Attainment of Course Outcomes

The PO and PSO are evaluated using Microsoft excel that simplifies CO, PO and PSO attainment calculation for every course.

1. Direct Assessment Process

The approach in evaluating the attainment of CO is using existing data from students' marks. This method is chosen because of the information is readily available and it is common for most courses. In general, assessment methods used are: (1) Internal Assessment Examinations (IAE) (2) Assignments (3) End Semester Examination. Each of these categories contributes a certain portion of the marks into some of the COs.

R-2017 -Direct CO Attainment = 80% Weightage of End Semester Examination + 20% of IAE

R-2021 -Direct CO Attainment = 60% Weightage of End Semester Examination + 40% of IAE

2. Indirect Assessment Process

Indirect assessment strategies are calculated from course end survey reports collected at the end of every semester.

After collection of individual survey forms, the marks for COs are calculated based on the following formula:
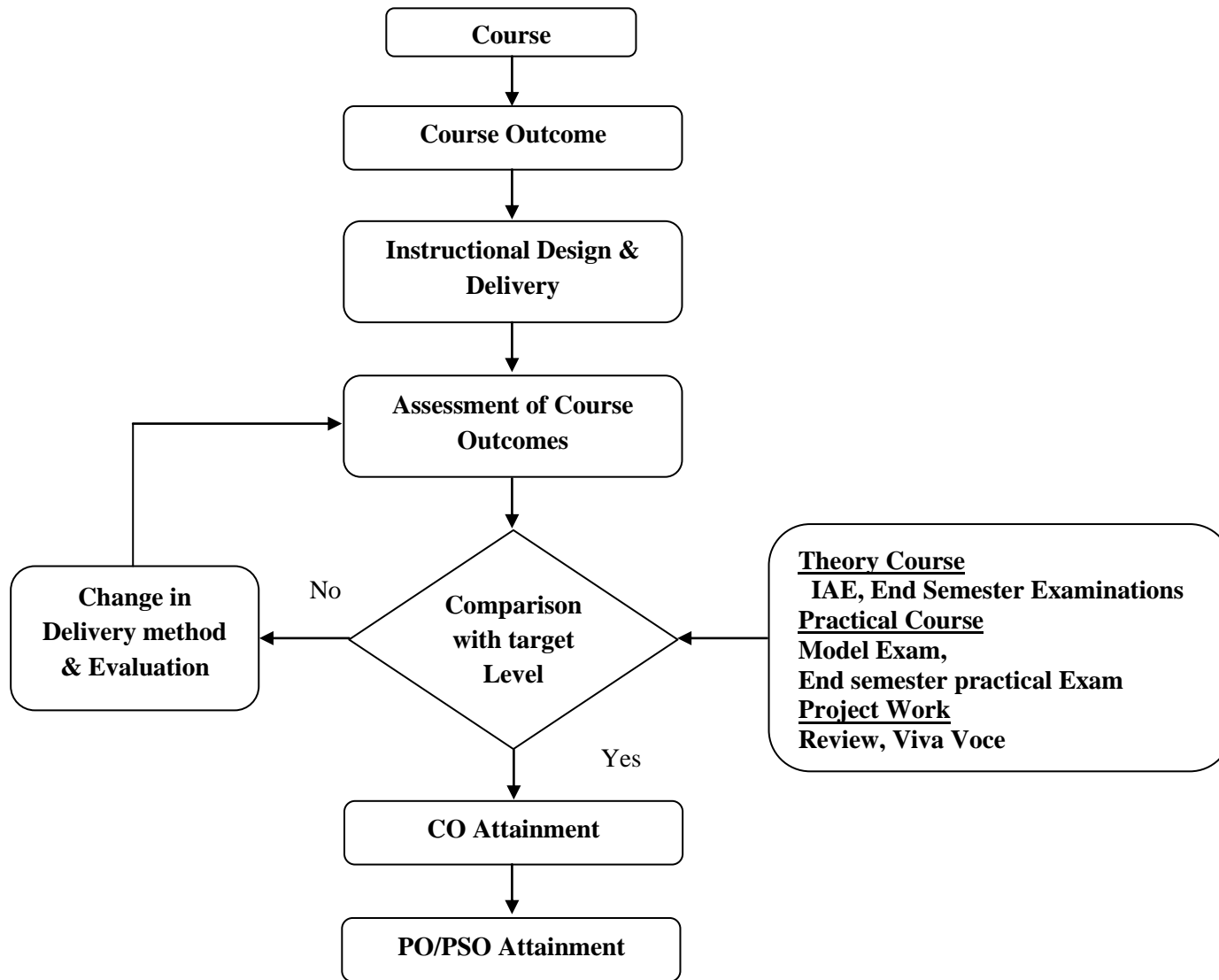
CO attainment =Average of (CO1+CO2+CO3+CO4+CO5)

