



EE410	79.22%				79.24%				83.55%	80.50%	
EE420	70.00%				71.00%						
EE421	71.17%	78.77%		74.71%							80.80%
EE423	63.70%		83.69%		72.06%						87.97%
EE431	73.63%		85.45%		73.63%						62.12%
EE432	66.50%		72.60%		65.80%						80.20%
EE445		78.34%		83.78%							
EE450	91.25%		71.67%		76.67%						75.00%
EE454	83.40%				83.20%						
EE456			76.10%		76.20%						
EE457		90.60%									84.60%
EE458	61.00%		83.70%		73.00%						80.00%
EE463					74.80%			71.00%			
EE464	78.36%	79.90%							89.20%		
EE482		93.00%			61.00%					85.00%	97.00%
EE483	87.09%		75.72%		80.15%						87.51%
EE496	84.85%	88.60%	90.03%	90.58%	89.32%	91.16%	89.79%	89.83%	90.47%	89.71%	89.52%
EE497	87.72%	90.43%	88.11%	88.75%	87.14%	89.04%	88.57%	88.57%	88.55%	88.40%	89.68%
<b>Average</b>	<b>76.76%</b>	<b>85.11%</b>	<b>79.60%</b>	<b>84.45%</b>	<b>74.66%</b>	<b>90.10%</b>	<b>89.18%</b>	<b>83.13%</b>	<b>87.94%</b>	<b>85.90%</b>	<b>82.81%</b>

The average score summary of 200 level courses, 300 level courses and 400 level courses are shown in Table 4 to Table 6, respectively for the last three years. The last row of these tables indicates the Target value which will help in evaluation of these assessments. For example, the target value of outcome A is 80% for all 200 to 400 level courses. Similarly, 85% target value is set for outcome B for all 200 to 400 level courses. These target values are the internal benchmarks which are set by the Accreditation committee of the department, in consultation with all group coordinators of the department.

**Table 4: Average score of achievements of program outcomes of 3 Years for 200 level courses**

	A	B	C	D	E	F	G	H	I	J	K
<b>Year 2012 - 2013</b>	68.66%	74.78%	68.59%	84.36%	67.34%	-	66.01%	74.53%	-	-	78.12%
<b>Year 2013 - 2014</b>	71.52%	76.99%	64.05%	92.55%	69.00%	-	79.27%	77.81%	-	-	66.97%
<b>Year 2014 - 2015</b>	68.55%	73.35%	62.17%	-	68.69%	-	73.70%	80.08%	-	-	73.35%
<b>Target</b>	80.00%	85.00%	80.00%	85.00%	80.00%	-	85.00%	80.00%	-	-	85.00%

**Table 5: Average score of achievements of program outcomes of 3 Years for 300 level courses**

	A	B	C	D	E	F	G	H	I	J	K
<b>Year 2012 - 2013</b>	68.78%	80.67%	66.44%	85.22%	66.97%	-	76.18%	-	-	-	77.93%

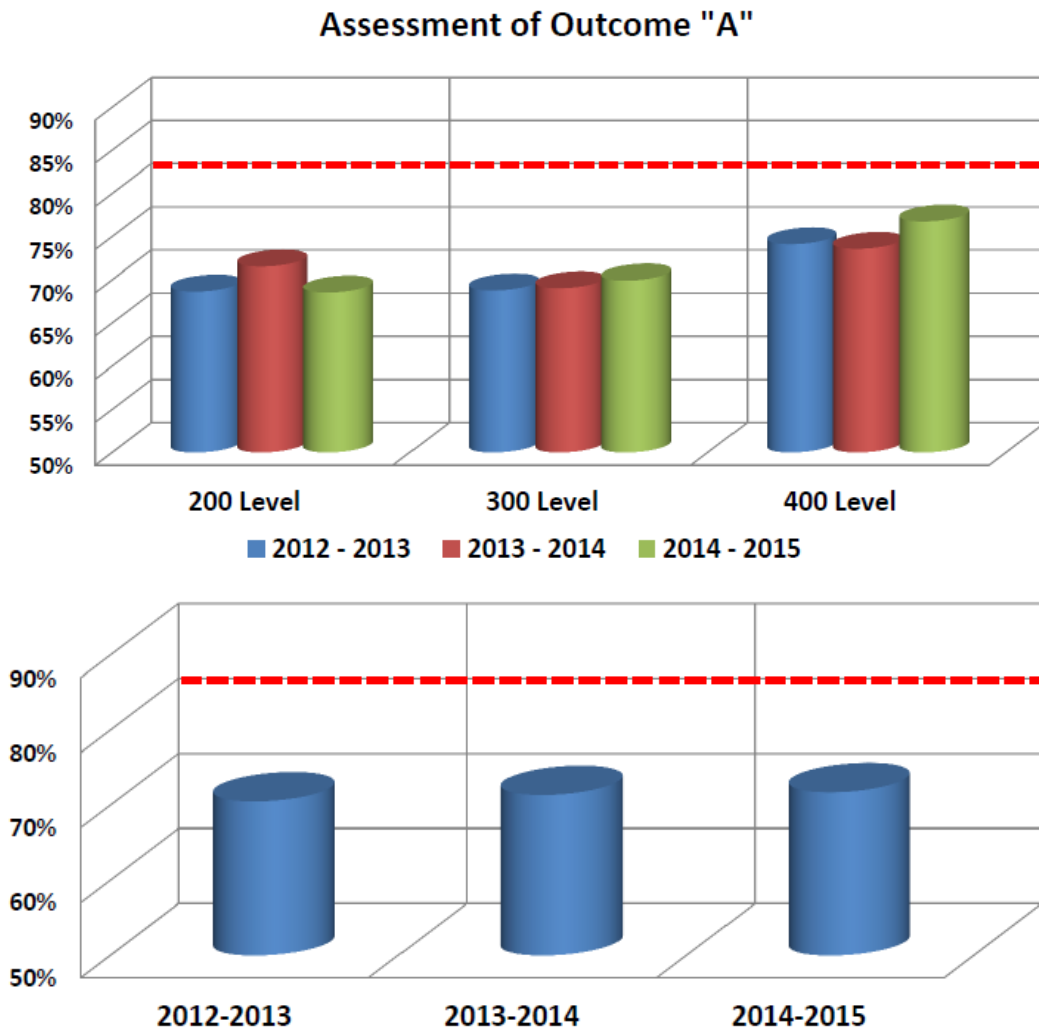
<b>Year 2013 - 2014</b>	69.04%	73.02%	65.95%	82.70%	70.56%	-	75.70%	62.68%	-	-	70.65%
<b>Year 2014 - 2015</b>	69.92%	77.29%	69.18%	78.87%	70.86%	-	-	72.05%	-	-	73.16%
<b>Target</b>	80.00%	85.00%	80.00%	85.00%	80.00%	-	85.00%	80.00%	-	-	85.00%

