

Continuous Assessment of Project: One of the best Practice in Engineering Institutes

¹Vikram A.Mane¹ Rupali.R.Jagtap² Santosh M.Herur³ Basavaraj S.S.⁴

¹Asso.Prof.Department of Electronics and telecommunication, ADCET Ashta, India

²Asst.Prof.Department of Electronics and telecommunication, ADCET Ashta, India

³Asst.Prof.Department of Electronics and telecommunication, ADCET Ashta, India

⁴Asst.Prof.Department of Electronics and telecommunication, ADCET Ashta, India

Abstract: Project continuous evaluation and assessment in engineering institute is tedious task. Keeping consolidate report of project and continuous improvement in required skills in the engineering projects is ultimate and necessary goal to develop employability in young budding engineers. Project evaluation method described in this paper is developed by us with our own rubric design. The term work marks and attainment of Program outcomes is carried out by us through calculations and with some formulae designed by us. This process gives complete design development and continuous assessments of program outcomes defined by NBA /ABET which will improve quality of product. This can be a best engineering practice for academic institutes.

Keywords: Rubric, outcome based, PO (Program Outcomes)

I. Earlier methods of project evaluations

For engineering Institutes accreditation is needed to improve the quality of education and sustain in the competitive world. Accreditation authorities mainly focus on skill development and continuous assessment of students. ABET is focus on graduate attributes like Engineering knowledge, Problem analysis, Design/development of solutions, Modern tool usage, Environmental sustainability etc which current industries required from academic institutes. For that they have also defined the program outcomes a to k(can be referred on ABET/NBA websites) and minimum one program specific program outcome designed by own program runners. By achieving these outcomes with continuously following well defined process it is possible for any engineering institute to produce engineers with required qualities laid down by ABET. So many practices can be followed which will measure and assess the process of skill development in students.

II. Tools to assess skill

For development of skills and to achieve the program outcomes laid down by NBA, assessment process may include direct assessment tools and indirect assessment tools. Direct assessment tool gives directly and clearer picture of assessment of graduate attributes. It may include class tests, continuously and periodically assessment of skills. But as far as program outcomes a to k is considered it is not possible to capture all outcomes by direct assessment tools. For e.g. program outcome a, b, c, d can be assessed by class tests but how to capture professional ethics by the students through class test?

For this there are indirect assessment tools like Rubric. By designing the best rubric it is possible to capture every skill and program outcome laid by NBA.

III. Project assessment Process

We are describing here project assessment process designed by ourselves which includes various rubrics to

Table1:Project Calendar

| Sr. No. | Particular | Tentative date/period | Marks |
|---------|--|---|-------|
| 1 | Group formation and technology/area selection | June 1 st to 15 th June 2016 | --- |
| 2 | Training on technology and interaction with industry (if needed) | May-June 2016 | --- |
| 3 | Literature Survey/ problem identification/ Topic selection | 1 st July- 15 th July 2016 | --- |
| 4 | Synopsis Preparation | 15 th July -31 st July 2016 | --- |
| 5 | Synopsis Submission | 1 st August 2016 | --- |
| 6 | Seminar (Presentation on Synopsis) (synopsis and presentation will be evaluated for term-work) | 1 st August - 15 th Sept 2016 | 40M |
| 7 | Poster Presentation | Last week Sept216 | 10M |
| 8 | Submission of seminar report | 1 st week of Oct 2016 | --- |
| 9 | Term-work calculation (Term work for Semester-VII will be calculated on following basis: seminar (40 M)+ poster presentation (10M) | 16 th Sept to 20 th Sept 2016 | --- |
| 10 | Demo-I (progress report -I and demo will be evaluated for term-work) | 11 th Jan - 21 st Jan 2017 | 20 M |
| 11 | Demo-II (progress report -I and demo will be evaluated for term-work) | 20 th Feb to 28 th Feb 2017 | 30M |
| 12 | Demo -III(final) (demo will be evaluated for term-work) | 2 nd March to 7 th March 2017 | 30 M |
| 13 | Final report submission(10M) and attendance of student(10M)(continues contact with guide expected)(Marks will be given by Guide) | 21 th March to 26 th March 2017 | 20M |
| 14 | Term-work calculation (Term work for Semester-II will be calculated on following basis: Demo -III (30M) +I Demo II (30M) + Demo I(20 M) Report and attendance(20M) | 27 th March to 30 th March 2017 | 100 |

