## ATTAINMENT OF COURSE OUTCOMES

The key aspects in Outcome-Based Education (OBE) are the assessment of course outcomes. At the initial stage of OBE implementation, the Course Outcomes (COs) for each course are defined based on the Programme Outcome (POs) and other requirements. At the end of each course, the COs needs to be assessed and evaluated, to check whether it has been attained or not.

Assessment is one or more processes, carried out by the department, that identify, collect, and prepare data to evaluate the achievement of Programme Educational Objectives and Programme Outcomes.

**CO Assessment Processes**

Assessment tools are categorized into two methods to assess the course outcomes as:

**Direct methods and indirect methods.**

1 Direct method displays the student's knowledge and skills from their performance in the continuous internal assessment tests, semester examinations, seminars, and class room and laboratory assignments etc. These methods provide a sampling of what students know and/or can do and provide strong evidence of student learning.

2 Indirect method includes student feedback on facilities, learning artifacts and course end survey that reflects the student's learning

Course Outcome is assessed in view of the performance of students in internal assessment, university examination of a Course and Course end survey. Direct assessment contributes 80% and indirect assessment contributes 20%. From direct assessment internal assessment contributes 25% and university assessment contributes 75% to the aggregate attainment of a CO.

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**Direct Assessment Method**

**Table: Direct Assessment Tool**

| S.No | Direct Assessment | Method Description |
|---|---|---|
| 1 | Internal Assessment Test | The Internal Assessment marks in a theory paper shall be based on two tests generally conducted at the end of 6 and 14 weeks of each semester. At the end of 14th week pre final examination may be conducted. An improvement test may be conducted for the desirous students before the end of the semester to give an opportunity to such students to improve their Internal Assessment Marks. It is a metric to continuously assess the attainment of course outcomes w.r.t Course Objectives. Average of the two tests shall be the Internal Assessment Marks for the relevant subject. |
| 2 | Lab Assignments | Lab Assignment can be one of the measuring criteria to mainly assess student's practical knowledge with their designing capabilities. In case of Practical, the internal assessment marks shall be based on the laboratory records and two practical test. |
| 3 | Mid Examination | The examination pattern prescribed by the University is strictly followed. Two internal (mid) exams- mid exam 1 & mid exam 2- are conducted and two assignments (1 & 2) are given in each semester. In each of the two exams, each student is evaluated for 25 marks with the following split- up:<br>• Descriptive test with the question paper set by concerned faculty: 10 marks<br>• Objective type test with the question paper set by university: 10 marks<br>• Assignment set by course teacher: 5 marks |

| | | |
|---|---|---|
| 4 | Theory and Practical Semester End Examination | Semester End Examination (Theory or Practical) are the metrics to assess whether all the course outcomes are attained or not by the course owner. Semester End Examination is more focused on attainment of the course outcomes and uses a descriptive exam. |
| 5 | Seminar | The Department selects a senior faculty member as a seminar coordinator. Seminar Coordinator has to sit with other faculty to assess the Technical seminar presentations by students. One seminar presentation per student in the VII semester would be conducted as per the schedule mentioned prior in Time Table. Seminar coordinators follow rubrics, which is set by the department for evaluation of seminar. |
| 6 | Project | Project batches are formed as per the instruction given by project coordinators. Synopsis will be submitted to the project coordinators for scrutinizing. Project Batches are allotted to the internal guides based on the specialization and competency skills of the faculties. Each internal guide will continuously monitor their students on a weekly basis to observe the progress of the work. The project guide along with project coordinator conduct 2 project reviews as per the rubrics, which is set by the Department.The Internal Assessment marks are submitted to the Head of Department. The department will encourage students to participate in technical Expo and the project guides motivate and guide the students to publish in standard conference/journal forums. |

As per the JNTU regulations, the marks allotted to theory are 25%and practical 25% for internal assessment. The remaining 75% is doneat university end assessment. The university end examinations are conducted at a center other than this college. Though the percentage of internal assessment is low, it is to be covering a large number of course objectives. The internal examination and the prescribed marks are to be complied with



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the regulation. Therefore, the scope for comprehensive assessment is less. In this frame work, the college conducts the components depicted in the above Table.

The internal assessment evaluation is separately compiled and graded to understand the process.

In the present analysis, the attainment levels are expressed in terms of the grades (3, 2 and 1) in accordance with the following rules:

**Attainment Level 3:** Greater than 60% of the students are scoring more than targeted value which is above the average of each Course Outcome in the internal examination.

**Attainment Level 2:** Between 50 to 59% of the students are scoring more than targeted value which is above the average of each Course Outcome in the internal examination.

**Attainment Level 1:**Between 40 to 49% of the students are scoring more than targeted value which is above the average of each Course Outcome in the internal examination.

