*Shiksha Mandal's*

# BAJAJ INSTITUTE OF TECHNOLOGY, PIPRI, WARDHA

## CRITERION-II

## Metric: 2.6.2

**Attainment of POs and COs are evaluated**

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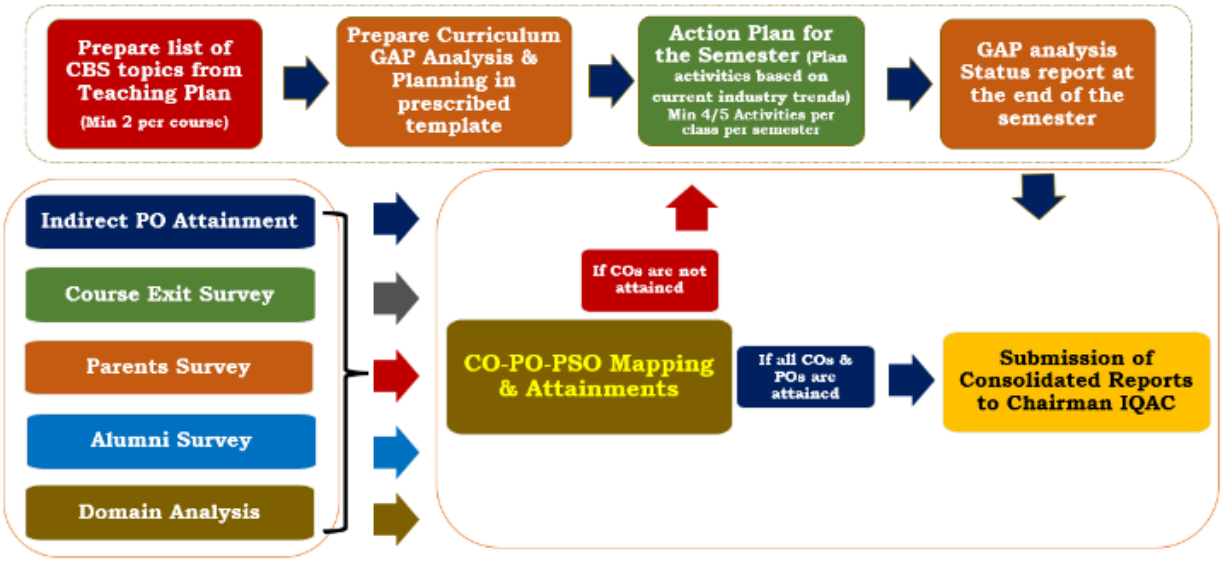
***Attainment of POs and COs are evaluated.***

Bajaj Institute of Technology believes in outcome-based education since its inception. The first batch is passed out in 2020-21. Due to pandemic and online nature of content delivery, evaluation of CO-PO attainment is started from 2020-21 (For 2019-20 Batch).

## Process Flow:




## Method of Measuring Attainment of CO:

Course CO attainment is measured based on students scores and set CO targets.
The CO targets are set by IQAC for all the courses in the program based on performance of students in internal and external examinations such as Continuous Assessment (CA), Mid Semester Examinations (MSE) and End Semester Examination (ESE). If the targets are achieved then all the COs are attained. If the set target is not achieved (≥ 30 % of set target), then the department prepares an action plan. These courses also have a priority while planning and preparing curriculum GAP analysis in subsequent years.
For evaluating CO attainments ERP portal (R-Work) is used for all the courses.

Following table shows Assessment tools, criterion and process.

| S. No | Assessment Tool | Assessment Criterion | Process for data collection |
|---|---|---|---|
| 1. | Continuous Assessment (CA-I) | CA-I is based on defined assessment parameters. Its assessment is based on defined rubrics for various parameters. | Evaluation of rubrics-based parameters and the score of the students. |
| 2. | Continuous Assessment (CA-II) | CA-II is based on defined assessment parameters. Its assessment is based on defined rubrics for various parameters | Evaluation of rubrics-based parameters and the score of the students. |

| | | | |
|---|---|---|---|
| 3. | Mid Semester Examination (MSE) | MSE is based on first two/three units of the syllabus. Three Questions are asked based on the syllabus. | Evaluation of the answer sheets and the score of the students out of 20. |
| 4. | End Semester Examination (ESE) | ESE is as per affiliating university schedule and on complete syllabus. | Marks scored by the students out of 80. |
| 5. | Lab Assessment CA-I & II and Oral Examination | CA-I and II is based on defined assessment parameters for laboratory work. Its assessment is based on defined rubrics for various parameters. | Evaluation of rubrics-based parameters and the score of the students. |
| | | Practical oral examination is as per affiliating university schedule and on complete syllabus. | Evaluation of rubrics-based parameters and the score of the students. |
| 6. | Project/Seminar /Mini Project | Review seminars are conducted for continuous assessment and evaluation. | Evaluation by internal and external examiners. Internal evaluation is based on defined rubrics. |

