	29
58	20RH1A0558	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	29
57	20RH1A0557	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	28
56	20RH1A0556	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	30
55	20RH1A0555	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	29
54	20RH1A0554	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	29
53	20RH1A0553	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	29
52	20RH1A0552	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	28
51	20RH1A0551	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	30
50	20RH1A0550	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	29
49	20RH1A0549	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	30
48	20RH1A0548	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	30
47	20RH1A0547	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	29
46	20RH1A0546	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	28
45	20RH1A0545	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	30
44	20RH1A0544	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	23
43	20RH1A0543	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	29
42	20RH1A0542	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	24
41	20RH1A0541	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	30
40	20RH1A0540	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	29
39	20RH1A0539	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	29
38	20RH1A0538	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	29
37	20RH140537	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	28
35	20RH1A0535	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	24
34	20RH1A0535	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	30
33	20RH1A0533	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	29
32	20RH1A0532	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	28

**Target Marks for Question** = 
$$\left[\frac{Class Average Marks}{Maximum marks}\right] \times Maximum marks of the Question$$

**Percentage of Students Achieved Target Marks**=  $\left[\frac{No.of Students reached Target Marks}{No.of Students attempted the Question}\right] \times 100$ 

Final CO ATTAINMENT	CO1	CO2	CO3	CO4	CO5	CO6
PERCENTAGE	100	100	99.1			

Calculation of CO <sub>n</sub> attainment
will be average of respective
CO <sub>n</sub> attainments

TARGET PERCENTAGE	97	TARGET= Average Marks %

CO ATTAINMENT	%	LEVEL
CO1	100	3
CO2	100	3
CO3	99.1	3
CO4		
CO5		
CO6		

**Attainment Level:** 

3 for (>=70% and <=100%), 2 for (<70% and >=50%), 1 for (<50% and >0%)

### DIRECT ASSESSMENT

### **CONTINUOUS INTERNAL ASSESSMENT-2**

	DESCRIPTIVE												
S.No	QUESTION NO.	Q1(A)	Q1(B)	Q2(A)	Q2(B)	Q3(A)	Q3(B)	Q4(A)	Q4(B)	Q5(A)	Q5(B)	Q6(A)	Q6(B)
	ENTER MAX. MARKS	5		5		5		5		5		5	
	HT. NO.												
1	19RH1A05K9	5		5						5		5	
2	20RH1A0501					5		5		5		5	
3	20RH1A0502	5				4				5		5	
4	20RH1A0503			5		5		5				5	
5	20RH1A0504			5		5		5				4	
6	20RH1A0505			5				5		5		5	
7	20RH1A0506					5		5		5		5	
8	20RH1A0507	5		5		5		5					
9	20RH1A0509	5				5				5		5	

10	20RH1A0510	5		5	5	5		
11	20RH1A0511		5	5	5		4	
12	20RH1A0512	5	5		5		5	
13	20RH1A0513	5	5			5	5	
14	20RH1A0514		5	5	5	4		
15	20RH1A0515		5	5	5		5	
16	20RH1A0516		5	5	5		5	
17	20RH1A0517		5		5	5	4	
18	20RH1A0518			4	5	5	5	
19	20RH1A0519	5		5		5	5	
20	20RH1A0520		4	5	5		5	
21	20RH1A0521	5	5		4		5	
22	20RH1A0522		5		5	5	4	
23	20RH1A0523		5	5	5		5	
24	20RH1A0524	5		5		5	5	
25	20RH1A0525	5		4	5	4		
26	20RH1A0526	5	4		5		5	
27	20RH1A0527		5		5	5	5	
28	20RH1A0528	5		4	5	4		
29	20RH1A0529	5		5		5	5	
30	20RH1A0530	5		4	5	4		
31	20RH1A0531	5		4	5	4		
32	20RH1A0532		4	5	5	4		
33	20RH1A0533	5	5	4		5		
34	20RH1A0534	5			5	5	5	
35	20RH1A0535		5	4		3	2	
36	20RH1A0536		4	5	5	4		
37	20RH1A0537			5	4	5	5	
38	20RH1A0538		5		5	5	4	
39	20RH1A0539		5		5	5	4	
40	20RH1A0540	5	5			5	5	
41	20RH1A0541		5	4		3	2	
42	20RH1A0542		5		5	5	4	
43	20RH1A0543			4	5	5	5	
44	20RH1A0544		4	5	5	4		
45	20RH1A0545	5	5	5	5			
46	20RH1A0546		4	5	5	4		
47	20RH1A0547			4	5	5	5	
48	20RH1A0548		5	5	5		5	
49	20RH1A0549		5	5	5		5	

r													
50	20RH1A0550	4		5		5		5					
51	20RH1A0551	5				5				5		5	
52	20RH1A0552			4		5		5		4			
53	20RH1A0553	4		5		5		5					
54	20RH1A0554			5				5		5		4	
55	20RH1A0555			5				4		5		5	
56	20RH1A0556					5		5		5		5	
57	20RH1A0557			4		5		5		4			
58	20RH1A0558	5		5						4		5	
59	20RH1A0559					4		5		5		5	
60	20RH1A0560			4		5		5				5	
Target	t Marks	3.0	0.0	3.0	0.0	3.0	0.0	3.0	0.0	3.0	0.0	3.0	0.0
No. of Achiev	Students ved Target Marks	24	0	40	0	43	0	47	0	43	0	41	0
% of S Target	Students achieved t Marks	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	95.4	0.0
Questi Attain	ion wise ment Level	3	0	3	0	3	0	3	0	3	0	3	0
CO M	APPING	CO4	CO4	CO4	CO4	CO5	CO5	CO5	CO5	CO6	CO6	CO6	CO6

**Target Marks for Question** =  $\left[\frac{Class Average Marks}{Maximum marks}\right] \times Maximum marks of the Question$ 

**Percentage of Students Achieved Target Marks**=  $\left[\frac{No.of Students reached Target Marks}{No.of Students attempted the Question}\right] \times 100$ 

	DESCRIPTIVE	OBJECTIVE										
S.No	QUESTION NO.	1	2	3	4	5	6	7	8	9	10	Α
	ENTER MAX. MARKS	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
	HT. NO.											
1	19RH1A05K9	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
2	20RH1A0501	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
3	20RH1A0502	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
4	20RH1A0503	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
5	20RH1A0504	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
6	20RH1A0505	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
7	20RH1A0506	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
8	20RH1A0507	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
9	20RH1A0509	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
10	20RH1A0510	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
11	20RH1A0511	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
12	20RH1A0512	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
13	20RH1A0513	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5

14	20RH1A0514	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
15	20RH1A0515	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
16	20RH1A0516	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
17	20RH1A0517	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
18	20RH1A0518	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
19	20RH1A0519	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
20	20RH1A0520	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
21	20RH1A0521	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
22	20RH1A0522	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
23	20RH1A0523	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
24	20RH1A0524	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
25	20RH1A0525	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
26	20RH1A0526	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
27	20RH1A0527	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
28	20RH1A0528	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
29	20RH1A0529	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
30	20RH1A0530	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
31	20RH1A0531	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
32	20RH1A0532	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
33	20RH1A0533	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
34	20RH1A0534	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
35	20RH1A0535	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
36	20RH1A0536	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
37	20RH1A0537	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
38	20RH1A0538	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
39	20RH1A0539	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
40	20RH1A0540	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
41	20RH1A0541	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
42	20RH1A0542	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
43	20RH1A0543	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
44	20RH1A0544	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
45	20RH1A0545	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
46	20RH1A0546	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
47	20RH1A0547	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
48	20RH1A0548	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
49	20RH1A0549	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
50	20RH1A0550	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
51	20RH1A0551	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
52	20RH1A0552	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
53	20RH1A0553	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5

