INSTITUTE OF TECHNOLOGY & MANAGEMENT, GWALIOR

IQAC Guidelines for Evaluating the Attainment of POs and COs

ITM Campus, NH-75, Opposite Sithouli Railway Station, Gwalior (M.P.)- 475001, India
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Assessment Process Report

Academic Year 2020-2021

1. PROGRAM OUTCOMES AND PROGRAM SPECIFIC

Program outcomes are statements that describe the knowledge, skills, abilities, and attributes that students are expected to have acquired by the time they complete a program of study. These outcomes are designed to reflect the broader educational goals and objectives of the program, and they guide the curriculum, teaching methods, and assessment strategies throughout the program.

POs are statements that describe what the students graduating from engineering programs should be able to do at the time of graduation

The NBA (National Board of Accreditation) has set 12 Program Outcomes, which are as follows:

A. Program Outcomes (POs)

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analyses**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety, and the cultural, societal, and environmental considerations.

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4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis, and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. Individual and teamwork: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

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B. Program-Specific Outcomes (PSOs) (Sample of CSE Dept)

PSOs are statements that describe what the graduates of a specific engineering program should be able to do at the time of graduation. There are three PSOs which are as follows:

PSO1: The ability to understand the principles of computer hardware and software to analyze, design, and develop algorithms for complex and logical problems.

PSO2: Enhance programming concepts and professional competencies of students by exercising principles of software engineering to fix various computational problems.

PSO3: To implement emerging technologies such as the internet of things, cloud computing, artificial intelligence, machine learning, etc. to serve society.

C. Course Outcomes (COs)

Course outcomes, also referred to as learning outcomes or objectives, are statements that outline the knowledge, understanding, and skills students should possess by the end of a course or program. These outcomes specify the expected competencies, abilities, and attitudes students should develop through their learning experiences.

Serving as a foundation for instructional design and delivery, course outcomes provide a clear and measurable focus for both educators and students, guiding the teaching and learning process. By clearly defining these outcomes, course designers can ensure that instructional strategies, assessments, and learning activities are aligned to actively engage students in achieving the desired results.

The development of course outcomes begins with a thorough understanding of the subject matter and the educational objectives of the program or institution. These outcomes should be specific, observable, measurable, and attainable, reflecting the broader goals of the curriculum and addressing the cognitive, affective, and psychomotor domains of learning. A sample is presented in Table 1.

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Table.1 (Sample of course outcomes)

Course Name: C303 (Data Structure)	**Year of Study: 2020-21**
C303.1	Ability to define, and understand concepts of different categories of data structures.
C303.2	Identify different parameters to analyze the performance of an algorithm.
C303.3	Design algorithms to perform operations with linear and nonlinear data structures.
C303.4	Compare and contrast different implementations of data structures.
C303.5	Apply appropriate data structure to solve and implement various real-time problems.

D. Course Outcome mapping with Program Outcomes according to new AICTE Exam Reform Policy

The detailed procedure for mapping COs with the POs and PSOs of CSE Dept. by using AICTE Exam Reform Policy is mentioned below in annexure 1. Table 2 depicts a sample of this matrix

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Table 2: Mapping with Course Outcomes and Program Outcomes																
Course	Course Out	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO1	PSO2	PSO3
CS303.1	Ability to Define, understand concepts of different categories of data Structures	2	1	-	1	1	-	-	-	-	-	-	-	-	-	-
CS303.2	Identify different parameters to analyze the performance of an algorithm.	2	1	-	1	1	-	-	-	-	-	-	-	1	1	-
CS303.3	Design algorithms to perform operations with Linear and Nonlinear data structures	2	1	-	1	1	-	-	-	-	-	-	-	1	1	-
CS303.4	Compare and contrast different implementations of data structures.	1	1	-	1	1	-	-	1	-	1	-	-	-	2	-
CS303.5	Apply appropriate data structure to solve and implement various real time problems.	1	1	1	1	1	-	-	-	-	1	-	-	-	2	-
Average		1.6	1	1	1	1	-	-	1	-	1	-	-	1	1.5	-

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2. PROGRAMME ASSESSMENT PROCESSES & ATTAINMENT TOOLS

A comprehensive and continuous assessment system is in place to actively engage students in their learning journey and enhance their participation in acquiring knowledge. This system includes various components designed to improve students' ability to demonstrate both technical knowledge and personal attributes. Key elements of this system comprise theory sessions, assignments, quizzes, mid-term exams, and Activity-Based Continuous Assessments (ABCAs) such as presentations, open-book assessments, and question framing, as well as project-based learning (PBL) and projects. To further strengthen the system's effectiveness, we also utilize Course Exit Surveys, Graduate/Exit Surveys, Alumni Surveys, Employer Surveys, and other evaluative measures.

2.1. Assessment processes

The Assessment Processes used to gather the data upon which the evaluation of course outcome is based is constituted with

A. Direct Attainment (80%)
   - Midterms, Quiz, ABCA, Viva, End Semester Examination

B. Indirect Attainment (20%)
   - Course Exit Survey

Attainment of course outcome is computed by these two components, as shown in the Figure 1.1.

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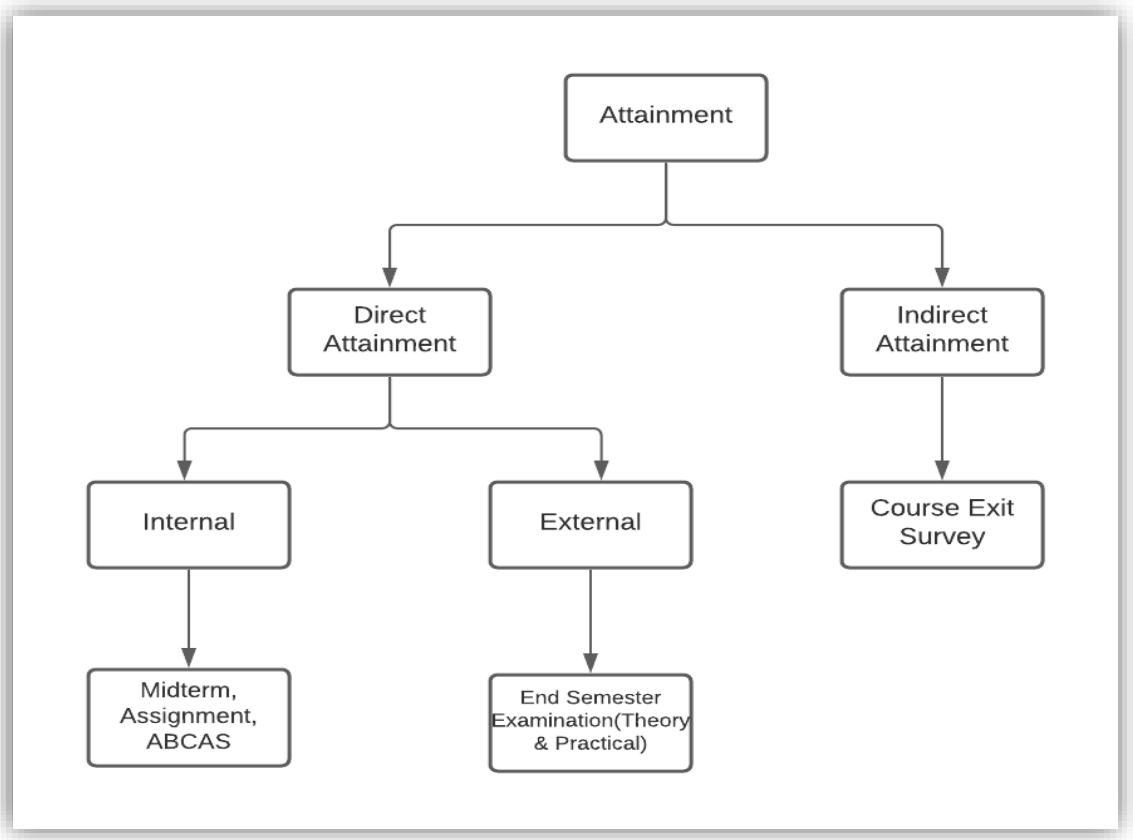

Figure 1.1 Attainment Calculation Process

Direct assessment holds the share of 80% for the calculation of final attainment, whereas indirect assessment contains 20%.

Data collection for course result

The process of collecting course result data involves multiple steps and utilizes both the Management Information System (MIS) and Learning Management System (LMS). Here's an overview of the process:

- **Course Assignment to Faculty**: Courses are assigned to faculty members based on their expertise and specialization, ensuring that each course is taught by someone with the appropriate knowledge and skills in that subject area.