The same yardsticks are applied to external evaluation. It is based on the results of the Examinations conducted by university at the end of each semester. However, the institute doesn't have access to the answer scripts and evaluation of individual course outcomes is not possible. University authorities provide us with the information on the marks/grades scored by each student in each course.The attainment levels are expressed in terms of the grades (3, 2 and 1) in accordance with the following rules:

**Attainment Level 3:**Greater than 60% of the students are scoring more than the University average percentage marks or set attainment level in the final examination

**Attainment Level 2:**Between 50 to 59% of the students are scoring more than the University average percentage marks or set attainment level in the final examination

**Attainment Level 1:**Between 40 to 49% of the students are scoring more than the University average percentage marks or set attainment level in the final examination

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**Indirect Assessment**

**Table: Indirect assessment methods**

| S.No | Indirect Assessment | Description |
|---|---|---|
| 1 | Alumni feedback | Collect the various information about program satisfaction and college from the Alumni students. |
| 2 | Exit survey | Collect the various information about program satisfaction and college from the final year students. |
| 3 | Employer feedback | Collect the various information about the graduate's skills, capabilities and opportunities. |
| 4 | Parents feedback | Collect the information about program satisfaction and college from parents. |
| 5 | Student feedback | Collect the information about outcome based education in teaching and learning process. |

**Tools used for assessment:**

Marks allocation by University: The division of marks given by university, and weight ages in arriving at the attainment of CO are given below. The CO assessment is carried out through Continuous internal Evaluation (CIE) and semester End Examination (SEE) with the following proportions:

**Table: Weightages of Marks for CIE: SEE**

| Type of course | Internal Marks(CIE) | External Marks(SEE) | Total Marks | Net CO Attainment Level As per Weightages |
|---|---|---|---|---|
| Theory | 25 | 75 | 100 | 0.25*CIE Level+0.75*SEE Level |
| Laboratory | 25 | 75 | 100 | 0.25*CIE Level+0.75*SEE Level |
| Seminar | 100 | - | 100 | CIE Level |
| Industrial oriented Mini Project/Summer internship | 25 | 75 | 100 | 0.25*CIE Level+0.75*SEE Level |
| Project stage -I | 100 | - | 100 | CIE Level |
| Project stage -II | 25 | 75 | 100 | 0.25*CIE Level+0.75*SEE Level |
| Mandatory course | 100 | - | 100 | CIE Level |

Based on combined Marks(i.e. CIE+SEE) Obtained by Candidate, Letter grades are Awarded as shown below Corresponding Grade Points also shown in table

| % Of marks Secured in Subject/Course (Class intervals) | Letter Grade (UGC Guidelines) | Grade Points |
|---|---|---|
| Greater than are Equal to 90% | O(Outstanding) | 10 |
| 80 and Less than 90 | A+(Excellent) | 9 |
| 70 and less than 80% | A(Very Good) | 8 |
| 60 and Less than 70% | B+(Good) | 7 |
| 50and Less than 60% | B(Average) | 6 |
| 40 and less than 50% | C(Pass) | 5 |
| Below 40% | F(Fail) | 0 |
| Absent | Ab | 0 |

Table: Letter Grades With Respect to Academic Performance

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**For attainment of course outcomes**

- Final Letter grades obtained by each student in the course in the course are made available by university.
- These Letter grades must be converted to marks as show in below table.

Table: Conversion of Letter grades into corresponding marks

| %of Marks Secured in a Subject | Letter Grade | Corresponging Marks |
|---|---|---|
| Greater than or equal to 90% | O | 1*Max SEE Marks |
| 80 and less than 90% | A+ | 0.89*Max SEE Marks |
| 70 and less than 80% | A | 0.79*Max SEE Marks |
| 60 and less than 70% | B+ | 0.69*Max SEE Marks |
| 50 and less than 60% | B | 0.59*Max SEE Marks |
| 40 and less than 50% | C | 0.49*Max SEE Marks |
| Below 40% | F | 0.39*Max SEE Marks |

- Frequency of data Collection

The data required for calculating attainments is to be gathered.Each course instructor maintains the data required like internal Marks mid wise and External Marks of their respective course.The frequency of data collection for collection for each assessment tool is show in a table.

| Assessment Toll | Frequency |
|---|---|
| University | Once a semester |
| Mid Examination | Twice a semester |
| Assignments | Twice a semester |
| Internal/External Lab Examination | Once a semester |

Table: Data Frequency

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**Attainment of CO's for Theory Courses:**

Attainment of theory courses calculated base on student performance I Continuous internal Evaluation (CIE) and semester End Examination (SEE)
Overall CO attainment -0.25 CIE Level +0.75 SEE Level

These values of the CO levels for the course are then used for mapping the PO attainments, using the array of target PO values for the course. The procedure adapted for calculating the attainment of Course Outcomes for a Theory course is described with an example for the course Data Base Management Systems.

Similarly CO attainment is calculated for all theory courses for corresponding academic years respectively

CO attainment level for courses other than Theory:

**a) Laboratory:**

***Continuous Internal Evaluation:***

The internal evaluation is based on session wise performance of experiment and viva voce, Observation, record and internal examination. The final internal marks are considered for CIE, and CO level for CIE attainment is decided upon the percentage of students who score more than 55% of the maximum internal marks, i.c., 13.75 out of 25 is used to decide the CO attainment level and is uniform for all CO's.