## Method of Measuring Attainment of PO and PSO:

PO attainment levels are evaluated based on Direct Attainment Method and Indirect attainment method.

| PO/ PSO | Assessment & Evaluation Method | Assessment and Evaluation Tool | Source | Frequency |
|---|---|---|---|---|
| | Direct Assessment (80 %) | Internal Assessment (CA) | CO Attainment Level | Throughout the Semester |
| | | Mid Semester & End Semester Examinations | | After results declaration |
| | Indirect Assessment (20%) | Course Exit Survey | Attainment Level from the survey form | End of Academic Year |
| | | Indirect PO Attainment | | End of Semester |
| | | Parents Feedback | | End of Semester |

Internal Quality Assurance Cell reviews all COs of the courses which are relevant to corresponding POs. The task is to review the course outcome assessment results towards PO assessment for each course and to draw conclusion on how the program outcomes are attained. CO-PO attainment levels are thoroughly viewed and action taken report is prepared and is submitted to the IQAC for further comments and necessary action. Based on the suggestions, department prepares action plan in the subsequent year and submits the same to IQAC Chairman for approval.

**Example:**

The PO and PSO attainments are calculated for complete batch of students which progresses through all the courses of a particular program including the project work. The attainment is calculated based upon the correlation level, i.e., low-moderate-high, of a particular course/ CO/ activity with respect to the PO or PSO in the scale of 1-3.
Direct PO attainment is calculated from CO attainment of the courses addressing corresponding PO.

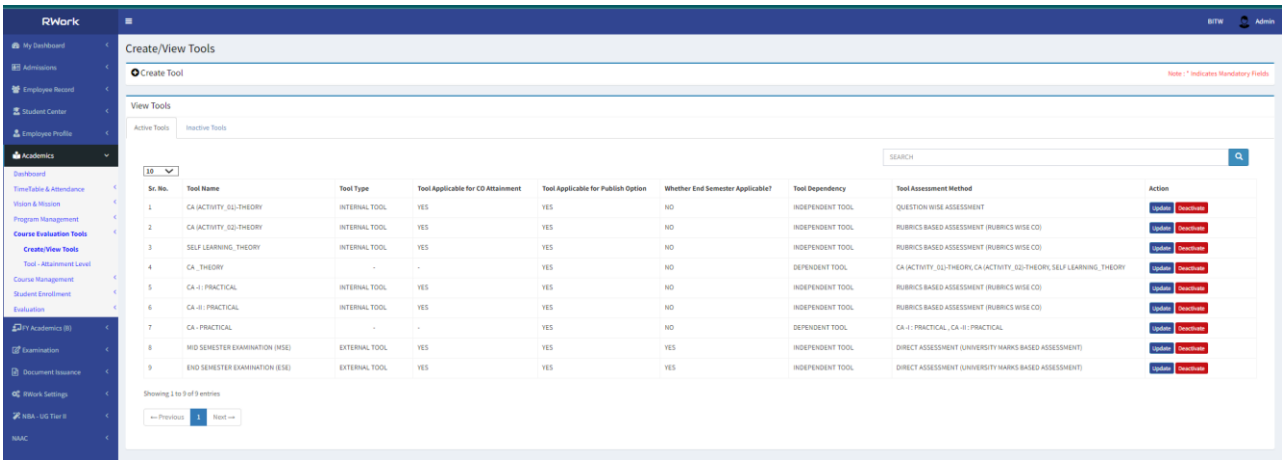
It is decided to have more indirect tools from 2023-24. These are

