Attainment of Course Outcomes and Programme Outcomes

SUBMITTED BY

Department of Computer Science

Mankar College, Mankar

Mankar, PurbaBarddhaman, West Bengal, 713144

2020-2021 SESSION

Contents

List of Course Outcomes

1st Year (Semester I & Semester II)

	Course Outcome
CO1	Understanding the fundamental concepts of programming in C and C++ in order to solve simple problems.
CO2	Analyzing the design and operation of digital circuits and the various components of a Computer System (such as CPU, Memory, I/O) in detail.
CO3	Developing the ability to apply Object Oriented Programming concepts to solve problems using JAVA.
CO4	Acquiring knowledge about discreet mathematical structures (such as graphs, sets etc.,) to develop the ability to model real-life problems mathematically in order to solve them using computers.

2nd Year (Semester III & Semester IV)

	Course Outcome
CO5	Learning about the various linear and non-linear data structures in C (such as stack, queue, tree etc.,) and their application in solving simple real-life problems.
CO6	Understanding the design of the Operating System and its role in managing the interaction and operation of the various components of a computer system.
CO7	Understanding the core concepts of all the layers of a Computer Networking System and various protocols governing the transmission of data across each layer.
CO8	Understanding the fundamental concepts of programming in Python in order to solve simple problems.
CO9	Understanding and analyzing various algorithm design techniques (such as Greedy method, Divide and Conquer etc.,) and developing the ability to design proper algorithms suitable for specific problems and analyzing their performance.
CO10	Understanding the process of designing a software and gaining the ability to develop software which are reliable and fulfill the objective.
CO11	Gaining the ability to handle data efficiently by understanding the structure of database storage and various access techniques.
CO12	Understanding the interaction between the user and the Operating System and developing the ability to write Shell programs.

3rd Year (Semester V& Semester VI)

	Course Outcome
CO13	Learning the fundamental concepts involved in creating web content using basic tools such as JDBC, JSP and Java Beans.
CO14	Learning about various automata (such as Turing machines, Pushdown Automata etc.,) to develop an idea of how machines solve problems.
CO15	Understanding the operation and architecture of 8085 Microprocessor and developing the ability to write Assembly language programs.
CO16	Learning various numerical techniques that can be used to solve computational problems and analyzing their accuracy and loopholes.
CO17	Developing the ability to make computers solve complex problems using Heuristic approach (such as A^* search, Hill climbing etc.,).
CO18	Understanding the basic concepts of Computer Graphics and developing the ability to create interactive computer graphics and animation.
CO19	Understanding the complexity of real-life problems and using Metaheuristic approach (such as GA, ANN and Fuzzy logic) to obtain near optimal solutions in limited amount of time.
CO20	Encouraging teamwork and developing problem solving and technical writing skills by solving a practical problem using the concepts learnt in previous subjects.

List of Programme Outcomes

PO1	**Building foundational knowledge** - Gaining knowledge of the existing theory of Computer Science and various modern tools and resources to build a strong foundational knowledge for solving complex engineering problems.
PO2	**Identifying and analyzing problems** - Identifying problems, modeling the problems into logical representations and analyzing them to correctly establish the suitable objectives that must be achieved to solve the problem.
PO3	**Formulating and analyzing solutions**- Formulating proper solutions using the foundational knowledge gained from the curriculum and analyzing their feasibility based on the available resources and tools
PO4	**Usage of modern tools** – Developing the discretion of identifying the modern tools, resources and techniques that are suitable and effective for solving specific complex problems.
PO5	**Developing Employability skills –** Developing core skills in students that caters to the practical needs and requirements of the current society, hence making them employable.
PO6	**Benefit the society** – Building students to assess the existing issues faced by the society render their services using the problem-solving skills developed by the curriculum.