Semester End University Examination Evaluation (SEE): SEE Lab exam is evaluated for 75 marks. In SEE of the lab, % of students who score over 40% of the maximum marks, i.e. 30 out of 75 marks, is used to decide the CO attainment level and is uniform for all CO's.

**b) Seminar:**

For seminars, the assessment is based only on internal evaluation. The marks obtained in seminar is used to decide the % of students who scored more than 55% of maximum marks, and this % is used for determining corresponding CO attainment level. This Attainment level is construed as uniform for all COs of the course.

**c) Industry Oriented Mini Project:**

For Industry Oriented Mini Project, the assessment is based only on External evaluation. The marks obtained in Industry Oriented Mini Project is used to decide the % of students who scored more than 40% of maximum marks, and this % is used for determining corresponding CO attainment level. This Attainment level is construed as uniform for all COs of the course.

**d) Project: Continuous Internal Evaluation:**

The internal marks for project (25) are the total of marks allotted in Project review, final presentation, and by project guide. The final internal marks are considered for CIE, and CO level for CIE attainment is decided upon the percentage of students who score more than 55% of the maximum internal marks, i.e., 13.75 out of 25 is used to decide the CO attainment level and is uniform for all Cos

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**Semester End University Examination Evaluation (SEE):**

The external evaluation is by award of Grade (Excellent/Very Good/Satisfactory /Poor). These grades are considered for SEE, and CO level for SEE attainment is decided upon the percentage of students who got Excellent/Very Good/Good to the number of students appeared is used to decide the CO attainment level and is uniform for all COs. The average value of the CO levels for the course are then used for mapping the PO attainments, using the array of target PO values for the course.

**Indirect Assessment Tools:**

The PO/PSOs are attained indirectly by taking different surveys. These surves are also having equal weightages

For overall PO/PSO attainment.

1. Program Exit Survey
2. Alumni Survey
3. Employer Feedback Survey

**Frequency of Data Collection:**

Table: Data Frequency

| S.No | Assement Tool | Frequency of data collection |
|---|---|---|
| 1. | Program Exit Survey | Once a year |
| 2. | Alumni Survey | Once a year |
| 3. | Employer Feedback Survey | Once a year |

**Indirect Assessment Tools:**

**Alumni Survey:** A feedback is collected on POS & PSOS from alumni students. It contributes towards the weight age of PO and PSO attainment. This survey is conducted by Alumni coordinator with the passed out students. Alumni coordinator collects both Alumni feedback forms filled by passed out student.

**Employer Feedback Survey:** A feedback is collected on Vision & Mission, PEOs, and POs & PSOS It is an indirect assessment tool which contributes towards theweightage of PO and PSOS. It is conducted after one year of service completed by the graduates from joining those respective organizations.

**Program Exit Survey:** The Program graduate exit survey is collected at the end of the program. The objective of the survey is to know the level of confidence of each POs &PSOS that a graduate possess by the end of the program.

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## COURSE OUTCOME ATTAINMENT LEVELS OF ALL COURSES

**I YEAR I SEMESTER**

| S. No. | Course Code | Course Title | CO1 | CO2 | CO3 | CO4 | CO5 |
|---|---|---|---|---|---|---|---|
| 1 | C111 | Mathematics - I | 1.63 | 1.42 | 1.43 | 1.43 | 1.43 |
| 2 | C112 | Applied Physics | 1.57 | 1.52 | 1.44 | 1.52 | 1.52 |
| 3 | C113 | Programming for Problem Solving | 1.53 | 1.38 | 1.47 | 1.39 | 1.39 |
| 4 | C114 | Engineering Graphics | 1.81 | 1.74 | 1.67 | 1.75 | 1.75 |
| 5 | C115 | Applied Physics Lab | 2.33 | 2.25 | 2.26 | 2.33 | 2.26 |
| 6 | C116 | Programming for Problem Solving Lab | 2.35 | 2.31 | 2.32 | 2.35 | 2.32 |

**I YEAR II SEMESTER**

| S. No. | Course Code | Course Title | CO1 | CO2 | CO3 | CO4 | CO5 |
|---|---|---|---|---|---|---|---|
| 1 | C121 | Mathematics - II | 1.63 | 1.44 | 1.4 | 1.45 | 1.45 |
| 2 | C122 | Chemistry | 1.58 | 1.54 | 1.47 | 1.55 | 1.55 |
| 3 | C123 | Basic Electrical Engineering | 1.64 | 1.54 | 1.49 | 1.55 | 1.55 |
| 4 | C124 | Engineering Workshop | 2.36 | 2.24 | 2.17 | 2.24 | 2.24 |
| 5 | C125 | English | 1.8 | 1.66 | 1.67 | 1.8 | 1.67 |
| 6 | C126 | Engineering Chemistry Lab | 2.4 | 2.34 | 2.26 | 2.35 | 2.35 |
| 7 | C127 | English Language and Communication Skills Lab | 2.21 | 2.12 | 2.06 | 2.12 | 2.12 |
| 8 | C128 | Basic Electrical Engineering Lab | 2.24 | 2.01 | 2.02 | 2.02 | 2.02 |