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- **Data Storage in MIS and LMS**: Faculty and student information is stored in the Management Information System (MIS) and Learning Management System (LMS). The MIS serves as a centralized database containing faculty profiles, student information, course details, and other relevant data. The LMS is an online platform used for managing course content, assessments, and tracking student progress.
- **Attendance and Lecture Data Recording**: Faculty members record daily student attendance and the lectures they conduct. This information is entered into the MIS, enabling easy tracking of student attendance and faculty activity.
- **Examinations and Evaluation**: When exams or tests are conducted, faculty members evaluate the answer scripts, grading and assigning scores based on student performance.
- **Result Upload in LMS**: After evaluation, the results are uploaded to the Learning Management System (LMS), allowing students to view their individual results online.
- **Result Storage and Presentation**: The LMS stores all result data, including individual student scores. This information is presented to students so they can review their grades and overall course performance.
- **Data Access for Analysis**: The stored data, which includes attendance records, lecture details, and exam results, is accessible for generating reports and analyzing student performance. This data provides valuable insights into student progress, highlights areas for improvement, and supports informed decision-making

A. Direct Attainment

Direct attainment is a prime assessment technique that includes the following

- ❖ Assignment
- ❖ Quiz
- ❖ Midterm

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- ABCAs
- Project-Based Learning(PBL)/Projects/Internship

B. Indirect Attainment

Indirect attainment accomplishes by conducting various surveys. Course Exit Survey is the prime constituent for the calculation, of course, indirect assessment.

- Course Exit Survey
- Graduate Exit Survey
- Alumni Survey
- Employer Survey

Direct Attainment (Assessment) Methods

Assignment: Assignments serve as a qualitative assessment tool to evaluate students' understanding of engineering practices, frameworks, and problem-solving skills. Students will be assigned a minimum of 2 and a maximum of 8 topics per subject.

Quiz: Multiple-choice question-based quizzes are administered, offering a user-friendly platform for both instructors and students during examinations.

Midterm: Midterm exams are integral to ensuring that students achieve both course and program outcomes. These exams are crucial in verifying that students who meet the program outcomes are eligible for certification. Each semester includes two midterm exams: one conducted offline and the other online.

ABCAS (Activity-Based Continuous Assessment System): Two activities are conducted each semester. Faculty members select activities based on their subject, choosing from options such as:

- Open book test
- Case study
- PPT/Poster presentation
- Simulation work, coding, virtual model creation, or dry runs
- Group discussion

Project-Based Learning (PBL)/Projects: Students are divided into groups of up to four members, with each group being mentored by a faculty member. Projects are then evaluated by external examiners who conduct a viva-voce and assign grades based on the students' performance.

Award of Credits and Grades: The distribution of weight-age/marks for theory and practical components is outlined in Table 3 and Table 4.

Theory fragment

Table: 3

S. No	Particulars	Weightage %
1	Quizzes, assignments and regularity	10%
2	Mid –semester test	20%
3	End –semester Exam	70%
	Total	100%

Practical fragment

Table: 4

S. No	Particulars	Weightage %
1	Lab work and performance, quizzes, assignments, and regularity	40%
2.	End-semester examination	60%
	Total	100%

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Table: 5

Grade	%Marks range (based on absolute marks system)	Grade Point	Description of performance
A+	91-100	10	Outstanding
A	81-90	9	Excellent
B+	71-80	8	V. Good
B	61-70	7	Good
C+	51-60	6	Average
C	41-50	5	Satisfactory
D	31-40	4	Marginal
F	30 and Below	0	Fail
I		0	Incomplete
W		0	Withdrawal

From the above table 5, it is clear that passing marks are 31%. From this passing marks out of 70 is equal to 70x 31/100 = 21.7 which is 22 marks.

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2.2.Process to calculate course attainment

The Program shall have set Course Outcome attainment levels for all courses.

(The attainment levels shall be set considering average performance levels in the university examination or any higher value set as target for the assessment years. Attainment level is to be measured in terms of student performance in internal assessments concerning the Course Outcomes of a course in addition to the performance in the University examination)

The Direct Attainment of Course Outcome is evaluated under two categories – University Assessment and Internal Assessment.

a) **Measuring Course Outcomes attained through University Examinations**

Attainment Level for External Assessment Exam

Table: 6

Percentage Of students scoring more than 60 marks	Attainment Level
>=60%	1
>=70%	2
>=80%	3

Attainments levels

i. Level 1:- 60% of students score 60% marks or more.

ii. Level 2:-70% of students score 60% of marks or more

iii. Level 3:-80% of students score 60% of marks or more

b) **Measuring CO attainment through Internal Assessments: (The examples indicated are for reference only. Program may appropriately define levels)**

Attainment Level for Internal Assessment Exam

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Table: 7

Percentage Of students scoring more than 60 marks	Attainment Level
>=60%	1
>=70%	2
>=80%	3

Attainments Levels

i. Level 1:- 60% of students score 60% marks or more.

ii. Level 2:- 70% of students score 60% of marks or more

iii. Level 3:- 80% of students score 60% of marks or more

Direct Course Attainment calculation for Internal and External Exam

Here we are giving 40% weightage to internal assessment and 60% weightage to external due to the following reason:

- Internal examinations are more meticulously check.
- University question papers have internal choices for which the Cos are not well defined in the syllabus.
- The question paper of RGPV is still not aligned with the AICTE exam reform policy.

Weightage given to Internal Assessment = 40%

Weightage given to External Assessment = 60%

Total Direct attainment assessment = (Internal Assessment in COs)*0.4 + (External Assessment in COs)*0.6

Indirect Course Attainment is evaluated by using course exit survey

Indirect attainment is evaluated through Course Exit Surveys conducted after course completion, gathering students' feedback on their learning experience.

Overall Course Attainment calculation

With the help of threshold value (60% of marks) the attainment of each CO related to Internals (Midterm1, Midterm2, Assignment, ABCA Activity1, ABCA Activity 2) and external (End Sem. marks, External viva) marks are calculated.

Overall CO Attainment Level = Direct CO Attainment ×0.8 + Indirect CO Attainment ×0.2

The detailed calculation for CO attainment are provided in the annexure no.2

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3. ATTAINMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

Direct Assessment

The Direct attainment level of a PO / PSO is determined by the following procedure

a) For a given core course calculate the CO attainment and also consider the correlation matrix of COs with POs.

(For example, consider a Course (Data Structure of CSE Dept.) and POs, the attainment levels of the COs for this course, and the correlation levels with POs are shown below in Table No.8)

Course CS303, Data Structure in II Year III Semester 2020-21 shown in table 8.

Table: 8

Course	Attainment level	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CS303.1	2.17	2	1	-	1	1	-	-	-	-	-	-	-	-	-	-
CS303.2	2.18	2	1	-	1	1	-	-	-	-	-	-	-	1	1	-
CS303.3	2.06	2	1	-	1	1	-	-	-	-	-	-	-	1	1	-
CS303.4	2.26	1	1	-	1	1	-	-	1	-	1	-	-	-	2	-
CS303.5	2.06	1	1	1	1	1	-	-	-	-	1	-	-	-	2	-
Average	**2.14**	**1.6**	**1.0**	**1.0**	**1.0**	**1.0**	**-**	**-**	**1.0**	**-**	**1.0**	**-**	**-**	**1.0**	**15**	**-**

b) To determine the Attainment level for PO5 from this course, the CO attainment level for each CO is multiplied with the corresponding Correlation levels. Their sum is then divided by the sum of the correlation levels. Only the COs (CS303.1, CS303.3, CS303.4, CS502.5) which correlate with the PO (PO5) are considered in the calculation. Hence attainment level for PO1, for this Course is obtained as

Attainment level for PO5 from the course =

(2.17*1 + 2.18*1 + 2.06*1 + 2.26*1+2.06*1) / (1+1+1+1+1)

= 2.15

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c) Similarly, the attainment levels for all POs/PSOs are determined for this course.

d) For direct assessment, the average attainment levels from all courses are calculated.

Indirect Assessment

Indirect assessment of POs & PSOs is evaluated by the following assessment tools:

i. Graduate exit survey (20%)

ii. Alumni Survey (20%)

iii. Employer Survey (20%)

The survey questions are based on the POs and PSOs of the program. Students are given ratings of 3(High), 2(Moderate), and 1(Low) to indicate the attainment of POs /PSOs. The attainment level from exit surveys is then calculated as

Attainment level = (N1*3 + N2*2 + N3*1) / (N1+N2+N3)

Total PO Attainment = 80% of Direct attainment + 20% of Indirect attainment

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CONCLUSION

In conclusion, this document outlines a comprehensive framework for assessing and achieving Program Outcomes (POs), Program-Specific Outcomes (PSOs), and Course Outcomes (COs) within the engineering curriculum. By defining clear and measurable outcomes, the program ensures that students acquire the necessary knowledge, skills, and attributes essential for their professional development.

The assessment process is robust, incorporating both direct and indirect methods to provide a well-rounded evaluation of student performance. The use of assignments, quizzes, midterms, ABCAs, and Project-Based Learning (PBL) ensures continuous engagement and assessment, while the incorporation of various surveys (Course Exit, Graduate Exit, Alumni, and Employer) provides valuable feedback for ongoing program improvement.

The integration of these assessment tools and processes demonstrates a commitment to aligning educational objectives with industry standards, ultimately fostering a culture of continuous learning and improvement. This systematic approach not only enhances the academic experience but also ensures that graduates are well-equipped to meet the challenges of the engineering profession.

