BHARATH COLLEGE OF SCIENCE AND MANAGEMENT
(UGC Recognized 2(f) & 12(B) Institution)
THANJAVUR-5
PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PO1	TheCell biology is the study of the structure and function of prokaryotic and eukaryotic cells. In this course the students will learn different areas of cellular biology including the structure and functions of cell, its organelles, synthesis and function of macromolecules such as carbohydrate, protein, lipid, DNA & RNA; membrane structure and function; bioenergetics; cellular communication; and microscopic techniques to understand the cell structure. course about the basic of microbiology dealing types of microbes analyse medical microbiology.
PO2	This course is designed to given an understanding about the basics of molecular biology – classical genetics & molecular aspects.
PO3	This courser is planned to give basic knowledge on r DNA Technology,Blotting techques ,pharmaceutical products, Gene therapy.
PO4	This course is designed to give basic concepts of immunology.Fundemental concepts and Anatomy of the immunesystem.vaccinology-Clinical immunology.
PO5	To learn about fundamentals of animal cell culture,GMOs,Gene therapy and transgenic animals.

COURSE : IMMUNOTECHNOLOGY COURSE CODE :16SMBEBT3
COURSE OUTCOME

CO1	isolation and maintainance of Industrially important microorganisms.Microbial growth and death kinetics
CO2	To acquire the knowledge about the design of bioreactors.Understand the principles of fermentation processing and its scope in downstream processing.
CO3	Added the informations about the upstream processing
CO4	Gaining added information on the production of media formulations and production of value added products from microorganisms.
CO5	Gaining the knowledge about purification of fermented foods

PO → CO↓	PO1	PO2	PO3	PO4	PO5
CO1	1	1	1	1	1
CO2	2	2	2	2	3
CO3	2	2	1	3	1
CO4	3	3	2	2	1
CO5	3	3	3	3	2
AVERAGE	**2.2**	**2.2**	**1.8**	**2.2**	**1.6**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	CB17S074276	ROJA.G	4	4	5	5	5	23	92
2	CB17S074521	AHILANDESHWARI.R	3	4	5	5	5	22	88
3	CB17S074523	ANTONY.A	4	4	4	4	4	20	80
4	CB17S074524	ARAVIND KUMAR.S	4	4	4	4	5	21	84
5	CB17S074525	BHUVANESHWARI.K	5	5	5	5	5	24	96
6	CB17S074526	BOOLOGANATHAN.C	4	4	4	4	4	20	80
7	CB17S074527	DEVAYANI.A	4	5	4	4	4	21	84
8	CB17S074528	DEVENDRAN.S	4	4	4	4	4	20	80
9	CB17S074529	DHANALAKSHMI.R	5	4	4	4	4	21	84
10	CB17S074530	DIVYA.R	4	4	4	4	4	20	80
11	CB17S074531	DIVYASHREE.S	4	4	4	4	4	20	80
12	CB17S074532	GOWRISANKAR.J	4	4	4	5	5	22	88
13	CB17S074533	ISWARYA.G	4	5	5	4	4	23	92
14	CB17S074535	JANAKI.M	4	4	4	4	4	20	80
15	CB17S074536	JENIFER.R	4	4	4	4	4	20	80
16	CB17S074537	KARTHIK.S	4	4	4	4	4	20	80
17	CB17S074538	KAVIYA.A	5	4	4	4	4	21	84
18	CB17S074539	KAVIYA.S	4	5	4	4	4	21	84
19	CB17S074540	MADHAN KUMAR.S	4	5	4	4	4	21	84
20	CB17S074541	MOHAMED ASSIK.A	4	4	4	4	4	20	80
21	CB17S074542	MURUGESHWARI.V	5	5	5	5	4	24	96
22	CB17S074543	MYTHILI.R	4	4	4	4	4	20	80
23	CB17S074544	NANDHINI.G	5	5	5	4	4	22	88
24	CB17S074546	NANDHINI.M	4	4	4	5	5	23	92
25	CB17S074549	PRASANTH.K	4	4	4	4	4	20	80
26	CB17S074550	PRIYADHARSHINI.R	4	4	4	4	4	20	80
27	CB17S074551	PURUSHOTHAMAN.R	4	4	4	4	4	20	80
28	CB17S074552	RAHUL.K	5	4	4	4	4	21	84
	CB17S074553	RAJESH.V	4	4	4	4	4	20	80

30	CB17S074554	RAJESHWAR.R	5	4	4	4	4	21	84
31	CB17S074555	RAMANIKANTH.A	4	4	4	4	4	20	80
32	CB17S074556	RAMESH KUMAR.M	4	4	4	4	4	20	80
33	CB17S074557	RATHISH.S	5	4	4	4	4	21	84
34	CB17S074558	SHARMILA.D	5	4	4	4	4	21	84
35	CB17S074559	SATHIYA LAKSHMI.K	5	5	4	4	4	23	92
36	CB17S074561	SHALINI.R	4	4	4	4	4	20	80
37	CB17S074562	SIVA.M	5	5	5	4	4	22	88
38	CB17S074563	SIVASANKARI.C	5	4	4	4	4	21	84
39	CB17S074565	SUNDAR.T	4	4	4	4	4	20	80
40	CB17S074566	SURESH.M	4	4	4	4	4	20	80
41	CB17S074567	SURYAPRAKASH.P	4	4	4	4	4	20	80
42	CB17S074569	THIRUNAVUKARASU. B	5	5	4	4	4	22	88
43	CB17S074572	VIGNESH. V	5	5	4	4	4	22	88
44	CB17S074573	VIJAYARAJ.L	4	4	4	4	4	20	80
45	CB17S074575	YOGAPRIYA.G	5	5	5	5	4	24	96
46	CB17S074576	YOGAPUTHALVAN.V	4	4	4	4	4	20	80
			4.30	4.26	4.17	4.15	4.13		