**Table 6: Average score of achievements of program outcomes of 3 Years for 400 level courses**

	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>	<b>H</b>	<b>I</b>	<b>J</b>	<b>K</b>
<b>Year 2012 - 2013</b>	74.11%	79.77%	75.45%	86.12%	74.80%	87.71%	80.16%	82.62%	87.18%	83.30%	80.22%
<b>Year 2013 - 2014</b>	73.58%	81.47%	78.83%	85.60%	74.33%	88.39%	78.38%	77.92%	82.23%	80.07%	80.32%
<b>Year 2014 - 2015</b>	76.76%	85.11%	79.60%	84.45%	74.66%	90.10%	89.18%	83.13%	87.94%	85.90%	82.81%
<b>Target</b>	80.00%	85.00%	80.00%	85.00%	80.00%	90.00%	85.00%	80.00%	85.00%	85.00%	85.00%

The level of achievement of individual outcome in last 3 years with the target value is presented in the following figures from Fig. 1 to Fig. 11.

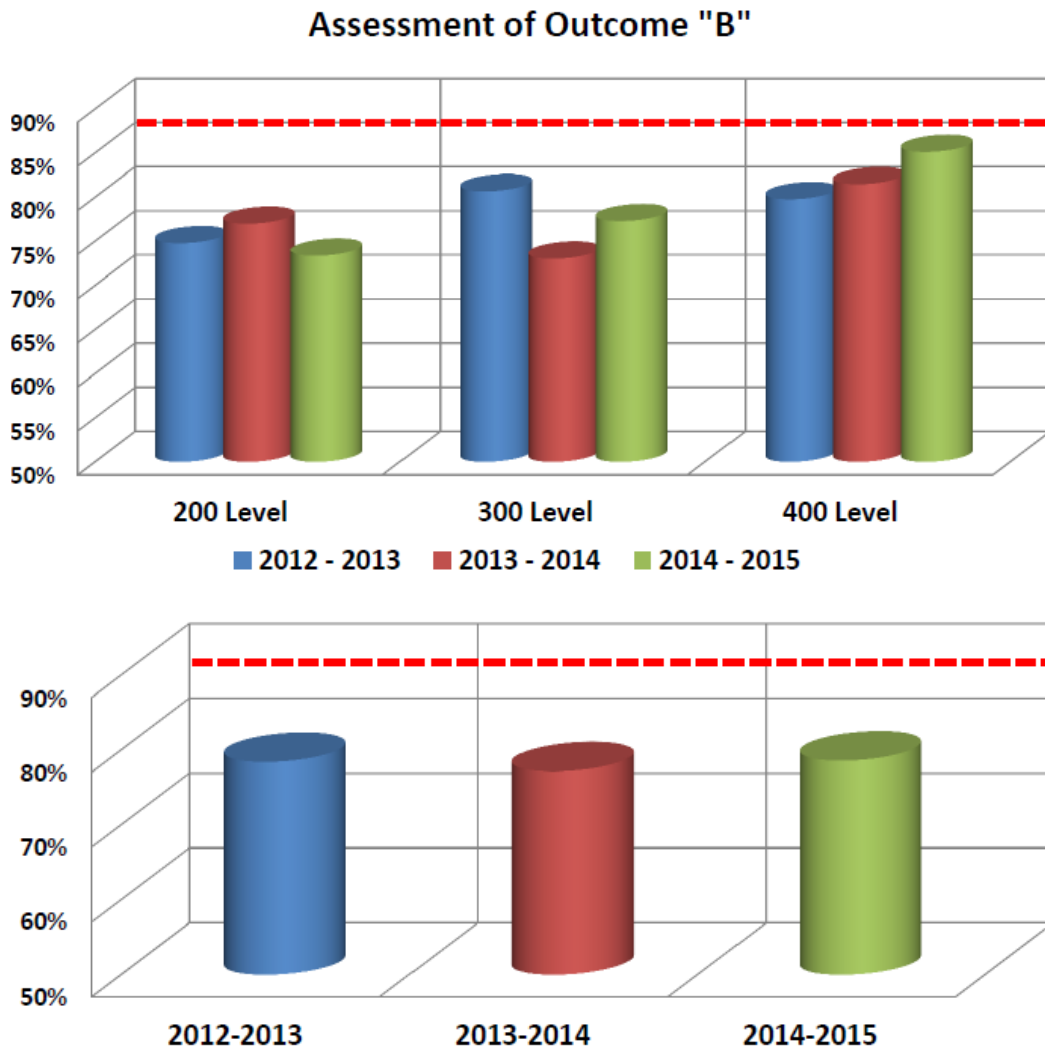
**Outcome A: Ability to apply knowledge of mathematics, science and engineering**



**Figure 1: (a)** Average score of achievement of program *outcome "A"* in last 3 Years for *200 to 400 level courses* **(b)** Average score of achievement of program *outcome "A"* in last 3 years for *all courses* (dotted horizontal line indicates the target value)

From Fig. 1(a), we can observe that in all 200 to 400 level courses, the average score of achievement of program outcome A is below the target value (80%). At the same time, we can observe from last three years data that after reaching the 400 level courses, the students are more capable to apply the knowledge of mathematics, science and engineering. From Fig. 1(b), overall a stagnant pattern of Outcome A can be noticed for last three years at around 71%. This is around 9% below our target of 80%.