54	20RH1A0554	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
55	20RH1A0555	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
56	20RH1A0556	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
57	20RH1A0557	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
58	20RH1A0558	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
59	20RH1A0559	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
60	20RH1A0560	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
Target	Marks	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	3.9
No. of S Marks	Students Achieved Target	60	60	60	60	60	60	60	60	60	60	60
% of St	udents achieved Target	100.0										
Marks		100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Marks Questio	on wise Attainment Level	3	100.0 3									

**Target Marks for Question** =  $\left[\frac{Class Average Marks}{Maximum marks}\right] \times Maximum marks of the Question$ 

**Percentage of Students Achieved Target Marks**=  $\left[\frac{No.of Students reached Target Marks}{No.of Students attempted the Question}\right] \times 100$ 

Final CO ATTAINMENT	CO1	CO2	CO3	CO4	CO5	CO6
PERCENTAGE				100	100	99.1

CO ATTAINMENT	%	LEVEL
CO1		
CO2		
CO3		
CO4	100	3
CO5	100	3
CO6	99.1	3

Calculation of CO<sub>n</sub> attainment will be average of respective CO<sub>n</sub> attainments

FINAL CO INTERNAL ATTAINMENT	%	LEVEL
CO1	100	3
CO2	100	3
CO3	99.1	3

CO4	100	3
C05	100	3
CO6	99.1	3

97	TARGET= AVERAGE MARKS %
	97

Attainment Level: 3 for (>=70% and <=100%), 2 for (<70% and >=50%), 1 for (<50% and >0%)

# DIRECT ASSESSMENT

### SEMESTER END EXAMINATION (SEE)

S.No	SCRIPT NO./OMR CODE	Q1(A)	Q1(B)	Q1(C)	Q1(D)	Q1(E)	Q1(F)	Q1(G)	Q1(H)
		2	2	2	2	2	2	2	2
1	19RH1A05K9	2			2	2	2	2	2
2	20RH1A0501	2			2		2	2	2
3	20RH1A0502	2		2		2		1	1
4	20RH1A0503	2	1	1	2	2	2	1	2
5	20RH1A0504	2			2	2	2	2	
6	20RH1A0505	2				1	1	1	2
7	20RH1A0506	2		2	2	2		2	2
8	20RH1A0507	2		2		2		2	2
9	20RH1A0509	2		2		2		2	1
10	20RH1A0510	2		2		2		2	2
11	20RH1A0511	2			2	2	2	2	2
12	20RH1A0512	2				2	2	2	2
13	20RH1A0513	2				2	2	2	2
14	20RH1A0514	2		2		2	2	2	2
15	20RH1A0515	2			2	2	2	2	2
16	20RH1A0516	2		2	2		2		2
17	20RH1A0517	2			2	1		1	2
18	20RH1A0518	2			2	2		1	2
19	20RH1A0519	2		2	2	2	2		2
20	20RH1A0520	2				2	2	2	2
21	20RH1A0521			2	2	2	2	2	1
22	20RH1A0522	1		2		2		2	2
23	20RH1A0523	1		1		2	2		2
24	20RH1A0524	2				2	2	2	2
25	20RH1A0525	2				2	2	2	2
26	20RH1A0526	2		2	2	2	2	2	
27	20RH1A0527	2		2	2	2	2	2	
28	20RH1A0528	2				2	2	2	2
29	20RH1A0529	2				2	2	2	2
30	20RH1A0530	2	1			2	2	2	
31	20RH1A0531	2			2	2		2	2
32	20RH1A0532	2		2		2		2	2

33	20RH1A0533	2			2	2	2	2	
34	20RH1A0534	2			2	2		2	2
35	20RH1A0535	2			2	2	2	2	2
36	20RH1A0536	1				1	2	2	2
37	20RH1A0537	2	1	2	2	2	2	2	2
38	20RH1A0538	2			2	2	2	2	2
39	20RH1A0539	2			2		2	2	2
40	20RH1A0540	2			2	2	2	2	
41	20RH1A0541	2	1			2	2	2	2
42	20RH1A0542	2			2	2	2	2	2
43	20RH1A0543	2			2	2	2	2	2
44	20RH1A0544	2				2	2	2	2
45	20RH1A0545	2			2	2	2	2	2
46	20RH1A0546	2			2	2	2	2	2
47	20RH1A0547	2		1		1		2	2
48	20RH1A0548	2		2		2		2	2
49	20RH1A0549	2			2	2	2	2	2
50	20RH1A0550	2				2	2	2	2
51	20RH1A0551	2			2	2	2	2	
52	20RH1A0552	2		2		2		2	2
53	20RH1A0553	2		2		2		2	2
54	20RH1A0554	2	1	1	1	2	1	2	2
55	20RH1A0555	2			2	2	1		2
56	20RH1A0556	2	2	2	2	2	2	2	2
57	20RH1A0557	2		2		2		2	2
58	20RH1A0558	2				2	2	2	2
59	20RH1A0559	2				2	2	2	2
60	20RH1A0560	2	2			2	2	2	2
Target N	Aarks	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
No. of St Marks	udents Achieved Target	59	7	23	31	57	44	56	53
% of Stu Marks	% of Students achieved Target Marks		100.00	100.00	100.00	100.00	100.00	100.00	100.00
Question	ı wise Attainment Level	3	3	3	3	3	3	3	3
CO MAI	PPING	C01	C01	CO2	CO2	CO3	CO4	CO5	CO6

S.No	SCRIPT NO./OMR CODE	Q2(A)	Q2(B)	Q3(A)	Q3(B)	Q4(A)	Q4(B)	Q5(A)	Q5(B)	Q6(A)	Q6(B)	Q7(A)
		6	6	6	6	6	6	12		6	6	6
1	19RH1A05K9	5	5					9		4	3	
2	20RH1A0501			3	5			9		5	4	
3	20RH1A0502	5	5					1				4
4	20RH1A0503	5	5					1				4
5	20RH1A0504	5	5					9		5	5	
6	20RH1A0505	5	5					9				4
7	20RH1A0506	5	5					1				5
8	20RH1A0507	5	5					8				5
9	20RH1A0509	5	5					9				5
10	20RH1A0510	5	5					1				5
11	20RH1A0511	6	6					11		5	5	
12	20RH1A0512			5	4			8				5
13	20RH1A0513			5	4			9				5
14	20RH1A0514	5	5					8				4
15	20RH1A0515	5	5					9				5
16	20RH1A0516	5	5					9				5
17	20RH1A0517	5	5					9				3
18	20RH1A0518			5	5			9				5
19	20RH1A0519	5	5					9				4
20	20RH1A0520	5	2					1				5
21	20RH1A0521			5	4			9				5
22	20RH1A0522	5	5					1				5
23	20RH1A0523	6	5					9				5
24	20RH1A0524			5	5			9				5
25	20RH1A0525	5	5					1				5
26	20RH1A0526	5	5					8				5
27	20RH1A0527	5	5					1				5
28	20RH1A0528			5	5			1		5	5	
29	20RH1A0529	5	5					9				4
30	20RH1A0530	5	5					9				5
31	20RH1A0531	5	2					8		2	4	4
32	20RH1A0532	5	5					9				5
33	20RH1A0533	5	5					9		3	5	
34	20RH1A0534	5	5					9				5
35	20RH1A0535	6	5					1				5
36	20RH1A0536	5	5					9				4
37	20RH1A0537	6	5					9				5