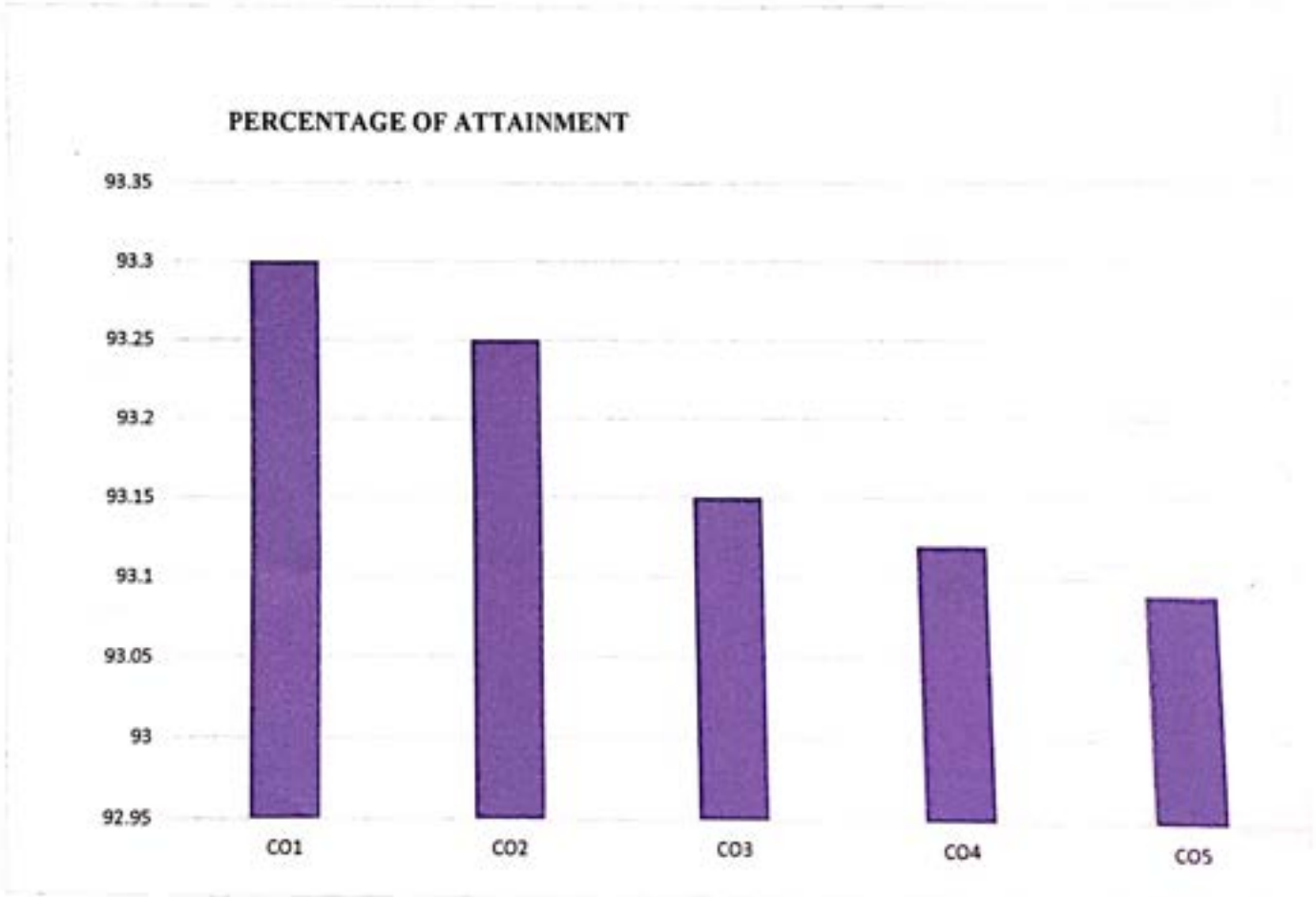
EXPECTED ATTAIMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	4.30	75	79.30	93.30
CO2	4.26	75	79.26	93.25
CO3	4.17	75	79.17	93.15
CO4	4.15	75	79.15	93.12
CO5	4.13	75	79.13	93.09

COURSE ATTAINMENT FOR UG BIOTECHNOLOGY

SUBJECT NAME: IMMUNOTECHNOLOGY
SUBJECT CODE: 16SMBEBT3
NO. OF STUDENTS: 46

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	93.30
CO2	93.25
CO3	93.15
CO4	93.12
CO5	93.09



COURSE ATTAINMENT FOR UG BIOTECHNOLOGY

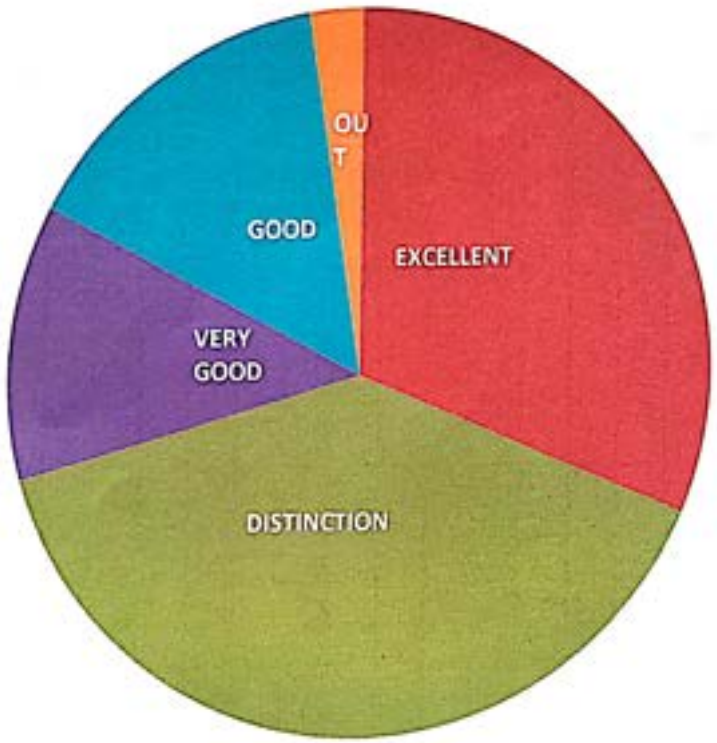
SUBJECT NAME: IMMUNOTECHNOLOGY
SUBJECT CODE:16SMBEBT3
NO. OF STUDENTS:46

CATEGORY (MARKS)	NO. OF STUDENTS	STATUS
90 -100	0	OUTSTANDING
80 - 89	13	EXCELLENT
70 - 79	16	DISINCTION
60 - 69	5	GOOD
50 - 59	6	VERY GOOD
40 - 49	6	AVERAGE
BELOW 40	0	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE

CATEGORY (MARKS)	PERCENTAGE	STATUS
80-89	28%	EXCELLENT
70-79	35%	DISINCTION
60-69	11%	VERY GOOD
50-59	13%	GOOD
40-49	13%	AVERAGE

COURSE OUTCOME PERCENTAGE



PRINCIPAL
Bharath College of Science and Management
Bharath Avenue (Near New Bus Stand)
THANJAVUR - 613 005.

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(UGC Recognized 2(f) & 12(B) Institution)
THANJAVUR-5
PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME

PO1	TheCell biology is the study of the structure and function of prokaryotic and cukaryotic cells. In this course the students will learn different areas of cellular biology including the structure and functions of cell, its organelles, synthesis and function of macromolecules such as carbohydrate, protein, lipid, DNA & RNA; membrane structure and function; bioenergetics; cellular communication; and microscopic techniques to understand the cell structure. course about the basic of microbiology dealing types of microbes analyse medical microbiology.
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COURSE : MICROBIAL BIOTECHNOLOGY COURSE OUTCOME	
CO1	isolation and maintainance of Industrially important microorganisms.Microbial growth and death kinetics
CO2	To acquire the knowledge about the design of bioreactors.Understand the principles of fermentation processing and its scope in downstream processing.
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PO →	PO1	PO2	PO3	PO4	PO5
CO1	3	1	2	2	1
CO2	3	2	3	2	2
CO3	3	1	1	2	1
CO4	3	3	2	2	2
CO5	1	3	3	3	3
AVERAGE	**2.6**	**2**	**2.2**	**2.2**	**1.8**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	5	1	1
CO2	5	1	1
CO3	5	1	1
CO4	5	1	1
CO5	5	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	CB17S074276	ROJA.G	4	4	5	5	5	23	92
2	CB17S074521	AHILANDESHWARI.R	3	4	5	5	5	22	88
3	CB17S074523	ANTONY.A	4	4	4	4	4	20	80
4	CB17S074524	ARAVIND KUMAR.S	4	4	4	4	5	21	84
5	CB17S074525	BHUVANESHWARI.K	5	5	5	5	5	24	96
6	CB17S074526	BOOLOGANATHAN.C	4	4	4	4	4	20	80
7	CB17S074527	DEVAYANI.A	4	5	4	4	4	21	84
8	CB17S074528	DEVENDRAN.S	4	4	4	4	4	20	80
9	CB17S074529	DHANALAKSHMI.R	5	4	4	4	4	21	84
10	CB17S074530	DIVYA.R	4	4	4	4	4	20	80
11	CB17S074531	DIVYASHREE.S	4	4	4	4	4	20	80
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40	CB17S074566	SURESH.M	4	4	4	4	4	20	80
41	CB17S074567	SURYAPRAKASH.P	4	4	4	4	4	20	80
42	CB17S074569	THIRUNAVUKARASU. B	5	5	4	4	4	22	88
43	CB17S074572	VIGNESH. V	5	5	4	4	4	22	88
44	CB17S074573	VIJAYARAJ.L	4	4	4	4	4	20	80
45	CB17S074575	YOGAPRIYA.G	5	5	5	5	4	24	96
46	CB17S074576	YOGAPUTHALVAN.V	4	4	4	4	4	20	80
AVERAGE			**4.30**	**4.26**	**4.17**	**4.15**	**4.13**		

BHARATH COLLEGE OF SCIENCE AND MANAGEMENT
Near New Bus Stand THANJAVUR-5

30	CB17S074554	RAJESHWAR.R	5	4	4	4	4	21	84
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32	CB17S074556	RAMESH KUMAR.M	4	4	4	4	4	20	80
33	CB17S074557	RATHISH.S	5	4	4	4	4	21	84
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45	CB17S074575	YOGAPRIYA.G	5	5	5	5	4	24	96
46	CB17S074576	YOGAPUTHALVAN.V	4	4	4	4	4	20	80
AVERAGE			**4.30**	**4.26**	**4.17**	**4.15**	**4.13**		

BHARATH COLLEGE OF SCIENCE AND MANAGEMENT
Near : New Bus Stand THANJAVUR-5

EXPECTED ATTAIMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	4.30	75	79.30	93.30
CO2	4.26	75	79.26	93.25
CO3	4.17	75	79.17	93.15
CO4	4.15	75	79.15	93.12
CO5	4.13	75	79.13	93.09

COURSE ATTAINMENT FOR B.Sc BIOTECHNOLOGY

SUBJECT NAME: MICROBIAL BIOTECHNOLOGY
SUBJECT CODE: 16SCCBT8
NO. OF STUDENTS: 46

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	93.30
CO2	93.25
CO3	93.15
CO4	93.12
CO5	93.09

EXPECTED ATTAIMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	4.30	75	79.30	93.30
CO2	4.26	75	79.26	93.25
CO3	4.17	75	79.17	93.15
CO4	4.15	75	79.15	93.12
CO5	4.13	75	79.13	93.09