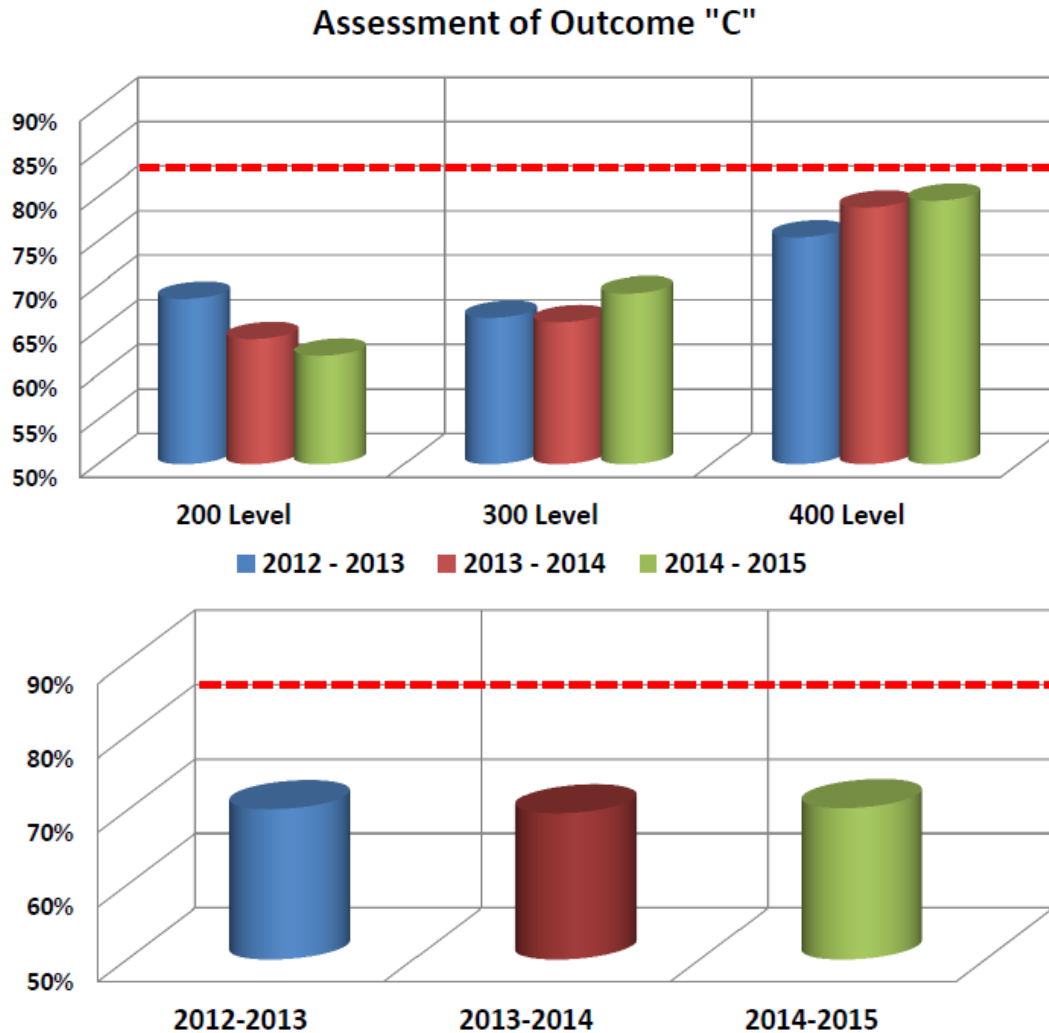
**Outcome B: Ability to design and conduct experiments as well as analyze and interpret data**



**Figure 2:** (a) Average score of achievement of program *outcome "B"* in last 3 Years for 200 to 400 level courses (b) Average score of achievement of program *outcome "B"* in last 3 years for *all courses* (dotted horizontal line indicates the target value)

From Fig. 2(a), we can observe that the average score of achievement of program outcome B in 200 to 300 level courses from last three years is below the target value (85%). We can also observe that students' ability to design and conduct experiments, as well as to analyze and interpret data has improved after reaching the 400 level courses. A gradual increase in average score of achievement (from 79% to 85%) can be observed in 400 level courses from 2012 till 2015, and the target value has been achieved in 400 level courses during the year 2014 – 2015. From Fig. 2(b), overall a stagnant pattern of Outcome B can be noticed for last three years at around 78%. This is around 7% below our target of 85%.

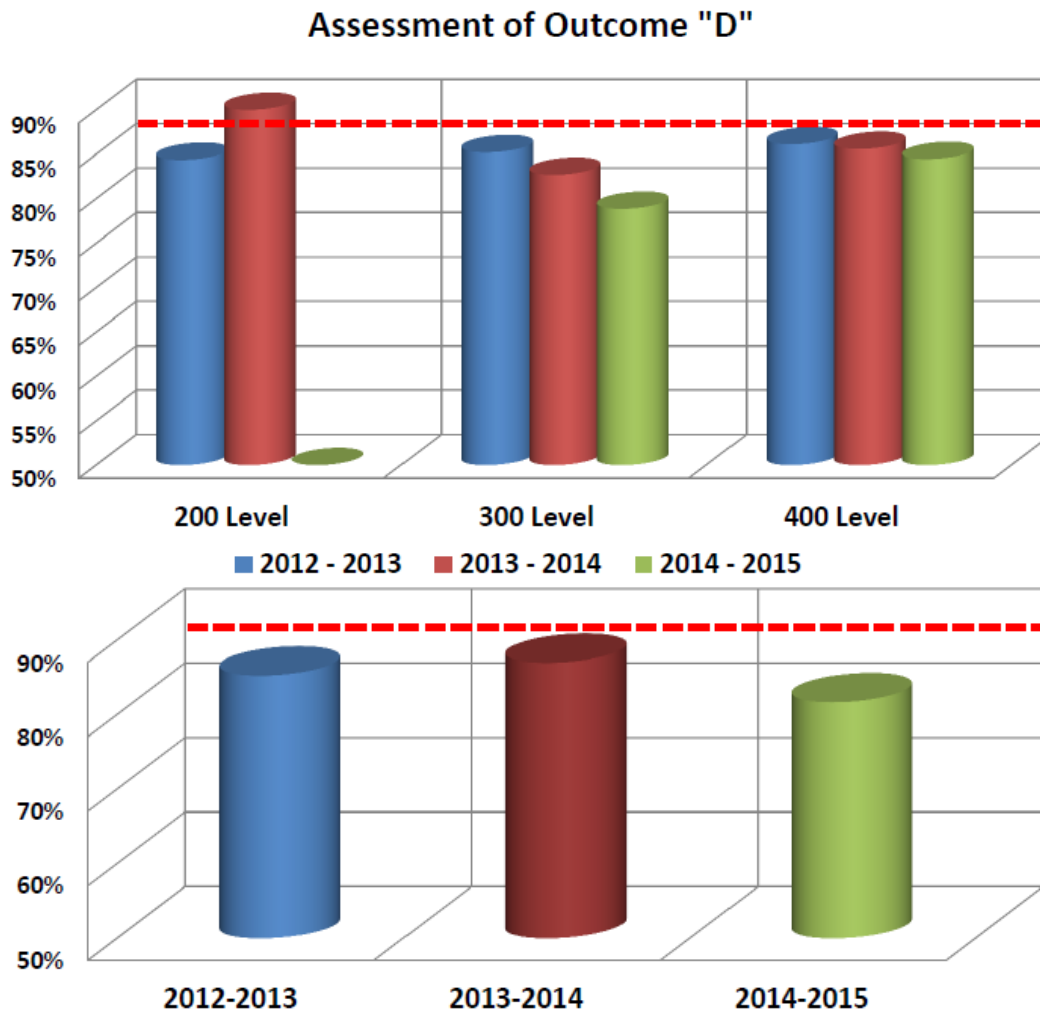
**Outcome C:** Ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health, and safety manufacturability, and sustainability



**Figure 3:** (a) Average score of achievement of program *outcome "C"* in last 3 Years for *200 to 400 level courses* (b) Average score of achievement of program *outcome "C"* in last 3 years for *all courses* (dotted horizontal line indicates the target value)

From Fig. 3(a), it can be observed that in 200 and 300 level courses, the students' average score of achievement of program outcome C is around 70% which is well below the target value (80%). At the same time, we can observe that after reaching the 400 level courses, the students are more capable to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability. From 2013 onwards, the students' average score of achievement has come closer to the target value. In the year 2014-2015, the target value (80%) has almost been achieved in 400 level courses as the average score of achievement of program outcome C is 79.6%. From Fig. 3(b), overall a stagnant pattern of Outcome C can be noticed for last three years at around 70%. This is around 10% below our target of 80%.