CO PO Matrix

CO PO Matrix: 1st Year				
	CO1	**CO2**	**CO3**	**CO4**
PO1	5	5	5	5
PO2	3	2	3	2
PO3	3	2	3	2
PO4	1	3	1	1
PO5	5	4	5	3
PO6	4	4	4	2

CO PO Matrix: 2nd Year								
	CO5	**CO6**	**CO7**	**CO8**	**CO9**	**CO10**	**CO11**	**CO12**
PO1	5	5	5	5	5	5	5	5
PO2	3	1	1	3	3	1	2	2
PO3	3	1	1	3	3	1	2	2
PO4	1	1	1	1	1	1	1	1
PO5	4	4	4	5	4	4	4	2
PO6	4	4	4	4	4	4	4	2

CO PO Matrix: 3rd Year								
	CO13	**CO14**	**CO15**	**CO16**	**CO17**	**CO18**	**CO19**	**CO20**
PO1	5	5	5	5	5	5	5	5
PO2	3	1	2	3	3	3	3	5
PO3	3	1	2	3	3	3	3	5
PO4	1	1	1	1	1	1	1	5
PO5	5	1	4	1	4	4	4	5
PO6	4	1	4	1	4	4	4	5

Significance level	Meaning
5	**Very highly correlated**
4	**Highly correlated**
3	**Moderately correlated**
2	**Poorly correlated**
1	**Very poorly correlated**

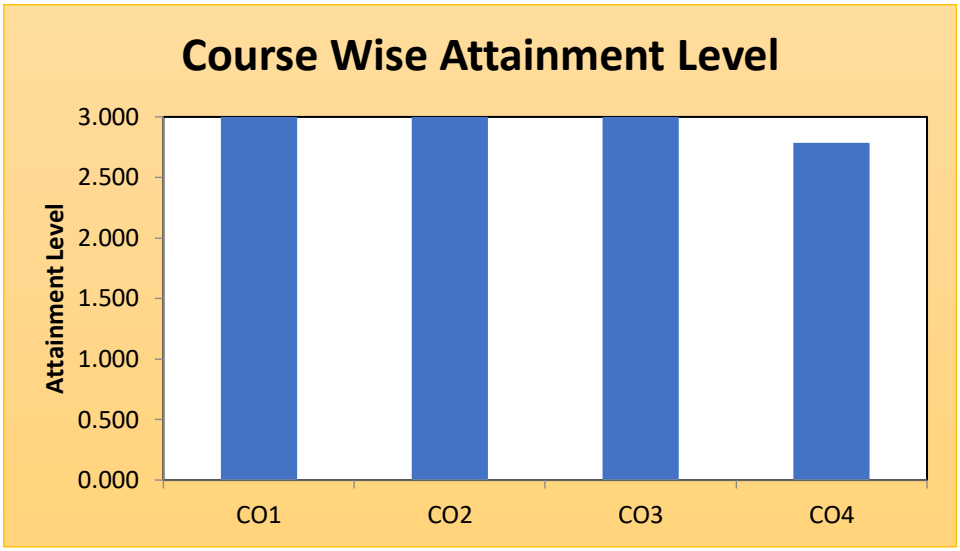
Attainment of Course Outcomes

Student wise GPA for course outcomes: 1st Year

Name	University Roll Number	CO1	CO2	CO3	CO4
XXXXX	200311700002	9	9	10	9
XXXXX	200311700003	10	9	10	9
XXXXX	200311700005	10	9	10	9
XXXXX	200311700007	10	9	10	9
XXXXX	200311700010	10	9	10	9
XXXXX	200311700012	10	9	10	9
XXXXX	200311700016	10	9	10	9
XXXXX	200311700017	9	9	10	8
XXXXX	200311700019	9	9	10	9
XXXXX	200311700020	9	9	10	8
XXXXX	200311700024	9	9	10	8
XXXXX	200311700027	9	9	10	8
XXXXX	200311700028	9	9	10	9
XXXXX	200311700030	9	9	10	9
XXXXX	200311700033	10	10	10	9
XXXXX	200311700035	9	9	10	9
XXXXX	200311700036	9	9	9	8
XXXXX	200311700037	9	9	10	9
XXXXX	200311700039	10	10	10	9
XXXXX	200311700040	10	10	10	9
XXXXX	200311700041	9	9	9	8
XXXXX	200311700043	10	9	10	9
XXXXX	200311700046	10	9	10	9
XXXXX	200311700047	10	9	10	9
XXXXX	200311700048	9	9	10	9
XXXXX	200311700049	10	10	10	9
XXXXX	200311700051	10	10	10	9
XXXXX	200311700054	10	10	10	9