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Annexure 1

CO_PO_PSOs mapping

of

Data Structure Course

(July Dec 2020)

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According to New Exam Reform Policy, Mapping of CO's With PO's

Each PO contains Competencies and each Competency consists of Performance Indicator

Program Outcomes	C.No.	Competencies	PI No.	Performance Indicators	CO1	CO2	CO3	CO4	CO5
PO1: Engineering Knowledge: apply knowledge of mathematics, science, engineering fundamentalsandanengineeringspecializationtothesolutionofcomplexengineeringproblems.	1.1	Demonstrate competence in mathematical modelling	1.1.1	Apply the knowledge of discrete structures, linear algebra, statistics and numerical techniques to solve problems	YES				
			1.1.2	Apply the concepts of probability, statistics and queuing theory in modelling of computer-based system, data and network protocols.					
	1.2	Demonstrate competence in basic sciences	1.2.1	Apply laws of natural science to an engineering problem					
	1.3	Demonstrate competence in engineering fundamentals	1.3.1	Apply engineering fundamentals	YES	YES	YES	YES	YES
	1.4	Demonstrate competence in specialized engineering knowledge to the program	1.4.1	Apply theory and principles of computer science and engineering to solve an engineering problem	YES	YES	YES	YES	YES
PO2: Problem Analysis: identify, formulate, review	2.1	Demonstrate an ability to	2.1.1	Evaluate problem statements and					

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research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.		identify and formulate complex engineering problem		identifies objectives .					
			2.1.2	Identify processes/modules/algorithms of a computer-based system and parameters to solve a problem	YES	YES	YES	YES	YES
			2.1.3	Identify mathematical algorithmic knowledge that applies to a given problem					
	2.2	Demonstrate an ability to formulate a solution plan and methodology for an engineering problem	2.2.1	Reframe the computer-based system into inter connected subsystems					
			2.2.2	Identify functionalities and computing resources.					
			2.2.3	Identify existing solution/methods to solve the problem, including forming justified approximations and assumptions			YES		
			2.2.4	Compare and contrast alternative solution/methods to select the best methods					
			2.2.5	Compare and contrast alternative solution processes to select the best process					

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	2.3	Demonstrate an ability to formulate and interpret a model	2.3.1	Able to apply computer engineering principles to formulate modules of a system with required applicability and performance.					
			2.3.2	Identify design constraints for required performance criteria.					
	2.4	Demonstrate an ability to execute a solution process and analyse results	2.4.1	Applies engineering mathematics to implement the solution.					
			2.4.2	Analyse and interpret the results using contemporary tools.					
			2.4.3	Identify the limitations of the solution and sources/causes.					
			2.4.4	Arrive at conclusions with respect to the objectives			YES	YES	
PO3:Design &DevelopmentofSolutions:designsolutionsforcomplexengineeringproblemsand designsystemcomponentsorprocessesthatmeetthespecifiedneedswithappropriateconsideration for the public health and safety, and the cultural, societal, and environmental considerations.	3.1	Demonstrate an ability to define a complex/ open-ended problem in engineering terms	3.1.1	Able to define a precise problem statement with objectives and scope.					
			3.1.2	Able to identify and document system requirements from stake-holders.					
			3.1.3	Able to review state-of-the-art literature to synthesize					

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				system requirements.					
			3.1.4	Able to choose appropriate quality attributes as defined by ISO/IEC/IEEE standard.					
			3.1.5	Explore and synthesize system requirements from larger social and professional concerns.					
			3.1.6	Able to develop software requirement specifications (SRS).					
	3.2	Demonstrate an ability to generate a diverse set of alternative design solutions	3.2.1	Able to explore design alternatives.					
			3.2.2	Able to produce a variety of potential design solutions suited to meet functional requirements.					
			3.2.3	Identify suitable non-functional requirements for evaluation of alternate design solutions.					
	3.3	Demonstrate an ability to select optimal design scheme for further development	3.3.1	Able to perform systematic evaluation of the degree to which several design concepts meet the criteria.					
			3.3.2	Consult with domain experts					

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				and stakeholders to select candidate engineering design solution for further development					
	3.4	Demonstrate an ability to advance an engineering design to defined end state	3.4.1	Able to refine architecture design into a detailed design within the existing constraints.					YES
			3.4.2	Able to implement and integrate the modules.					
			3.4.3	Able to verify the functionalities and validate the design.					
PO4: Conduct Investigation of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.	4.1	Demonstrate an ability to conduct investigations of technical issues consistent with their level of knowledge and understanding	4.1.1	Define a problem for purposes of investigation, its scope and importance	YES				
			4.1.2	Able to choose appropriate procedure/algorithm, dataset and test cases.	YES	YES	YES	YES	YES
			4.1.3	Able to choose appropriate hardware/software tools to conduct the experiment.					
	4.2	Demonstrate an ability to design experiments to solve open-ended problems	4.2.1	Design and develop appropriate procedures/methodologies based on the study objectives					YES

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	4.3	4.6 Demonstrate an ability to analyse data and reach a valid conclusion	4.3.1	Use appropriate procedures, tools and techniques to collect and analyse data					
			4.3.2	Critically analyse data for trends and correlations, stating possible errors and limitations					
			4.3.3	Represent data (in tabular and/or graphical forms) so as to facilitate analysis and explanation of the data, and drawing of conclusions					
			4.3.4	Synthesize information and knowledge about the problem from the raw data to reach appropriate conclusions					
PO5: Modern Tools Usage: create, select and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.	5.1	Demonstrate an ability to identify/create modern engineering tools, techniques and resources	5.1.1	Identify modern engineering tools, techniques and resources for engineering activities					
			5.1.2	Create/adapt/modify/extend tools and techniques to solve engineering problems	YES	YES	YES	YES	YES

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	5.2	Demonstrate an ability to select and apply discipline specific tools, techniques and resources	5.2.1	Identify the strengths and limitations of tools for (i) acquiring information, (ii) modelling and simulating, (iii) monitoring system performance, and (iv) creating engineering designs.					
			5.2.2	Demonstrate proficiency in using discipline-specific tools					
	5.3	Demonstrate an ability to evaluate the suitability and limitations of tools used to solve an engineering problem	5.3.1	Discuss limitations and validate tools, techniques and resources					
			5.3.2	Verify the credibility of results from tool use with reference to the accuracy and limitations, and the assumptions inherent in their use.					
PO6: The Engineer and Society: apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.	6.1	Demonstrate an ability to describe engineering roles in a broader context, e.g. pertaining to the environment, health,	6.1.1	Identify and describe various engineering roles; particularly as pertains to protection of the public and public interest at the global, regional and local level					

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		safety, legal and public welfare							
	6.2	Demonstrate an understanding of professional engineering regulations, legislation and standards	6.2.1	Interpret legislation, regulations, codes, and standards relevant to your discipline and explain its contribution to the protection of the public					
PO7: Environment & Sustainability: understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.	7.1	Demonstrate an understanding of the impact of engineering and industrial practices on social, environmental and in economic contexts	7.1.1	Identify risks/impacts in the life-cycle of an engineering product or activity					
			7.1.2	Understand the relationship between the technical, socio-economic and environmental dimensions of sustainability					
	7.2	Demonstrate an ability to apply principles of sustainable design and development	7.2.1	Describe management techniques for sustainable development					
			7.2.2	Apply principles of preventive engineering and sustainable development to an engineering activity or product relevant to the discipline					
PO8: Ethics: apply ethical principles and commit to professional ethics and	8.1	Demonstrate an ability to recognize	8.1.1	Identify situations of unethical professional					

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responsibilities and norms of engineering practice.		ethical dilemmas		conduct and propose ethical alternatives					
	8.2	Demonstrate an ability to apply the Code of Ethics	8.2.1	Identify tenets of the ASME professional code of ethics					
			8.2.2	Examine and apply moral & ethical principles to known case studies				YES	
PO9: Individual & Team work: function effectively as an individual and as a member or leader in diverse teams, and in multidisciplinary settings.	9.1	Demonstrate an ability to form a team and define a role for each member	9.1.1	Recognize a variety of working and learning preferences; appreciate the value of diversity on a team					
			9.1.2	Implement the norms of practice (e.g. rules, roles, charters, agendas, etc.) of effective team work, to accomplish a goal.					
	9.2	Demonstrate effective individual and team operations--communication, problem solving, conflict resolution and leadership skills	9.2.1	Demonstrate effective communication, problem-solving, conflict resolution and leadership skills					
			9.2.2	Treat other team members respectfully					
			9.2.3	Listen to other members					
			9.2.4	Maintain composure in difficult situations					
	9.3	Demonstrate success in a team-	9.3.1	Present results as a team, with smooth integration of					

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		based project		contributions from all individual efforts					
PO10: Communication: communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	10.1	Demonstrate an ability to comprehend technical literature and document project work	10.1.1	Read, understand and interpret technical and non- technical information					
			10.1.2	Produce clear, well-constructed, and well-supported written engineering documents					
			10.1.3	Create flow in a document or presentation – a logical progression of ideas so that the main point is clear					YES
	10.2	Demonstrate competence in listening, speaking, and presentation	10.2.1	Listen to and comprehend information, instructions, and viewpoints of others					
			10.2.2	Deliver effective oral presentations to technical and non-technical audiences				YES	YES
	10.3	Demonstrate the ability to integrate different modes of communication	10.3.1	Create engineering-standard figures, reports and drawings to complement writing and presentations					
			10.3.2	Use a variety of media effectively to convey a message in a document or a presentation					