38	20RH1A0538	5	5					9				5
39	20RH1A0539	6	5					1				5
40	20RH1A0540	5	5					9				5
41	20RH1A0541	5	5					9				5
42	20RH1A0542			5	5			9				5
43	20RH1A0543	5	5					8				5
44	20RH1A0544	5	5					1				5
45	20RH1A0545	5	5					1				5
46	20RH1A0546	5	5					9				5
47	20RH1A0547	5	5					1				4
48	20RH1A0548	5	5					6		5	5	
49	20RH1A0549	5	4					7		4	4	5
50	20RH1A0550	5	4					11				6
51	20RH1A0551	6	5					8				5
52	20RH1A0552	5	5					9		5		4
53	20RH1A0553	5	5					9				5
54	20RH1A0554	5	5					8		5	5	
55	20RH1A0555	5	5					9				5
56	20RH1A0556	5	5	1				9				5
57	20RH1A0557	5	5					1				4
58	20RH1A0558	5	5					9				5
59	20RH1A0559	5	5					9				4
60	20RH1A0560	5	5					9		5	5	
Target	Marks	4.00	4.00	4.00	4.00	4.00	4.00	9.00	0.00	4.00	4.00	4.00
No. of Target	Students Achieved Marks	52	50	7	8	0	0	35	0	10	10	50
% of S Target	tudents achieved Marks	100.00	96.15	77.78	100.00	0.00	0.00	58.33	0.00	83.33	90.91	98.04
Questi Level	on wise Attainment	3	3	3	3	0	1	2	1	3	3	3
CO M	APPING	CO1	CO1	CO1	CO1	CO2	CO2	CO2	CO3	CO3	CO3	CO3

S.No	SCRIPT NO./OMR CODE	Q7(B)	<b>Q8(A)</b>	Q8(B)	Q9(A)	Q9(B)	Q10(A)	Q10(B)	Q11(A)	Q11(B)	TOTAL MARKS
		6	6	6	6	6	12		12		70
1	19RH1A05K9		3	3			8		3		5
2	20RH1A0501				5	5			8		54
3	20RH1A0502	4	5	5			7				53
4	20RH1A0503	5			4	4			7		54
5	20RH1A0504				4	5	6				54

6	20RH1A0505	4			4	4	7		49
7	20RH1A0506	5	5	4			9		58
8	20RH1A0507	5			5	5	1		58
9	20RH1A0509	5			5	4	9		56
10	20RH1A0510	4		5	5		9		53
11	20RH1A0511		4	5			11		63
12	20RH1A0512	5			4	4		8	53
13	20RH1A0513	5	5	5				9	57
14	20RH1A0514	4			5	5	9		55
15	20RH1A0515	5	5	5			9		58
16	20RH1A0516	5	4	4				8	55
17	20RH1A0517	3			4	4	9		5
18	20RH1A0518	5			5	4		8	55
19	20RH1A0519	4			5	4	1		56
20	20RH1A0520	5			5	5		8	55
21	20RH1A0521	5			4	5		8	55
22	20RH1A0522	5			5	5	8		57
23	20RH1A0523	5			4	4	9		55
24	20RH1A0524	3			5	5	9		56
25	20RH1A0525	5			5	5		1	6
26	20RH1A0526	5			5	5	9		57
27	20RH1A0527	5			5	5	9		59
28	20RH1A0528		5	5				9	59
29	20RH1A0529	4	4	4				9	54
30	20RH1A0530	5			5	5	9		57
31	20RH1A0531				4	4	8		47
32	20RH1A0532	5	5	5			9		58
33	20RH1A0533				5	5	9		56
34	20RH1A0534	5	5	5				9	58
35	20RH1A0535	5	1		5	5	9		6
36	20RH1A0536	4			4	5	9		53
37	20RH1A0537	5	4	4				8	56
38	20RH1A0538	5	5	5			1	6	59
39	20RH1A0539	5			5	4	8		58
40	20RH1A0540	5	5	5			9		58
41	20RH1A0541	5			4	5	8		56
42	20RH1A0542	5	4	4			9		56
43	20RH1A0543	5	5	5			8		56
44	20RH1A0544	5			4	5		9	58
45	20RH1A0545	5	5	5			9		59

46	20RH1A0546	5			4	4	9				56
47	20RH1A0547	5			4	4	5				5
48	20RH1A0548				5	5	9				55
49	20RH1A0549	4	3	3			6				47
50	20RH1A0550	5	5	5			1				61
51	20RH1A0551	5	5	5			9				58
52	20RH1A0552	4			5	5	9				56
53	20RH1A0553	5			5	5	9				58
54	20RH1A0554		5	5					8		55
55	20RH1A0555	5			4	4			7		53
56	20RH1A0556	5			4	5	1				58
57	20RH1A0557	5	5	5					1		59
58	20RH1A0558	5	5	5			9				58
59	20RH1A0559	4			4	3	9				53
60	20RH1A0560		5	4			1				58
Target	Marks	4.00	4.00	4.00	4.00	4.00	9.00	0.00	9.00	0.00	51.75
No. of S Target	Students Achieved Marks	48	22	23	36	34	26	0	5	0	52
% of S Target	tudents achieved Marks	96.00	88.00	92.00	100.00	97.14	60.47	0.00	26.32	0.00	86.67
Questio Level	on wise Attainment	3	3	3	3	3	2	1	1	1	3
CO MA	APPING	CO4	CO4	CO4	CO5	CO5	CO5	CO6	CO6	CO6	

**Target Marks for Question** =  $\left[\frac{Class Average Marks}{Maximum marks}\right] \times Maximum marks of the Question$ 

**Percentage of Students Achieved Target Marks**=  $\left[\frac{No.of Students reached Target Marks}{No.of Students attempted the Question}\right] \times 100$ 

Final CO ATTAINMENT	CO1	CO2	CO3	CO4	CO5	CO6
PERCENTAGE	95.36	85.41	96.56	92.64	79.56	61.17

CO ATTAINMENT	%	LEVEL
CO1	95.36	3
CO2	85.4	3
CO3	96.6	3
CO4	92.6	3
CO5	79.6	3
CO6	61.2	2

Calculation of CO <sub>n</sub> attainment
will be average of respective
CO <sub>n</sub> attainments

### TARGET PERCENTAGE

72

**TARGET= AVERAGE MARKS. %** 

OVERALL INTERNAL EXAM CO ATTAINMENT									
CO ATTAINMENT	%	LEVEL							
C01	<b>99.7</b>	3							
CO2	<b>99.4</b>	3							
CO3	99.3	3							
CO4	<b>99.7</b>	3							
CO5	99.4	3							
CO6	99.3	3							
Average of Internal Exam Attainment	99.4	3							

OVERALL DIRECT CO ATTAINMENT( 70% E.A+30% I.A)									
CO ATTAINMENT	%	LEVEL							
C01	96.7	3							
CO2	89.6	3							
CO3	97.4	3							
CO4	94.8	3							
CO5	85.5	3							
CO6	72.6	3							
Average of CO Attainment	89.4	3							

OVERALL END EXAM CO ATTAINMENT								
CO ATTAINMENT	%	LEVEL						
CO1	95.4	3						
CO2	85.4	3						
CO3	96.6	3						
CO4	92.6	3						
CO5	79.6	3						
CO6	61.2	2						
Average of End Exam Attainment	85.1	3						

**Overall Direct CO Attainment =** 

70% of Semester End Exam CO Attainment + 30% of Internal Exam CO Attainment

# INDIRECT ASSESSMENT COURSE END SURVEY

COURSE END SURVEY											
S.No	No.         CO1         CO2         CO3         CO4         CO5										
1	20RH1A0401	3	3	3	3	3	3				
2	20RH1A0402	3	3	3	3	3	3				
3	20RH1A0403	3	3	3	3	3	3				
4	20RH1A0404	3	3	3	3	3	3				
5	20RH1A0405	3	3	3	3	3	3				
6	20RH1A0406	2	3	3	3	2	3				
7	20RH1A0407	3	3	3	3	3	3				
8	20RH1A0408	3	2	3	2	3	2				
9	20RH1A0409	3	3	3	3	3	3				
10	20RH1A0410	3	3	3	2	3	3				
11	20RH1A0411	3	3	3	3	3	3				
12	20RH1A0412	3	3	3	3	3	3				
13	20RH1A0413	3	2	2	3	3	2				
14	20RH1A0414	3	3	3	3	3	3				
15	20RH1A0415	3	3	3	3	3	3				
16	20RH1A0416	3	3	3	3	3	3				
17	20RH1A0417	3	3	3	3	3	3				
18	20RH1A0418	3	3	3	3	3	3				
19	20RH1A0419	3	3	2	3	3	3				
20	20RH1A0420	3	3	3	3	3	3				
21	20RH1A0421	3	3	3	3	3	3				
22	20RH1A0422	3	2	3	3	3	2				
23	20RH1A0423	3	3	2	3	3	3				
24	20RH1A0424	3	3	3	3	3	3				
25	20RH1A0425	3	3	3	3	3	3				
26	20RH1A0426	3	3	2	3	3	3				
27	20RH1A0427	2	3	3	3	2	3				
28	20RH1A0428	3	3	3	3	3	3				
29	20RH1A0429	3	3	3	3	3	3				
30	20RH1A0430	3	3	3	3	3	3				
31	20RH1A0431	3	2	3	3	3	2				
32	20RH1A0432	3	3	3	2	3	3				
33	20RH1A0433	3	3	3	3	3	3				
34	20RH1A0434	3	3	3	3	3	3				