**Outcome D: *Ability to function on multidisciplinary teams***

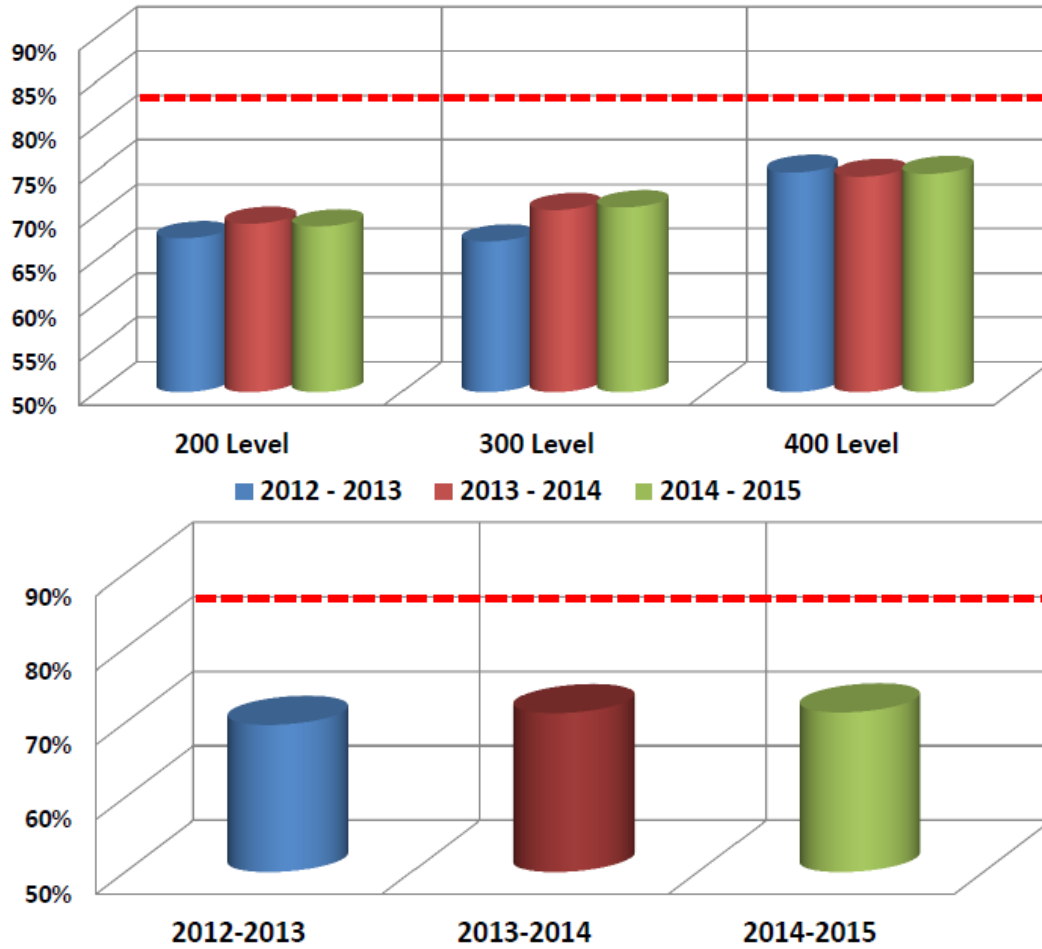


**Figure 4:** (a) Average score of achievement of program *outcome "D"* in last 3 Years for 200 to 400 level courses (b) Average score of achievement of program *outcome "D"* in last 3 years for *all courses* (dotted horizontal line indicates the target value)

From Fig. 4(a), we can observe that overall students' ability to function in multidisciplinary teams is satisfactory and close to or reached the target value of 85%. Although, we also observed that during the year 2014 – 2015, the average score of achievement of outcome D for students in 300 level courses is well below the target value, or even below 80%. The missing outcome in 200 level for the academic year of 2014 – 2015 is due to the unavailability of data. From Fig. 4(b), we can observe that in last two academic years, the target value (85%) of program outcome D was achieved as the average scores of achievement for all courses are 85.23% and 86.95% in 2012 – 2013 and 2013 – 2014 respectively. However, 4% to 5% drop in average score of achievement has been observed in the academic year 2014 – 2015.