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PO11: Project management & Finance: demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.	11.1	Demonstrate an ability to evaluate the economic and financial performance of an engineering activity	11.1.1	Describe various economic and financial costs/benefits of an engineering activity					
			11.1.2	Analyse different forms of financial statements to evaluate the financial status of an engineering project					
	11.2	Demonstrate an ability to compare and contrast the costs/benefits of alternate proposals for an engineering activity	11.1.3	Analyse and select the most appropriate proposal based on economic and financial considerations.					
	11.3	Demonstrate an ability to plan/manage an engineering activity within time and budget constraints	11.3.1	Identify the tasks required to complete an engineering activity, and the resources required to complete the tasks.					
			11.3.2	Use project management tools to schedule an engineering project, so it is completed on time and on budge					
PO12: Life-long Learning: recognize the need for, and have the preparation and ability to engage in	12.1	Demonstrate an ability to identify gaps in	12.1.1	Describe the rationale for the requirement for continuing					

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independent and life-long learning in the broadest context of technological change.		knowledge and a strategy to close these gaps		professional development					
			12.1.2	Identify deficiencies or gaps in knowledge and demonstrate an ability to source information to close this gap					
	12.2	Demonstrate an ability to identify changing trends in engineering knowledge and practice	12.2.1	Identify historic points of technological advance in engineering that required practitioners to seek education in order to stay current					
			12.2.2	Recognize the need and be able to clearly explain why it is vitally important to keep current regarding new developments in your field					
	12.3	Demonstrate an ability to identify and access sources for new information	12.3.1	Source and comprehend technical literature and other credible sources of information					
			12.3.2	Analyse sourced technical and popular information for feasibility, viability, sustainability, etc.					
PSO1	The ability to understand the principles of computer hardware and software					1	1		

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	to analyse, design and develop algorithms for complex and logical problems.					
PSO2	Enhance programming concepts and professional competencies of students by exercising principles of software engineering to fix various computational problems.		1	1	2	2
PSO3	To implement emerging technologies such as internet of things, cloud computing, artificial intelligence, machine learning etc. to serve the society.					

From the above mapping. Total No. of "YES" Mapped with PI's (Generated Matrix)

	CO1	CO2	CO3	CO4	CO5
PO1	3	2	2	2	2
PO2	1	1	3	2	1
PO3	0	0	0	0	1
PO4	2	1	1	1	2
PO5	1	1	1	1	1
PO6	0	0	0	0	0
PO7	0	0	0	0	0
PO8	0	0	0	1	0
PO9	0	0	0	0	0
PO10	0	0	0	1	2
PO11	0	0	0	0	0
PO12	0	0	0	0	0
PSO1	0	1	1	0	0
PSO2	0	1	1	2	2
PSO3	0	0	0	0	0

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Mapping Strength of Course Outcomes with Program Outcomes

		Program Outcomes																																			PSOs		
		PO1			PO2			PO3			PO4			PO5			PO6			PO7			PO8			PO9			PO10			PO11			PO12			PSO1	PSO2	PSO3
		TPIs	M.PIs	MG	TPIs	M.PIs	MG	TPIs	M.PIs	MG	TPIs	M.PIs	MG	TPIs	M.PIs	MG	TPIs	M.PIs	MG	TPIs	M.PIs	MG	TPIs	M.PIs	MG	TPIs	M.PIs	MG	TPIs	M.PIs	MG	TPIs	M.PIs	MG	TPIs	M.PIs	MG			
Course Outcomes	CO1	5	3	**2**	14	1	**1**	14	0	**0**	8	2	**1**	6	1	**1**	2	0	**0**	4	0	**0**	3	0	**0**	7	0	**0**	7	0	**0**	5	0	**0**	6	0	**0**	0	0	0
	CO2	5	2	**2**	14	1	**1**	14	0	**0**	8	1	**1**	6	1	**1**	2	0	**0**	4	0	**0**	3	0	**0**	7	0	**0**	7	0	**0**	5	0	**0**	6	0	**0**	1	1	0
	CO3	5	2	**2**	14	3	**1**	14	0	**0**	8	1	**1**	6	1	**1**	2	0	**0**	4	0	**0**	3	0	**0**	7	0	**0**	7	0	**0**	5	0	**0**	6	0	**0**	1	1	0
	CO4	5	2	**2**	14	2	**1**	14	0	**0**	8	1	**1**	6	1	**1**	2	0	**0**	4	0	**0**	3	1	**1**	7	0	**0**	7	1	**1**	5	0	**0**	6	0	**0**	0	2	0
	CO5	5	2	**2**	14	1	**1**	14	1	**1**	8	2	**1**	6	1	**1**	2	0	**0**	4	0	**0**	3	0	**0**	7	0	**0**	7	2	**1**	5	0	**0**	6	0	**0**	0	2	0

TPIs	Total Perf. Indicator
M.PIs	Mapped Per. Indica
MG	Mapping Grade

Thre	%Levels
3	67
2	34
1	0

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CO-PO-PSO Mapping matrix

Course	Course Outcomes	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO1	PSO2	PSO3
CS303.1	Ability to Define, understand concepts of different categories of data Structures to analyze the data.	2	1	0	1	1	0	0	0	0	0	0	0	0	0	0
CS303.2	Identify different parameters to analyze the performance of an algorithm.	2	1	0	1	1	0	0	0	0	0	0	0	1	1	0
CS303.3	Design algorithms to perform operations with Linear and Nonlinear data structures	2	1	0	1	1	0	0	0	0	0	0	0	1	1	0
CS303.4	Compare and contrast different implementations of data structures.	2	1	0	1	1	0	0	1	0	1	0	0	0	2	0
CS303.5	Apply appropriate data structure to solve and implement various real time problems	2	1	1	1	1	0	0	0	0	1	0	0	0	2	0
Average		2.00	1.00	0.20	1.00	1.00	0.00	0.00	0.20	0.00	0.40	0.00	0.00	0.40	1.20	0.00

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Annexure 2

CO_PO Attainment

of

Data Structure Course

(July Dec 2020)

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Target Setting for 2020

Course name-Dats structure
Course code:303

On the basis of 2019 CO attainment
Total course attainment for Data Structure from previous year(2019) is 1.74

	2019	2020(Target)
CO1	1.74	1.85
CO2	1.74	1.85
CO3	1.74	1.85
CO4	1.74	1.85
CO5	1.74	1.85

>=60% = |eve|1	60 perc. Of students score 60 perc. Or more
>=70% = |eve|2	70 perc. Of students score 60 perc. Or more
>=80% = |eve|3	80 perc. Of students score 60 perc. Or more

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Program B.Tech | Branch:- CS

Course name: Data Structure | Course code:CS 303

Semester-3 | June-Dec(2020-2021)