Student wise attainment level for course outcomes: 1st Year

Name	University Roll Number	CO1	CO2	CO3	CO4
XXXXX	200311700002	3	3	3	3
XXXXX	200311700003	3	3	3	3
XXXXX	200311700005	3	3	3	3
XXXXX	200311700007	3	3	3	3
XXXXX	200311700010	3	3	3	3
XXXXX	200311700012	3	3	3	3
XXXXX	200311700016	3	3	3	3
XXXXX	200311700017	3	3	3	2
XXXXX	200311700019	3	3	3	3
XXXXX	200311700020	3	3	3	2
XXXXX	200311700024	3	3	3	2
XXXXX	200311700027	3	3	3	2
XXXXX	200311700028	3	3	3	3
XXXXX	200311700030	3	3	3	3
XXXXX	200311700033	3	3	3	3
XXXXX	200311700035	3	3	3	3
XXXXX	200311700036	3	3	3	2
XXXXX	200311700037	3	3	3	3
XXXXX	200311700039	3	3	3	3
XXXXX	200311700040	3	3	3	3
XXXXX	200311700041	3	3	3	2
XXXXX	200311700043	3	3	3	3
XXXXX	200311700046	3	3	3	3
XXXXX	200311700047	3	3	3	3
XXXXX	200311700048	3	3	3	3
XXXXX	200311700049	3	3	3	3
XXXXX	200311700051	3	3	3	3
XXXXX	200311700054	3	3	3	3
CO attainment		3.000	3.000	3.000	2.786



The above chart illustrates the achievement levels of CO1, CO2, CO3 and CO4. It shows that, although the achievement level is high for CO1, CO2 and CO3, it is relatively low for CO4. Therefore, the following steps have been taken to improve the achievement level of this course in subsequent years:–

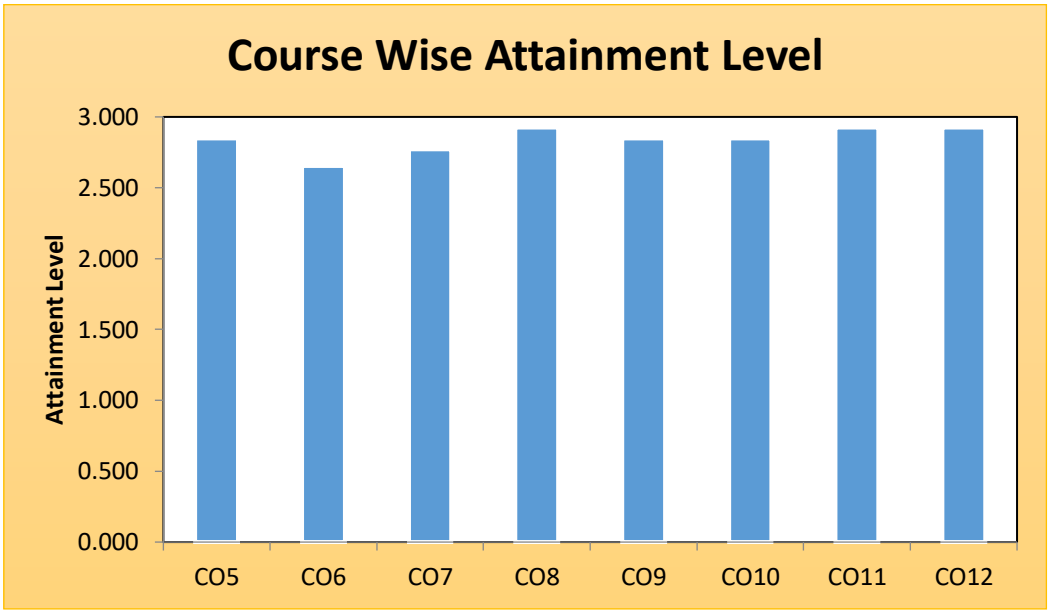
- The number of classes has been increased for this course.
- Faculty members were requested to take remedial classes for those who failed to achieve satisfactory scores in internal assessment or class tests.