assess the outcomes of students. Projects at final year of Undergraduate students need to carry out in more

effective manner as it may change life of student if some research comes in the hand of student. Project is one of the activity carried out in undergraduate institutes which includes all the outcomes laid down by NBA/ABET. Perhaps all other courses may return 2- 3 program outcomes from a to k. We have planned to prepare the group of students not more than three before start of their final year. Project guide are visiting Industries to ask for projects and current needs in industries. And also giving chances for students to come up with any such projects which satisfy the societal needs. At the start of semester project calendar we are preparing which includes plan of overall year along with dates. As shown below in Table 1.

Above calendar includes various activities to be carried out by in entire year. This includes finalization of project, Synopsis writing seminar presentation and Poster presentation based on their project. And carrying out demonstration of actual project work periodically in the form of Demo I, Demo II and final Demo III. Finally carrying out consolidate report of overall assessment and attainments of Pos by project co-ordinators. To carry out this process along with project co-ordinator project committee is formed to assess all these activities. After finalising the project the continuous assessment start.

The continuous assessment of project is carried on in the following manner as shown in Table 2.

Table 2: Project Plan for one year

| Sr.No. | Phase | Assessment Method | Skills | Assessment Tool | PO mapped | Remark |
|--------|-------------------------|--|--|--|-----------------------|---------------------------------|
| 1. | Phase-I Semester-odd | Synopsis Submission Seminar Presentation | Communication skill, Technical knowledge | Seminar assessment rubric (Team work and Team Member Rubric) | a,g,h,j,f | Individual and group assessment |
| 2. | Phase-II Semester-odd | Poster Presentation | Communication skill, Technical knowledge, Presentation skill | Poster Rubric (Team work and Team Member Rubric) | a,g,h,j,f | Individual and group assessment |
| 3. | Phase-III Semester-even | Project Demo I | Communication skill, Technical knowledge, Presentation skill | Project Assessment Rubric, Oral Communication Rubric | a,b,c,d,e,f,g,i,k,l,m | group assessment |
| 4. | Phase-IV Semester-even | Project Demo II | Communication skill, Technical knowledge, Presentation skill | Project Assessment Rubric, Team Work Rubric | a,b,c,d,e,f,g,i,k,l,m | group assessment |
| 5. | Phase-V Semester-even | Project Demo III | Communication skill, Technical knowledge, Presentation skill | Project Assessment Rubric, Team Member Rubric | a,b,c,d,e,f,g,i,k,l,m | Individual and group assessment |
| 6. | Phase-VI | Report Writing | Written communication | Written Communication Rubric | g | Individual and group assessment |

Final PO attainment of entire year is calculated by average of respective Pos of each project which will be useful to find out strength and weaknesses in students.

IV. Seminar (On synopsis) assessment rubric

Phase I starts with synopsis writing and Presentation of seminar at odd semester. For assessing the skills of students in seminars we are assigning two external examiners with project guide. They need to assess the students, concentrating on various questionnaires defined in the rubric. The aim of questioner is toward how we can achieve the program outcomes laid by NBA. The sample of Synopsis rubric is as shown in Table 3 and Table 4 which will capture team work and team member rubric.

Table 3. Team work Rubric

| Sr. No. | Assessments | Inadequate (1) | Average (2) | Admirable (3) | Outstanding (4) | Score |
|--|--|--|---|---|---|-------|
| Team work assessment seminar (B1) | | | | | | |
| 1 | Topic selection (h, j) | Useful for limited group and not innovative | Useful for society but not innovative | Somewhat innovative and useful for society | Complete Innovative and useful for society | |
| 2. | Problem Definition (a) | Nearly meet expectations | Meets expectation in some manner | Extend expectation in some manner | Exceeds expectation | |
| 3 | Organization of presentation(g) | Hard to follow; sequence of information not proper | Most of information presented in sequence | Information presented in sequence; easy to follow | Information presented as interesting, sequence & easy to follow | |
| 4 | Visual aids free from errors including grammar . (g) | Nearly meet expectations | Meets expectation in some manner | Extend expectation in some manner | Exceeds expectation | |
| 5 | Literature survey (j) | Not standard references | conference paper | Journals but not standard | standard journals | |
| | Total B1 | | | | | |