S. NO.	ROLL No.	NAME	Marks	Attendance	(Midterm+Assignment+Quiz) Total 30	Midterm1(20) Total MT1 marks 20	CO1 6.67	CO2 6.67	CO3 6.67	Midterm2(20) Total MT2 marks 20	CO3 6.67	CO4 6.67	CO5 6.67	ARCA Total CO4,CO5 Activity marks	ARCA1 CO4 10	ARCA2 CO5 10	Avg of Assg & Act. Out of	Practical 20	Q.1 CO1 4	Q.2 CO2 4	Q.3 CO3 4	Q.4 CO4 4	Q.5 CO5 4	RGPV Exam (Theory + Practical) CO1,2,3,4 Total Marks 100	CO1 20	CO2 20	CO3 20	CO4 20	CO5 20
			Compet			12	4	4	4	12	4	4	4	6	5	5		12	2.4	2.4	2.4	2.4	2.4	60 out	12	12	12	12	12
1	0905CS191001	ABHAY UPADHYAY		41,875	21,875	14	4.7	4.7	4.7	14	4.7	4.7	4.7	9	9	9	7.875	20	4	4	4	4	4	85	17	17	17	17	17
2	0905CS191002	ABHAY SINGH		29,875	17,875	11	3.7	3.7	3.7	10	3.3	3.3	3.3	3.5	7	0	3.375	12	2.4	2.4	2.4	2.4	2.4	75	15	15	15	15	15
3	0905CS191003	ABHINAV GOYAL		40,625	26,625	19	6.3	6.3	6.3	19	6.3	6.3	6.3	7.5	7	8	7.625	14	2.8	2.8	2.8	2.8	2.8	85	17	17	17	17	17
4	0905CS191004	ABHINAV GUPTA		40,875	22,875	16	5.3	5.3	5.3	15	5.0	5.0	5.0	8	8	8	7.375	18	3.6	3.6	3.6	3.6	3.6	85	17	17	17	17	17
5	0905CS191005	ABHINAV JAIN		34,75	21,75	13	4.3	4.3	4.3	15	5.0	5.0	5.0	4	8	0	5.75	13	2.6	2.6	2.6	2.6	2.6	75	15	15	15	15	15
6	0905CS191006	ABHISHEK GUPTA		28,75	18,75	12	4.0	4.0	4.0	10	3.3	3.3	3.3	4	0	8	5.75	11	2.2	2.2	2.2	2.2	2.2	75	15	15	15	15	15
7	0905CS191007	ABHISHEK JHA		27,75	12,75	0	0.0	0.0	0.0	15	5.0	5.0	5.0	3.5	7	0	3.75	15	3	3	3	3	3	85	17	17	17	17	17
8	0905CS191008	ABHISHEK KUMAR		39,25	25,25	14	4.7	4.7	4.7	17	5.7	5.7	5.7	8	8	8	7.75	16	3.2	3.2	3.2	3.2	3.2	85	17	17	17	17	17
9	0905CS191009	ABHISHEK KUMAR		26,875	14,875	7	2.3	2.3	2.3	10	3.3	3.3	3.3	0	0	0	5.375	12	2.4	2.4	2.4	2.4	2.4	65	65	13	13	13	13	13
10	0905CS191010	ABHISHEK PATEL		24,125	10,125	5	1.7	1.7	1.7	9	0.0	0.0	0.0	3	6	0	7.625	14	2.8	2.8	2.8	2.8	2.8	60	60	13	13	13	13	13
11	0905CS191011	ABHISHEK PATHAK		47,5	21,5	13	4.3	4.3	4.3	14	4.7	4.7	4.7	7	7	7	8	20	4	4	4	4	4	85	85	17	17	17	17	17
12	0905CS191012	ABHISHEK		31,875	17,875	9	3.0	3.0	3.0	12	4.0	4.0	4.0	0	0	0	7.375	14	2.8	2.8	2.8	2.8	2.8	75	75	15	15	15	15	15
13	0905CS191013	ABHISHEK		37	21	15	5.0	5.0	5.0	12	4.0	4.0	4.0	7.5	7	8	7.5	16	3.2	3.2	3.2	3.2	3.2	95	95	19	19	19	19	19
14	0905CS191014	ABHISHEK		28,25	18,25	11	3.7	3.7	3.7	12	4.0	4.0	4.0	8.5	7	9	8.75	13	2.6	2.6	2.6	2.6	2.6	85	85	17	17	17	17	17
15	0905CS191015	ABHISHEK SINGH		34,75	18,75	15	5.0	5.0	5.0	14	4.7	4.7	4.7	7	7	7	4.25	16	3.2	3.2	3.2	3.2	3.2	85	85	17	17	17	17	17
16	0905CS191016	ADARSH DUBEY		42,375	24,375	17	5.7	5.7	5.7	17	5.7	5.7	5.7	7.5	7	8	7.375	18	3.6	3.6	3.6	3.6	3.6	85	85	17	17	17	17	17
17	0905CS191017	ADITI TOMAR		39,625	19,625	15	5.0	5.0	5.0	10	3.3	3.3	3.3	8	8	8	7.125	17	3.4	3.4	3.4	3.4	3.4	95	95	19	19	19	19	19
18	0905CS191018	ADITYA JHA		30	15	9	3.0	3.0	3.0	9	3.0	3.0	3.0	4	8	0	8	15	3	3	3	3	3	75	75	15	15	15	15	15
19	0905CS191019	ADITYA SAHU		34,125	14,125	13	4.3	4.3	4.3	0	0.0	0.0	0.0	7.5	7	8	7.625	20	4	4	4	4	4	95	95	19	19	19	19	19
20	0905CS191020	ADITYA SHARMA		27,875	11,875	5	1.7	1.7	1.7	9	3.0	3.0	3.0	0	0	0	7.375	16	3.2	3.2	3.2	3.2	3.2	75	75	15	15	15	15	15
21	0905CS191021	ADITYA SINGH		42	23	15	5.3	5.3	5.3	15	5.0	5.0	5.0	7	7	7	7.5	19	3.8	3.8	3.8	3.8	3.8	85	85	17	17	17	17	17
22	0905CS191022	ADITYA SONI		29,5	17,5	10	3.3	3.3	3.3	11	3.7	3.7	3.7	0	0	0	7	12	2.4	2.4	2.4	2.4	2.4	75	75	15	15	15	15	15
23	0905CS191023	ADITYA UPADHYAY		32,375	18,375	14	4.0	4.0	4.0	0	0.0	0.0	0.0	0	0	0	7.375	16	3.2	3.2	3.2	3.2	3.2	75	75	15	15	15	15	15
24	0905CS191024	AJAY PAL JATAV		22	11	4	1.3	1.3	1.3	9	3.7	3.7	3.7	0	0	0	6.5	11	2.2	2.2	2.2	2.2	2.2	55	55	11	11	11	11	11
25	0905CS191025	AKANKSHA		36,875	16,875	9	3.0	3.0	3.0	14	5.0	5.0	5.0	8	8	8	7.875	17	3.4	3.4	3.4	3.4	3.4	85	85	17	17	17	17	17
26	0905CS191026	AKARSH UPADHYA		33,75	18,75	12	4.0	4.0	4.0	17	5.7	5.7	5.7	7.5	8	7	8.75	18	3	3	3	3	3	85	85	17	17	17	17	17
27	0905CS191027	AKSHAT MANGAL		30,5	16,5	11	3.7	3.7	3.7	9	3.7	3.7	3.7	0	0	0	7.5	15	3	3	3	3	3	85	85	17	17	17	17	17
28	0905CS191028	AKSHAT VERMA		27,75	15,75	7	2.3	2.3	2.3	12	4.0	4.0	4.0	3.5	7	0	6.25	12	2.4	2.4	2.4	2.4	2.4	65	65	13	13	13	13	13
29	0905CS191029	ALANKRITA SAH		41,375	23,375	17	5.7	5.7	5.7	17	5.7	5.7	5.7	9	9	9	6.375	18	3.6	3.6	3.6	3.6	3.6	85	85	17	17	17	17	17
30	0905CS191030	ALPIT		35,75	17,75	8	2.7	2.7	2.7	11	3.7	3.7	3.7	8	8	8	8.25	18	3.6	3.6	3.6	3.6	3.6	75	75	15	15	15	15	15
31	0905CS191031	AMAN ARYAN		36,125	20,125	12	4.0	4.0	4.0	13	4.3	4.3	4.3	8	8	8	7.625	16	3.2	3.2	3.2	3.2	3.2	85	85	17	17	17	17	17
32	0905CS191032	AMAN SONI		28,625	16,625	7	2.3	2.3	2.3	12	4.0	4.0	4.0	0	0	0	7.125	12	2.4	2.4	2.4	2.4	2.4	65	65	13	13	13	13	13
33	0905CS191033	AMIT KUSHWAH		39	23	15	5.3	5.3	5.3	12	4.0	4.0	4.0	8	8	8	8	16	3.2	3.2	3.2	3.2	3.2	85	85	17	17	17	17	17
34	0905CS191034	AMIT SHARMA		41,25	21,25	14	4.7	4.7	4.7	13	4.3	4.3	4.3	0	0	0	7.75	20	4	4	4	4	4	85	85	17	17	17	17	17
35	0905CS191035	ANADI SHARMA		32,375	14,375	16	5.3	5.3	5.3	9	0.0	0.0	0.0	8	8	8	6.375	18	3.6	3.6	3.6	3.6	3.6	75	75	15	15	15	15	15
36	0905CS191036	ANANT KUMAWAT		42,75	22,75	18	6.0	6.0	6.0	15	5.0	5.0	5.0	3.5	7	0	6.25	20	4	4	4	4	4	85	85	17	17	17	17	17
37	0905CS191037	ANIKET AGRAWAL		30,25	18,25	9	3.0	3.0	3.0	13	4.3	4.3	4.3	0	0	0	7.25	12	2.4	2.4	2.4	2.4	2.4	75	75	15	15	15	15	15
38	0905CS191038	ANIMESH SHARMA		36,875	18,875	12	4.0	4.0	4.0	14	4.7	4.7	4.7	7.5	7	8	5.875	20	4	4	4	4	4	75	75	15	15	15	15	15
39	0905CS191039	ANJUL SHARMA		28,75	18,75	11	3.7	3.7	3.7	7	2.3	2.3	2.3	0	0	0	8.75	14	2.8	2.8	2.8	2.8	2.8	65	65	13	13	13	13	13
40	0905CS191040	ANKIT JAIN		26,375	15,375	7	2.3	2.3	2.3	12	4.0	4.0	4.0	0	0	0	6.875	11	2.2	2.2	2.2	2.2	2.2	65	65	13	13	13	13	13
41	0905CS191041	ANKIT JHA		35,25	18,25	14	4.7	4.7	4.7	9	3.0	3.0	3.0	0	0	0	8.75	17	3.4	3.4	3.4	3.4	3.4	85	85	17	17	17	17	17
42	0905CS191042	ANKUR GUPTA		37,25	21,25	15	5.3	5.3	5.3	15	5.0	5.0	5.0	7.5	7	8	8.75	16	3.2	3.2	3.2	3.2	3.2	85	85	17	17	17	17	17
43	0905CS191043	ANSH GUPTA		34,25	18,25	13	4.3	4.3	4.3	10	3.3	3.3	3.3	8	8	8	8.75	16	3.2	3.2	3.2	3.2	3.2	85	85	17	17	17	17	17
44	0905CS191044	ANSH MISHRA		39,25	19,25	14	4.7	4.7	4.7	11	3.7	3.7	3.7	8	8	8	8.75	20	4	4	4	4	4	95	95	19	19	19	19	19