COURSE ATTAINMENT FOR B.Sc BIOTECHNOLOGY

SUBJECT NAME: MICROBIAL BIOTECHNOLOGY
SUBJECT CODE: 16SCCBT8
NO. OF STUDENTS: 46

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	93.30
CO2	93.25
CO3	93.15
CO4	93.12
CO5	93.09

EXPECTED ATTAIMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	4.30	75	79.30	93.30
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CO3	4.17	75	79.17	93.15
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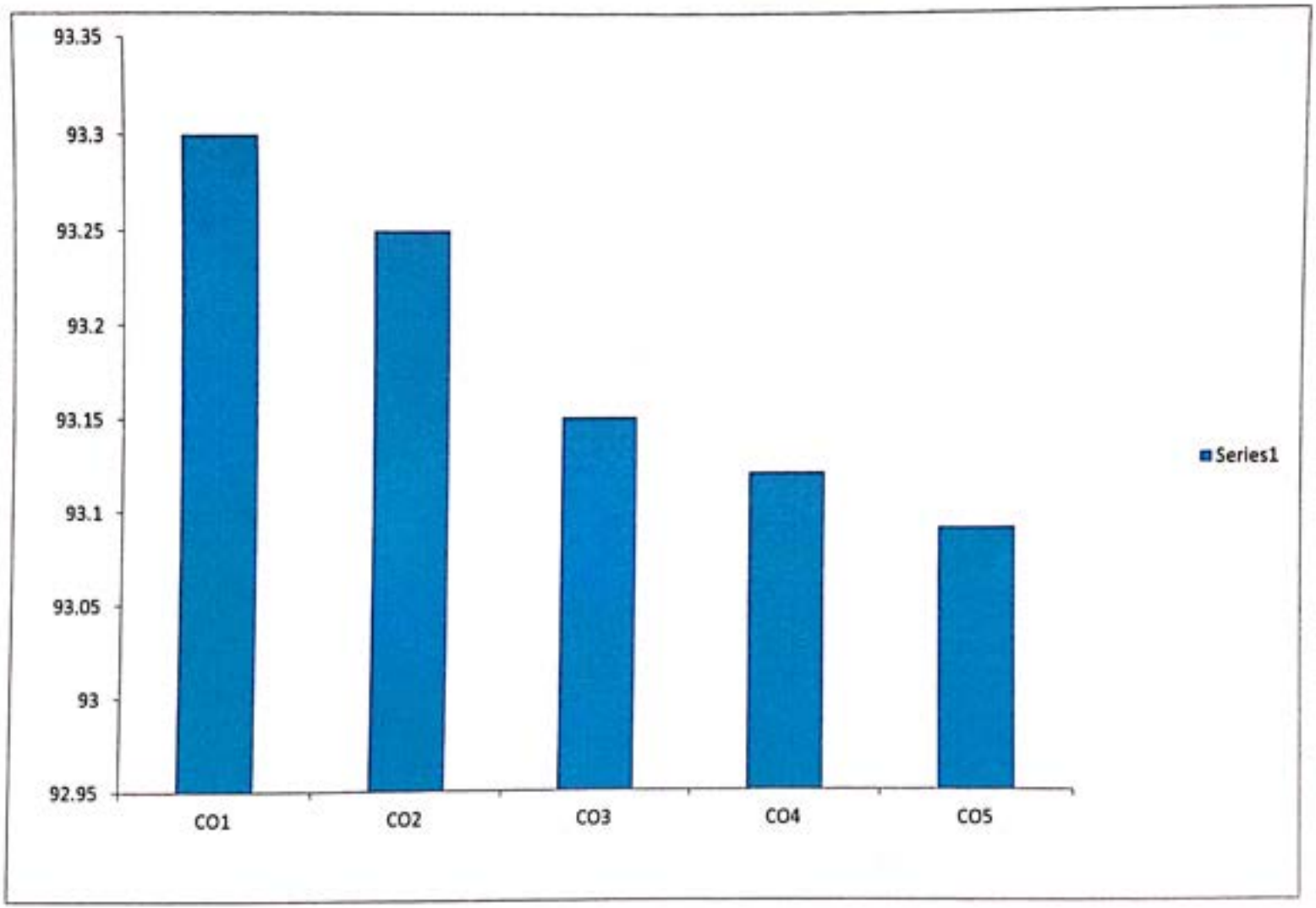
CO5	4.13	75	79.13	93.09

COURSE ATTAINMENT FOR B.Sc BIOTECHNOLOGY

SUBJECT NAME: MICROBIAL BIOTECHNOLOGY
SUBJECT CODE: 16SCCBT8
NO. OF STUDENTS: 46

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	93.30
CO2	93.25
CO3	93.15
CO4	93.12
CO5	93.09