Table 4. Team Member Rubric

| S r . N o . | Assesse ment insides | Inade quate (1) | Aver age (2) | Admi rable (3) | Outs tand ing (4) | ROLL NO. And score | | | | |
|---|---|-------------------------------------|---|--|--|-----------------------|--|--|--|--|
| | | | | | | | | | | |
| Team Member assessment -seminar (A1) | | | | | | | | | | |
| 1 | Student introduces self to audience (g) | Intro duces name only | Intro duces name, class, along with role in project work | Intro duces name, class, along with role in project work | Intro duces Name, Class , along with skills and role in project work | | | | | |
| 2 | Effective communication (g) | Nearl y meet expectations | Meets expectation in some manner: | Exten d expectation in some manner | Exce eds expectation | | | | | |
| 3 | Is able to give correct answers appropriate to guide/instructor/audience questions(a) | Nearl y meet expectations | Meets expectation in some manner | Exten d expectation in some manner | Exce eds expectation | | | | | |
| 4 | Individual Contribution (f) | Contrib ution only in documentation | Contrib ution in documentation and presentation preparation | Contrib ution in documentation, presentation, requirements and specification | Contrib ution in overall work | | | | | |
| Total (A1) | | | | | | | | | | |

Above designed rubric calculates the team member skills and Team work skills. Skills assessment in team work rubric is carried out on the scale of 1-4. Based on questionnaires and or level of attainments is assessed in various ways like Topic selection(h, j), Problem Definition, Organization of presentation(g), Visual aids free from errors including grammar(g), Literature survey(j). The quantities written in the bracket represents which outcomes can achieve by observing the content of the synopsis. The team work skills is captured

by these process. Similar to this team member can be assessed by applying team member rubric. Which include the topic of assessment like Student introduces self to audience (g), Effective communication(g), Is he able to give correct answers appropriate to guide/instructor/audience questions(a), Individual Contribution(f) etc. And final attainment of PO and term work marks can be calculated by following way shown in table 5.

Table 5: Term Work Mark Calculation

| R o l l N o | A1 (m ax 16) | A2 (m ax 16) | A3 (m ax 16) | B1 (m ax 20) | B2 (m ax 20) | B3 (m ax 20) | TOTA L (A1+ B1)* 0.833 | TOT AL (A2+ A3+ B2+ B3)* 0.138 | Mark s out of (40) |
|----------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|------------------------------------|--|-----------------------------|
| | | | | | | | | | |
| | | | | | | | | | |

In above calculation A1, B1 comes from rubric applied by guide. And A2, B2, and A3, B3 are from same rubric but assessed by another two external examiners excluding project guide. And then by above chart, term work marks and overall po attainment can be calculated by below shown method by observing scale given in above two rubrics. Table 6 shows consolidated PO attainment of one project. And Table 7 shows summary of average PO attained in Table6.

Table 6: PO attainment

| Roll No. | Team Work Rubric-seminar | | | | | Team Member Rubric-seminar | | | | | |
|------------------------|--------------------------|---|---|---|---|----------------------------|---|---|---|---|---|
| | Que. | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | |
| | PO | h | j | a | g | g | j | a | g | g | f |
| Total | | | | | | | | | | | |
| Avg. | | | | | | | | | | | |
| Attainment in % | | | | | | | | | | | |

Summary

Table 7. : Average Pos mapped

| PO | a | b | c | d | e | f | g | h | i | j | k | l | m |
|------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Attain ment (%) | | | | | | | | | | | | | |

VI. Project Phase II- Poster assessment rubric

Poster presentation is one of the best activity can be carried out which shows the demonstration skills of students in more visual than synopsis. To assess the different skills of the students, same rubrics defined in Table 3, and 4 can be applied and same process can be followed to calculate term work marks and PO attainments through Posters. And finally overall PO attainment through Poster can be consolidated in similar manner.