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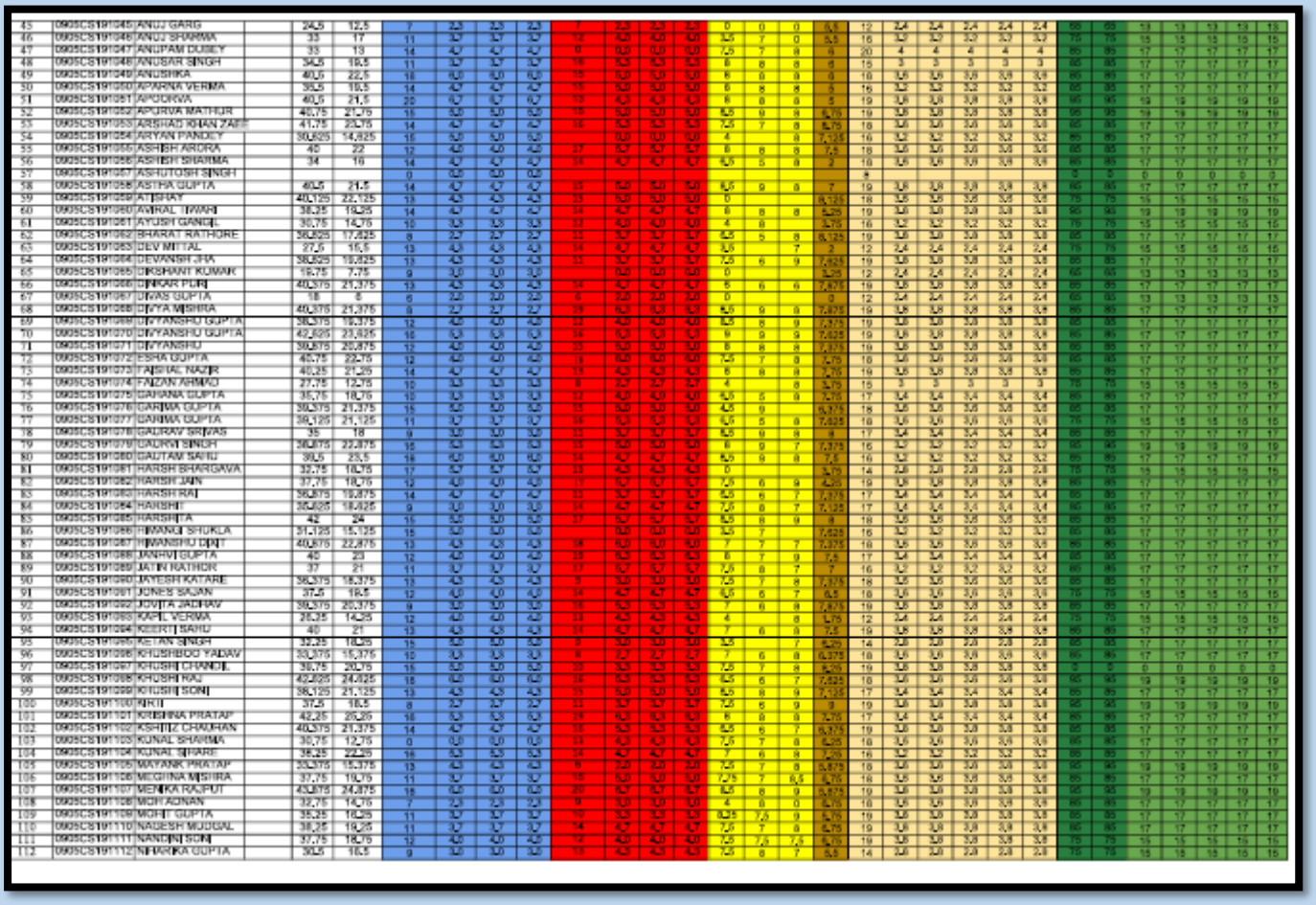

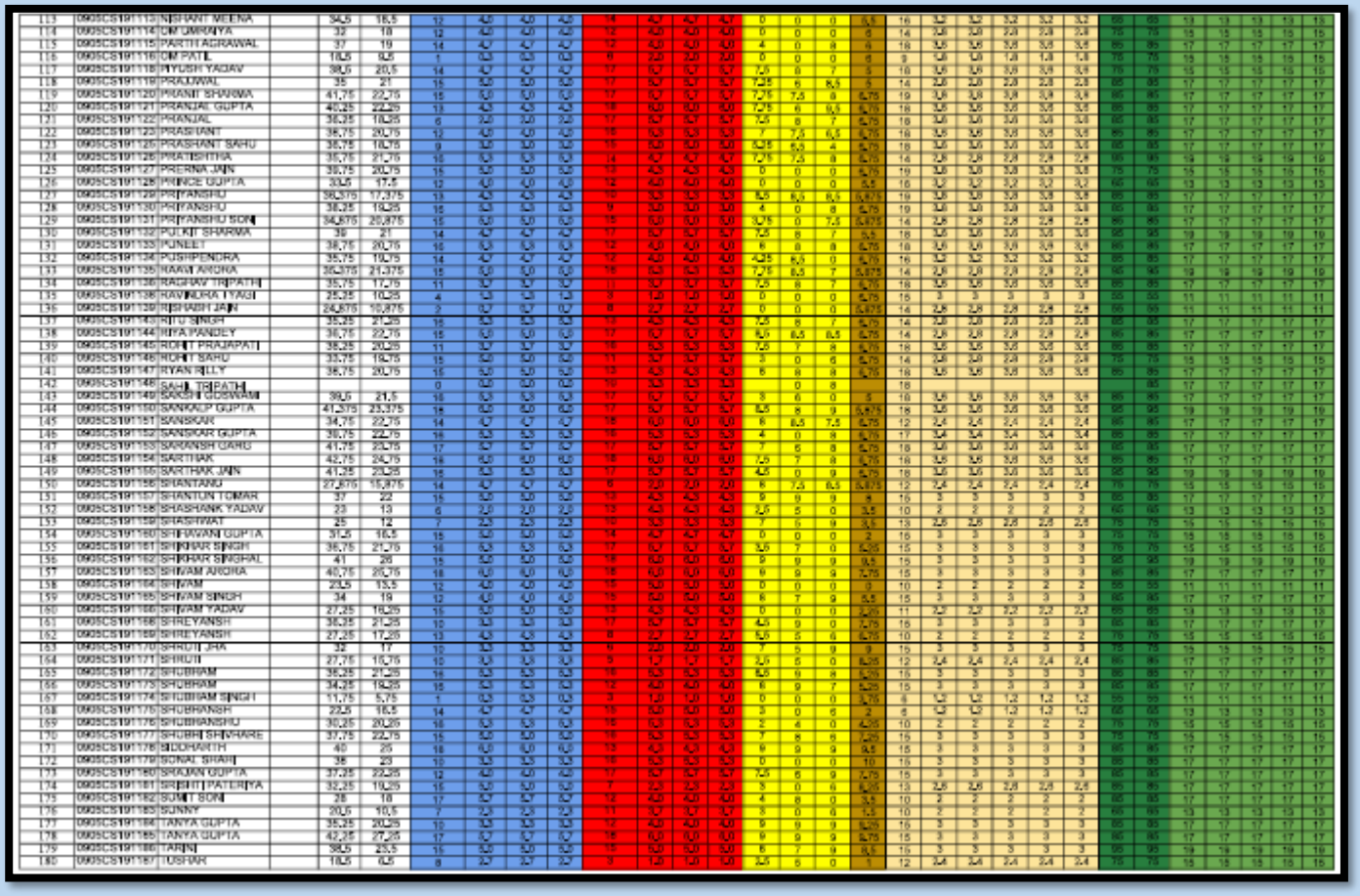

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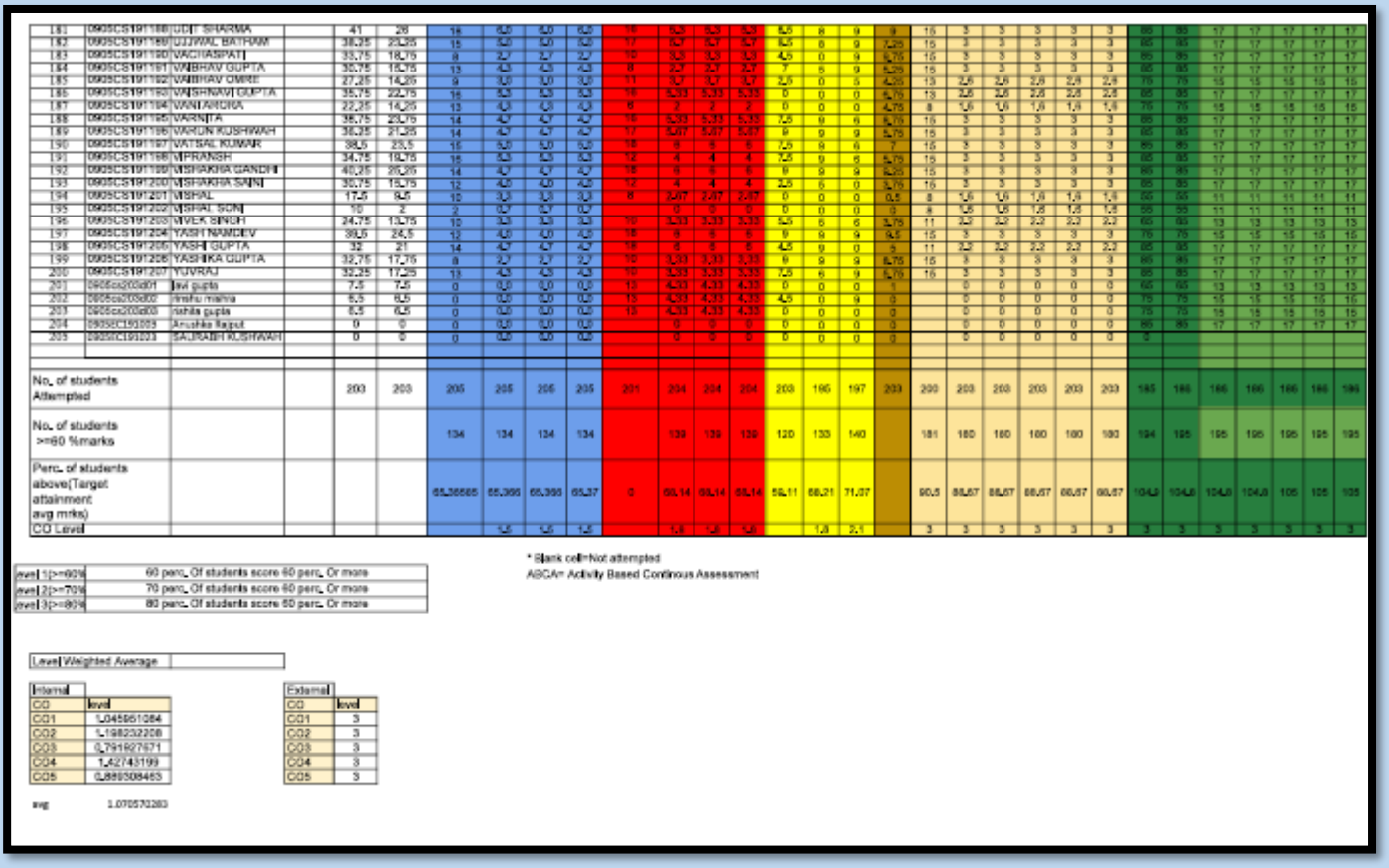