COURSE ATTAINMENT FOR B.Sc BIOTECHNOLOGY

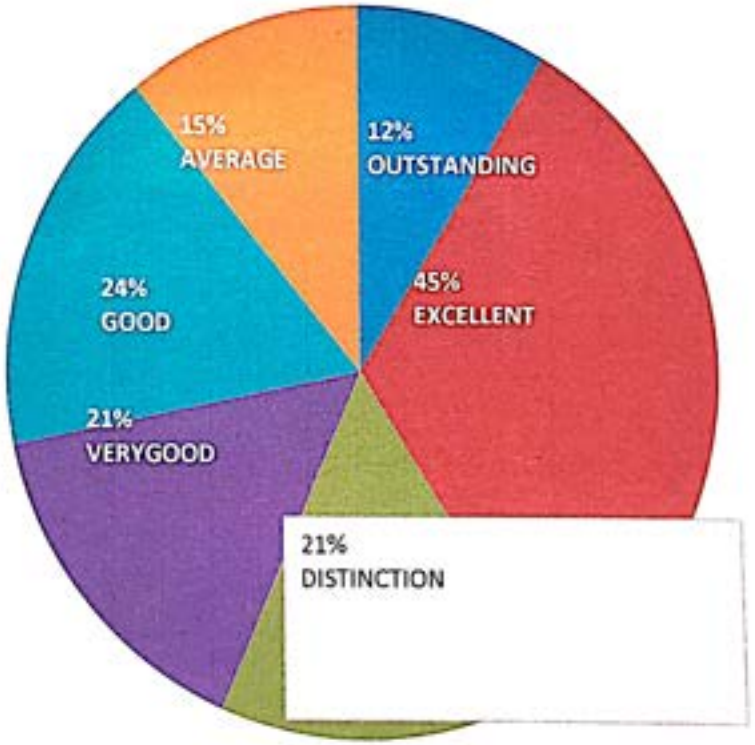
SUBJECT NAME: MICROBIAL BIOTECHNOLOGY
SUBJECT CODE:16SCCBT8
NO. OF STUDENTS:46

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	**NO. OF STUDENTS**	**STATUS**
90 -100	4	OUTSTANDING
80 - 89	15	EXCELLENT
70 - 79	7	DISINCTION
60 - 69	7	GOOD
50 - 59	8	VERY GOOD
40 - 49	5	AVERAGE
BELOW 40	0	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE

CATEGORY (MARKS)	PERCENTAGE	STATUS
90-100	12%	OUTSTANDING
80-89	45%	EXCELLENT
70-79	21%	DISINCTION
60-69	21%	VERY GOOD
50-59	24%	GOOD
40-49	15%	AVERAGE

COURSE OUTCOME PERCENTAGE



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THANJAVUR-5
PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME

PO1	TheCell biology is the study of the structure and function of prokaryotic and eukaryotic cells. In this course the students will learn different areas of cellular biology including the structure and functions of cell, its organelles, synthesisand function of macromolecules such as carbohydrate, protein, lipid, DNA & RNA; membrane structure and function; bioenergetics; cellular communication; and microscopic techniques to understand the cell structure. course about the basic ofmicrobiology dealing types of microbes analyse medical microbiology.
PO2	This course is designed to given an understanding about the basics of molecular biology – classical genetics & molecular aspects.Isolation, preservation and improvement of strains.Food Microbiology-Medical Microbiology,Agricultural Microbiology.
PO3	This courser is planned to give basic knowledge on r DNA Technology,Blotting techques ,pharmaceutical products, Gene therapy.structure functions of biomolecules.Amino Acids and Proteins.Classification of lipids.Fundemental concepts and Anatomy of the immune system.vaccinology-Clinical immunology.Classification of lipids.macro and micro minerals - source and functions.Fundamental Concepts and Anatomy of the Immune System.Vaccinology,Clinical Immunology.to specialize in instruments in centrifugation, chromatography, electrophoresis, spectroscopy and crystallography.
PO4	This course is planned to give basic knowledge about plant tissue culture, transgenesis, genetic modifications in agriculture,Plant Genetic Engineering,Genetic modification in food industry,Production of organic food.This course is planned to impart knowledge on fundamentals of animal cell culture, GMOs, gene therapy & transgenic animals.Biostatistics - Concepts of statistics.
PO5	This course is designed to give an idea about the avenues of exploiting microbes and to study the downstream processes for product recovery in fermentation.Microbes in food processing and production,Fermented foods and beverages.

COURSE : PLANT BIOTECHNOLOGY SUB CODE :16SCCBT5
COURSE OUTCOME

CO1	Plant tissue culture.in-vitro pollination and fertilization,embryogenesis and organogenesis,somaclonal variations
CO2	Genetic manipulation of plants-methods of fusing protoplasts, somatic hybridization.
CO3	Genetic engineering & crop improvement, herbicide resistance, insect resistance, virus resistance, plants as bioreactors.
CO4	Genetic modification in Agriculture,Transgenic plants, genetically modified food.
CO5	Production of organic food, types of organic food, identification of organic food, organic food & preservatives.

PO →	PO1	PO2	PO3	PO4	PO5
CO1	2	3	2	2	1
CO2	2	3	3	2	2
CO3	2	3	1	3	1
CO4	3	3	2	2	2
CO5	3	3	3	3	2
AVERAGE	**2.4**	**3**	**2.2**	**2.4**	**1.6**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	CB17S074521	AHILANDESWARI.R	4	4	4	4	4	20	80
2	CB17S074523	ANTONY.A	4	3	4	4	4	19	76
3	CB17S074524	ARAVINDKUMAR.S	4	4	4	4	4	20	80
4	CB17S074525	BHUVANESWARI.S	5	5	5	4	4	23	92
5	CB17S074526	BOOLOGANATHAN.C	3	3	3	3	3	12	48
6	CB17S074527	DEVAYANI.A	4	4	4	4	5	21	84
7	CB17S074528	DEVENDRAN.S	4	4	4	4	4	20	80
8	CB17S074529	DHANALAKSHMI.R	4	4	4	4	5	21	84
9	CB17S074530	DIVYA.R	3	4	4	4	4	19	76
10	CB17S074531	DIVYASREE.S	4	4	3	4	4	20	80
11	CB17S074532	GOWRISANKAR.J	4	5	4	4	4	21	84
12	CB17S074533	ISHWARYA.G	5	5	4	4	4	22	88
13	CB17S074535	JANAKI.M	4	4	4	4	4	20	80
14	CB17S074536	JENIFER.R	3	4	4	4	4	19	76
15	CB17S074537	KARTHIK.S	4	4	4	4	3	19	76
16	CB17S074538	KAVIYA.A	4	4	4	4	4	20	80
17	CB17S074539	KAVIYA.S	5	4	4	4	4	21	84
18	CB17S074540	MADHANKUMAR.S	3	3	5	5	5	21	84
19	CB17S074541	MOHAMMED ASIK.V	4	4	4	3	3	19	76
20	CB17S074542	MYTHILI.R	5	5	5	3	5	23	92
21	CB17S074543	NANDHINI.G	3	5	3	4	4	19	76
22	CB17S074544	NANDHINI.M	4	4	4	4	5	21	84
23	CB17S074546	PRASANTH.K	5	5	4	4	4	22	88
24	CB17S074549	PRIYADHARSHINI.R	3	3	3	3	2	13	52
25	CB17S074550	PURUSOTHMAN.R	5	4	3	3	3	18	72
26	CB17S074551	RAHUL.K	3	3	4	4	5	19	76
27	CB17S074552	RAJESH.V	4	4	4	4	4	20	80
[illegible]	CB17S074553	RAJESWAR.R	4	4	4	3	4	19	76