V. Project Demonstration I, II and III

Project demonstration is carried out in three phases based. Demo I,II and III. Here it is expected to develop actual hardware and or software and demonstrate it in front of assessment committee. In the demonstration I the student's skills can be captured by applying Project rubric and oral communication rubric. The said rubrics developed as shown below fig 8,9 and 10.

Table 8. Project Assessment Rubric (V.03)

| Criterion No. | Performance Criteria | PO Mapped | Excellent (4-5) | Average (3-2) | Poor (1) | Grading scale 1 to 5 Guide | Grading scale 1 to 5 Examiner |
|---------------|--|------------|--|--|--|----------------------------|-------------------------------|
| CR1 | Technical design | a, b, c, e | Meets/exceeds specifications with efficient design. | Meets average specifications | Meets poor specifications | | |
| CR2 | Percent of Work Completion | f | 50% | 30% | 10% | | |
| CR3 | Explanation of the results on the work done | a, b | Appropriate explanation of results obtained and insightful conclusions | Produced some results, but struggled with interpretation, lack sufficient support for their conclusions | Generated few results with little meaningful interpretation; conclusions are absent/wrong/trivial or unsubstantiated | | |
| CR4 | Level of Understanding | a | 80 to 100% | 40 to 60% | 10 to 20% | | |
| CR5 | Appropriate choice & use of resources (computers, lab equipments etc.) | k | Innovative selection of resources; Expert use of resources | Appropriate resources used as was demonstrated in class; Resources limited to faculty provided materials/tools | Inadequate use of suggested resources. | | |
| CR6 | Oral Presentation | g | Demonstration with good technical details and communication skills. | Demonstration with average technical skills and communication. | Demonstration with poor technical skills and communication | | |
| CR7 | Team Management | d | Excellent Coordination of all team members. | Average Coordination of all team members. | Poor Coordination of all team members. | | |

| | | | | | | | |
|------|---|---|---|--|--|----|----|
| CR8 | Clarity of Future work | i | Able to explain clearly future work related with full execution of project. | Average idea about future work and full execution of project. | Poor idea about future work and full execution of project. | | |
| CR9 | Information management; Log book, status reports, workmanship documentation | f | Detailed, appropriate and timely entries; collected and distributed to appropriate parties, | Adequate entries in journal or log books; Only critical data/information collected and distributed | Insufficient data collection/recording. Existing documentation is not shared/utilized. | | |
| CR10 | Use of modern technology | l | Extensive use of advance CAD tool for design & simulation | Moderate use of advance CAD tool for design & simulation | Low use of advance CAD tool for design & simulation | | |
| CR11 | Overall final Product quality | m | Aesthetically good workmanship, Direct applicable for real world application | Aesthetically satisfactory workmanship, Partly applicable for real world problem | Aesthetically poor workmanship, Not suitable for real world application | | |
| | | | | | Total | | |
| | | | | | | A1 | B1 |

Table 9. Oral Communication Assessment Rubric (V.01)
PO Mapping to 'g'

| Criterion No. | Performance Criteria | Excellent (5-4) | Average (3-2) | Poor (1) | Grading |
|---------------|----------------------|--|---|---|---------|
| CR1 | Introduction | Complete, concise and complete | Introduction orients the audience adequately | Introduction is missing or confusing | |
| CR2 | Organization | Points are clearly presented in a logical order, Easily followed. | Most points are ordered well. | Confusing, disorganized; | |
| CR3 | Language | Wording is concise, clear, and easy to follow. Speaking style is consistent and appropriate in formality. Professional tone with proper voice modulation. Grammatically correct. | Speaker has most of the "Excellency" traits | Distracting word choice; Speaking style is not appropriate in formality. Unprofessional. Grammatically not correct. | |
| CR4 | Delivery | Extemporaneous, relaxed body language; excellent eye contact, pace and volume | Notes were used by the speaker; minimum distraction; appropriate eye contact, pace and volume | Obviously read or memorized major portions; Little or no eye contact; too slow or too fast; too soft or too loud | |

| | | | | | |
|-----------------|-------------------|--|--|--|--|
| CR ₅ | Conclusion s/ Q/A | Clear, insightful conclusions; questions handled well | Most but not all points contained in the conclusions | Inadequate summary; No conclusion; Q/A a were handled unprofessionally. Most of the answers were technically wrong | |
| CR ₆ | Visuals | Easy to read; Improves comprehension | Layout is satisfactory; meets standard requirements | Visuals inappropriate or distracting | |
| CR ₇ | Content | Consistently appropriate; Analysis is logical and sound- no gaps in topic coverage | Generally appropriate to audience and speaker's role; appropriate length; Analysis is sufficient | Major gaps in information or analysis; too long or too short | |
| | | Name and Sign of Guide | | Total | |