35	20RH1A0435	3	3	2	2	3	3
36	20RH1A0436	3	3	3	3	3	3
37	20RH1A0437	3	3	3	3	3	3
38	20RH1A0438	3	3	3	3	3	3
39	20RH1A0439	2	3	2	3	2	3
40	20RH1A0440	3	3	3	3	3	3
41	20RH1A0441	3	3	3	3	3	3
42	20RH1A0442	3	3	3	3	3	3
43	20RH1A0443	2	2	3	3	2	2
44	20RH1A0444	3	3	3	3	3	3
45	20RH1A0445	3	3	3	3	3	3
46	20RH1A0446	3	3	3	3	3	3
47	20RH1A0447	3	3	3	2	3	3
48	20RH1A0448	3	3	3	3	3	3
49	20RH1A0449	3	2	2	3	3	2
50	20RH1A0450	3	3	3	3	3	3
51	20RH1A0451	3	3	3	3	3	3
52	20RH1A0452	3	2	3	3	3	2
53	20RH1A0453	3	3	2	3	3	3
54	20RH1A0454	3	3	3	3	3	3
55	20RH1A0455	3	3	3	3	3	3
56	20RH1A0456	3	3	3	3	3	3
57	20RH1A0457	3	3	3	3	3	3
58	20RH1A0458	3	3	3	3	3	3
59	20RH1A0459	3	3	3	2	3	3
60	20RH1A0460	3	3	3	3	3	3
Target	t Level	2.93	2.88	2.87	2.90	2.93	2.88
No. of	Students Achieved Target Level	56	53	52	54	56	53
% of S	tudents achieved Target Level	93.33	88.33	86.67	90	93.33	88.33
CO wi	se Attainment Level	3	3	3	3	3	3
CO M	APPING	CO1	CO2	CO3	CO4	CO5	CO6

Attainment Level:

3 for (>=70% and <=100%), 2 for (<70% and >=50%), 1 for (<50% and >0%)

DIRECT CO ATTAINMENT( 70% E.A+30% I.A)								
CO ATTAINMENT	%	LEVEL						
C01	96.65	3						
CO2	89.59	3						
CO3	97.38	3						
CO4	94.76	3						
CO5	85.49	3						
CO6	72.60	2						
Average of Direct CO Attainment	89.41	2.83						

INDIRECT CO ATTAINMENT									
CO ATTAINMENT	%	LEVEL							
CO1	93.33	3							
CO2	88.33	3							
CO3	86.67	3							
CO4	90	3							
CO5	93.33	3							
CO6	88.33	3							
Average of Indirect CO Attainment	90.00	3.00							

	Target`	79			
OVERALL CO ATT.	AINMENT( 80% ]				
CO ATTAINMENT	%	LEVEL	OBSERVATION		
C01	95.99	2.88	TARGET ATTAINED		
CO2	89.34	2.68	TARGET ATTAINED		
CO3	95.24	2.86	TARGET ATTAINED		
CO4	93.80	2.81	TARGET ATTAINED		
CO5	87.06	2.61	TARGET ATTAINED		
CO6	75.75	2.27	TARGET NOT REACHED		
Average of CO Attainment	89.53	2.69	TARGET ATTAINED		

**Target for Overall CO Attainment** = Internal Exam Target + Semester End Exam Target Value

**Overall CO Attainment** = 80% of Direct Attainment + 20% of Indirect Attainment

Attainment Level = CO Attainment Percentage X Maximum Attainment Level (3)



### **Corrective Actions of the course Design and Analysis of Algorithms:**

	Course outcome	Attai	inment Perce	Observation	
	Course outcome	Direct	Indirect	Overall	Observation
CO1	Understand algorithm efficiency through time and space complexity analysis	96.65	93.33	95.99	TARGET ATTAINED
CO2	Use divide-and-conquer techniques for sorting and matrix multiplication.	89.59	88.33	89.34	TARGET ATTAINED
CO3	Able to synthesize disjoint set operations and Understand Tree Traversal method	97.38	86.67	95.24	TARGET ATTAINED
CO4	Apply Greedy Algorithms and Dynamic Programming concept to solve various problems	94.76	90	93.80	TARGET ATTAINED
CO5	Apply Backtracking, Branch and Bound concept to solve various problems	85.49	93.33	87.06	TARGET ATTAINED
CO6	Recognize and classify NP-Hard and NP- Complete problems by analyzing non- deterministic algorithms, Cook's theorem, and complexity classes.	72.60	88.33	75.75	TARGET NOT ATTAINED
	Average Value			89.53	TARGET ATTAINED

In view of continuously improve Quality, the corrective actions for a sample course:

All Course outcomes are NOT Attained.

From the above subject all COs are not attained so that we need to take an action for the not attained COs.

### Actions Taken (CO 6):

Additional hands-on programming sessions will be conducted to practice algorithms like NP-Hard and NP-Complete problems and on cook's theorem.

These sessions will be supplemented with real-world problem-solving assignments, peer discussions, and targeted quizzes to reinforce key concepts and improve proficiency.

COURSE CO-PO-PSO ARTICULATION MATRIX																
Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
<b>CO1</b>		3	3		2									3		
CO2		3	3	2	2									3		
CO3		3	3	2	2									3		
CO4		3	3	3	3									3		
CO5		3	3	3	3	3							3	3	3	
CO6		3	3		2									3	3	
	AVERAGE	3	3	2.5	2.3	3							3	3	3	

	COURSE CO-PO-PSO ATTAINMENT MATRIX															
Course Outcome	FINAL CO ATTAINE MENT	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	2.88	2.8	2.8		1.9									2.88		
CO2	2.68	2.6	2.6	1.78	1.7									2.68		
CO3	2.86	2.8	2.8	1.90	1.9									2.85		
CO4	2.81	2.8	2.8	2.81	2.8									2.81		
CO5	2.61	2.6	2.6	2.61	2.6	2.6							2.61	2.61	2.61	
CO6	2.27	2.2	2.2		1.5									2.27	2.27	
	AVERAGE	2.6	2.6	2.2	2.0	2.6							2.61	2.69	2.44	

 $PO_{n} \text{ Attainment Calculation} = \left[\frac{Final CO Attainment Level}{Maximum Attainment Level (3)}\right] \mathbf{X} \text{ CO}_{n} - PO_{n} \text{ Mapping Value.}$   $PSO_{n} \text{ Attainment Calculation} = \left[\frac{Final CO Attainment Level}{Maximum Attainment Level (3)}\right] \mathbf{X} \text{ CO}_{n} - PSO_{n} \text{ Mapping Value.}$ 