**Outcome E: Ability to identify, formulate and solve engineering problems**

**Assessment of Outcome "E"**



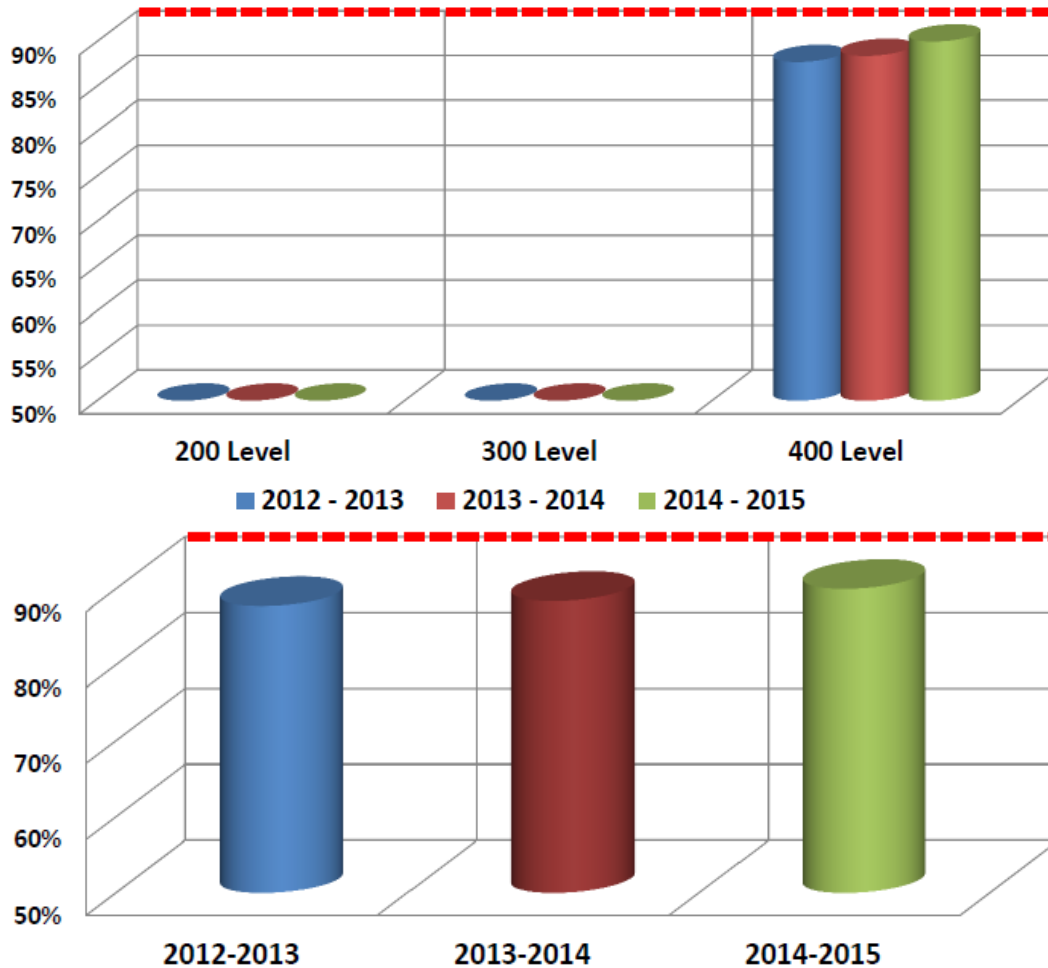
**Figure 5: (a)** Average score of achievement of program *outcome "E"* in last 3 Years for *200 to 400 level courses* **(b)** Average score of achievement of program *outcome "E"* in last 3 years for *all courses* (dotted horizontal line indicates the target value)

From Fig. 5(a), we can observe that overall average score of achievement of outcome E is below the target value (80%) in all the years and also in all the levels. But we can also observe that students in level 400 display overall better ability to identify, formulate, and solve engineering problems as compare to students in level 200 and 300. From Fig. 5(b), we can observe that the average score of achievement of outcome E in all courses is around 9% to 10% below our target value of 80% from last three academic years. However, a very little improvement of 1.7% can be observed in the last academic year of 2014 – 2015 from 2012 – 2013.



**Outcome F: *Understanding of professional and ethical responsibility***

**Assessment of Outcome "F"**

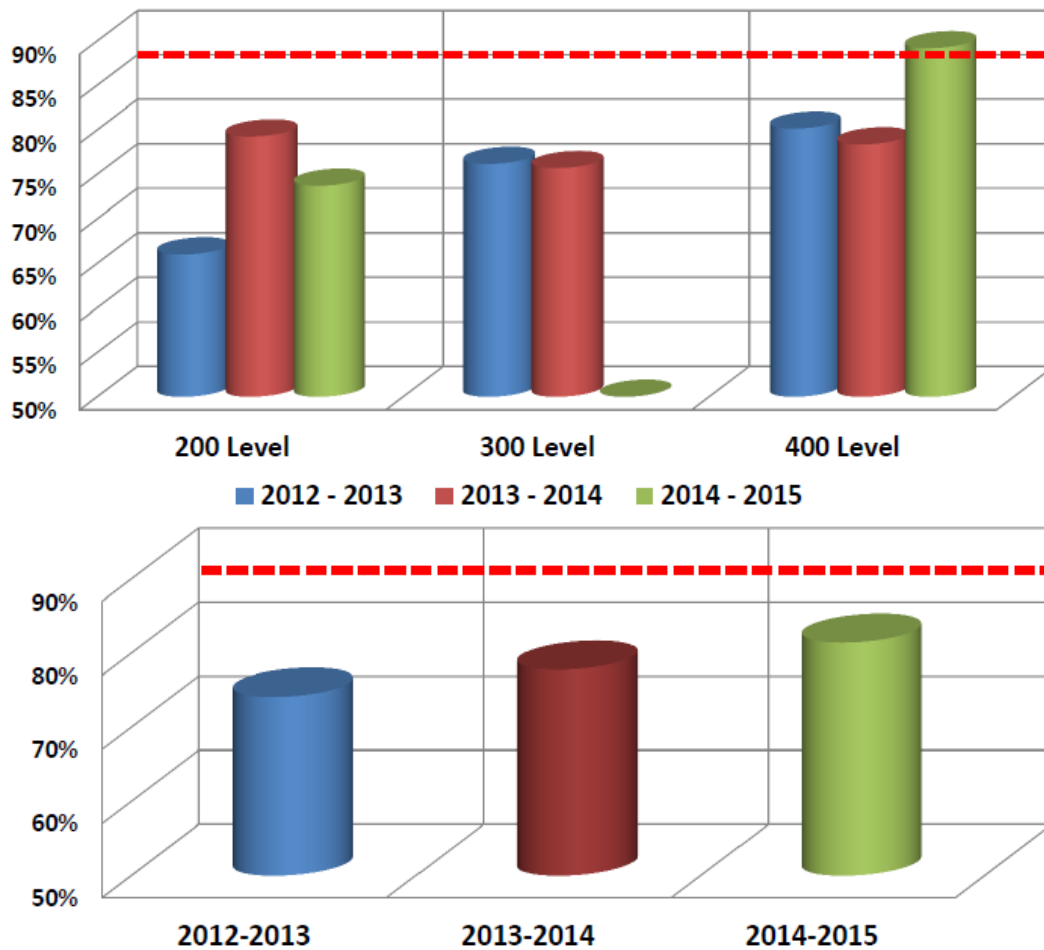


**Figure 6: (a) Average score of achievement of program *outcome "F"* in last 3 Years for 200 to 400 level courses (b) Average score of achievement of program *outcome "F"* in last 3 years for all courses (dotted horizontal line indicates the target value)**

From Fig. 6(a), we can observe that data for 200 and 300 level courses is unavailable, while in 400 level courses, the average score of achievement of program outcome F is satisfactory and very close to the target value of 90% from last three years. The target value of 90% has been achieved in the academic year of 2014 – 2015. From Fig. 6(b), an improving trend very close to the target value from one year to another can be observed. The percentages of attainment from last three consecutive academic years are 87.71%, 88.39% and 90.1% which shows that our students understand well their professional and ethical responsibility.