Final Overall CO Attainment

Final CO attainment for each course is calculated based on the contribution of direct and indirect assessments as per the weightage given below:

1. Direct Assessment (80%)

2. Indirect Assessment (20%)

Final CO attainment level = (80% Direct assessment + 20 % Indirect assessment)

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                    ┌─────────────────┐
                    │     Course      │
                    └─────────────────┘
                            │
                            ▼
                    ┌─────────────────┐
                    │ Course Outcome  │
                    └─────────────────┘
                            │
                            ▼
                    ┌─────────────────┐
                    │ Instructional   │
                    │ Design &        │
                    │ Delivery        │
                    └─────────────────┘
                            │
                            ▼
                    ┌─────────────────┐
                    │ Assessment of   │
                    │ Course Outcomes │
                    └─────────────────┘
```

Course

Course Outcome

Instructional Design & Delivery

Assessment of Course Outcomes

Comparison with target Level

No

Yes

Change in Delivery method & Evaluation

Theory Course
  IAE, End Semester Examinations
Practical Course
Model Exam,
End semester practical Exam
Project Work
Review, Viva Voce

CO Attainment

PO/PSO Attainment

Fig. Assessment method to assess the attainment of the Course Outcomes

Course Outcomes Attainment Calculations

Table A. Ratio of Internal and End Semester Mark Split up for various Courses

S.No.	Regulation	Category of Course	Internal Mark %	University Semester Exam Marks %	Total Marks
1	R2017	Theory course	20	80	100
2		Laboratory courses /Project work	20	80	100
1	R2021	Theory course	40	60	100
2		Laboratory courses /Project work	60	40	100

Internal Assessment Process for Theory Courses

Table B Internal Assessment Process for Theory Courses

S.No	Components for IAP	Syllabus Coverage for the test	Duration of the test in Hrs.	Marks (Max)
R2017				
1	Internal Assessment Examinations I	First 1.5 Units	1 hr 30 min	50 Marks (Converted to 20)
2	Internal Assessment Examinations II	1.5 – 3 Units	1 hr 30 min	
3	Internal Assessment Examinations III	4-5 Units	1 hr 30 min	
4	University Examination	All 5 Units	3 hrs	100 (Converted to 80)
Total				**100**

R2021				
1	Internal Assessment Examinations I (60) Assignment I/ Seminar I (40)	First 2.5 units	3 hrs	100 Marks (Converted to 40)
		2.5 – 5 units	3 hrs	
2	Internal Assessment Examinations I (60) Assignment I/ Seminar I (40)	2.5 – 5 units	3 hrs	
3	University Examination	All 5 Units	3 hrs	100 (Converted to 60)