Rubric applied for group

Table 10. Project demo

I(Rubric)

| Cr ite ri on N o. | Perfor mance Crite ria | Excellent (5-4) | Average (3-2) | Poor (1) | G r a d i n g |
|-------------------|------------------------|--|--|---|---------------|
| CR ₁ | Introduction | Complete, concise and complete | Introduction orients the audience adequately | Introduction is missing or confusing | |
| CR ₂ | Organization | Points are clearly presented in a logical order, Easily followed. | Most points are ordered well. | Confusing, disorganized; | |
| CR ₃ | Language | Wording is concise, clear, and easy to follow. Speaking style is consistent and appropriate in formality. Professional tone with proper voice modulation. Grammatically correct. | Speaker has most of the "Excellency" traits | Distracting word choice; Speaking style is not appropriate in formality. Unprofessional. Grammatically not correct. | |
| CR ₄ | Delivery | Extemporaneous, relaxed body language; excellent eye contact, pace and volume | Notes were used by the speaker; minimum distraction; appropriate eye contact, pace and volume | Obviously read or memorized major portions; Little or no eye contact; too slow or too fast; too soft or too loud | |
| CR ₅ | Conclusions/ Q/A | Clear, insightful conclusions; questions handled well | Most but not all points contained in the conclusions | Inadequate summary; No conclusion; Q/A a were handled unprofessionally. Most of the answers were technically wrong | |
| CR ₆ | Visuals | Easy to read; Improves comprehension | Layout is satisfactory; meets standard requirements | Visuals inappropriate or distracting | |
| CR ₇ | Content | Consistently appropriate; Analysis is logical and sound- no gaps in topic coverage | Generally appropriate to audience and speaker's role; appropriate length; Analysis is sufficient | Major gaps in information or analysis; too long or too short | |
| | | Name and Sign of examiner | | Total | |

Above rubric shows progress of students in various skills like Oral Communication and written communication. Similar to Demo I, Demo II and can kept by giving some suggestions to student about the limitations of their project. Demo II includes same Project rubric but this time with Team work Rubric shown in Table 11 which will map how they perform in group.

Table 11. Team Work Assessment Rubric (V.01)
PO Mapping to 'd'

| Cr ite ri on N o. | Performance Criteria | Excellent(5-4) | Average(3-2) | Poor(1) | Grading |
|-------------------|---|--|--|---|---------|
| CR ₁ | Contributions (Quality/management of quality) | All members routinely contribute quality and useful ideas and information; Team evaluates all ideas and uses only the best | Most (but not all) members contribute useful idea & information; The team as a whole adequately integrates the ideas presented | Internal conflicts result in team failing to achieve project goals. | |
| CR ₂ | Division of labor (Equality /quantity) | All members make significant contributions & are accountable to complete assigned tasks | Progress is satisfactory, but unequal workloads in observed | Serious problems due to unequal workload | |
| CR ₃ | Communication (within the team) | Consistent communication throughout the project; Insightful use of real and virtual meetings; Meetings are productive | Adequate number of meetings (real or virtual) | Inadequate meetings and communications | |
| CR ₄ | Professional Conduct | All team members consistently behave in a professional manner(show up for meetings prepared and on time, treat other team members with courtesy & respect) & seek outside advise if team is not productive | Team members usually behave in a professional manner; Do not repeat the same error & accept outside advise if team is not productive | Team members frequently fail to behave in a professional manner; Team does not seek outside help. | |
| CR ₅ | Group Discipline | Stays focused on task; Finds solutions as problems are encountered. Uses sound principles of inquiry when analyzing problems and seeking solutions | Adequate focus to complete task; some problems are discounted until a later time | Totally lacks focus; Problems are discounted; Team does not take responsibility for failures of the group | |
| CR ₆ | Group Dynamics | Synergy | Majority of team members willingly participate; team functions adequately | Every member of team goes in his/her way. | |
| | | Signature of Guide with date | | Total | |

This now focuses more on more skills of students. And demo III involves above said project rubric and team member rubric.