181	0905CS191188	UDIT SHARMA		41	28	18	6,0	6,0	6,0	18	6,3	6,3	6,3	6,5	6	9	9	18	3	3	3	3	3	86	86	17	17	17	17	17
182	0905CS191189	UJJWAL BATHAM		38,25	25,25	15	5,0	5,0	5,0	17	5,7	5,7	5,7	6,5	6	9	7,25	18	3	3	3	3	3	86	86	17	17	17	17	17
183	0905CS191190	VACHASPATI		33,75	18,75	9	3,0	3,0	3,0	10	3,3	3,3	3,3	4,5	0	9	5,75	18	3	3	3	3	3	86	86	17	17	17	17	17
184	0905CS191191	VAIBHAV GUPTA		30,75	18,75	13	4,3	4,3	4,3	8	2,7	2,7	2,7	7	8	9	8,25	18	3	3	3	3	3	86	86	17	17	17	17	17
185	0905CS191192	VAIBHAV OMRE		27,25	14,25	9	3,0	3,0	3,0	11	3,7	3,7	3,7	2,5	0	3	4,25	13	2,6	2,6	2,6	2,6	2,6	78	78	15	15	15	15	15
186	0905CS191193	VAISHNAVI GUPTA		35,75	22,75	18	6,0	6,0	6,0	16	5,33	5,33	5,33	6	0	0	5,75	13	2,6	2,6	2,6	2,6	2,6	86	86	17	17	17	17	17
187	0905CS191194	VANITA ARORA		22,25	14,25	13	4,0	4,0	4,0	6	2	2	2	0	0	0	4,75	8	1,6	1,6	1,6	1,6	1,6	78	78	15	15	15	15	15
188	0905CS191195	VARNITA		36,75	25,75	14	4,7	4,7	4,7	16	5,33	5,33	5,33	7,5	9	6	5,75	18	3	3	3	3	3	86	86	17	17	17	17	17
189	0905CS191196	VARUN KUSHWAH		36,25	21,25	14	4,7	4,7	4,7	17	5,67	5,67	5,67	9	9	9	5,75	18	3	3	3	3	3	86	86	17	17	17	17	17
190	0905CS191197	VATSAL KUMAR		38,5	23,5	15	5,0	5,0	5,0	18	6	6	6	7,5	9	6	7	18	3	3	3	3	3	86	86	17	17	17	17	17
191	0905CS191198	VIPRANSH		34,75	18,75	15	5,3	5,3	5,3	12	4	4	4	7,5	9	6	5,75	18	3	3	3	3	3	86	86	17	17	17	17	17
192	0905CS191199	VISHAKHA GANDHI		40,25	26,25	14	4,7	4,7	4,7	18	6	6	6	9	9	9	6,25	18	3	3	3	3	3	86	86	17	17	17	17	17
193	0905CS191200	VISHAKHA SAINI		30,75	15,75	12	4,0	4,0	4,0	12	4	4	4	2,5	6	0	5,75	18	3	3	3	3	3	86	86	17	17	17	17	17
194	0905CS191201	VISHAL		17,5	8,5	12	3,3	3,3	3,3	8	2,67	2,67	2,67	0	0	0	0,5	8	1,6	1,6	1,6	1,6	1,6	56	56	11	11	11	11	11
195	0905CS191202	VISHAL SONI		10	2	2	0,7	0,7	0,7		0	0	0	0	0	0	0	8	1,6	1,6	1,6	1,6	1,6	56	56	11	11	11	11	11
196	0905CS191203	VIVEK SINGH		34,75	18,75	10	3,3	3,3	3,3	10	3,33	3,33	3,33	5,5	6	6	5,75	11	2,2	2,2	2,2	2,2	2,2	65	65	13	13	13	13	13
197	0905CS191204	YASH NAMDEV		39,5	24,5	12	4,0	4,0	4,0	18	6	6	6	9	9	9	6,5	15	3	3	3	3	3	78	78	15	15	15	15	15
198	0905CS191205	YASH GUPTA		32	21	14	4,7	4,7	4,7	18	6	6	6	4,5	9	0	5	11	2,2	2,2	2,2	2,2	2,2	65	65	13	13	13	13	13
199	0905CS191206	YASHIKA GUPTA		32,75	17,75	9	3,0	3,0	3,0	10	3,33	3,33	3,33	9	9	9	5,75	18	3	3	3	3	3	86	86	17	17	17	17	17
200	0905CS191207	YUVRAJ		32,25	17,25	13	4,3	4,3	4,3	10	3,33	3,33	3,33	7,5	6	9	5,75	18	3	3	3	3	3	86	86	17	17	17	17	17
201	0905ca203d01	ravi gupta		7,5	7,5	0	0,0	0,0	0,0	13	4,33	4,33	4,33	0	0	0	1		0	0	0	0	0	65	65	13	13	13	13	13
202	0905ca203d02	rinshu mishra		6,5	6,5	0	0,0	0,0	0,0	13	4,33	4,33	4,33	4,5	0	9	0		0	0	0	0	0	75	75	15	15	15	15	15
203	0905ca203d03	rishita gupta		6,5	6,5	0	0,0	0,0	0,0	13	4,33	4,33	4,33	0	0	0	0		0	0	0	0	0	75	75	15	15	15	15	15
204	0905EC191003	Anushka Rajput		0	0	0	0,0	0,0	0,0		0	0	0	0	0	0	0		0	0	0	0	0	86	86	17	17	17	17	17
205	0905EC191023	SAURABH KUSHWAH		0	0	0	0,0	0,0	0,0		0	0	0	0	0	0	0		0	0	0	0	0	0						
No. of students Attempted				203	203	205	205	205	205	201	204	204	204	203	195	197	203	200	203	203	203	203	203	195	195	195	195	195	195	195
No. of students >=60 %marks						134	134	134	134		139	139	139	120	133	140		181	180	180	180	180	180	194	195	195	195	195	195	195
Perc. of students above(Target attainment avg mrks)						65,36585	65,366	65,366	65,37	0	68,14	68,14	68,14	58,11	68,21	71,07		90,5	88,67	88,67	88,67	88,67	88,67	104,9	104,6	104,6	104,6	105	105	105
CO Level							1,5	1,5	1,5		1,8	1,8	1,8		1,8	2,1		3	3	3	3	3	3	3	3	3	3	3	3	3

* Blank cell=Not attempted
ABCA= Activity Based Continous Assessment

evel 1(>=60%	60 perc. Of students score 60 perc. Or more
evel 2(>=70%	70 perc. Of students score 60 perc. Or more
evel 3(>=80%	80 perc. Of students score 60 perc. Or more

Level	Weighted Average

Internal	
CO	level
CO1	1,045561364
CO2	1,198232208
CO3	0,791927671
CO4	1,42743199
CO5	0,869308463