Total				100

Internal Assessment Process for Laboratory Courses

Table C Internal Assessment Process for Laboratory Courses

S.No	Components for IAM	Marks (max.)	Attainment Calculation
R2017			
1	Record	75	Record & Model Mark Converted to 20 Marks
2	Model Exam	25	
3	University Practical Exam	100	University Practical Exam converted to 80 Marks
Total			100
R2021			
1	Record	75	Record & Model Mark Converted to 60 Marks
2	Model Exam	25	
3	University Practical Exam	100	Converted to 40 Marks
Total			100

Internal Assessment Process for Project Work

Table D Internal Assessment Process for Project work

S.No	Components for IAM	Marks (max.)	Attainment Calculation
1	Project Review	100	3 Review marks (5+7.5+7.5) Converted to 20 marks
2	University Viva-Voce	100	Converted to 80 marks
Total			100

Methodology for attainment of Course Outcomes
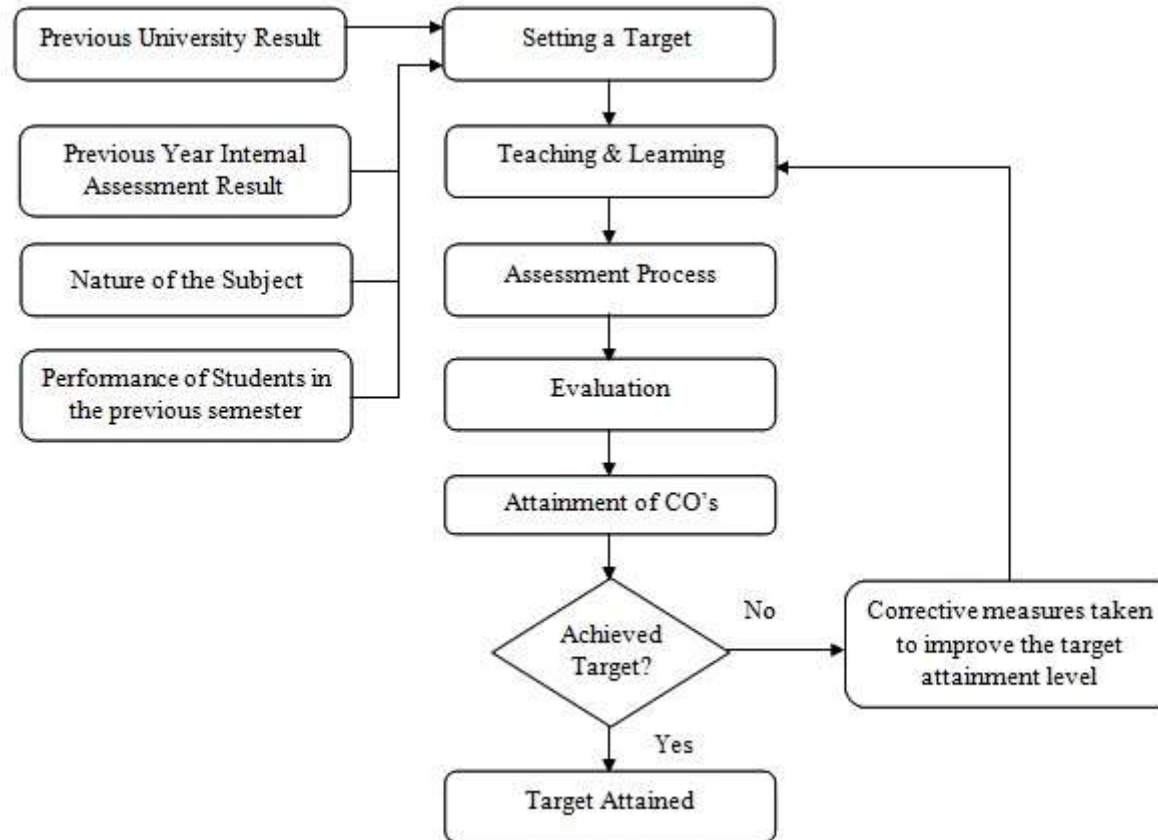
Fig.3.2.2 Attainment of all Courses

IAE Attainment calculation:

REG. NO	Name	Q1(2)	Q2(2)	Q3(2)	Q4(2)	Q5(2)	Q6(13)		Q7 (13)		Q8(14)		TEST SCORE (50)	TEST SCORE (100)
							a	b	a	b	a	b		
Expected Marks to attainment		1.2	1.2	1.2	1.2	1.2	7.8	7.8	7.8	7.8	8.4	8.4		
732118205001	ABIRAMI.G	2	2	1	1	0	10			11	10		37	74
732118205002	AMBIKA.K	2	2	2	2	2	10		10		11		41	82
732118205003	ARSHAD.I	2	2	2	2	0	12		12		12		44	88
732118205004	ATHAVAN.P.A	2	1	1	2	0		10		10		10	36	72
732118205005	BHARATHI.S	1	2	1	2	1	7			7		9	30	60
732118205006	BOOPATHI N	2	2	2	2	2		10	10		11		41	82
732118205007	CHOKKALINGAM.P	2	2	2	2	2		11	11		11		43	86
732118205008	DURGA.B	2	2	2	2	2		10	10		11		41	82
732118205009	GOKUL AJITH. V	2	2	2	2	2		11	10		10		41	82
732118205011	GOWSALYA K	2	2	1	2	2		10	11		12		42	84
732118205012	HARIKRISHNAN S	2	2	2	1	2	10		10		10		39	78
732118205013	JANANI M	2	2	2	2	2	9		11		12		42	84
732118205014	JEEVITHA.S	2	2	1	2	1	9			9		9	35	70
732118205015	KIRUBA SHANKAR	2	1	2	1	1		8	10			10	35	70

NANDHA COLLEGE OF TECHNOLOGY, PERUNDURAI, ERODE-638052
DEPARTMENT OF INFORMATION TECHNOLOGY
IAE-1 ANALYSIS
COURSE NAME & CODE : CS8391 - DATA STRCUTURES
FACULTY NAME: Mr.T.KRISHNAKAARTHIK, AP/ IT
Each question Expected Level of attainment - 60 %
TOTAL STRENGTH = 33

Reg No	Name												Total	%
732118205016	MANOJKUMAR.P	2	1	1	2	1	9		7		7		30	60
732118205017	MONIKA M	2	1	2	1	2	8		8			8	32	64
732118205019	NAVEEN KUMAR M	2	2	2	2	2	7		7			9	33	66
732118205020	NIVETHA.G	2	2	2	2	2	10		9		8		37	74
732118205021	PRAKASH.R	2	2	2	2	2		11	11		12		44	88
732118205022	PRASANNA Y	1	2	2	1	2	10		9		9		36	72
732118205023	RANJITH B	2	2	2	2	2	11			11	11		43	86
732118205024	SEENIVASAN.T	2	2	2	2	2	10			10	10		40	80
732118205025	SHANGAVI.S	2	2	2	2	2		10		10	7		37	74
732118205026	SIVA MANOJ.M	2	2	2	2	2		10	6		7		33	66
732118205028	SUBHA SHREE.S	2	2	2	1	2		10	5		7		31	62