29	CB17S074554	RAMANIKANTH.A	4	4	4	4	4	20	80
30	CB17S074555	RAMESHKUMAR.M	4	4	4	4	4	20	80
31	CB17S074557	RATHISH.S	4	4	4	4	4	20	80
33	CB17S074558	SARMILA.D	4	5	4	5	5	23	92
34	CB17S074559	SATHYALAKSHMI.K	4	4	4	5	3	22	88
35	CB17S074561	SHALINI.K	4	4	4	4	4	20	80
36	CB17S074562	SIVA.M	4	4	4	4	5	21	84
37	CB17S074563	SIVASANKARI.C	4	4	4	4	4	20	80
38	CB17S074565	SUNDAR.T	4	4	4	3	3	18	72
39	CB17S074566	SURESH.M	4	5	4	4	3	19	76
40	CB17S074567	SURIYAPRAKASH.P	3	3	4	3	3	19	76
41	CB17S074569	THIRUNAVUKKARASU.S	4	4	4	4	5	21	84
42	CB17S0745572	VIGNESH.V	4	4	4	4	5	21	84
43	CB17S0745573	VIJAYARAJ.L	4	4	4	4	3	19	76
44	CB17S0745575	YOGAPRIYA.G	5	5	5	4	4	23	92
45	CB17S0745576	YOGAPUTHALVAN.V	3	4	4	4	4	19	76
46	CB17S074276	ROJA.G	5	4	4	4	5	22	88
AVERAGE			**3.978**	**4.067**	**3.978**	**3.889**	**4.00**		

BHARATH COLLEGE OF SCIENCE AND MANAGEMENT
Near New Bus Stand THANJAVUR-5

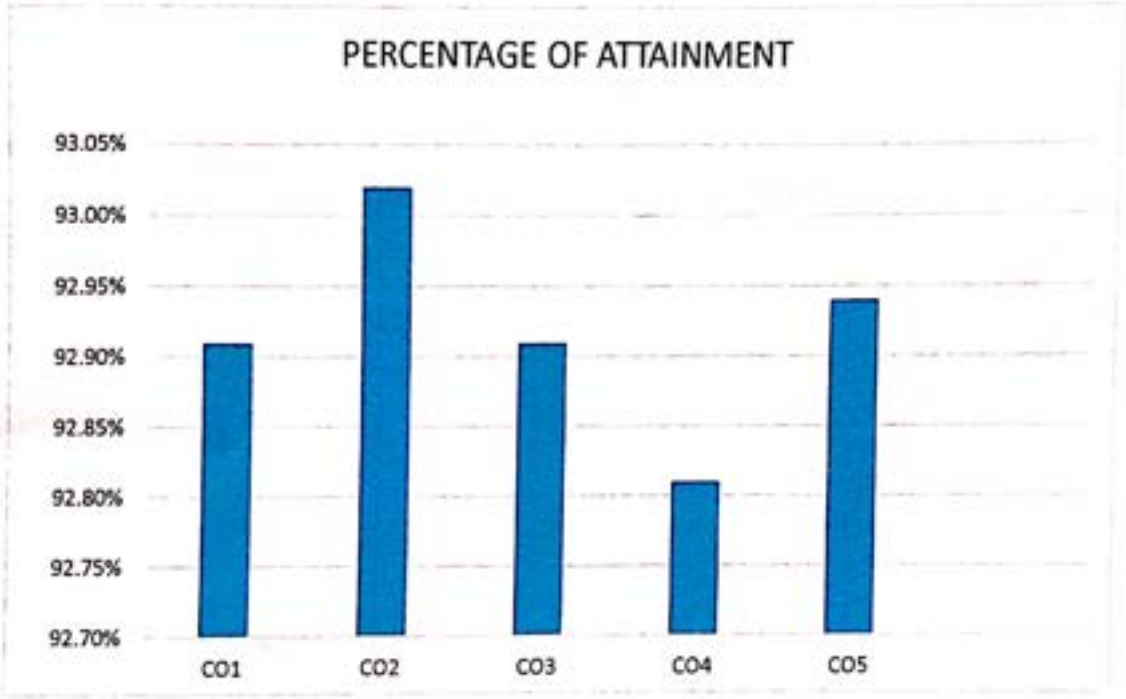
EXPECTED ATTAIMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	3.98	75	78.98	92.92
CO2	4.07	75	79.07	93.02
CO3	3.98	75	78.98	92.92
CO4	3.89	75	78.89	92.81
CO5	4	75	79	92.94

COURSE ATTAINMENT FOR B.Sc., BIOTECHNOLOGY

SUBJECT NAME: PLANT BIOTECHNOLOGY
SUBJECT C(16SCCBT5
NO. OF STUDENTS:46

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	92.91%
CO2	93.02%
CO3	92.91%
CO4	92.81%
CO5	92.94%