### 13. RECORD OF CO, PO & PSO EVALUATION

# Attainment Levels of Course Outcomes for the 2020 Admitted batch of students

C	Course			CO A	TTAINME	NT %	Attainmont
No	Code	Subject Name	CO	Direct	Indirect	Over all	Level
			CO1	92.57	98.33	93.72	2.81
			CO2	78.61	90.79	81.04	2.43
C101	200005001	Mathematica	CO3	83.16	89.96	84.52	2.54
C101	2000BS01	Mathematics – I	CO4	93.58	89.54	92.77	2.78
			CO5	85.44	93.72	87.10	2.61
			CO6	85.35	94.14	87.10	2.61
			CO1	84.09	98.33	86.94	2.61
			CO2	77.32	90.79	80.01	2.40
G103	200000000		CO3	92.58	89.96	92.06	2.76
C102	2000BS05	Applied Physics	CO4	90.39	89.54	90.22	2.71
			CO5	84.79	93.72	86.57	2.60
			CO6	88.22	94.14	89.40	2.68
			CO1	85.41	98.33	88.00	2.64
C103 2005ES01			CO2	76.77	90.79	79.57	2.39
	00055001	Programming for	CO3	76.91	89.96	79.52	2.39
	2005ES01	Problem Solving	CO4	91.01	89.54	90.71	2.72
			CO5	81.43	93.72	83.88	2.52
			CO6	76.88	94.14	80.34	2.41
			CO1	95.16	98.33	95.79	2.87
			CO2	86.74	86.61	86.72	2.60
C104	20025501	Engineering Drawing	CO3	96.06	86.19	94.09	2.82
C104	2005E501		CO4	98.01	87.03	95.81	2.87
			CO5	91.94	92.89	92.13	2.76
			CO6	92.29	92.89	92.41	2.77
			CO1	96.05	97.07	96.25	2.89
			CO2	96.05	97.49	96.33	2.89
C105	200008561	Applied Physics Lab	CO3	96.05	96.23	96.08	2.88
C105	20000501	Applied Fliysles Lab	CO4	96.05	94.56	95.74	2.87
			CO5	96.05	97.49	96.33	2.89
			CO6	96.05	96.23	96.08	2.88
			CO1	98.8	97.07	98.45	2.95
			CO2	98.8	97.49	98.53	2.96
C106	2005ES61	Programming for	CO3	98.8	96.23	98.28	2.95
C100	2003ES01	Problem Solving Lab	CO4	98.8	94.56	97.94	2.94
			CO5	98.8	97.49	98.53	2.96
			CO6	98.8	96.23	98.28	2.95
C107	2000BS02	Mathematics – II	CO1	70.46	95.82	75.53	2.27
0107	200000002	manematics – 11	CO2	88.55	93.72	89.58	2.69

			CO3	77.02	96.23	80.86	2.43
			CO4	73.52	97.49	78.31	2.35
			CO5	88.94	94.56	90.07	2.70
			CO6	80.62	94.56	83.41	2.50
C108	2005ES02	Python Programming	CO1	62.22	95.82	68.94	2.07
			CO2	78.78	93.72	81.77	2.45
			CO3	63.65	96.23	70.17	2.11
			CO4	62.95	97.49	69.86	2.10
			CO5	63.9	94.56	70.03	2.10
			CO6	72.1	94.56	76.59	2.30
C109	2000HS01	English	CO1	72.24	95.82	76.96	2.31
			CO2	94.42	93.72	94.28	2.83
			CO3	88.80	96.23	90.29	2.71
			CO4	73.06	97.49	77.95	2.34
			CO5	77.32	94.56	80.77	2.42
			CO6	86.47	94.56	88.09	2.64
C110	2002ES01	Basic Electrical Engineering	CO1	63.48	95.82	69.95	2.10
			CO2	61.81	93.72	68.19	2.05
			CO3	43.63	96.23	54.15	1.62
			CO4	67.01	97.49	73.10	2.19
			CO5	55.41	94.56	63.24	1.90
			CO6	71.50	94.56	76.11	2.28
C111	2003ES61	Engineering Workshop	CO1	93.64	97.07	94.33	2.83
			CO2	93.64	97.49	94.41	2.83
			CO3	93.64	96.23	94.16	2.82
			CO4	93.64	94.56	93.82	2.81
			CO5	93.64	97.49	94.41	2.83
			CO6	93.64	96.23	94.16	2.82
C112	2002ES61	Basic Electrical Engineering Lab	CO1	81.91	97.07	84.94	2.55
			CO2	81.91	97.49	85.03	2.55
			CO3	81.91	96.23	84.78	2.54
			CO4	81.91	94.56	84.44	2.53
			CO5	81.91	97.49	85.03	2.55
			CO6	81.91	96.23	84.78	2.54
C113	2005ES62	Python Programming Lab	CO1	84.27	97.07	86.83	2.60
			CO2	84.27	97.49	86.91	2.61
			CO3	84.27	96.23	86.66	2.60
			CO4	84.27	94.56	86.32	2.59
			CO5	84.27	97.49	86.91	2.61
			CO6	84.27	96.23	86.66	2.60
C114	2000HS61	English Language & Communication Skills Lab	C01	87.33	97.07	89.28	2.68
			CO2	87.33	97.49	89.36	2.68
			CO3	87.33	96.23	89.11	2.67
			CO4	87.33	94.56	88.78	2.66
			CO5	87.33	97.49	89.36	2.68
			CO6	87.33	96.23	89.11	2.67
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			CO1	76.81	97.68	80.98	2.43
			CO2	65.68	89.58	70.46	2.11
C201	20000504	Drobability & Statistics	CO3	82.14	89.58	83.63	2.51
C201	20000504	FIODADIIITY & Statistics	CO4	85.44	88.03	85.95	2.58
			CO5	84.4	89.58	85.44	2.56
			CO6	85.85	88.03	86.29	2.59
			CO1	85.38	97.68	87.84	2.64
			CO2	76.76	89.58	79.32	2.38
C202	20045501	Analog & Digital	CO3	77.86	89.58	80.20	2.41
C202	2004L501	Electronic Circuits	CO4	83.93	88.03	84.75	2.54
			CO5	77.03	97.68	81.16	2.43
			CO6	100.0	89.58	97.92	2.94
			CO1	91.47	97.68	92.71	2.78
			CO2	86.51	89.58	87.12	2.61
C202	2005DC01	Data Structures &	CO3	81.41	89.58	83.04	2.49
C205	2003FC01	Algorithms	CO4	98.10	88.03	96.09	2.88
			CO5	95.43	97.68	95.88	2.88
			CO6	99.63	89.58	97.62	2.93
			CO1	97.55	97.68	97.57	2.93
			CO2	84.26	89.58	85.32	2.56
C204	20050002	5PC02 Operating System	CO3	94.82	89.58	93.77	2.81
C204	2005PC02 Operating System	CO4	95.65	88.03	94.13	2.82	
			CO5	95.83	97.68	96.20	2.89
			CO6	100.0	89.58	97.92	2.94
			CO1	84.62	97.68	87.24	2.62
			CO2	78.86	89.58	81.00	2.43
0005	20050002		CO3	77.19	89.58	79.67	2.39
C205	2005PC03	Discrete Mathematics	CO4	81.24	88.03	82.59	2.48
			CO5	81.94	97.68	85.09	2.55
			CO6	99.81	89.58	97.76	2.93
			CO1	90.96	97.07	92.18	2.77
			CO2	90.96	97.49	92.26	2.77
<b>GO</b> 06		Data Structures &	CO3	90.96	96.23	92.01	2.76
C206	2005PC61	Algorithms Lab	CO4	90.96	94.56	91.68	2.75
			CO5	90.96	97.49	92.26	2.77
			CO6	90.96	96.23	92.01	2.76
			C01	85.65	97.07	87.93	2.64
			CO2	85.65	97.49	88.01	2.64
		CO3	85.65	96.23	87.76	2.63	
C207	2005PC62	Operating System Lab	CO4	85.65	94.56	87.43	2.62
			C05	85.65	97.49	88.01	2.64
			C06	85.65	96.23	87.76	2.63
C208	2000HS03	Managerial Economics	C01	97.42	96.53	97.24	2.92