732118205029	SUDHAKAR C	1	1	0	2	2	6			6	0		18	36
732118205030	SUJITHA.B	2	1	2	2	1		8		9	9		34	68
732118205031	TAMILSELVI J	2	2	2	2	2		10		9	10		39	78
732118205032	VASANTH R	1	1	2	1	1		9		9	6		30	60
732118205033	VASUNTARA DEVI P	1	1	1	2	1		7		9		8	30	60
732118205034	VIGNESHKUMAR.S	2	2	2	2	2		8		8		10	36	72
732118205036	YUKESH.D	2	2	2	2	2		12		12		12	46	92
732118205701	KAVIN.S	2	2	2	2	2		2		10		11	33	66
No of students scores upto expected level (60%)		28	25	25	26	23	12	16	14	13	16	8		
% of scoring above the attainment level		84.85	75.76	75.76	78.79	69.7	80	88.89	77.78	86.67	69.57	80		

2. Course Outcome attainment level indicator														
Scale				3			2				1			
Range of attainment				>60			50-60				<50			
Mapping with CO		CO1	CO1	CO1	CO2	CO2	CO1	CO1	CO2	CO2	CO1	CO2		
Attainment level of each CO		3	3	3	3	3	3	3	3	3	3	3		
ATTAINMENT LEVEL OF ALL CO		CO1	CO2											
		3.00	3.00											
Mapping with PO		1,2,3,12	1,2,3,12											

End Semester Attainment:

NANDHA COLLEGE OF TECHNOLOGY, PERUNDURAI, ERODE-638052		
DEPARTMENT OF INFORMATION TECHNOLOGY		
END SEMESTER MARK ATTAINMENT		
COURSE NAME & CODE : CS8391 - DATA STRCUTURES		
FACULTY NAME: Mr.T.KRISHNAKAARTHIK, AP/ IT		
Overall Expected % Level of Attainment : 60%		
TOTAL STRENGTH =		33
REG. NO	Student Name	Grade (O=10, A+=9, A=8, B+=7, B=6)
732118205001	ABIRAMI.G	B
732118205002	AMBIKA.K	B
732118205003	ARSHAD.I	B+
732118205004	ATHAVAN.P.A	U
732118205005	BHARATHI.S	B
732118205006	BOOPATHI N	A
732118205007	CHOKKALINGAM.P	A
732118205008	DURGA.B	B+
732118205009	GOKUL AJITH. V	B+
732118205011	GOWSALYA K	B
732118205012	HARIKRISHNAN S	B+
732118205013	JANANI M	B
732118205014	JEEVITHA.S	B
732118205015	KIRUBA SHANKAR	B
732118205016	MANOJKUMAR.P	B
732118205017	MONIKA M	B
732118205019	NAVEEN KUMAR M	B+
732118205020	NIVETHA.G	B
732118205021	PRAKASH.R	B+

732118205025	SHANGAVI.S	B
732118205026	SIVA MANOJ.M	B
732118205028	SUBHA SHREE.S	B
732118205029	SUDHAKAR C	B
732118205030	SUJITHA.B	U
732118205031	TAMILSELVI J	B
732118205032	VASANTH R	B
732118205033	VASUNTARA DEVI P	B+
732118205034	VIGNESHKUMAR.S	B+
732118205036	YUKESH.D	A
732118205701	KAVIN.S	A

| No of students scores upto expected level | 31 |
| % of scoring above the attainment level, Total appeared for Test | 94 |

2. Course Outcome attainment level indicator

	3	2	1
Range of attainment	> 60	50 - 60	<50
Satisfaction attainment level based on level indicator	3		
Mapping with CO	CO1, CO2,CO3, CO4 and CO5		
ATTAINMENT LEVEL OF ALL CO	3		
Mapping with PO	1,2,3,12		

Course end survey:

REG. NO	Interpret abstract data types for linear data structures	Implement appropriate linear data structure operations for solving a given problems.	Apply appropriate non–linear data structure operations for solving a given problems.	Apply appropriate graph algorithms for graph applications.	Analyze the various searching and sorting algorithms.