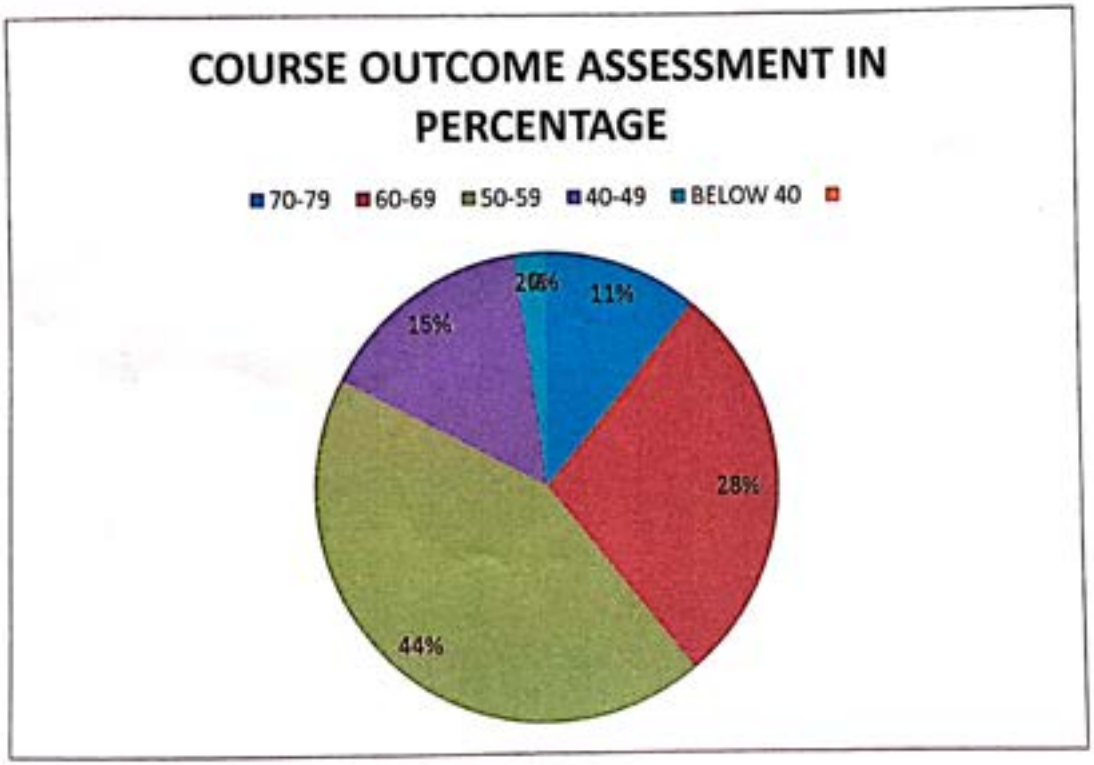


COURSE ATTAINMENT FOR B.Sc., BIOTCHNOLOGY

SUBJECT NAME: PLANT BIOTECHNOLOGY
SUBJECT CODE: 16SCCBT5
NO. OF STUDENTS: 46

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO. OF STUDENTS	STATUS
90 & ABOVE	0	OUTSTANDING
80 - 89	0	EXCELLENT
70 - 79	5	DISTINCTION
60 - 69	13	VERY GOOD
50 - 59	20	GOOD
40 - 49	7	AVERAGE
BELOW 40	1	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
70-79	10.86%	DISTINCTION
60-69	28.26%	VERY GOOD
50-59	43.47%	GOOD
40-49	15.21%	AVERAGE
BELOW 40	2.17%	RA



PRINCIPAL
Bharath College of Science and Management
Bharath Avenue (Near New Bus Stand)
THANJAVUR - 613 005.

BHARATH COLLEGE OF SCIENCE AND MANAGEMENT
(UGC Recognized 2(f) & 12(B) Institution)
THANJAVUR-5
PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME B.Sc., BIOTECHNOLOGY

PO1	TheCell biology is the study of the structure and function of prokaryotic and eukaryotic cells. In this course the students will learn different areas of cellular biology including the structure and functions of cell, its organelles, synthesis and function of macromolecules such as carbohydrate, protein, lipid, DNA & RNA; membrane structure and function; bioenergetics; cellular communication; and microscopic techniques to understand the cell structure. course about the basic of microbiology dealing types of microbes analyse medical microbiology.
PO2	This course is designed to given an understanding about the basics of molecular biology – classical genetics & molecular aspects.Isolation, preservation and improvement of strains.Food Microbiology-Medical Microbiology,Agricultural Microbiology.
PO3	This courser is planned to give basic knowledge on r DNA Technology,Blotting techques ,pharmaceutical products, Gene therapy.structurefunctions of biomolecules.Amino Acids and Proteins.Classification of lipids.Fundemental concepts and Anatomy of the immune system.vaccinology-Clinical immunology.Classification of lipids.macro and micro minerals - source and functions.Fundamental Concepts and Anatomy of the Immune System.Vaccinology,Clinical Immunology.to specialize in instruments in centrifugation, chromatography, electrophoresis, spectroscopy and crystallography.
PO4	This course is planned to give basic knowledge about plant tissue culture, transgenesis, genetic modifications in agriculture,Plant Genetic Engineering,Genetic modification in food industry,Production of organic food.This course is planned to impart knowledge on fundamentals of animal cell culture, GMOs, gene therapy & transgenic animals.Biostatistics - Concepts of statistics.
PO5	This course is designed to give an idea about the avenues of exploiting microbes and to study the downstream processes for product recovery in fermentation.Microbes in food processing and production,Fermented foods and beverages.

COURSE :BIOSTATISTICS AND BIO SAFETY SUB CODE :16SCCBT7

COURSE OUTCOME

CO1	Variables - measurements, functions and limitation; Data -types of data, methods of collection of data, merits and demerits- tabulation and representation of data by frequency distribution diagram (Simple/Multiple/Subdivided bar diagram, Pie diagram), Graphs (Histogram, polygon, curve) Stem and leaf diagram.
CO2	Mean, median, mode and geometric mean; Measures of dispersion - range, mean deviations, standard deviation, Variance, Skewness, Kurtosis, quartile deviation -merits and demerits; coefficient of variations.
CO3	Hypothesis - definition, types (0ne tailed, two tailed); Sampling distribution and errors; Statistical Tests of significance -'t'-test, Chi-square.
CO4	Introduction, biosafety issues in biotechnology-historical background; Introduction to Biological Safety Cabinets; Primary Containment for Biohazards; Biosafety Levels; Biosafety Levels of Specific Microorganisms
CO5	Biosafety guidelines and regulations (National and International) – operation of biosafety guidelines and regulations of Government of India; Definition of GMOs & LMOs; Roles of Institutional Biosafety Committee, RCGM, GEAC etc. for GMO applications in food and agriculture; Environmental release of GMOs.