		and Financial Analysis	CO2	86.07	87.64	86.38	2.59
			CO3	94.10	87.26	92.73	2.78
			CO4	94.08	86.49	92.56	2.78
			CO5	90.63	88.03	90.11	2.70
			CO6	79.70	86.87	81.13	2.43
			CO1	96.29	97.68	96.57	2.90
			CO2	85.91	89.58	86.64	2.60
C200	20050005		CO3	92.31	89.58	91.76	2.75
C209	2005PC05	Software Engineering	CO4	92.34	88.03	91.48	2.74
			CO5	95.45	89.58	94.27	2.83
			CO6	93.54	89.58	92.75	2.78
			CO1	90.80	97.68	92.18	2.77
			CO2	85.07	89.58	85.97	2.58
C210	20040E01	Computer Organization	CO3	90.05	89.58	89.95	2.70
C210	2004OE01	Computer Organization	CO4	82.72	88.03	83.78	2.51
			CO5	91.32	88.42	90.74	2.72
			CO6	84.46	86.87	84.94	2.55
			CO1	97.30	97.30	97.30	2.92
			CO2	85.84	88.80	86.43	2.59
C211	2005PC04	Object Oriented Programming through	CO3	93.58	89.58	92.78	2.78
C211	20031 C04	Java	CO4	85.12	88.03	85.70	2.57
		buru	CO5	93.04	88.42	92.12	2.76
			CO6	83.01	89.19	84.24	2.53
			CO1	79.22	94.19	82.21	2.47
			CO2	69.86	86.43	73.17	2.20
C212	2005PC07	Formal Language &	CO3	76.91	87.60	79.05	2.37
C212	20051 C07	Automata Theory	CO4	68.26	86.05	71.82	2.15
			CO5	84.63	87.21	85.14	2.55
			CO6	74.59	85.66	76.80	2.30
			CO1	86.21	86.49	86.26	2.59
			CO2	86.01	87.64	86.34	2.59
C213	2005PC08	Database Management	CO3	84.67	87.26	85.19	2.56
0215	20051 000	Systems	CO4	91.94	87.64	91.08	2.73
			CO5	73.17	94.98	77.53	2.33
			CO6	81.69	86.10	82.57	2.48
			CO1	90.10	97.07	91.49	2.74
		Object Oriented	CO2	90.10	97.49	91.57	2.75
C214	2005PC63	Programming through	CO3	90.10	96.23	91.32	2.74
	20001 000	263 Programming through Java Lab		90.10	94.56	90.99	2.73
			CO5	90.10	97.49	91.57	2.75
			CO6	90.10	96.23	91.32	2.74
C215	2005PC64	Database Management	C01	88.63	97.07	90.32	2.71
213	20001 001	Systems Lab	CO2	88.63	97.49	90.40	2.71

			CO3	88.63	96.23	90.15	2.70
			CO4	88.63	94.56	89.82	2.69
			CO5	88.63	97.49	90.40	2.71
			CO6	88.63	96.23	90.15	2.70
			CO1	87.66	97.69	89.66	2.69
			CO2	75.97	89.62	78.70	3.00
C201	200011504	Managamant Saianaa	CO3	78.69	96.92	82.34	3.00
C301	20001504	Management Science	CO4	79.10	96.92	82.67	3.00
			CO5	81.54	93.85	84.01	3.00
			CO6	78.39	94.62	81.63	3.00
			CO1	93.25	97.69	94.13	2.82
			CO2	95.54	89.62	94.36	2.83
C302	2005000	Compilar Design	CO3	92.83	89.62	92.19	2.77
C302	20031 C09	Compiler Design	CO4	97.24	88.08	95.40	2.86
			CO5	94.04	88.08	92.85	2.79
			CO6	94.09	88.08	92.89	2.79
			CO1	96.65	97.68	96.86	2.91
			CO2	89.59	89.58	89.59	2.69
C303	2005PC10	Design and Analysis of	CO3	97.38	89.58	95.82	2.87
C303	20031 C10	Algorithms	CO4	94.76	88.03	93.41	2.80
		CO5	85.49	97.68	87.93	2.64	
			CO6	74.60	91.58	79.83	2.78
			CO1	88.13	97.69	90.04	2.70
			CO2	85.62	89.62	86.42	2.59
C304	2005PC11	Computer Networks	CO3	80.06	89.62	81.97	2.46
0.504	20031 C11	Computer Networks	CO4	83.02	88.08	84.03	2.52
			CO5	84.24	97.69	86.93	2.61
			CO6	83.36	89.62	84.61	2.54
			CO1	94.77	97.69	95.36	2.86
			CO2	99.02	89.62	97.14	2.91
C305		Foundations of Data	CO3	91.46	89.62	91.10	2.73
0.505	2012PE01	Science	CO4	92.44	88.08	91.57	2.75
			CO5	93.09	97.69	94.01	2.82
			CO6	94.52	89.62	93.54	2.81
			CO1	91.09	97.69	92.41	2.77
			CO2	83.55	89.62	84.76	2.54
C306		Principles of Electronic		86.15	89.62	86.84	2.61
0000	2004OE03 Communications		CO4	77.89	88.08	79.93	2.40
			CO5	81.43	85.38	82.22	2.47
			CO6	78.35	86.15	79.91	2.40
		Design and Analysis of	CO1	93.61	97.3	94.35	2.83
C307	2005PC65	Algorithms Lab	CO2	93.61	97.68	94.42	2.83
	Algorithms Lab		CO3	93.61	96.53	94.19	2.83

			CO4	93.61	96.53	94.19	2.83
			CO5	93.61	97.68	94.42	2.83
			CO6	93.61	96.53	94.19	2.83
			CO1	88.18	94.59	89.47	2.68
			CO2	88.18	94.98	89.54	2.69
C200	20050000		CO3	88.18	96.53	89.85	2.70
C308	2005PC00	Computer Networks Lab	CO4	88.18	89.96	88.54	2.66
			CO5	88.18	94.98	89.54	2.69
			CO6	88.18	96.53	89.85	2.70
			CO1	OVERA	LL CO ATTA	INMENT	3.00
			CO2	OVERA	LL CO ATTA	INMENT	3.00
C200	2005DD01	Innovative Product	CO3	OVERA	LL CO ATTA	INMENT	3.00
C309	2003PR01	Development-1	CO4	OVERA	LL CO ATTA	INMENT	3.00
			CO5	OVERA	LL CO ATTA	INMENT	3.00
			CO6	OVERA	LL CO ATTA	INMENT	3.00
			CO1	72.89	97.69	77.85	2.34
			CO2	74.92	89.62	77.86	2.34
C210	200011502	Drofossional English	CO3	78.86	89.62	81.01	2.43
C310	200011502	Professional English	CO4	83.79	88.08	84.65	2.54
			CO5	82.83	93.85	85.03	2.55
			CO6	78.44	93.85	81.52	2.45
			CO1	88.86	97.69	90.63	2.72
			CO2	80.92	89.62	82.66	2.48
C311	2012PC01	Data Warehousing and	CO3	78.54	89.62	80.76	2.42
CJII	20121 C01	Data Mining	CO4	87.04	88.08	87.25	2.62
			CO5	78.84	89.62	81.00	2.43
			CO6	97.53	88.08	95.64	2.87
			CO1	94.38	97.69	95.04	2.85
			CO2	91.28	89.62	90.94	2.73
C312	2012PC02	Web Technologies	CO3	85.61	89.62	86.42	2.59
0.512	20121 002	web reennoiogies	CO4	79.68	88.08	81.36	2.44
			CO5	86.53	89.62	87.15	2.61
			CO6	83.93	89.62	85.07	2.55
			CO1	88.34	97.69	90.21	2.71
			CO2	82.12	89.62	83.62	2.51
C313	2005PE04	Mobile Computing	CO3	90.70	89.62	90.48	2.71
	13 2005PE04 Mobile Computing		CO4	87.87	88.08	87.91	2.64
			CO5	90.02	97.69	91.56	2.75
			CO6	86.50	97.69	88.74	2.66
			C01	88.42	97.69	90.28	2.71
C314	2005PE06	Cloud Computing	CO2	79.63	89.62	81.63	2.45
	20001 200	cioua companing	CO3	87.39	89.62	87.83	2.64
			CO4	86.02	88.08	86.43	2.59