**Outcome G: Ability to communicate effectively**

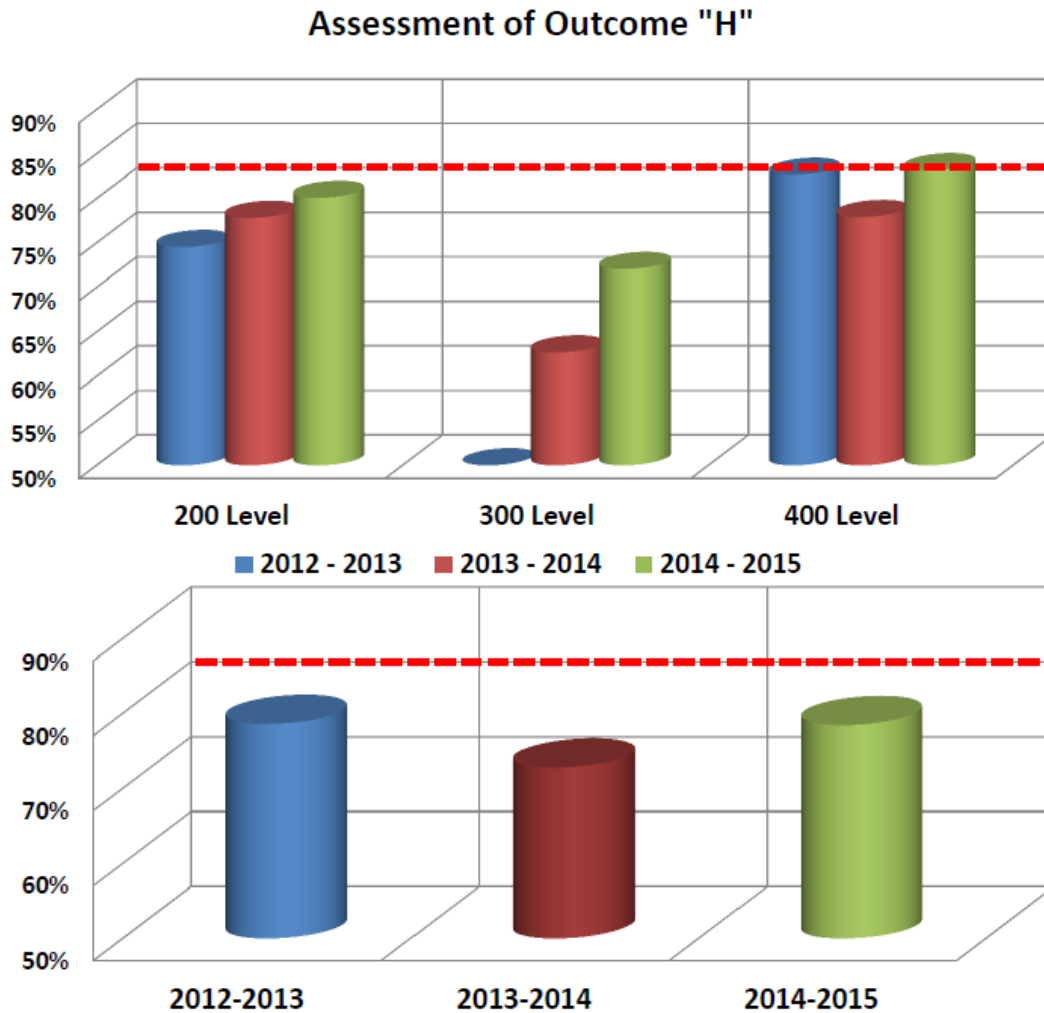
**Assessment of Outcome "G"**



**Figure 7: (a) Average score of achievement of program *outcome "G"* in last 3 Years for 200 to 400 level courses (b) Average score of achievement of program *outcome "G"* in last 3 years for *all courses* (dotted horizontal line indicates the target value)**

From Fig. 7(a), we can observe that overall the average score of achievement of outcome G in 400 level courses is better than the overall average score of 200 and 300 level courses. We can also observe that the target value (85%) of students' ability to communicate effectively has been achieved by students of 400 level during the year 2014 – 2015. The missing outcome in 300 level for the year of 2014 – 2015 is due to the unavailability of data. Fig. 7(b) shows an improving trend of this outcome attainment. From 74.12% in academic year 2012 – 2013, the percentage of attainment has increased to 81.44% in academic year 2014 – 2015, that is around 7% of improvement. However, the combined result of all level courses in each academic year is still less than the target value of 85% from last three academic years.

**Outcome H: *Understand the impact of engineering solutions in a global, economic, environmental, and societal context***