	NANDHA COLLEGE OF TECHNOLOGY, PERUNDURAI, ERODE-638052				
	DEPARTMENT OF INFORMATION TECHNOLOGY				
	COURSE END SURVEY				
	COURSE NAME & CODE :CS8391 - DATA STRCUTURES				
	FACULTY NAME: Mr.T.KRISHNAKAARTHIK, AP/ IT				
732118205001	3	2	3	2	3
732118205002	3	3	3	2	3
732118205003	2	3	1	1	1
732118205004	3	2	3	2	3
732118205005	3	3	3	1	3
732118205006	2	3	2	2	3
732118205007	3	2	3	1	3
732118205008	3	2	1	2	2
732118205009	3	3	3	1	3
732118205011	3	3	3	2	2
732118205012	3	2	3	1	3
732118205013	2	2	2	2	2

732118205013	2	2	2	2	2
732118205014	3	3	3	1	3
732118205015	2	3	2	1	2
732118205016	3	2	3	2	3
732118205017	1	3	1	2	1
732118205019	3	2	3	2	3
732118205020	3	3	3	3	3
732118205021	2	3	3	2	2
732118205022	3	3	3	2	3
732118205023	3	3	3	2	3
732118205024	2	2	2	3	2
732118205025	3	3	3	2	1
732118205026	2	2	3	2	2
732118205028	3	3	3	2	3
732118205029	3	3	3	2	3
732118205030	2	2	2	3	2
732118205031	2	3	3	3	3
732118205032	3	3	3	3	3
732118205033	3	2	3	3	2
732118205034	2	2	2	3	2
732118205036	3	3	3	3	3
732118205701	3	3	3	3	3
AVERAGE	**2.6**	**2.6**	**2.6**	**2.1**	**2.5**

Over all Attainment:

DIRECT ASSEMENT	ATTAINMENT %				
	CO1	CO2	CO3	CO4	CO5
IAE 1	3.00	3.00			
IAE 2		3.00	3.00		
IAE 3				3.00	3.0
AVERAGE OF IAE	3.00	3.00	3.00	3.00	3.00
CO ATTAINMENT(3) (20% of IAE)	0.60	0.60	0.60	0.60	0.60
End Sem(3)	3	3	3	3	3
80% END SEM + 20% IAE (Direct Assessment)	3.00	3.00	3.00	3.00	3.00
Course End Survey (Indirect Assessment)	2.64	2.61	2.64	2.06	2.52
Final CO% Attainment (80% of Direct +20% of Indirect)	2.93	2.92	2.93	2.81	2.90

CO-PO-PSO Attriculation Matrix

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	2	3	-	-	-	-	-	-	-	-	2	3	-
2	2	3	2	-	-	-	-	-	-	-	-	2	2	-
3	3	3	3	-	-	-	-	-	-	-	-	2	3	-
4	3	3	3	-	-	-	-	-	-	-	-	2	2	-
5	2	2	2	-	-	-	-	-	-	-	-	2	2	-
AVERAGE	2.6	2.6	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.4	0.0

PO & PSO Attainment %

CO Attainment	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
2.93	2.93	1.95	2.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.95	2.93	0.00
2.92	1.95	2.92	1.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.95	1.95	0.00
2.93	2.93	2.93	2.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.95	2.93	0.00
2.81	2.81	2.81	2.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.87	1.87	0.00
2.90	1.94	1.94	1.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.94	1.94	0.00
Overall PO/PSO ATTAINMENT OUT OF 3	3	3	3	0	0	0	0	0	0	0	0	2	2	0
Overall PO/PSO ATTAINMENT PERCENTAGE	97	97	97	0	0	0	0	0	0	0	0	97	97	0

COs Attainment of all Courses

Table 3.2.2 COs Attainment of all Courses for the batch 2018-2022