Student wise GPA for course outcomes: 2nd Year

Name	University Roll Number	CO5	CO6	CO7	CO8	CO9	CO10	CO11	CO12
XXXXX	190311700002	10	9	9	9	10	9	10	10
XXXXX	190311700003	10	9	9	10	10	9	10	10
XXXXX	190311700004	10	9	9	10	10	9	9	9
XXXXX	190311700006	10	9	10	10	10	10	10	10
XXXXX	190311700007	9	9	8	9	9	9	9	9
XXXXX	190311700010	10	9	9	9	9	9	10	9
XXXXX	190311700015	9	8	8	10	9	9	9	10
XXXXX	190311700016	9	9	9	9	9	9	10	10
XXXXX	190311700018	10	9	9	10	10	9	10	10
XXXXX	190311700019	7	5	7	8	7	7	8	8
XXXXX	190311700022	10	9	9	10	10	9	9	10
XXXXX	190311700024	10	8	9	10	10	9	9	10
XXXXX	190311700025	10	9	9	10	9	10	10	10
XXXXX	190311700031	10	8	9	10	9	9	10	9
XXXXX	190311700037	10	9	9	10	9	9	9	10
XXXXX	190311700041	9	9	9	9	9	9	9	9
XXXXX	190311700042	10	8	9	10	9	9	10	10
XXXXX	190311700044	10	10	10	10	10	9	10	10
XXXXX	190311700045	7	5	7	8	7	7	8	8
XXXXX	190311700046	9	9	9	10	9	9	10	9
XXXXX	190311700047	10	9	10	10	9	9	10	10
XXXXX	190311700050	9	8	10	10	9	9	10	9
XXXXX	190311700052	10	9	10	10	9	10	10	10
XXXXX	190311700053	10	9	10	10	9	10	10	10
XXXXX	190311700054	9	9	9	9	9	9	9	9
XXXXX	190311700055	10	9	9	10	10	9	10	10

Student wise attainmentlevel for course outcomes:2nd Year

Name	University Roll Number	CO5	CO6	CO7	CO8	CO9	CO10	CO11	CO12
XXXXX	190311700002	3	3	3	3	3	3	3	3
XXXXX	190311700003	3	3	3	3	3	3	3	3
XXXXX	190311700004	3	3	3	3	3	3	3	3
XXXXX	190311700006	3	3	3	3	3	3	3	3
XXXXX	190311700007	3	3	2	3	3	3	3	3
XXXXX	190311700010	3	3	3	3	3	3	3	3
XXXXX	190311700015	3	2	2	3	3	3	3	3
XXXXX	190311700016	3	3	3	3	3	3	3	3
XXXXX	190311700018	3	3	3	3	3	3	3	3
XXXXX	190311700019	1	1	1	2	1	1	2	2
XXXXX	190311700022	3	3	3	3	3	3	3	3
XXXXX	190311700024	3	2	3	3	3	3	3	3
XXXXX	190311700025	3	3	3	3	3	3	3	3
XXXXX	190311700031	3	2	3	3	3	3	3	3
XXXXX	190311700037	3	3	3	3	3	3	3	3
XXXXX	190311700041	3	3	3	3	3	3	3	3
XXXXX	190311700042	3	2	3	3	3	3	3	3
XXXXX	190311700044	3	3	3	3	3	3	3	3
XXXXX	190311700045	1	1	1	2	1	1	2	2
XXXXX	190311700046	3	3	3	3	3	3	3	3
XXXXX	190311700047	3	3	3	3	3	3	3	3
XXXXX	190311700050	3	2	3	3	3	3	3	3
XXXXX	190311700052	3	3	3	3	3	3	3	3
XXXXX	190311700053	3	3	3	3	3	3	3	3
XXXXX	190311700054	3	3	3	3	3	3	3	3
XXXXX	190311700055	3	3	3	3	3	3	3	3
CO Attainment		2.846	2.654	2.769	2.923	2.846	2.846	2.923	2.923



Although the CO attainment level of most of the courses was satisfactory, it is slightly poor for CO6. Therefore, to improve the attainment level of this course the following actions were taken –