**II YEAR I SEMESTER**

| S. No. | Course Code | Course Title | CO1 | CO2 | CO3 | CO4 | CO5 |
|---|---|---|---|---|---|---|---|
| 1 | C211 | Electronic Devices and Circuits | 1.57 | 1.45 | 1.45 | 1.45 | 1.45 |
| 2 | C212 | Network Analysis and Transmission Lines | 1.5 | 1.44 | 1.38 | 1.44 | 1.44 |
| 3 | C213 | Digital System Design | 1.49 | 1.44 | 1.4 | 1.44 | 1.44 |
| 4 | C214 | Signals and Systems | 1.39 | 1.3 | 1.31 | 1.39 | 1.31 |
| 5 | C215 | Probability Theory and Stochastic Processes | 1.45 | 1.38 | 1.38 | 1.45 | 1.38 |
| 6 | C216 | Electronic Devices and Circuits Lab | 2.4 | 2.17 | 2.35 | 2.18 | 2.18 |
| 7 | C217 | Digital System Design Lab | 2.31 | 2.26 | 2.27 | 2.31 | 2.27 |
| 8 | C218 | Basic Simulation Lab | 2.25 | 2.14 | 2.14 | 2.14 | 2.14 |

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**II YEAR II SEMESTER**

| S. No. | Course Code | Course Title | CO1 | CO2 | CO3 | CO4 | CO5 |
|---|---|---|---|---|---|---|---|
| 1 | C221 | Laplace Transforms, Numerical Methods &Complex Variables | 1.62 | 1.51 | 1.44 | 1.51 | 1.51 |
| 2 | C222 | Electromagnetic Fields and Waves | 1.44 | 1.43 | 1.44 | 1.44 | 1.44 |
| 3 | C223 | Analog and Digital Communications | 1.61 | 1.57 | 1.57 | 1.61 | 1.57 |
| 4 | C224 | Linear IC Applications | 1.63 | 1.53 | 1.46 | 1.53 | 1.53 |
| 5 | C225 | Electronic Circuit Analysis | 1.58 | 1.53 | 1.54 | 1.58 | 1.54 |
| 6 | C226 | Analog and Digital Communications Lab | 2.27 | 2.1 | 2.02 | 2.11 | 2.11 |
| 7 | C227 | IC Applications Lab | 2.34 | 2.16 | 2.08 | 2.16 | 2.16 |
| 8 | C228 | Electronic Circuit Analysis Lab | 2.3 | 2.12 | 2.01 | 2.13 | 2.13 |
| 9 | C229 | Gender Sensitization Lab | 2.25 | 2.14 | 2.07 | 2.14 | 2.14 |

**II YEAR I SEMESTER**

| S. No. | Course Code | Course Title | CO1 | CO2 | CO3 | CO4 | CO5 |
|---|---|---|---|---|---|---|---|
| 1 | C311 | Microprocessors & Microcontrollers | 1.38 | 1.38 | 1.38 | 1.38 | 1.38 |
| 2 | C312 | Data Communications and Networks | 1.51 | 1.4 | 1.4 | 1.51 | 1.4 |
| 3 | C313 | Control Systems | 1.49 | 1.38 | 1.39 | 1.49 | 1.39 |
| 4 | C314 | Business Economics & Financial Analysis | 1.46 | 1.41 | 1.41 | 1.46 | 1.41 |
| 5 | C315 | Professional Elective – I (EMI) | 1.59 | 1.5 | 1.5 | 1.59 | 1.5 |
| 6 | C316 | Microprocessors & Microcontrollers Lab | 2.14 | 2.04 | 2.04 | 2.14 | 2.04 |
| 7 | C317 | Data Communications and Networks Lab | 2.29 | 2.25 | 2.15 | 2.25 | 2.25 |
| 8 | C318 | Advanced Communication Skills Lab | 2.1 | 2.07 | 2.07 | 2.1 | 2.07 |

**III YEAR II SEMESTER**

| S. No. | Course Code | Course Title | CO1 | CO2 | CO3 | CO4 | CO5 |
|---|---|---|---|---|---|---|---|
| 1 | C321 | Antennas and Propagation | 1.55 | 1.55 | 1.55 | 1.55 | 1.55 |
| 2 | C322 | Digital Signal Processing | 1.57 | 1.46 | 1.42 | 1.46 | 1.46 |
| 3 | C323 | VLSI Design | 1.69 | 1.58 | 1.43 | 1.58 | 1.58 |
| 4 | C324 | Professional Elective – II (ESD) | 1.65 | 1.58 | 1.58 | 1.58 | 1.58 |
| 5 | C325 | Open Elective – I (IM) | 1.61 | 1.6 | 1.6 | 1.61 | 1.6 |
| 6 | C326 | Digital Signal Processing Lab | 2.08 | 1.95 | 1.95 | 2.08 | 1.95 |
| 7 | C327 | e – CAD Lab | 2.05 | 1.91 | 1.91 | 2.05 | 1.91 |
| 8 | C328 | Scripting Languages Lab | 1.99 | 1.9 | 1.9 | 1.99 | 1.9 |