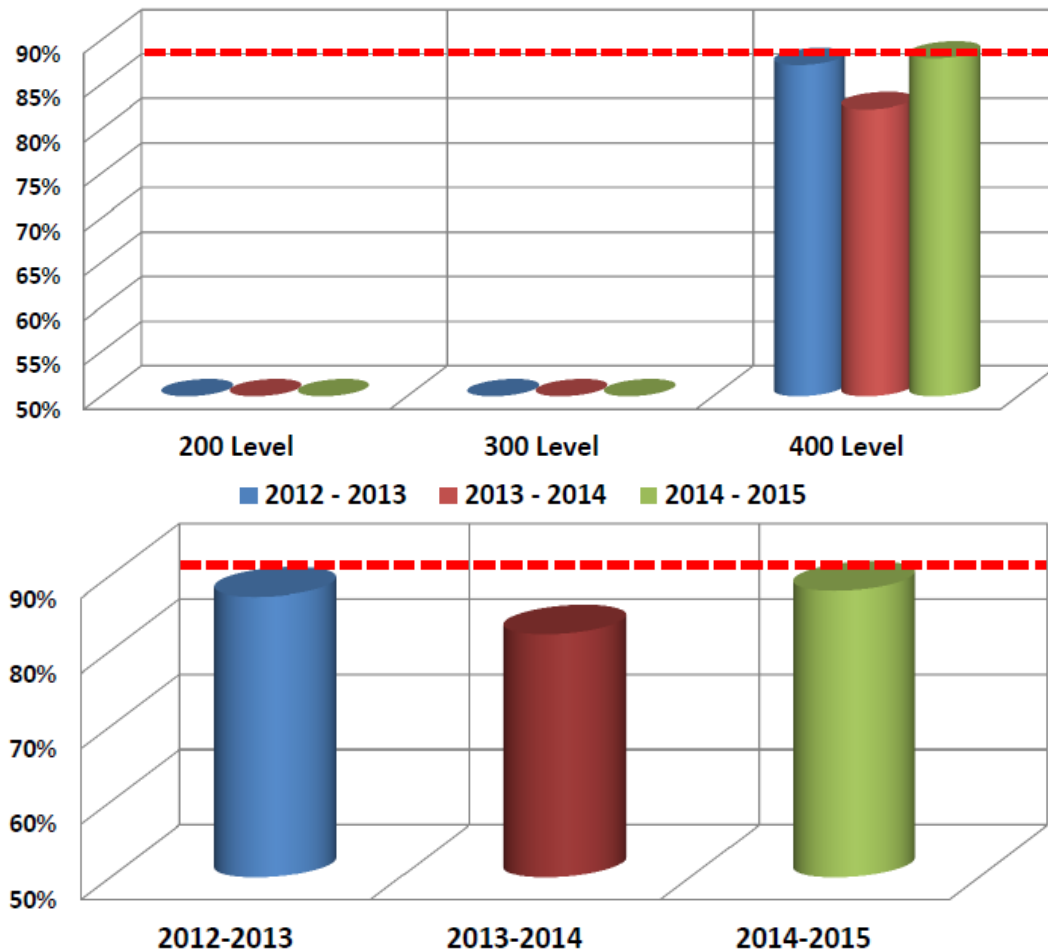


**Figure 8:** (a) Average score of achievement of program *outcome "H"* in last 3 Years for 200 to 400 level courses (b) Average score of achievement of program *outcome "H"* in last 3 years for all courses (dotted horizontal line indicates the target value)

From Fig. 8(a), we can observe that students in 400 level courses have achieved the target value (80%) of outcome H in the year 2012 – 2013 as well as in 2014 – 2015, although during the year 2013 – 2014, the score is below the target but still close (77.92%). We can observe that the average score of achievement of outcome H in 200 level courses has an improving trend and the target value has been achieved in year 2014 – 2015. However, in 300 level courses, the average score of achievement is well below the target value of 80%. The missing outcome in 300 level for the year of 2012 – 2013 is due to the unavailability of data. From Fig. 8(b), we can observe that the attainment of this outcome for the combined result of all level courses reduces from 78.57% to 72.80% from academic year 2012 – 2013 to 2013 – 2014. Then, there was an improvement of around 5.6% in the next academic year (2014 – 2015) and the attainment level came back to 78.42%. However, the combined result of all level courses in each academic year is still little less than the target value of 80%.

**Outcome I: *Recognize of the need for, and an ability to engage in, lifelong learning***

**Assessment of Outcome "I"**

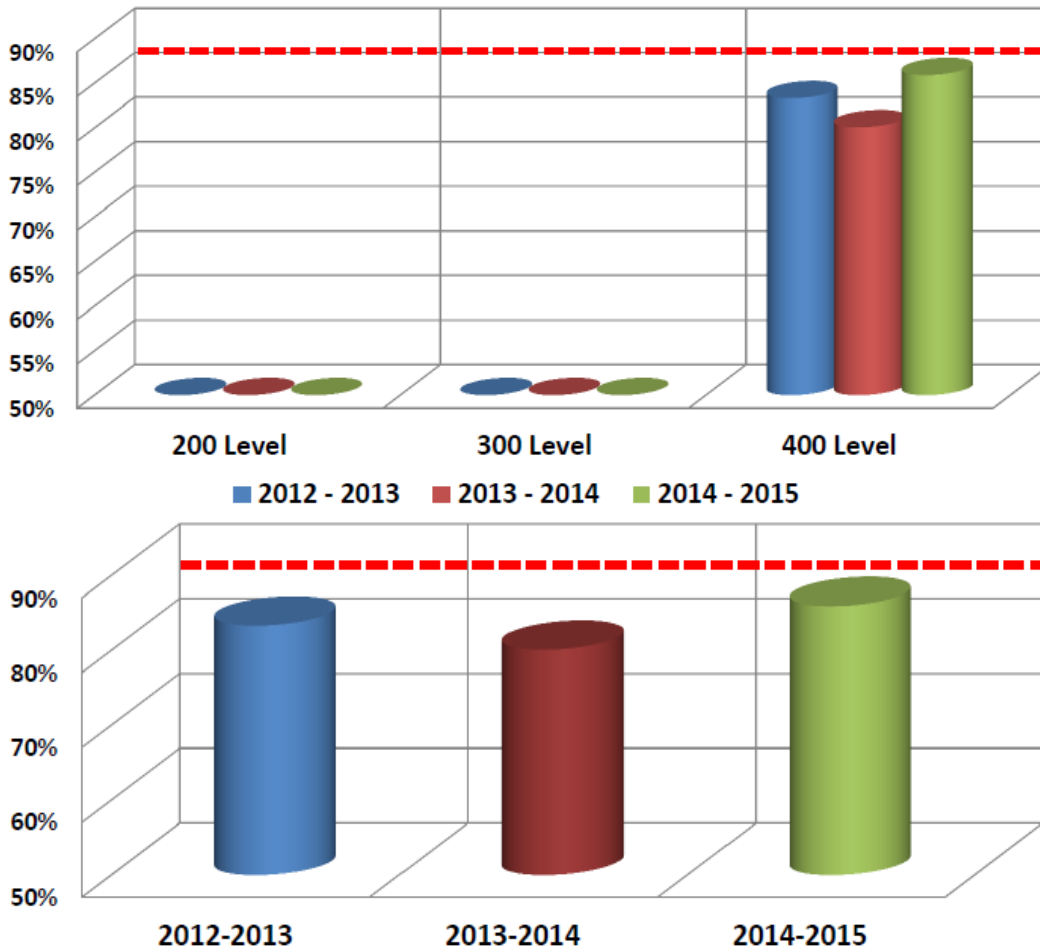


**Figure 9: (a)** Average score of achievement of program *outcome "I"* in last 3 Years for 200 to 400 level courses **(b)** Average score of achievement of program *outcome "I"* in last 3 years for *all courses* (dotted horizontal line indicates the target value)

From Fig. 9(a), we can observe that data for 200 and 300 level courses is unavailable, while in 400 level courses, the average score of achievement of program outcome I is satisfactory. During the academic years 2012 – 2013 and 2014 – 2015, the target value of 85% has been achieved, while during the academic year 2013 – 2014, the average score of achievement (82.23%) is very close to the target value. From Fig. 9(b), it can be observed that we are able to maintain the attainment level of outcome I above 85% in two academic years (2012 – 2013 and 2014 – 2015). However, the attainment level reduces to around 5% during the academic year of 2013 – 2014.