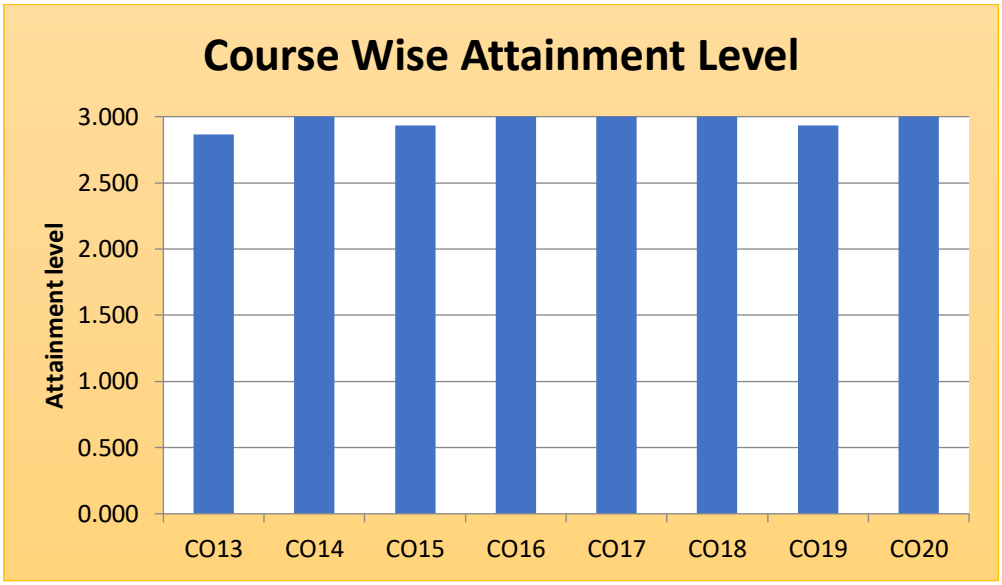
- Students of the subsequent years were provided with study materials and extra classes.
- Previous years university exams questions were discussed with them to make them aware of the question pattern.

Student wise GPA for course outcomes: 3rd Year

Name	University Roll Number	CO13	CO14	CO15	CO16	CO17	CO18	CO19	CO20
XXXXX	**180311700001**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**
XXXXX	**180311700003**	**9**	**9**	**9**	**9**	**9**	**10**	**10**	**10**
XXXXX	**180311700005**	**9**	**10**	**9**	**9**	**9**	**9**	**10**	**10**
XXXXX	**180311700013**	**9**	**10**	**9**	**9**	**10**	**9**	**10**	**9**
XXXXX	**180311700014**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**
XXXXX	**180311700015**	**8**	**9**	**8**	**9**	**9**	**9**	**9**	**9**
XXXXX	**180311700021**	**9**	**9**	**9**	**9**	**10**	**9**	**9**	**9**
XXXXX	**180311700025**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**
XXXXX	**180311700028**	**9**	**9**	**9**	**9**	**9**	**9**	**10**	**9**
XXXXX	**180311700029**	**10**	**10**	**10**	**9**	**10**	**10**	**10**	**10**
XXXXX	**180311700037**	**9**	**10**	**10**	**10**	**9**	**10**	**10**	**9**
XXXXX	**180311700038**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**
XXXXX	**180311700041**	**9**	**9**	**10**	**10**	**9**	**10**	**10**	**10**
XXXXX	**180311700042**	**9**	**10**	**10**	**9**	**9**	**9**	**9**	**9**
XXXXX	**180311700043**	**9**	**9**	**10**	**10**	**10**	**9**	**9**	**9**

Student wise attainment level for course outcomes: 3rd Year

Name	University Roll Number	CO13	CO14	CO15	CO16	CO17	CO18	CO19	CO20
XXXXX	**180311700001**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
XXXXX	**180311700003**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
XXXXX	**180311700005**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
XXXXX	**180311700013**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
XXXXX	**180311700014**	**2**	**3**	**3**	**3**	**3**	**3**	**2**	**3**
XXXXX	**180311700015**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
XXXXX	**180311700021**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
XXXXX	**180311700025**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
XXXXX	**180311700028**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
XXXXX	**180311700029**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
XXXXX	**180311700037**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
XXXXX	**180311700038**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
XXXXX	**180311700041**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
XXXXX	**180311700042**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
CO Attainment		**2.867**	**3.000**	**2.933**	**3.000**	**3.000**	**3.000**	**2.933**	**3.000**