- Domain wise analysis and attainment
- Alumni Survey
- Employer Feedback

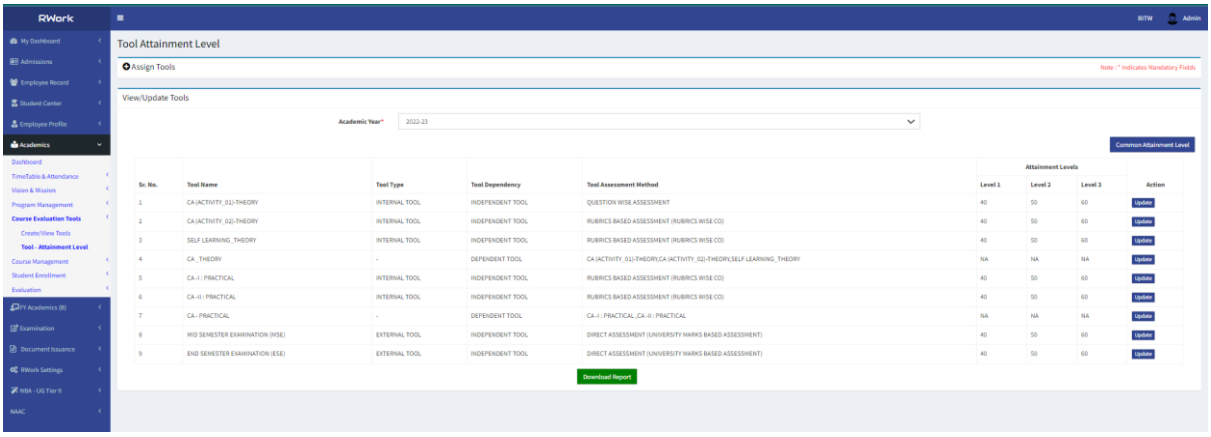
| | Assessment & Evaluation Method | Assessment and Evaluation Tool | Source | Frequency |
|---|---|---|---|---|
| **PO/ PSO** | Direct Assessment (80%) | Internal Assessment (CA) | CO Attainment Level | Throughout the Semester |
| | | Mid Semester & End Semester Examinations | | After results declaration |
| | Indirect Assessment (20%) | Course Exit Survey | Attainment Level from the survey form | End of Academic Year |
| | | Indirect PO Attainment | | End of Semester |
| | | Parents Feedback | | End of Semester |
| | | Domain Analysis | | End of Academic Year |
| | | Alumni Survey | | End of Academic Year |
| | | Employer Survey | | End of Academic Year |

**The method is as follows:**

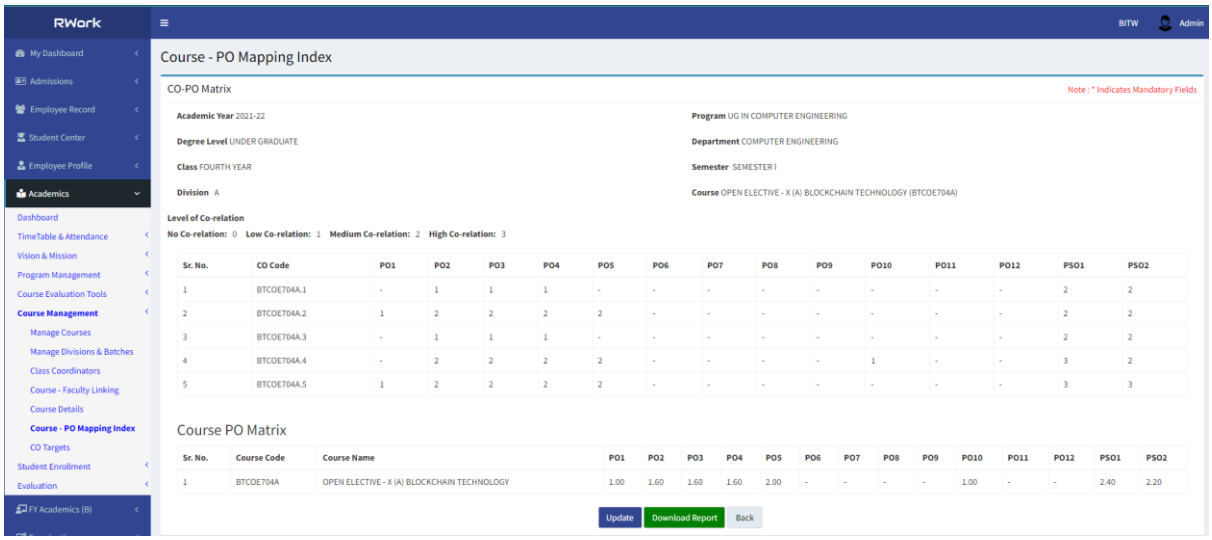
1. Define independent and dependent tools along with assessment method.