			CO5	80.80	89.62	82.56	2.48
			CO6	99.64	88.08	97.33	2.92
			CO1	91.09	97.69	92.41	2.77
			CO2	83.55	89.62	84.76	2.54
0215	20040505	Principles of Computer	CO3	86.15	89.62	86.84	2.61
C315	2004OE05	Networks	CO4	77.89	88.08	79.93	2.40
		Networks	CO5	81.43	85.38	82.22	2.47
			CO6	78.35	86.15	79.91	2.40
			CO1	84.63	96.15	86.93	2.61
			CO2	84.63	95.38	86.78	2.60
C216	20120061	Data Warehousing and	CO3	84.63	96.54	87.01	2.61
C310	2012PC01	Data Mining Lab	CO4	84.63	95.38	86.78	2.60
			CO5	84.63	95.38	86.78	2.60
			CO6	84.63	96.54	87.01	2.61
			CO1	83.52	97.69	86.35	2.59
			CO2	83.52	98.08	86.43	2.59
C217	20120062	Wah Taabnalagiaa Lab	CO3	83.52	96.54	86.12	2.58
C317	2012PC02	web recinologies Lab	CO4	83.52	98.08	86.43	2.59
			CO5	83.52	98.08	86.43	2.59
			CO6	83.52	96.54	86.12	2.58
			CO1	OVERA	LL CO ATTA	INMENT	3.00
			CO2	OVERA	LL CO ATTA	INMENT	3.00
C318	Innovative Product	Innovative Product	CO3	OVERA	LL CO ATTA	INMENT	3.00
C310	20031 K02	Development-2	CO4	OVERA	LL CO ATTA	INMENT	3.00
			CO5	OVERA	LL CO ATTA	3.00	
			CO6	OVERA	3.00		
			CO1	89.72	97.69	91.32	2.74
			CO2	95.59	89.23	94.31	2.83
C401	2005PC12	Machine Learning	CO3	91.88	89.62	91.43	2.74
C+01	20031 C12	Waenine Leanning	CO4	93.34	88.46	92.36	2.77
			CO5	87.34	97.69	89.41	2.68
			CO6	85.15	97.69	87.66	2.63
			CO1	82.04	97.69	85.17	2.56
			CO2	93.18	89.23	92.39	2.77
C402	2005PC13	Information Security	CO3	74.83	89.62	77.79	2.33
02	20051 015	information Security	CO4	87.14	88.46	87.41	2.62
			CO5	81.58	97.69	84.80	2.54
			CO6	80.17	97.69	83.68	2.51
			CO1	93.70	97.69	94.50	2.83
			CO2	93.74	89.23	92.84	2.79
C403	2012PE04	<b>Business Analytics</b>	CO3	73.89	89.62	77.04	2.31
			CO4	81.55	88.46	82.93	2.49
			CO5	82.63	97.69	85.64	2.57

			CO6	82.15	97.69	85.26	2.56
			CO1	79.44	97.69	83.09	2.49
			CO2	77.23	89.23	79.63	2.39
C404		5C Tashralasu	CO3	77.19	89.62	79.67	2.39
C404	2004OE07	5G Technology	CO4	81.29	88.46	82.73	2.48
			CO5	75.80	97.69	80.18	2.41
			CO6	74.91	97.69	79.47	2.38
			CO1	88.19	97.31	90.01	2.70
			CO2	88.19	95	89.55	2.69
C405	2005DC67	Machina Laorning Lab	CO3	88.19	96.54	89.86	2.70
C403	2003PC07	Machine Learning Lab	CO4	88.19	92.31	89.01	2.67
			CO5	88.19	95	89.55	2.69
			CO6	88.19	96.54	89.86	2.70
			CO1	88.56	96.15	90.08	2.70
			CO2	88.56	96.54	90.16	2.70
C106	20050069	Information Security	CO3	88.56	96.54	90.16	2.70
C400	2003PC08	Lab	CO4	88.56	88.08	88.46	2.65
			CO5	88.56	96.54	90.16	2.70
			CO6	88.56	96.54	90.16	2.70
			CO1	OVERAI	LL CO ATTA	INMENT	3.00
			CO2	OVERAI	LL CO ATTA	INMENT	3.00
C407	20050002	Innovative Product	CO3	OVERAI	LL CO ATTA	INMENT	3.00
C407	2003FK03	Development-3	CO4	OVERAI	LL CO ATTA	INMENT	3.00
			CO5	OVERAI	LL CO ATTA	INMENT	3.00
			CO6	OVERAI	LL CO ATTA	INMENT	3.00
			CO1	OVERAI	LL CO ATTA	INMENT	3.00
			CO2	OVERAI	LL CO ATTA	INMENT	3.00
C408	2005PP04	Droject I	CO3	OVERAI	LL CO ATTA	INMENT	3.00
C408	20031 K04	110ject-1	CO4	OVERAI	LL CO ATTA	INMENT	3.00
			CO5	OVERAI	LL CO ATTA	INMENT	3.00
			CO6	OVERAI	LL CO ATTA	INMENT	3.00
			CO1	OVERAI	LL CO ATTA	INMENT	3.00
			CO2	OVERAI	LL CO ATTA	INMENT	3.00
C409	2005PR04	Industry Oriented Mini	CO3	OVERAI	LL CO ATTA	INMENT	3.00
C407	20031 R04	Project / Internship	CO4	OVERAI	LL CO ATTA	INMENT	3.00
			CO5	OVERAI	LL CO ATTA	INMENT	3.00
			CO6	OVERA	LL CO ATTA	INMENT	3.00
			CO1	85.74	97.69	88.13	2.64
			CO2	82.89	89.23	84.16	2.52
C410	2012PE05	Introduction to Big Data	CO3	82.45	89.62	83.88	2.52
	20121 1203	Analytics	CO4	79.32	88.46	81.15	2.43
			CO5	76.66	97.69	80.87	2.43
				71.75	97.69	76.94	2.31

			CO1	87.78	97.69	89.76	2.69
			CO2	85.52	89.23	86.26	2.59
C411	2005DE11	Wah Comisso	CO3	86.44	89.62	87.08	2.61
C411	2003PE11	web Services	CO4	79.59	88.46	81.36	2.44
			CO5	76.54	96.54	80.54	2.42
			CO6	76.48	96.54	80.49	2.41
			CO1	OVERAI	LL CO ATTA	INMENT	3.00
			CO2	OVERAI	LL CO ATTA	INMENT	3.00
C412	2005DD02	Technical Seminar	CO3	OVERAI	LL CO ATTA	INMENT	3.00
C412	2003FK03	Technical Seminar	CO4	OVERAI	LL CO ATTA	INMENT	3.00
			CO5	OVERAI	LL CO ATTA	INMENT	3.00
			CO6	OVERAI	LL CO ATTA	INMENT	3.00
			CO1	OVERAI	LL CO ATTA	INMENT	3.00
			CO2	OVERAI	LL CO ATTA	INMENT	3.00
C412	20050005	Ducient II	CO3	OVERAI	LL CO ATTA	INMENT	3.00
C415	2003PK03	Project-II	CO4	OVERAI	LL CO ATTA	INMENT	3.00
			CO5	OVERAI	LL CO ATTA	INMENT	3.00
			CO6	OVERAI	LL CO ATTA	INMENT	3.00
			CO1	OVERAI	LL CO ATTA	INMENT	3.00
			CO2	OVERAI	LL CO ATTA	INMENT	3.00
C414	4 2005PR04 Innovation Startup & Entrepreneurship	Innovation Startup &	CO3	OVERAI	LL CO ATTA	INMENT	3.00
C414		Entrepreneurship	CO4	OVERAI	LL CO ATTA	INMENT	3.00
			CO5	OVERA	LL CO ATTA	INMENT	3.00
			CO6	OVERAI	LL CO ATTA	INMENT	3.00