External	
CO	level
CO1	3
CO2	3
CO3	3
CO4	3
CO5	3

avg 1,070570283

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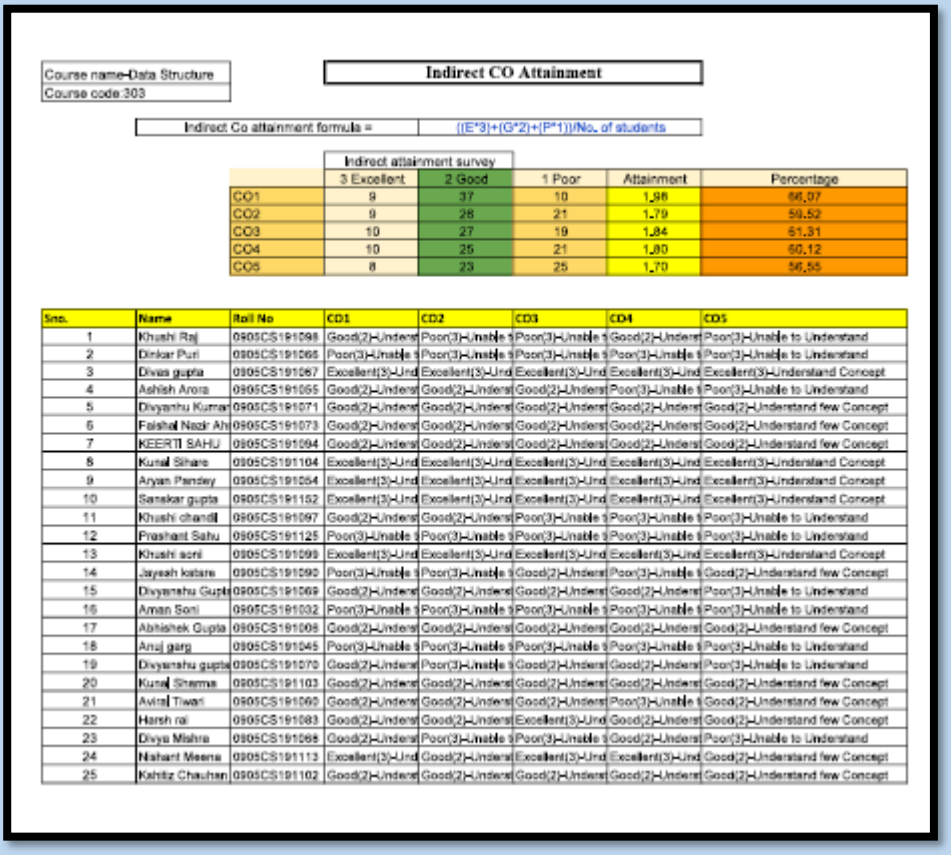

Course name-Data Structure
Course code 303

Indirect CO Attainment

Indirect Co attainment formula = ((E*3)+(G*2)+(P*1))/No. of students

	Indirect attainment survey				
	3 Excellent	2 Good	1 Poor	Attainment	Percentage
CO1	9	37	10	1,86	66,07
CO2	9	28	21	1,79	59,52
CO3	10	27	19	1,84	61,31
CO4	10	25	21	1,80	60,12
CO5	8	23	25	1,70	56,55

Sno.	Name	Roll No	CO1	CO2	CO3	CO4	CO5
1	Khushi Raj	0905CS191098	Good(2)-Underst	Poor(3)-Unable t	Poor(3)-Unable t	Good(2)-Underst	Poor(3)-Unable to Understand
2	Dinkar Puri	0905CS191065	Poor(3)-Unable t	Poor(3)-Unable t	Poor(3)-Unable t	Poor(3)-Unable t	Poor(3)-Unable to Understand
3	Divas gupta	0905CS191067	Excellent(3)-Und	Excellent(3)-Und	Excellent(3)-Und	Excellent(3)-Und	Excellent(3)-Understand Concept
4	Ashish Arora	0905CS191055	Good(2)-Underst	Good(2)-Underst	Good(2)-Underst	Poor(3)-Unable t	Poor(3)-Unable to Understand
5	Divyanhu Kumar	0905CS191071	Good(2)-Underst	Good(2)-Underst	Good(2)-Underst	Good(2)-Underst	Good(2)-Understand few Concept
6	Faishal Nadir Ah	0905CS191073	Good(2)-Underst	Good(2)-Underst	Good(2)-Underst	Good(2)-Underst	Good(2)-Understand few Concept
7	KEERTI SAHU	0905CS191094	Good(2)-Underst	Good(2)-Underst	Good(2)-Underst	Good(2)-Underst	Good(2)-Understand few Concept
8	Kunal Sihare	0905CS191104	Excellent(3)-Und	Excellent(3)-Und	Excellent(3)-Und	Excellent(3)-Und	Excellent(3)-Understand Concept
9	Aryan Pandey	0905CS191054	Excellent(3)-Und	Excellent(3)-Und	Excellent(3)-Und	Excellent(3)-Und	Excellent(3)-Understand Concept
10	Sanskar gupta	0905CS191152	Excellent(3)-Und	Excellent(3)-Und	Excellent(3)-Und	Excellent(3)-Und	Excellent(3)-Understand Concept
11	Khushi chandil	0905CS191097	Good(2)-Underst	Good(2)-Underst	Poor(3)-Unable t	Poor(3)-Unable t	Poor(3)-Unable to Understand
12	Prashant Sahu	0905CS191125	Poor(3)-Unable t	Poor(3)-Unable t	Poor(3)-Unable t	Poor(3)-Unable t	Poor(3)-Unable to Understand
13	Khushi soni	0905CS191099	Excellent(3)-Und	Excellent(3)-Und	Excellent(3)-Und	Excellent(3)-Und	Excellent(3)-Understand Concept
14	Jayesh kalare	0905CS191090	Poor(3)-Unable t	Poor(3)-Unable t	Good(2)-Underst	Poor(3)-Unable t	Good(2)-Understand few Concept
15	Divyanshu Gupta	0905CS191069	Good(2)-Underst	Good(2)-Underst	Good(2)-Underst	Good(2)-Underst	Poor(3)-Unable to Understand
16	Aman Soni	0905CS191032	Poor(3)-Unable t	Poor(3)-Unable t	Poor(3)-Unable t	Poor(3)-Unable t	Poor(3)-Unable to Understand
17	Abhishek Gupta	0905CS191006	Good(2)-Underst	Good(2)-Underst	Good(2)-Underst	Good(2)-Underst	Good(2)-Understand few Concept
18	Anuj garg	0905CS191045	Poor(3)-Unable t	Poor(3)-Unable t	Poor(3)-Unable t	Poor(3)-Unable t	Poor(3)-Unable to Understand
19	Divyanshu gupta	0905CS191070	Good(2)-Underst	Poor(3)-Unable t	Good(2)-Underst	Good(2)-Underst	Poor(3)-Unable to Understand
20	Kunal Sharma	0905CS191103	Good(2)-Underst	Good(2)-Underst	Good(2)-Underst	Good(2)-Underst	Good(2)-Understand few Concept
21	Avina Tiwari	0905CS191060	Good(2)-Underst	Good(2)-Underst	Good(2)-Underst	Poor(3)-Unable t	Good(2)-Understand few Concept
22	Harsh rai	0905CS191083	Good(2)-Underst	Good(2)-Underst	Excellent(3)-Und	Good(2)-Underst	Good(2)-Understand few Concept
23	Divya Mishra	0905CS191068	Good(2)-Underst	Poor(3)-Unable t	Poor(3)-Unable t	Good(2)-Underst	Poor(3)-Unable to Understand
24	Nishant Meena	0905CS191113	Excellent(3)-Und	Good(2)-Underst	Excellent(3)-Und	Excellent(3)-Und	Good(2)-Understand few Concept
25	Kshitiz Chauhan	0905CS191102	Good(2)-Underst	Good(2)-Underst	Good(2)-Underst	Good(2)-Underst	Good(2)-Understand few Concept

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Final CO Attainment

Course name-Data Structure
Course code:303

	Final direct course attainment Calculations			Final InDirect course(2020)	
Course Outcome		Internal	End Semester	CO	Level
CO1		1.05	3	CO1	1.98
CO2		1.20	3	CO2	1.79
CO3		0.79	3	CO3	1.84
CO4		1.43	3	CO4	1.80
CO5		0.89	3	CO5	1.70
	Attainment	1.07	3	Final InDirect course attainment calc.	1.82
	Weightage	40%	60%		
	Direct total attainment	0.43	1.8		
	Final direct total attainme	2.23			
	Weightage	80%		20%	
	Total attainment	1.78		0.364285714	
	Final course attainment	2.15			

CO-Wise Attainment

	Direct					Direct(80%)	Indirect(20%)		Total
CO	End Sem	Internal	Endsem(60%)	Internal(40%)	Total		Survey	Survey(20%)	Direct+Indirect
CO1	3	1.05	1.8	0.42	2.22	1.77	1.98	0.40	2.17
CO2	3	1.20	1.8	0.48	2.28	1.82	1.79	0.36	2.18
CO3	3	0.79	1.8	0.32	2.12	1.69	1.84	0.37	2.06
CO4	3	1.43	1.8	0.57	2.37	1.90	1.80	0.36	2.26
CO5	3	0.89	1.8	0.36	2.16	1.72	1.70	0.34	2.06
									2.15

Target attainment Calculation

Course name-Data Structure
Course code:303

CO attainments			
	Target set(2020	COAttainment 2	Remarks
CO1	1.85	2.17	Achieved
CO2	1.85	2.18	Achieved
CO3	1.85	2.06	Achieved
CO4	1.85	2.26	Achieved
CO5	1.85	2.06	Achieved
AVG		2.15	

Remark:-	In 2020-21 the RGPV examination conducted were open book exam, hence the the endsemester CO attainment is extraordinary.
	With due consideration about the pandemic situation and the examination process, the target set for 2021-22 is not the average of cos attainded but we are making progressive development from 1.85 to 1.9

(Dr. S. S. Chauhan)
Dean Academic/ Coordinator IQAC
Co-ordinator, IQAC
Institute of Technology & Management
Gwalior (M.P.)

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