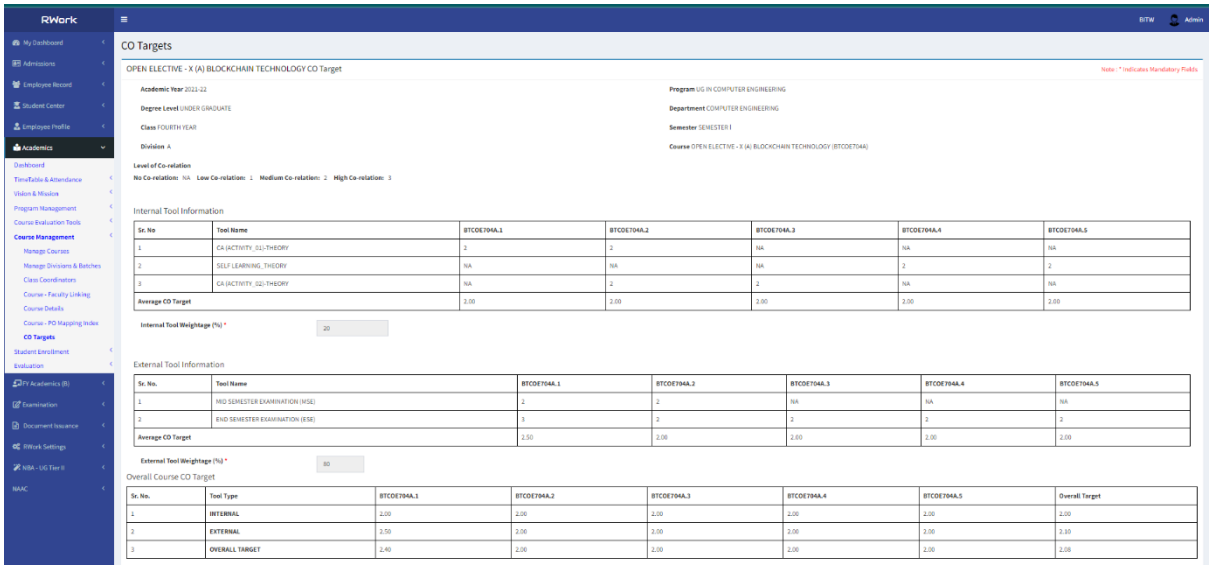
2. Set attainment level as 40, 50 and 60 as level 1, level 2 and level 3 respectively. (Common for all the courses in that AY.