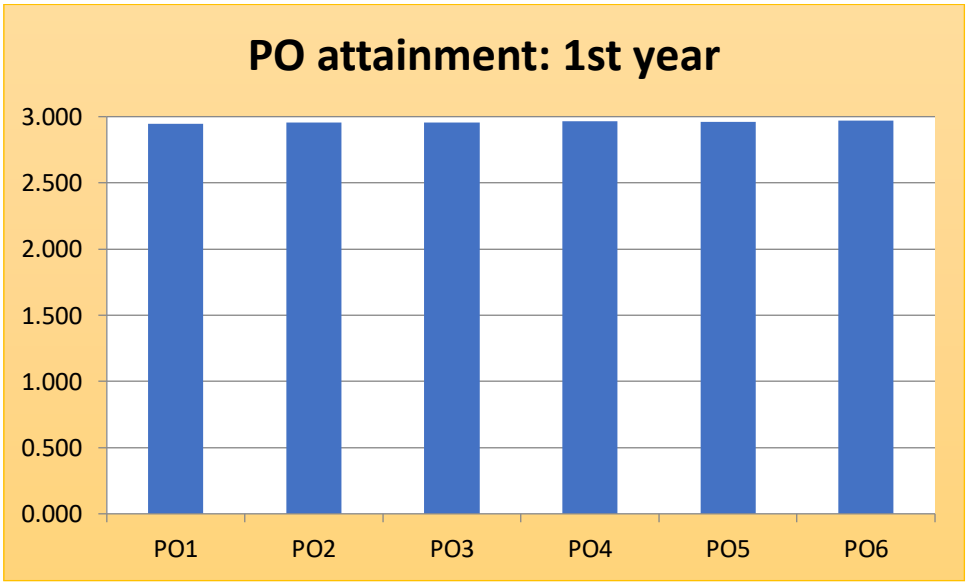
The above chart depicts low attainment level for the course i.e. CO14. The course CO14 consists application part, which the student face difficult to solve. Therefore, to overcome this problem, the following actions were taken –

- The students of subsequent years were provided with extra study materials and model question answers papers.
- Class tests and few mock tests were taken to increase their knowledge and confidence.
- According to students' feedback, they did not get time to solve the problems in the specified time frame. Therefore, to gain their adeptness, it is decided to take regular class tests and mock tests.

Attainment of Programme Outcomes

Calculation of attainment of Programme Outcomes: 1st year

Course Variables	Course Outcomes	CO1	CO2	CO3	CO4	Programme Wise Total Correlation Value	PO Attainment Level
	Average Attainments	**3.000**	**3.000**	**3.000**	**2.786**		
Programme Outcomes	**PO1**	5	5	5	5	20	2.947
	PO2	3	2	3	2	10	2.957
	PO3	3	2	3	2	10	2.957
	PO4	1	3	1	1	6	2.964
	PO5	5	4	5	3	17	2.962
	PO6	4	4	4	2	14	2.969

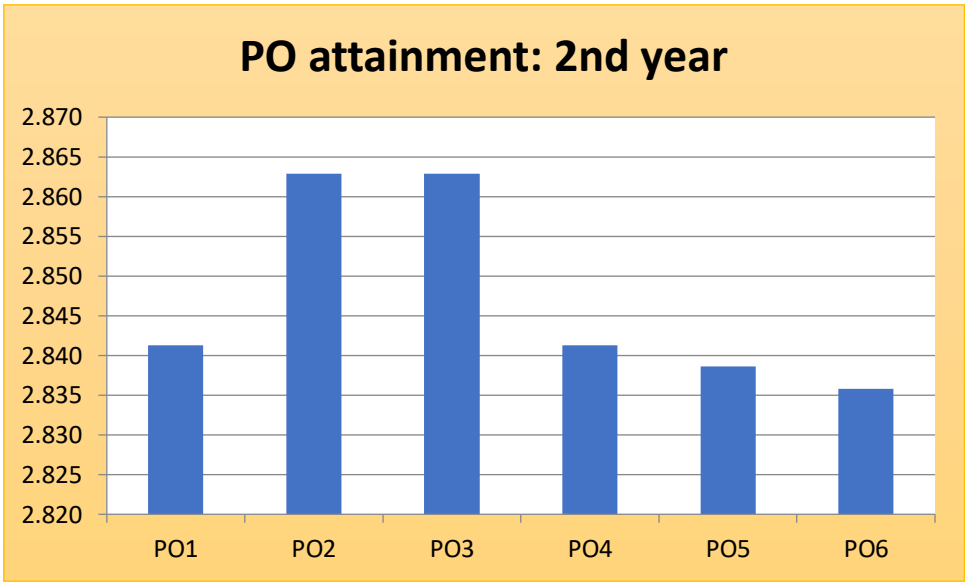


From the above chart we found good attainment level of most of the programme outcomes. The following actions have been adopted to improve it.