S.NO	Course	Course Code	Course Name	Direct Attainment		Overall Direct Attainment	Indirect Attainment	Target Fixed	Over all CO Attainment	Attained or Not Attained
				IAE	End Sem					
Semester I										
1	C101	HS8151	Communicative English	0.59	1.6	2.19	1.87	2.1	2.12	Attained
2	C102	MA8151	Engineering Mathematics - I	0.6	1.6	2.2	2.25	1.8	2.21	Attained
3	C103	PH8151	Engineering Physics	0.58	0.8	1.38	2.61	2.1	1.63	Not Attained
4	C104	CY8151	Engineering Chemistry	0.59	0.8	1.39	2.55	2.1	1.62	Not Attained
5	C105	GE8151	Problem Solving and Python Programming	0.47	1.6	2.07	2.35	2.1	2.12	Attained
6	C106	GE8152	Engineering Graphics	0.6	2.4	3	2.38	1.8	2.88	Attained
7	C107	GE8161	Problem Solving and Python Programming Laboratory	0.6	2.4	3	2.48	2.1	2.9	Attained
8	C108	BS8161	Physics and Chemistry Laboratory	0.6	2.4	3	2.97	2.4	2.97	Attained
Semester II										
9	C109	HS8251	Technical English	0.58	1.6	2.18	2.52	2.1	2.25	Attained

10	C110	MA8251	Engineering Mathematics - II	0.59	2.4	2.99	2.42	1.8	2.55	Attained
11	C111	PH8252	Physics for Information Science	0.48	0.8	1.28	2.73	2.1	1.57	Not Attained
12	C112	BE8255	Basic Electrical, Electronics and Measurement Engineering	0.54	0.8	1.34	2.2	1.8	1.51	Not Attained
13	C113	IT8201	Information Technology Essentials	0.43	1.6	2.03	2.25	2.1	2.07	Not Attained
14	C114	CS8251	Programming in C	0.47	1.6	2.07	2.37	2.1	2.13	Attained
15	C115	GE8261	Engineering Practices Laboratory	0.6	2.4	3	2.8	2.4	2.96	Attained
16	C116	CS8261	C Programming Laboratory	0.6	2.4	3	2.48	2.1	2.9	Attained
17	C117	IT8211	Information Technology Essentials Laboratory	0.6	2.4	3	2.44	2.1	2.89	Attained
Semester III										
18	C201	MA8351	Discrete Mathematics	0.59	2.4	2.99	2.62	1.8	2.92	Attained
19	C202	CS8351	Digital Principles and System Design	0.46	2.4	2.86	2.62	1.8	2.81	Attained
20	C203	CS8391	Data Structures	0.6	2.4	3	2.49	1.8	2.9	Attained
21	C204	CS8392	Object Oriented Programming	0.53	2.4	2.93	2.55	1.8	2.86	Attained
22	C205	EC8394	Analog and Digital Communication	0.54	0.8	1.34	2.26	1.8	1.52	Not Attained
23	C206	CS8381	Data Structures Laboratory	0.6	2.4	3	2.4	2.1	2.88	Attained
24	C207	CS8383	Object Oriented Programming Laboratory	0.2	2.4	2.6	2.69	2.4	2.62	Attained

25	C208	CS8382	Digital Systems Laboratory	0.6	0.8	1.4	2.6	2.4	2.34	Not Attained
26	C209	HS8381	Interpersonal Skills/Listening & Speaking	0.6	2.4	3	2.36	2.1	2.46	Attained
Semester IV										
27	C210	MA8391	Probability and Statistics	0.57	2.4	2.97	2.6	1.8	2.9	Attained
28	C211	CS8491	Computer Architecture	0.6	2.4	3	2.43	1.8	2.89	Attained
29	C212	CS8492	Database Management Systems	0.43	2.4	2.83	2.34	1.8	2.73	Attained
30	C213	CS8451	Design and Analysis of Algorithms	0.6	2.4	3	2.33	1.8	2.87	Attained
31	C214	CS8493	Operating Systems	0.58	2.4	2.98	2.33	1.8	2.85	Attained