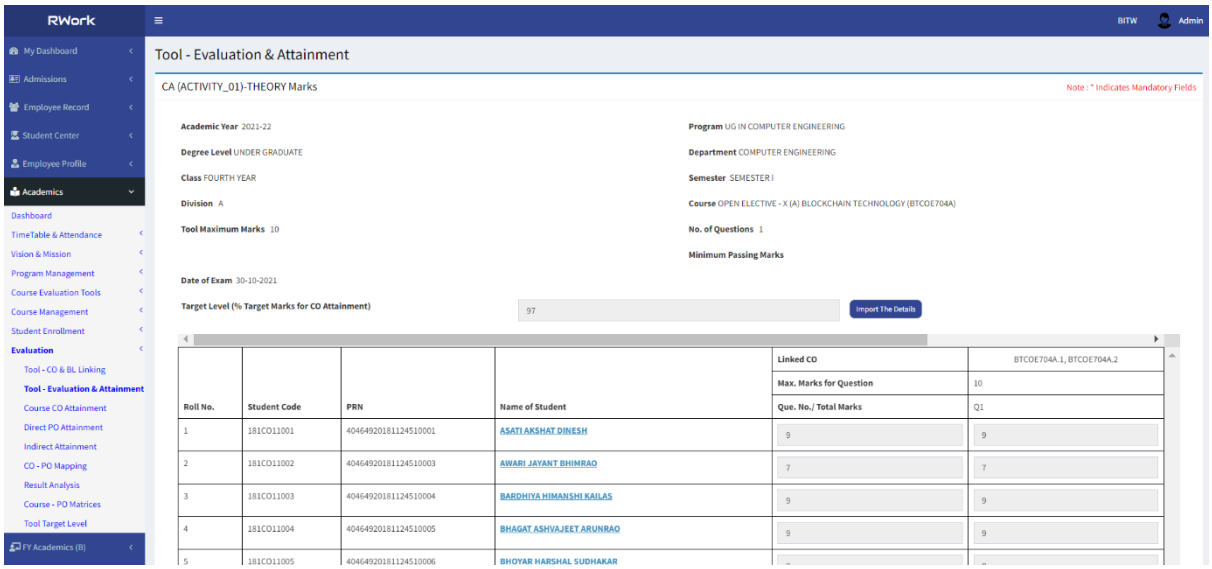

3. Complete the course PO mapping of all the courses.



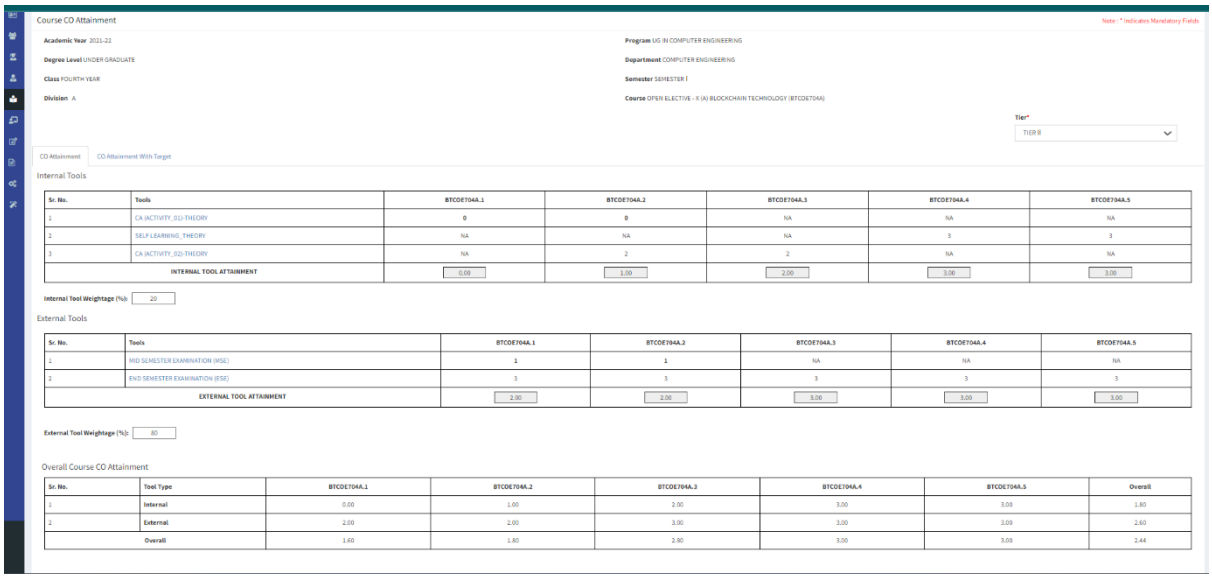

4. Assign CO targets for all the independent tools for the course.



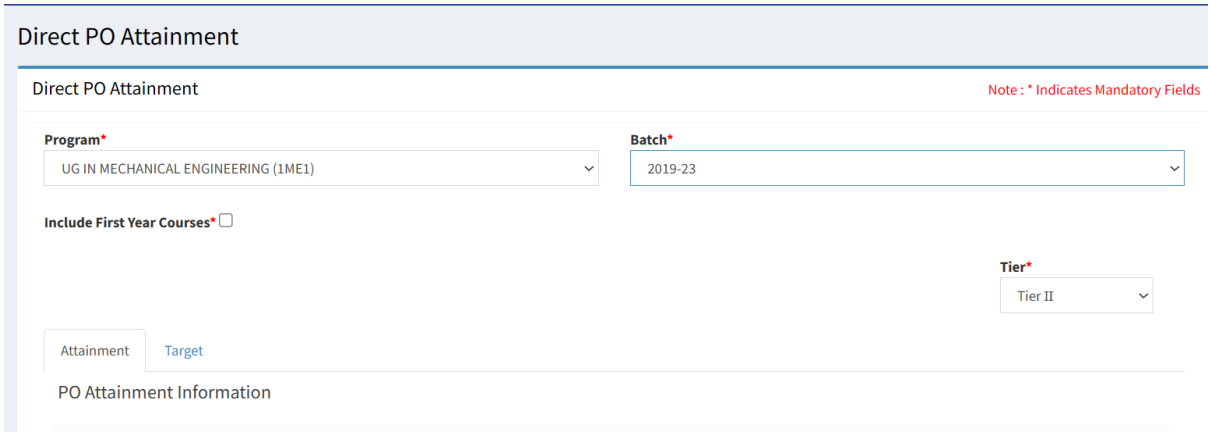
5. Enter Tool Targets and marks



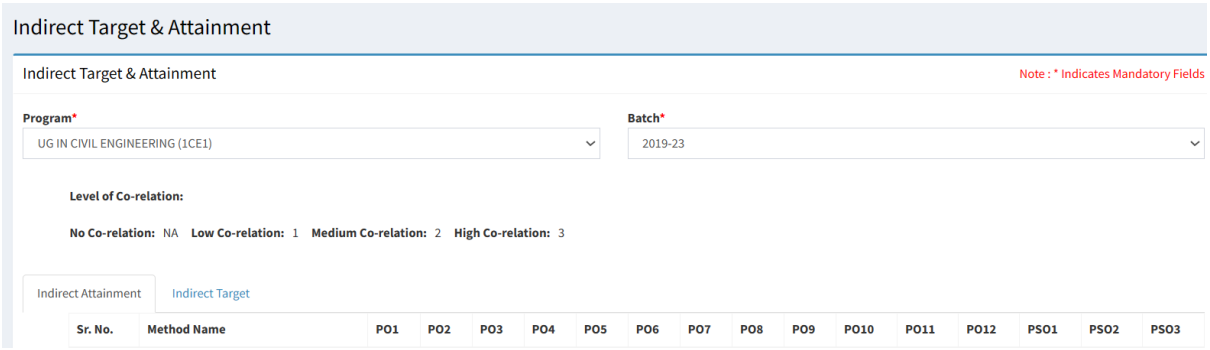