- It is planned to counsel the students.
- Students were motivated to attend regular classes.

Calculation of attainment of Programme Outcomes: 2nd year

Course Variables	Course Outcomes	CO5	CO6	CO7	CO8	CO9	CO10	CO11	CO12	Programme Wise Total Correlation Value	PO Attainment Level
	Average Attainments	**2.846**	**2.654**	**2.769**	**2.923**	**2.846**	**2.846**	**2.923**	**2.923**		
Programme Outcomes	PO1	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**40**	**2.841**
	PO2	**3**	**1**	**1**	**3**	**3**	**1**	**2**	**2**	**16**	**2.863**
	PO3	**3**	**1**	**1**	**3**	**3**	**1**	**2**	**2**	**16**	**2.863**
	PO4	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**8**	**2.841**
	PO5	**4**	**4**	**4**	**5**	**4**	**4**	**4**	**2**	**31**	**2.839**
	PO6	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**2**	**30**	**2.836**

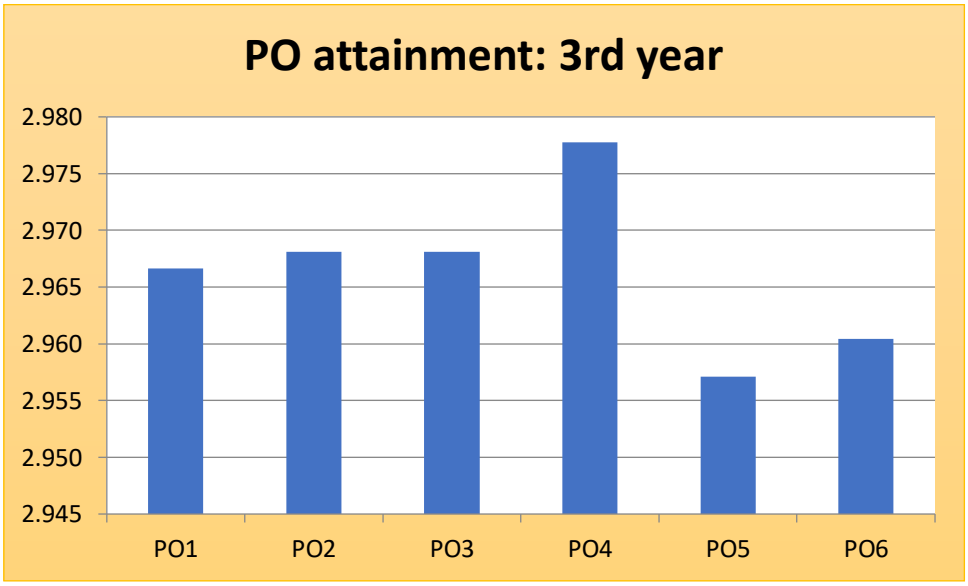


The following actions were taken to overcome the poor attainment level of the programme outcome PO6.

- Specific subject areas were chosen where the students face difficulties and it is decided to arrange remedial classes for these areas.
- Bridge courses have been introduced.

Calculation of attainment of Programme Outcomes: 3rd year

Course Variables	Course Outcomes	CO13	CO14	CO15	CO16	CO17	CO18	CO19	CO20	Programme Wise Total Correlation Value	PO Attainment Level
	Average Attainments	2.867	3.000	2.933	3.000	3.000	3.000	2.933	3.000		
Programme Outcomes	PO1	5	5	5	5	5	5	5	5	40	2.967
	PO2	3	1	2	3	3	3	3	5	23	2.968
	PO3	3	1	2	3	3	3	3	5	23	2.968
	PO4	1	1	1	1	1	1	1	5	12	2.978
	PO5	5	1	4	1	4	4	4	5	28	2.957
	PO6	4	1	4	1	4	4	4	5	27	2.960



The above chart shows the programme attainment level for the PO1, PO2, PO3, PO4, PO5 and PO6. The attainment level is high for PO4. To progress the attainment level for the remaining outcomes the following steps have been adopted –

- Remedial classes are planned for slow learners.
- Mini projects and seminars were arranged in the specific topics to make the students focused on those topics.
- Extra study materials and web links were provided.