Fig 12.Team Member Assessment Rubric (V.01)

PO Mapping to 'd'

| Criteria No. | Performance Criteria | Excellent (5-4) | Average (3-2) | Poor (1) | Grading on 1-5 | | | | | |
|--------------|---------------------------------------|---|---|---|----------------|--|--|--|--|--|
| | | | | | | | | | | |
| CR1 | Researches and gathers information | Collects a great deal of information and relates to the topic | Collects basic information needed and relates most of it to the topic | Does not collect any information / collected information does not relate to the topic | | | | | | |
| CR2 | Fulfills team role's responsibilities | Performs all duties satisfactorily of the assigned team role | Performs nearly all duties of the assigned team role | Does not perform or performs very little duties of the assigned team role | | | | | | |
| CR3 | Shares in the work of team | Always does the assigned work without having to be reminded | Usually does the assigned work; rarely needs to be reminded | Always relies on others to do the work. | | | | | | |
| CR4 | Listens to other teammates | Listens and speaks a fair amount | Listens but sometimes talks too much. | Always talks and never allows other teammate to speak. | | | | | | |
| | | | | Total D1 | | | | | | |

Finally PO attainment by demo I is calculated by method given below in Table 13 for one project group.

Table 13.Summary of Project assessment Demo I

| Po attainment | Formula | Total (T) | Use below method for % calculation | % PO Attainment |
|---------------|---|-----------|------------------------------------|-----------------|
| a | (Project Rubric by guide cr1+cr3+cr4)+ (Project Rubric by Examiner CR1+cr3+cr4)(Max 30) | | 3.33*T | |
| b | (Project Rubric by guide cr3)+ (Project Rubric by Examiner cr3)(Max10) | | 10*T | |
| c | (Project Rubric by guide cr1)+ (Project Rubric by Examiner cr1)(Max10) | | 10*T | |
| d | (Project Rubric by guide cr7)+ (Project Rubric by Examiner cr7) (Max10) | | 10*T | |
| e | (Project Rubric by guide cr1)+ (Project Rubric by Examiner cr1) (Max10) | | 10*T | |
| f | (Project Rubric by guide cr2+ cr9)+ (Project Rubric by Examiner cr2+cr9) (Max20) | | 5*T | |
| g | (Project Rubric by guide cr6)+ (Project Rubric by Examiner cr6)+(oral Rubric by Guide+ oral Rubric by examiner) (Max80) | | 1.25*T | |
| i | (Project Rubric by guide cr8)+ (Project Rubric by Examiner cr8)(Max10) | | 10*T | |
| k | (Project Rubric by guide cr5)+ (Project Rubric by Examiner cr5) (Max10) | | 10*T | |
| l | (Project Rubric by guide cr10)+ (Project Rubric by Examiner cr10) (Max10) | | 10*T | |

| | | | | |
|---|---|--|------|--|
| m | (Project Rubric by guide cr11)+ (Project Rubric by Examiner cr11) (Max10) | | 10*T | |
| | A | | | |

Similar method is applied to calculate PO attainment by Demo II and Demo III.

And finally overall PO attainment is calculated by summarizing all Rubrics applied to demo I,demoII and demo III along with seminar and poster PO as shown in Table14.