**Outcome J: Knowledge of contemporary issues**

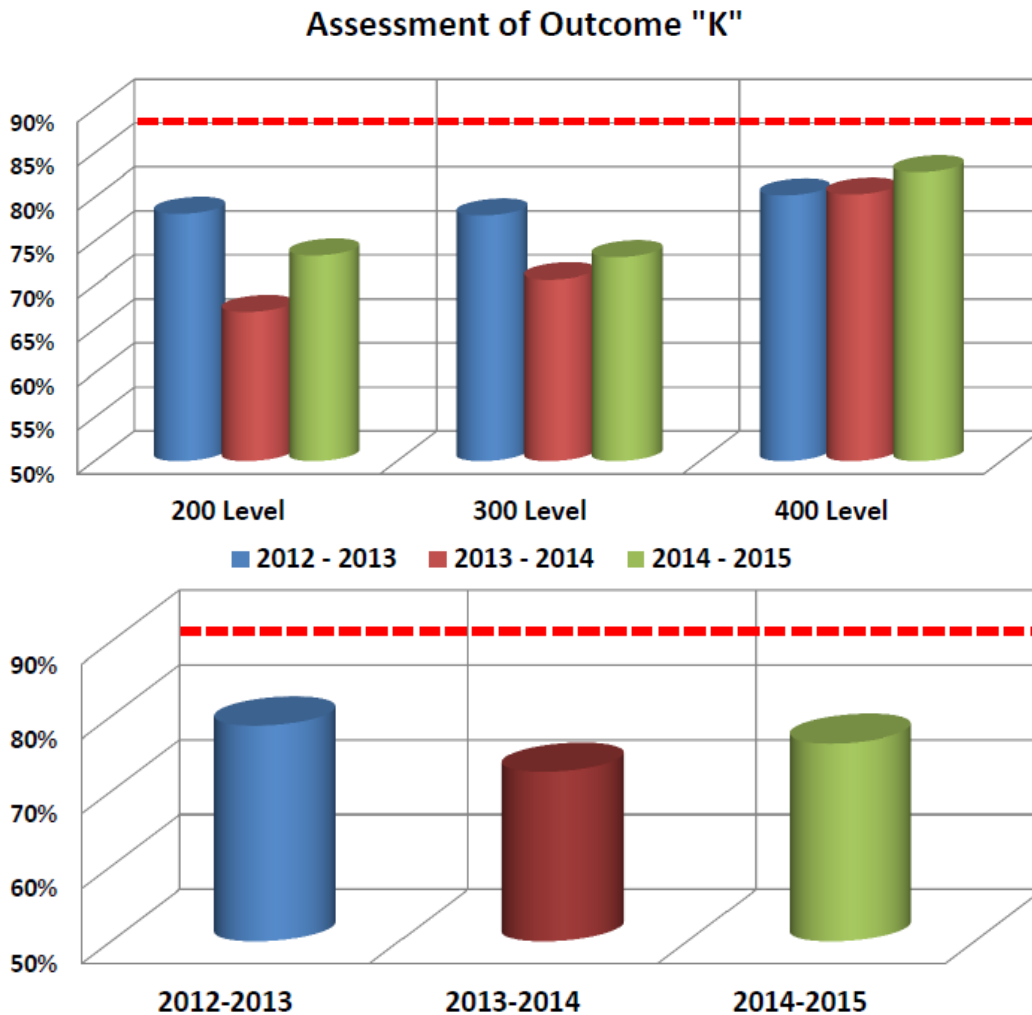
**Assessment of Outcome "J"**



**Figure 10: (a)** Average score of achievement of program *outcome "J"* in last 3 Years for 200 to 400 level courses **(b)** Average score of achievement of program *outcome "J"* in last 3 years for all courses (dotted horizontal line indicates the target value)

From Fig. 10(a), we can observe that during the academic year 2014 – 2015, the target value of 85% has been achieved by students in 400 level courses, while during the academic year 2012 – 2013 and 2013 – 2014, the average score of achievement is below the target value. The missing outcomes in 200 and 300 level courses for the academic years of 2012 – 2013 and 2013 – 2014 are due to the unavailability of data. From Fig. 10(b), we can observe that there was an improvement of around 2.6% and 5.8% in attainment of this outcome from the academic year of 2012 – 2013 and 2013 – 2014 respectively to academic year 2014 – 2015. The target value has been achieved in the last academic year (2014 – 2015).

**Outcome K: Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice**



**Figure 11: (a) Average score of achievement of program *outcome "K"* in last 3 Years for 200 to 400 level courses (b) Average score of achievement of program *outcome "K"* in last 3 years for *all courses* (dotted horizontal line indicates the target value)**

From Fig. 11(a), we can observe that the overall average score of achievement of outcome K in 400 level courses is better than the overall average score of 200 and 300 level courses. We can also observe that the target value (85%) of students' ability to use the techniques, skills, and modern engineering tools necessary for engineering practice has not been achieved yet, however, the attainment level of outcome K by students in 400 level courses during the academic year (2014 – 2015) is close to the target value. The average score of achievement of outcome K in 200 and 300 level courses is even below 80% from last three academic years. From Fig. 11(b), we can observe that the attainment of this outcome for the combined result of all level courses reduces from 78.76% to 72.64% from the academic year 2012 – 2013 to 2013 – 2014. Then, there was an improvement of around 3.8% in the next academic year (2014 – 2015) and the attainment level was 76.44%. However, the combined result of all level courses in each academic year is still less than 80% and the target value for this outcome is 85%.

## General Conclusions:

The percentage of achievement of all outcomes (from A to K) with target values for the last three academic years (2012 – 2013, 2013 – 2014 and 2014 – 2015) is presented in Table 7.

**Table 7: Average score of achievements of program outcomes of 3 academic years for *all level courses***

Outcome	Percentage of Achievement			Targeted Achievement
	2012 – 2013	2013 – 2014	2014 – 2015	
A	70.52%	71.38%	71.74%	80%
B	78.41%	77.16%	78.58%	85%
C	70.16%	69.61%	70.32%	80%
D	85.23%	86.95%	81.66%	85%
E	69.71%	71.30%	71.40%	80%
F	87.71%	88.39%	90.10%	90%
G	74.12%	77.78%	81.44%	85%
H	78.57%	72.80%	78.42%	80%
I	87.18%	82.23%	87.94%	85%
J	83.30%	80.07%	85.90%	85%
K	78.76%	72.64%	76.44%	85%

As a general conclusion, we can observe that there is an increasing trend in percentage of achievement for the outcomes A, E, F and G over the last three academic years. Additionally, it can be observed that there is a drop in percentage of achievement from the academic year 2012 – 2013 to 2013 – 2014 but the achieved percentage increased in the next academic year 2014 – 2015 for the outcomes B, C, H, I, J and K. However, the target value of program outcome D was achieved in academic years 2012 – 2013 and 2013 – 2014 but 4% to 5% drop in average score of achievement is observed in the academic year 2014 – 2015.

The target values of outcomes F, I and J only have been achieved in the academic year 2014 – 2015. There is a need for improvement in order to achieve the target values for the remaining outcomes.