6. View CO attainments of all the assign courses in AY.



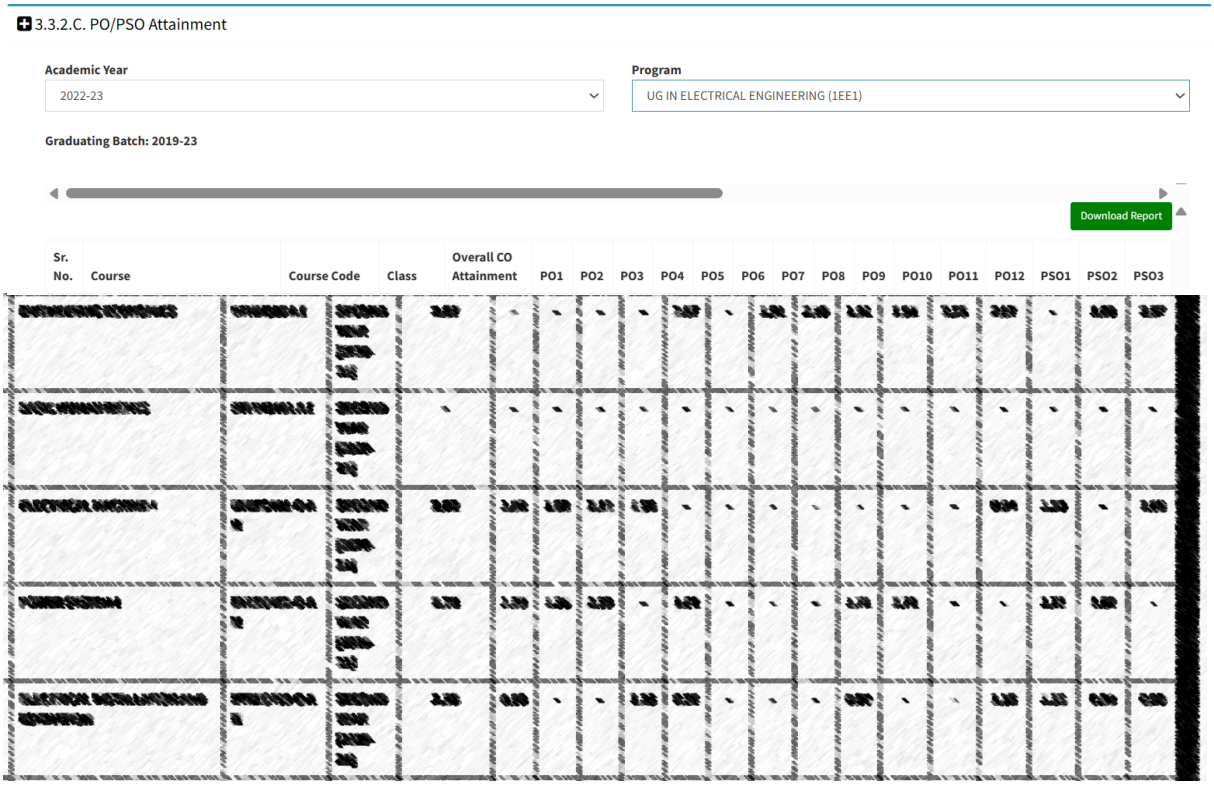

7. View Direct PO attainment of a batch.



8. Create indirect tools (Course Exit Survey, Parents Feedback and Indirect PO attainment) for PO attainment.




9. PO attainment.




After CO attainment levels are tabulated for every course in the semester corresponding POs are evaluated