# **Direct - PO Attainment**

CODE	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	PO 4	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO 8</b>	<b>PO 9</b>	<b>PO 10</b>	PO 11	PO 12
C101	2.63	2.63										
C102	2.63	2.73	2.63	2.36								2.19
C103	2.15	2.03	2.10	2.60	2.39					2.39		
C104	2.78	2.78		2.63	2.63						2.17	2.48
C105	2.88			2.88					2.88			2.24
C106	2.95	2.95	2.62	2.29	2.95							
C107	2.49	2.36										
C108	2.19	2.10	2.21	2.16	2.16							1.97
C109						2.71		1.81		2.15		2.41
C110	2.02	1.91	2.10		2.28		2.16					1.88
C111	2.83	2.83	2.45	1.88				2.83	2.83		2.83	
C112	2.33	2.12	2.33	2.20								

C113	2.17	2.60	2.31	2.17	2.60	2.61						2.60
C114						2.67		2.67		2.32		2.68
C201	2.46	2.29		2.35								2.29
C202	2.56	2.56	2.56	2.14	2.94							
C203	2.76	2.32	2.27	2.11	2.26							
C204	2.82	2.35	2.50	2.23	2.25							
C205	2.57	2.42	2.38									
C206	2.15	2.15	2.30	2.46								
C207	2.34	2.49	2.05	2.19	2.20							2.05
C208		2.14		2.18		2.71	2.56	2.57	2.21	2.30	2.55	2.78
C209	2.77	2.46	2.77	2.77	2.77					2.77		
C210	2.52	2.13	1.94	2.31	2.77	2.30	2.77		2.77	2.27	2.29	2.09
C211	2.69	2.41	2.51	2.57	2.03							
C212	2.34	2.34	2.34	2.34								1.95
C213	2.60	2.46	2.52	2.73	2.54	2.33		2.73	2.59		2.33	2.56
C214	2.74	2.29	2.44	2.28	2.29							
C215	2.48	2.41	2.48	2.34						2.25		2.70
C301	2.95	3.00		2.00	2.90							2.00
C302	2.81	2.49	2.49	2.10	2.49							
C303	2.70	2.70	2.29	2.10	2.64							2.64
C304	2.57	2.24	1.99	2.29	2.14							2.07
C305	2.50	2.80	2.43	2.42	2.50							2.65
C306	2.52	2.52	2.52	2.12						2.52		
C307	2.83	2.83	2.20	2.26	2.51				2.83	2.83	2.83	
C308	2.69	2.68	2.70	2.38	2.24				2.15			2.24
C309	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
C310						2.43		2.43		2.13		2.30
C311	2.20	2.13	2.72	2.30	2.60							
C312	2.63	2.47	2.06	2.15	2.03							
C313	2.51	2.12	2.69	2.13	2.08				2.66			2.66
C314	2.63	2.63	2.45	2.26	2.53				2.10	2.53	2.48	
C315	2.52	2.47		2.00	2.52							1.64
C316	2.61	2.61	2.61	2.32	2.09							
C317	2.59	2.01	2.59	2.59	2.59							2.59

C318	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
C401	2.75	2.74	2.73	2.74	2.12							2.63
C402	2.56	2.43	2.56	2.54	2.31	2.25	2.18	2.13	2.64	1.67	2.63	2.56
C403	2.59	2.07	1.75	2.50	2.59							1.73
C404	2.40	1.75	1.99	2.38								
C405	2.24	1.97	1.79	2.24								
C406	2.70	2.70	2.69	2.69	2.70	2.70	2.70	2.70	2.70	2.69	2.69	2.69
C407	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
C408	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
C409	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
C410	2.48	2.48	2.44	2.43	2.07	2.43					1.61	2.48
C411	2.53	2.49	2.53	2.50	1.98	2.16	2.01		1.85	1.65	2.38	2.23
C412	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
C413	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
C414	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
AVERAGE	2.62	2.50	2.48	2.44	2.53	2.70	2.74	2.74	2.71	2.57	2.67	2.47

Indirect Attainment	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	<b>PO10</b>	PO11	PO12
Graduate Exit Survey(S1)	2.88	2.90	2.90	2.83	2.77	2.96	2.93	2.90	2.85	2.86	2.91	2.95
Alumni Survey(S2)	2.76	2.71	2.84	2.69	2.72	2.85	2.84	2.83	2.91	2.79	2.79	2.84
Employer Survey(S3)	2.87	2.84	2.78	2.76	2.76	2.78	2.58	2.67	2.62	2.73	2.76	2.76
Overall Indirect Attainment (Average)	2.83	2.82	2.84	2.76	2.75	2.86	2.78	2.80	2.79	2.79	2.82	2.85

## **Indirect - PO Attainment**

### **Overall PO Attainment**

Attainment	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	<b>PO10</b>	<b>PO11</b>	PO12
Direct Attainment(D.A)	2.62	2.50	2.48	2.44	2.53	2.70	2.74	2.74	2.71	2.57	2.67	2.47
Indirect Attainment(I.A)	2.83	2.82	2.84	2.76	2.75	2.86	2.78	2.80	2.79	2.79	2.82	2.85
Overall Attainment(80% of D.A + 20% of I.A)	2.66	2.56	2.55	2.50	2.57	2.73	2.75	2.75	2.73	2.61	2.70	2.55

### **Direct - PSO Attainment**

CODE	PSO 1	PSO 2	PSO 3
C101	2.63		
C102	2.48		
C103	2.20	2.19	
C104		2.32	
C105	2.72		
C106	2.95		2.36
C107	2.49		
C108	2.07	2.16	
C109	1.66	1.67	2.30
C110	2.14		
C111		2.83	
C112	2.54		
C113	2.08		2.26

C114	2.32	2.14	2.08
C201	2.46		
C202	2.14		
C203	2.93	2.76	2.93
C204	2.21	2.88	
C205	2.38		
C206	2.30		2.45
C207	2.63	2.20	
C208	2.24	2.70	2.70
C209	2.31	2.15	
C210	2.67	2.04	2.77
C211	2.65		
C212	2.34	1.83	
C213	2.55	2.20	2.20
C214	2.74		
C215	2.71		
C301	1.97	2.00	
C302	2.19	2.79	2.77
C303	2.70	2.46	
C304	2.28	2.04	2.12
C305	2.24	2.24	2.21
C306	2.52		
C307	2.26	2.83	
C308	2.15	2.68	2.39
C309	3.00	3.00	3.00
C310	2.14	1.96	2.14
C311	2.38	2.19	
C312	2.23	2.04	
C313	2.46		
C314	2.05		
C315	1.68	1.64	
C316	2.17	2.03	
C317	2.59	2.59	2.01
C318	3.00	3.00	3.00

C401	2.12	2.66	
C402	2.70	2.54	2.18
C403	2.59	2.59	2.59
C404	1.99		
C405	2.69		
C406	2.70	2.70	2.69
C407	3.00	3.00	3.00
C408	3.00	3.00	3.00
C409	3.00	3.00	3.00
C410	3.17	2.48	2.43
C411	2.53	2.53	2.53
C412	3.00	3.00	3.00
C413	3.00	3.00	3.00
C414	3.00	3.00	3.00
AVERAGE	2.48	2.46	2.58

Indirect - PSO Attainment

Indirect Attainment	PSO1	PSO2	PSO3
Graduate Exit Survey(S1)	2.83	2.82	2.83
Alumni Survey(S2)	2.79	2.79	2.84
Employer Survey(S3)	2.82	2.62	2.78
<b>Overall Indirect Attainment(Average)</b>	2.82	2.74	2.82

### **Overall PSO Attainment**

Attainment	PSO1	PSO2	PSO3
Direct Attainment(D.A)	2.48	2.46	2.58
Indirect Attainment(I.A)	2.82	2.74	2.82
Overall Attainment(80% of D.A + 20% of I.A)	2.54	2.52	2.62