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III YEAR I SEMESTER

| S. No. | Course Code | Course Title | CO1 | CO2 | CO3 | CO4 | CO5 |
|---|---|---|---|---|---|---|---|
| 1 | C411 | Microwave and Optical Communications | 1.6 | 1.54 | 1.6 | 1.54 | 1.54 |
| 2 | C412 | Professional Elective – III (DIP) | 1.61 | 1.5 | 1.67 | 1.5 | 1.5 |
| 3 | C413 | Professional Elective – IV (NSC) | 1.68 | 1.63 | 1.73 | 1.63 | 1.63 |
| 4 | C414 | Open Elective – II (JP) | 1.56 | 1.51 | 1.63 | 1.51 | 1.51 |
| 5 | C415 | Professional Practice, Law & Ethics | 1.64 | 1.59 | 1.55 | 1.59 | 1.59 |
| 6 | C416 | Microwave & Optical Communications Lab | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 |
| 7 | C417 | Industrial Oriented Mini Project/ Summer Internship | 2 | 2 | 2 | 2 | 2 |
| 8 | C418 | Seminar | 2 | 2 | 2 | 2 | 2 |
| 9 | C419 | Project Stage - I | 2 | 2 | 2 | 2 | 2 |

IV YEAR II SEMESTER

| S. No. | Course Code | Course Title | CO1 | CO2 | CO3 | CO4 | CO5 |
|---|---|---|---|---|---|---|---|
| 1 | C421 | Professional Elective – V (WSN) | 1.72 | 1.68 | 1.74 | 1.68 | 1.68 |
| 2 | C422 | Professional Elective – VI (SOC) | 1.68 | 1.61 | 1.69 | 1.61 | 1.61 |
| 3 | C423 | Open Elective – III (NCSE) | 1.74 | 1.69 | 1.8 | 1.69 | 1.69 |
| 4 | C424 | Project Stage - II | 2 | 2 | 2 | 2 | 2 |

Assessment tools are categorized into direct and indirect methods to assess the Program Outcomes and Program Specific Outcomes

1. Direct method displays the student's knowledge and skills from their performance in the continuous assessment tests, end–semester examinations, presentations, and classroom assignments etc. These methods provide a sampling of what students know and/or can do and provide strong evidence of student learning.

2. Indirect methods such as surveys and interviews ask the stakeholders to reflect on students learning. They assess opinions or thoughts about the graduates knowledge or skills and their valued by different stakeholders.

The program outcomes are assessed with the help of course outcomes of the relevant Courses through direct and indirect methods.

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**Direct Assessment Method (B1):**

Direct Assessment methods are formative as well as summative. It measures are provided through direct examinations or observations of student knowledge or skills against measureable course outcomes. The knowledge and skills described by the course outcomes are mapped to specific problems on internal exams/home assignment/group task. Throughout the semester the faculty records the performance of each student on each course outcome. At the end of the semester students receive grades from external exams. Calculations are same as that done for CO attainment and carry forwarded here.

| S.No | Direct Assessment Method | Description | Frequency of Data Collection |
|---|---|---|---|
| 1 | Internal Assessment Test | The internal assessment marks for a theory subject shall be based on average of two internal tests marks obtained. | Twice in a Semester |
| 2 | Lab Internal Assessment Test | The internal assessment marks for a laboratory shall be based on laboratory reports (Record), conduction of experiments, viva voce and internal test marks obtained. | Before the end of every semester |
| 3 | Seminar (Internal Assessment ) | The internal assessment marks in the case of seminars in the final year shall be based on the evaluation by a committee comprising of head of the department and senior faculty members as per rubrics prepared. | VII semester |

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**Indirect Assessment Method (B2):**

Indirect assessment strategies are implemented by embedding them in

a) Alumni Survey

b) Graduate Exit Survey

c) Employers Survey and

d) Parents Survey.

The assessment methods and how it is carried is as shown in the below table

| S.No | Direct Assessment Method | Description | Frequency of Data Collection |
|---|---|---|---|
| 1 | Graduate Exit Survey | To evaluate the success of programme in providing students with opportunities to achieve the programme outcome. | Every Year |
| 2 | Parents Survey | Collect variety of information about program satisfaction, from parent'send. | Once in a Year |
| 3 | Alumni Survey | Collect variety of information about program satisfaction, from graduate'send | Every Year |
| 4 | Employers Survey | Provide information about our graduate's skills and capability. | Every Year |