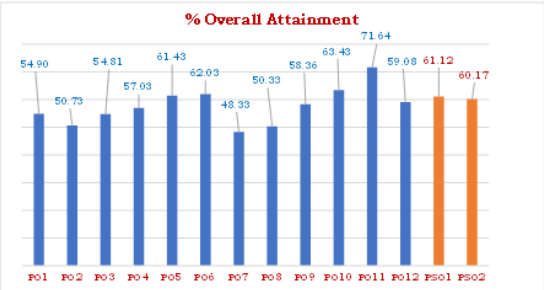
Shikshan Mandal's

# Bajaj Institute of Technology, Wardha

## CO, PO & PSO Attainments

**Department of Mechanical Engineering** — **Batch (2019-20)**

| Semester | Name of the Course/Subject | Course CO Attainment | Mapping of all the Courses with POs & PSOs | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| **III Semester** | | | | | | | | | | | | | | | | |
| 1 | ENGINEERING MATHEMATICS-III | 2.72 | 2.25 | 2.00 | 1.00 | | | | | | | | | | 1.50 | |
| 2 | MATERIALS SCIENCE AND METALLURGY | 2.71 | 1.67 | 1.50 | 1.67 | 2.00 | 1.80 | 1.00 | 1.67 | 1.00 | 1.00 | 1.00 | | | 2.00 | 2.00 |
| 3 | FLUID MECHANICS | 2.61 | 2.71 | 3.00 | 1.33 | 1.33 | 1.00 | | | | | | | 1.00 | 1.71 | 1.00 |
| 4 | MACHINE DRAWING AND CAD | 2.23 | 1.67 | 1.25 | | | 1.00 | | | | 2.17 | 1.33 | | 1.00 | 2.17 | 1.00 |
| 5 | THERMODYNAMICS | 2.52 | 1.25 | 1.25 | 1.00 | | | | | | | | | | 1.40 | 1.40 |
| 6 | MATERIALS SCIENCE AND METALLURGY LAB | 2.66 | 1.60 | 1.40 | 1.80 | 2.00 | 1.80 | 1.00 | 1.67 | 1.00 | 1.00 | 1.00 | | | 2.00 | 2.00 |
| 7 | FLUID MECHANICS LAB | 2.42 | 1.00 | 1.00 | 1.00 | 3.00 | 1.00 | | | | 1.00 | 2.00 | | 1.00 | 1.29 | 2.00 |
| 8 | MACHINE DRAWING AND CAD LAB | 2.66 | 1.67 | 1.25 | | | 1.00 | | | | 2.17 | 1.33 | | 1.00 | 2.17 | 1.00 |
| 9 | FIELD TRAINING /INTERNSHIP/INDUSTRIAL TRAINING I | 2.66 | | 1.00 | 1.00 | | 2.00 | | 1.00 | | | 3.00 | 2.50 | | 2.50 | 2.50 |
| **IV Semester** | | | | | | | | | | | | | | | | |
| 10 | MANUFACTURING PROCESSES-I | 2.35 | 1.50 | 1.33 | 1.00 | | 1.00 | 1.00 | | | | 1.00 | | 1.00 | 1.60 | 1.60 |
| 11 | THEORY OF MACHINES-I | 1.93 | 1.00 | 1.00 | | 1.80 | | | | | | | | 2.60 | 1.33 | 2.25 |
| 12 | STRENGTH OF MATERIALS | 2.20 | 1.00 | 1.40 | 2.00 | 1.80 | | 1.00 | | 1.00 | | | | 2.20 | 3.00 | 1.40 |
| 13 | NUMERICAL METHODS IN MECHANICAL ENGINEERING | 1.67 | 3.00 | 3.00 | | 1.00 | 3.00 | | | | | | | | 2.00 | 2.00 |
| 14 | INTERPERSONAL COMMUNICATION SKILL& SELF DEVELOPMENT | 2.70 | | | | | | | | 1.00 | 1.00 | 2.00 | 3.00 | 2.00 | 2.00 | 1.00 |
| 15 | MANUFACTURING PROCESSES LAB-I | 2.66 | 1.33 | 1.00 | | 3.00 | 1.00 | | 1.00 | | 1.00 | 1.83 | | 1.00 | 1.00 | 1.00 |
| 16 | THEORY OF MACHINES LAB - I | 2.34 | 1.00 | 1.00 | | 2.25 | | | | | | | | 2.50 | 1.50 | 2.50 |