32	C215	GE8291	Environmental Science and Engineering	0.45	2.4	2.85	2.64	2.1	2.81	Attained
33	C216	CS8481	Database Management Systems Laboratory	0.2	2.4	2.6	2.69	2.4	2.62	Attained
34	C217	CS8461	Operating Systems Laboratory	0.6	2.4	3	2.45	2.1	2.89	Attained
35	C218	HS8461	Advanced Reading and Writing	0.6	2.4	3	2.61	2.1	2.92	Attained
Semester V										
36	C301	MA8551	Algebra and Number Theory	0.59	2.4	2.99	2.68	1.8	2.93	Attained
37	C302	CS8591	Computer Networks	0.6	2.4	3	2.58	2.1	2.92	Attained
38	C303	EC8691	Microprocessors and Microcontrollers	0.46	2.4	2.86	2.39	1.8	2.77	Attained
39	C304	IT8501	Web Technology	0.6	2.4	3	2.74	2.1	2.95	Attained

40	C305	CS8494	Software Engineering	0.6	2.4	3	2.4	2.1	2.88	Attained
41	C306	OCE551	Air Pollution And Control Engineering	0.6	2.4	3	2.55	2.1	2.91	Attained
42	C307	EC8681	Microprocessors and Microcontrollers Laboratory	0.6	2.4	3	2.57	2.1	2.63	Attained
43	C308	CS8581	Networks Laboratory	0.6	2.4	3	2.38	2.1	2.88	Attained
44	C309	IT8511	Web Technology Laboratory	0.6	2.4	3	2.47	2.1	2.89	Attained
Semester VI										
45	C310	IT8601	Computational Intelligence	0.49	2.4	2.89	2.35	1.8	2.78	Attained
46	C311	CS8592	Object Oriented Analysis and Design	0.6	2.4	3	2.35	2.1	2.87	Attained
47	C312	IT8602	Mobile Communication	0.54	2.4	2.94	2.35	1.8	2.82	Attained
48	C313	CS8091	Big Data Analytics	0.55	2.4	2.93	2.48	2.1	2.84	Attained
49	C314	CS8092	Computer Graphics and Multimedia	0.57	2.4	2.97	2.48	2.1	2.88	Attained
50	C315	IT8076	Software Testing	0.54	2.4	2.94	2.35	2.1	2.82	Attained
51	C316	CS8662	Mobile Application Development Laboratory	0.6	2.4	3	2.66	2.1	2.93	Attained
52	C317	CS8582	Object Oriented Analysis and Design Laboratory	0.6	2.4	3	2.39	2.1	2.88	Attained

53	C318	IT8611	Mini Project	0.6	2.4	3	2.48	2.1	2.9	Attained
Semester VII										
54	C319	HS8581	Professional Communication	0.6	2.4	3	2.51	2.1	2.9	Attained
55	C401	MG8591	Principles of Management	0.54	2.4	2.94	2.23	2.1	2.8	Attained
56	C402	CS8792	Cryptography and Network Security	0.59	2.4	2.99	2.33	1.8	2.85	Attained
57	C403	CS8791	Cloud Computing	0.54	2.4	2.94	2.34	2.1	2.82	Attained
58	C404	OCE 751	Environmental and Socio Impact Assessment	0.6	2.4	3	2.31	1.8	2.86	Attained
59	C405	IT8075	Software Project Management	0.6	2.4	3	2.31	1.8	2.86	Attained
60	C406	CS8079	Human Computer Interaction	0.56	2.4	2.96	2.23	2.1	2.82	Attained
61	C407	IT8711	FOSS and Cloud Computing Laboratory	0.6	2.4	3	2.41	2.1	2.88	Attained
62	C408	IT8761	Security Laboratory	0.6	2.4	3	2.5	2.1	2.9	Attained
Semester VIII										
63	C409	IT8073	Information Security	0.6	2.4	3	2.31	1.8	2.86	Attained
64	C410	CS8080	Information Retrieval Techniques	0.6	2.4	3	2.31	1.8	2.86	Attained
65	C411	IT8811	Project Work	0.6	2.4	3	2.62	2.4	2.92	Attained