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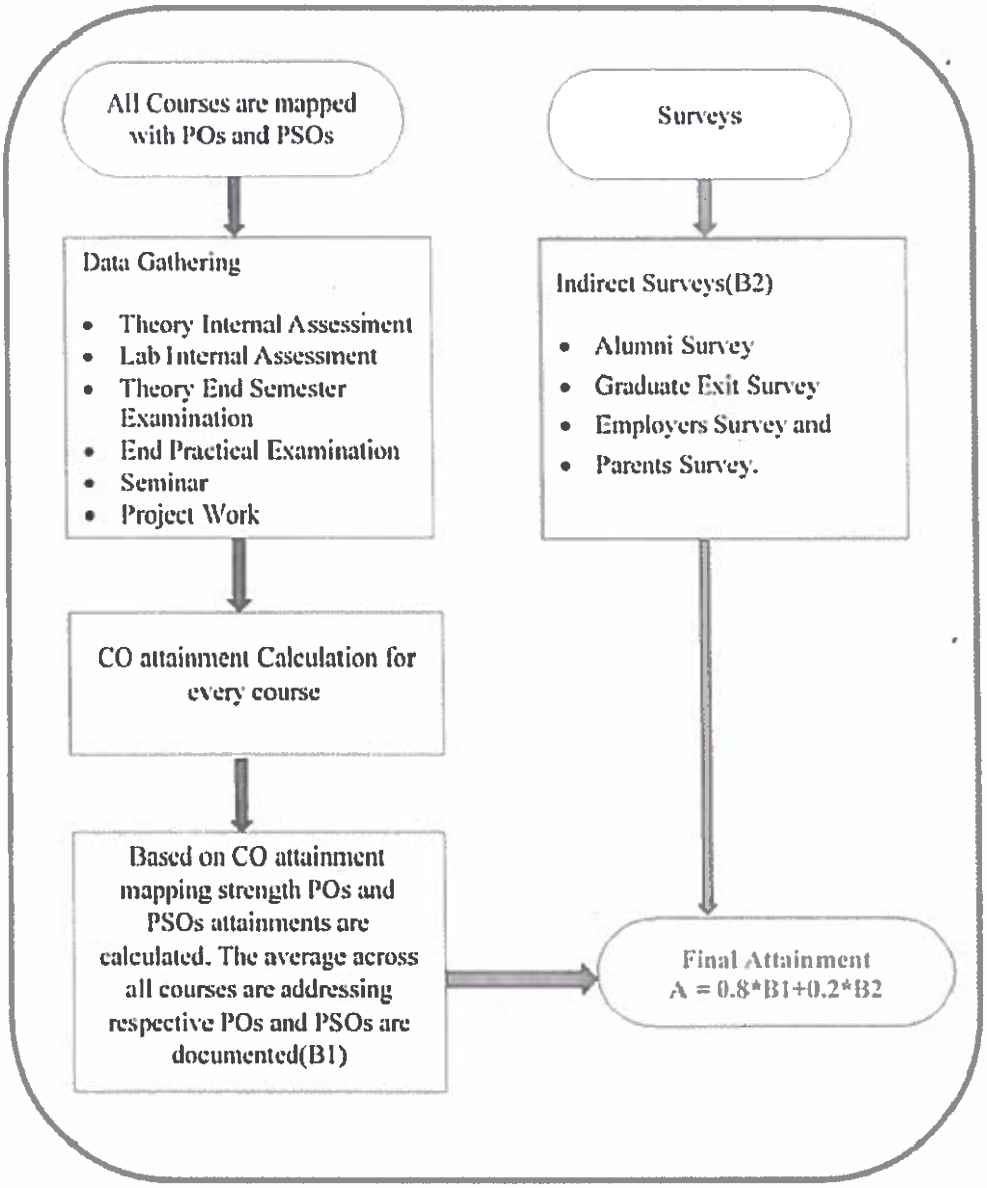
**Process followed for Measuring Attainment of PO & PSO's**