| 17 | STRENGTH OF MATERIALS LAB | 2.02 | 1.00 | 1.00 | 2.00 | 2.00 | | 1.00 | | 1.00 | | | | 2.25 | 3.00 | 1.25 |
| 18 | NUMERICAL METHODS LAB | 2.66 | 3.00 | 3.00 | | 1.00 | 3.00 | | | | | | | | 2.00 | 2.00 |
| **V Semester** | | | | | | | | | | | | | | | | |
| 19 | HEAT TRANSFER | 0.63 | 2.67 | 2.17 | 3.00 | 1.50 | 1.33 | | 2.00 | | 1.00 | | | | 1.50 | 1.67 |
| 20 | APPLIED THERMODYNAMICS-I | 2.27 | 1.00 | 1.67 | 1.00 | | | | | | | | | | 1.20 | 1.20 |
| 21 | MACHINE DESIGN-I | 2.45 | 1.83 | 1.67 | 2.00 | 1.00 | | 1.20 | | 1.00 | | 1.00 | | 1.00 | 2.17 | 1.50 |
| 22 | THEORY OF MACHINES-II | 2.29 | 2.00 | 2.67 | 1.00 | 2.00 | 2.00 | | 1.00 | | | 2.00 | | 2.60 | 1.50 | 1.83 |
| 23 | METROLOGY AND QUALITY CONTROL | 2.49 | 1.00 | 2.00 | 2.00 | 3.00 | 2.00 | 2.33 | | 3.00 | 3.00 | | 2.50 | 2.00 | 2.17 | 1.50 |
| 24 | HEAT TRANSFER LAB | 1.09 | 2.67 | 3.00 | | 3.00 | 2.00 | | 2.00 | | | | | | 1.33 | 2.00 |
| 25 | APPLIED THERMODYNAMICS LAB | 1.01 | 1.33 | 1.33 | 1.00 | 1.75 | 1.00 | 1.00 | | | | 2.00 | | 2.00 | 2.20 | 2.00 |
| 26 | MACHINE DESIGN PRACTICE - I | 0.37 | 2.00 | 2.20 | 2.00 | 1.40 | | 1.00 | 1.33 | 1.00 | 1.50 | 2.00 | 2.00 | 1.50 | 2.43 | 1.43 |
| 27 | THEORY OF MACHINES LAB-II | 2.38 | 2.25 | 2.50 | 1.00 | 2.50 | 2.50 | | 2.00 | | | | | 3.00 | 1.00 | 1.00 |
| 28 | FIELD TRAINING /INTERNSHIP/INDUSTRIAL TRAINING II | 2.77 | | 1.00 | 1.00 | | | 2.00 | | 1.00 | | | 3.00 | 2.50 | 2.50 | 2.00 |
| **VIII Semester** | | | | | | | | | | | | | | | | |
| 53 | FUNDAMENTALS OF AUTOMOTIVE SYSTEMS | 2.65 | 1.33 | 1.20 | 3.00 | 2.60 | 3.00 | 3.00 | 2.33 | | 2.33 | 2.67 | 2.00 | | 1.83 | 1.67 |
| 54 | NON-CONVENTIONAL ENERGY RESOURCES | 0.90 | 1.67 | 2.00 | | 2.00 | | | 2.50 | | | | | 1.33 | 1.67 | 1.50 |
| 55 | PROJECT STAGE-II OR INTERNSHIP AND PROJECT | 2.75 | 1.00 | 1.00 | 2.00 | 1.50 | 1.67 | 1.33 | 1.50 | 1.00 | | 2.00 | | 1.00 | 2.50 | 2.00 |
| | **Overall Attainment** | | 1.65 | 1.52 | 1.64 | 1.71 | 1.84 | 1.86 | 1.45 | 1.51 | 1.75 | 1.90 | 2.15 | 1.77 | 1.83 | 1.81 |
| | **% Overall Attainment** | | 54.90 | 50.73 | 54.81 | 57.03 | 61.43 | 62.03 | 48.33 | 50.33 | 58.36 | 63.43 | 71.64 | 59.08 | 61.12 | 60.17 |




| Batch 2019-20 | Average PO Attainment | 57.68 |
|---|---|---|

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