Table 14.Overall PO attainment

| PO attainment | Details | Assessment for skills | Average of all on the scale of 5 | %PO Attainment | Reamrk |
|--|---|--|----------------------------------|----------------|--------|
| a | 1.Seminar Synopsis Submission | Understanding Level Oral communication skills Technical skills Poster quality Oral communication Team work Technical skills Oral communication Technical skills Team work | | | |
| b | 2.Poster Presentation | | | | |
| c | 3.Project Demonstration | | | | |
| d | 4.Project Review-I | | | | |
| e | 5.Poster Presentation | | | | |
| f | 6.Poster Presentation | | | | |
| g | 7.Poster Presentation | | | | |
| h | 8.Poster Presentation | | | | |
| i | 9.Poster Presentation | | | | |
| k | 10.Poster Presentation | | | | |
| l | 11.Poster Presentation | | | | |
| m | 12.Poster Presentation & Final Assessment | | | | |
| Phase-V project assessment is jointly carried out by external and internal examiner appointed by SUK | | | | | |

VII . Results

By applying above said rubric following results we have obtained In year 2014-15

Table15. Consolidate Pos 214-15

| PO | a | b | c | d | e | f | g | h | i | j | k | l | m |
|--------------|----|----|---|----|----|----|----|---|----|----|-----|----|----|
| % attainment | 7 | 7 | 8 | 7 | 7 | 8 | 7 | 8 | 7 | 7 | | 7 | 8 |
| | 9. | 9. | . | 8. | 8. | 1. | 8. | . | 7. | 8. | | 6. | 7. |
| | 8 | 5 | 0 | 0 | 6 | 4 | 2 | 6 | 8 | 4 | 76. | 0 | 2 |
| | 2 | 0 | 4 | 2 | 6 | 1 | 4 | 9 | 4 | 9 | 16 | 5 | 0 |

Project PO Attainment 2014-15

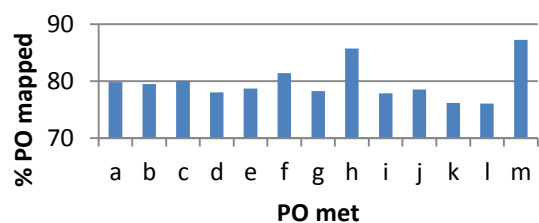


Fig 1 consolidate Pos 214-15(graphical)

By applying above same rubrics following results we have obtained In year 2015-16

Table 16 consolidate Pos 215-16

| PO | a | b | c | d | e | f | g | h | i | j | k | l | m |
|--------------|----|----|---|----|----|----|-----|----|---|----|----|----|----|
| % attainment | 8 | 8 | 8 | 8 | 8 | 8 | | 9 | 8 | 8 | 8 | 8 | 8 |
| | 7. | 8. | . | 5. | 9. | 7. | 88. | 2. | . | 8. | 8. | 9. | 9. |
| | 5 | 9 | . | 4 | 2 | 8 | 19 | 4 | . | 8 | 8 | 4 | 7 |
| | 4 | 4 | 6 | 7 | 1 | 2 | | 6 | 6 | 8 | 6 | 1 | 9 |

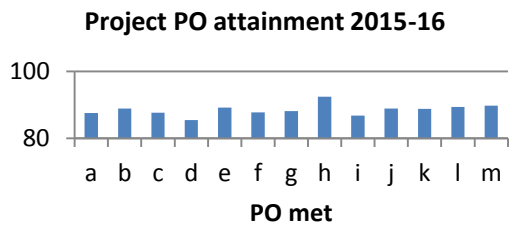


Fig 2. consolidate Pos 215-16(Graphical)

Comparison of results obtained in these two successive years the following discussion can be made

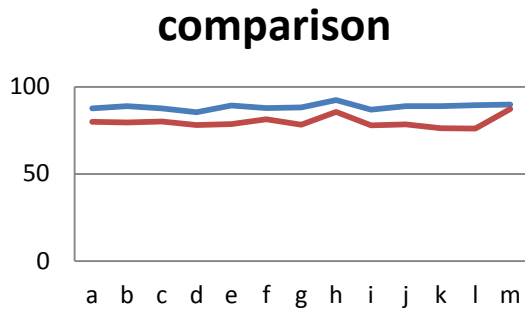


Fig 3. Comparison Pos

By observing strength and weaknesses in above developed skills it is possible to take corrective action by observing last year data analysis. Above said results are consolidate result of around 100 projects carried out in the institute which is showing improvement in skills of students.

VIII. Conclusion

Preparing Project dairy which includes all these analysis and consolidate report help us to manage engineering project in academic institute. And also for improving the quality of projects.

References:

1. Guidelines of NBA SAR
2. Shivaji University BE(E&TC) Syllabus effective from 2016