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**PO Attainment**

| Course | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C111 | 1.47 | 1.47 | 1.47 | 1.47 | 1.47 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| C112 | 1.01 | 0.91 | 0.2 | 0.8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| C113 | 0.86 | 1.43 | 0.86 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.29 | 0.67 |
| C114 | 1.63 | 1.74 | 1.74 | 0.47 | 1.16 | 1.04 | 0 | 0 | 0 | 0 | 0 | 1.16 |
| C115 | 1.52 | 1.32 | 0.31 | 1.21 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| C116 | 2.02 | 1.71 | 0.31 | 0 | 0.16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| C121 | 1.47 | 1.47 | 1.47 | 1.47 | 1.47 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| C122 | 1.54 | 0.82 | 0.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| C123 | 1.55 | 1.04 | 0.52 | 0.1 | 1.13 | 0.41 | 0 | 1.31 | 0.73 | 0.4 | 0.83 | 1.04 |
| C124 | 2.1 | 2.25 | 2.25 | 0.61 | 1.5 | 1.35 | 0 | 0 | 0 | 0 | 0 | 1.5 |
| C125 | 1.03 | 0 | 0 | 0 | 0.22 | 0 | 0 | 0.93 | 1.04 | 0.93 | 0 | 1.38 |
| C126 | 0.78 | 1.24 | 0.92 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| C127 | 1.27 | 0 | 0 | 0 | 0 | 0 | 0 | 1.14 | 1.28 | 1.13 | 0 | 1.7 |
| C128 | 2.06 | 1.37 | 0.69 | 0.13 | 1.76 | 0.81 | 0 | 0.4 | 0.84 | 0.81 | 0.97 | 1.37 |
| C211 | 1.48 | 1.48 | 1.48 | 1.18 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 0.19 |
| C212 | 0.8 | 1.06 | 0.38 | 0 | 0 | 0.29 | 0 | 0 | 0 | 0 | 0 | 0.1 |
| C213 | 1.35 | 1.15 | 1.06 | 0 | 0.87 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 |
| C214 | 1.34 | 1.34 | 0.71 | 0.36 | 0.17 | 0 | 0 | 0 | 0 | 0 | 0 | 0.36 |
| C215 | 1.41 | 1.41 | 0.57 | 1.07 | 0.29 | 1.41 | 0 | 0 | 0 | 0 | 0 | 0 |
| C216 | 0.75 | 0 | 1.5 | 0 | 2.25 | 0 | 0 | 2.25 | 2.25 | 0 | 0 | 0.75 |
| C217 | 2.28 | 1.52 | 2.28 | 1.57 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| C218 | 2.16 | 1.44 | 2.16 | 2.16 | 2.16 | 1.4 | 0 | 0 | 2.16 | 0.72 | 0 | 0.72 |
| C221 | 1.52 | 1.52 | 1.52 | 1.52 | 1.52 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| C222 | 1.43 | 1.43 | 0.96 | 0.77 | 0 | 0.48 | 0 | 0 | 0 | 0.48 | 0 | 0 |
| C223 | 1.59 | 1.59 | 1.59 | 0.53 | 0 | 1.38 | 1.06 | 0 | 0 | 0 | 0 | 0.53 |
| C224 | 1.53 | 1.53 | 0.81 | 0.4 | 0.2 | 0 | 0 | 0 | 0 | 0 | 0 | 0.41 |
| C225 | 1.5 | 1.55 | 0.62 | 1.14 | 0.32 | 1.55 | 0 | 0 | 0 | 0 | 0 | 0 |
| C226 | 0.71 | 0 | 1.41 | 0 | 2.12 | 0 | 0 | 2.12 | 2.12 | 0 | 0 | 0.71 |
| C227 | 2.18 | 1.45 | 2.18 | 1.45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| C228 | 2.14 | 1.43 | 2.14 | 2.14 | 2.14 | 1.43 | 0 | 0 | 2.14 | 0.71 | 0 | 0.71 |
| C229 | 2.15 | 1.43 | 2.15 | 2.15 | 2.15 | 1.43 | 0 | 0 | 2.15 | 0.72 | 0 | 0.7 |
| C311 | 1.38 | 1.38 | 1.38 | 1.38 | 1.38 | 1.38 | 1.38 | 0 | 1.38 | 1.38 | 0.92 | 1.38 |
| C312 | 1.25 | 1.44 | 0.96 | 1.26 | 1.44 | 0 | 0 | 0 | 0 | 1.34 | 1.15 | 0.96 |
| C313 | 1.43 | 1.43 | 1.23 | 1.05 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.48 |
| C314 | 0.05 | 1.05 | 1.05 | 1.05 | 1.43 | 1.05 | 1.05 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| C315 | 1.54 | 0.92 | 0.71 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| C316 | 2.08 | 2.08 | 2.08 | 2.08 | 2.08 | 2.08 | 0 | 2.08 | 2.08 | 1.39 | 2.08 | 2.08 |
| C317 | 1.2 | 1.04 | 1.19 | 0.74 | 1.04 | 1.05 | 0 | 0 | 0 | 1.2 | 0 | 0.9 |
| C318 | 1.25 | 0 | 0 | 0 | 0 | 0 | 0 | 1.1 | 1.25 | 1.11 | 0 | 1.66 |
| C321 | 1.5 | 1.55 | 1.55 | 1.55 | 1.03 | 1.55 | 1.03 | 0 | 0 | 1.16 | 1.55 | 1.03 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C322 | 1.47 | 1.47 | 1.28 | 1.28 | 1.38 | 0 | 0 | 0 | 0 | 0 | 1.18 | 1.47 |
| C323 | 1.17 | 0.52 | 1.57 | 0 | 0.31 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| C324 | 1.17 | 1.17 | 1.17 | 1.17 | 1.59 | 1.17 | 1.17 | 0 | 1.06 | 1.06 | 1.06 | 1.06 |
| C325 | 0 | 0 | 0 | 0 | 0 | 0.53 | 1.07 | 1.07 | 1.6 | 1.6 | 1.6 | 1.07 |
| C326 | 1.74 | 1.59 | 1.6 | 1.73 | 1.72 | 0 | 0 | 1.59 | 1.46 | 1.61 | 0 | 1.46 |
| C327 | 1.31 | 1.31 | 1.31 | 1.31 | 0.97 | 0 | 0 | 0 | 0 | 0.65 | 0 | 1.97 |
| C328 | 1.55 | 0.52 | 0.52 | 0.26 | 0.26 | 0 | 0 | 0 | 0 | 0 | 0 | 0.52 |
| C411 | 1.56 | 1.56 | 1.56 | 1.56 | 1.04 | 0.52 | 0.52 | 0 | 0.52 | 0.52 | 1.04 | 1.56 |
| C412 | 1.5 | 1.5 | 1.5 | 1.55 | 1.04 | 0.52 | 0.52 | 0 | 0.52 | 0.52 | 1.04 | 1.55 |
| C413 | 0.77 | 0.66 | 0.78 | 0.44 | 0.66 | 0.77 | 1.22 | 0.54 | 0.77 | 0.35 | 0.43 | 0 |
| C414 | 1.13 | 0 | 0.2 | 0 | 0.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 |
| C415 | 0.74 | 1.27 | 1.59 | 0.95 | 0.96 | 0 | 0 | 0 | 0 | 0 | 0 | 0.96 |
| C416 | 2.27 | 2.27 | 2.27 | 2.27 | 1.51 | 0.76 | 0.76 | 0 | 0.76 | 0.76 | 1.51 | 2.27 |
| C417 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| C418 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| C419 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| C421 | 1.7 | 1.59 | 1.47 | 0.57 | 1.25 | 0 | 0 | 0 | 0 | 0 | 0 | 1.02 |
| C422 | 1.44 | 1.53 | 1.5 | 0.55 | 0 | 0.77 | 0.77 | 0 | 0 | 0 | 0 | 0.55 |
| C423 | 0.57 | 0.57 | 0.57 | 0.57 | 0 | 0 | 0 | 0 | 0 | 0 | 0.57 | 0.57 |
| C424 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |

**PO Attainment Level**

| Course | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO Attainment | 1.77 | 1.73 | 1.62 | 1.36 | 1.59 | 1.54 | 1.59 | 1.78 | 1.77 | 1.47 | 1.58 | 1.47 |
| Direct Attainment | 1.46 | 1.41 | 1.28 | 1.20 | 1.24 | 1.18 | 1.24 | 1.47 | 1.46 | 1.09 | 1.23 | 1.09 |
| InDirect Attainment | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |

**PSO Attainment**

| Course | PSO1 | PSO2 |
|---|---|---|
| C111 | 1.47 | 0 |
| C112 | 0.31 | 0.4 |
| C113 | 0 | 0 |
| C114 | 1.16 | 1.28 |
| C115 | 0.46 | 0.61 |
| C116 | 0 | 0 |
| C121 | 1.47 | 0 |
| C122 | 0 | 0 |
| C123 | 1.14 | 0 |
| C124 | 1.5 | 1.66 |
| C125 | 0.57 | 0 |
| C126 | 0 | 0 |
| C127 | 0.71 | 0 |
| C128 | 1.37 | 0 |
| C211 | 1.19 | 0.89 |



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Kondapur, Ghatkesar Mundal

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|---|---|---|
| C212 | 0.96 | 0 |
| C213 | 1.25 | 1.44 |
| C214 | 1.07 | 1.16 |
| C215 | 1.3 | 1.13 |
| C216 | 1.81 | 0.75 |
| C217 | 2.28 | 2.28 |
| C218 | 2.16 | 0 |
| C221 | 1.52 | 0 |
| C222 | 1.43 | 1.43 |
| C223 | 1.06 | 1.06 |
| C224 | 1.23 | 1.33 |
| C225 | 1.24 | 1.24 |
| C226 | 1.71 | 0.71 |
| C227 | 2.18 | 2.18 |
| C228 | 2.14 | 0 |
| C229 | 2.15 | 0 |
| C311 | 1.38 | 1.38 |
| C312 | 1.06 | 0.68 |
| C313 | 0.48 | 0 |
| C314 | 1.43 | 1.43 |
| C315 | 1.54 | 0.51 |
| C316 | 2.08 | 2.08 |
| C317 | 1.04 | 1.2 |
| C318 | 0.69 | 0 |
| C321 | 1.55 | 1.55 |
| C322 | 1.47 | 1.17 |
| C323 | 1.16 | 0.84 |
| C324 | 1.59 | 1.59 |
| C325 | 0 | 0 |
| C326 | 1.06 | 1.06 |
| C327 | 1.97 | 1.97 |
| C328 | 1.67 | 1.29 |
| C411 | 1.56 | 1.56 |
| C412 | 1.55 | 1.55 |
| C413 | 1.1 | 0.88 |
| C414 | 0 | 0 |
| C415 | 1.27 | 1.06 |
| C416 | 2.27 | 2.27 |
| C417 | 2 | 2 |
| C418 | 2 | 2 |
| C419 | 2 | 2 |
| C421 | 1.59 | 1.25 |
| C422 | 1.31 | 1.31 |



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| | | |
|---|---|---|
| C423 | 0 | 0 |
| C424 | 2 | 2 |

**PSO Attainment Level**

| Course | PSO1 | PSO2 |
|---|---|---|
| CO Attainment | 1.74 | 1.68 |
| Direct Attainment | 1.43 | 1.35 |
| InDirect Attainment | 3 | 3 |

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO 1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Direct (A) | 1.46 | 1.41 | 1.28 | 1.2 | 1.24 | 1.18 | 1.24 | 1.47 | 1.46 | 1.09 | 1.23 | 1.09 | 1.43 | 1.35 |
| Indirect (B) | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Final Attainment (A*0.8+B*0.2) | 1.77 | 1.73 | 1.62 | 1.36 | 1.59 | 1.54 | 1.59 | 1.78 | 1.77 | 1.47 | 1.58 | 1.47 | 1.74 | 1.68 |

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