PO → CO↓	PO1	PO2	PO3	PO4	PO5
CO1	0	0	1	3	1
CO2	0	0	0	3	0
CO3	1	1	0	3	0
CO4	0	0	1	3	1
CO5	1	1	0	3	0
AVERAGE	**0.4**	**0.4**	**0.4**	**3**	**0.4**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	CB17S074521	AHILANDESWARI.R	5	3	3	5	4	20	80
2	CB17S074523	ANTONY.A	4	4	4	4	4	20	80
3	CB17S074524	ARAVINDKUMAR.S	4	4	4	4	3	19	76
4	CB17S074525	BHUVANESWARI.S	5	5	5	5	3	23	92
5	CB17S074526	BOOLOGANATHAN.C	2	3	2	2	3	12	48
6	CB17S074527	DEVAYANI.A	5	5	5	3	3	21	84
7	CB17S074528	DEVENDRAN.S	4	4	4	4	4	20	80
8	CB17S074529	DHANALAKSHMI.R	5	5	3	4	3	20	80
9	CB17S074530	DIVYA.R	4	4	4	4	3	19	76
10	CB17S074531	DIVYASREE.S	4	4	4	4	2	18	72

11	CB17S074532	GOWRISANKAR.J	5	4	4	4	4	22	88
12	CB17S074533	ISHWARYA.G	5	4	4	5	4	22	88
14	CB17S074535	JANAKI.M	4	4	4	4	4	20	80
15	CB17S074536	JENIFER.R	4	4	4	4	2	18	72
16	CB17S074537	KARTHIK.S	3	4	4	4	5	20	80
17	CB17S074538	KAVIYA.A	4	4	4	4	4	20	80
18	CB17S074539	KAVIYA.S	4	4	4	4	4	20	80
19	CB17S074540	MADHANKUMAR.S	5	4	4	4	5	22	88
20	CB17S074541	MOHAMMED ASIK.V	4	4	4	4	4	20	80
21	CB17S074542	MURUGESHWARI.V	5	5	5	4	4	23	92
22	CB17S074543	MYTHILI.R	3	3	3	5	5	19	76
23	CB17S074544	NANDHINI.G	5	4	4	4	5	22	88
24	CB17S074546	NANDHINI.M	5	5	5	4	3	22	88
25	CB17S074549	PRASANTH.K	2	4	2	3	2	13	52
26	CB17S074550	PRIYADHARSHINI.R	4	4	4	3	3	18	72
27	CB17S074551	PURUSOTHMAN.R	4	4	4	4	4	20	80
28	CB17S074552	RAHUL.K	4	4	4	4	4	20	80
29	CB17S074553	RAJESH.V	5	5	3	3	3	19	76
30	CB17S074554	RAJESWAR.R	5	4	4	3	4	20	80
31	CB17S074555	RAMANIKANTH.A	3	4	4	5	3	19	76
32	CB17S074556	RAMESHKUMAR.M	3	4	4	5	4	20	80
33	CB17S074557	RATHISH.S	3	4	4	4	4	19	76
34	CB17S074558	SARMILA.D	3	4	5	4	4	20	80
35	CB17S074559	SATHYALAKSHMI.K	5	5	4	4	3	23	92
36	CB17S074561	SHALINI.K	4	4	4	4	3	19	76
37	CB17S074562	SIVA.M	4	4	4	5	4	21	84
38	CB17S074563	SIVASANKARI.C	4	4	4	4	3	19	76
39	CB17S074565	SUNDAR.T	3	3	3	5	5	19	76
40	CB17S074566	SURESH.M	3	3	4	4	5	19	76
41	CB17S074567	SURIYAPRAKASH.P	3	3	3	3	3	15	60
42	CB17S074569	THIRUNAVUKKARASU.S	4	5	4	4	3	20	80
	CB17S0745572	VIGNESH.V	4	3	4	3	4	18	72

44	CB17S0745573	VIJAYARAJ.L	3	3	3	5	4	20	80
45	CB17S0745575	YOGAPRIYA.G	5	5	5	3	2	20	80
46	CB17S0745576	YOGAPUTHALVAN.V	3	3	4	4	5	19	76
AVERAGE			3.978	4	3.89	3.98	3.64		

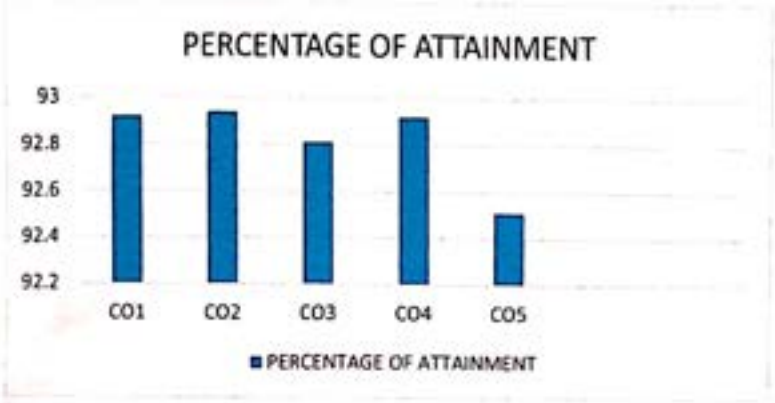
EXPECTED ATTAINMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+	END SEM	TOTAL	%
CO1	3.98	75	78.98	92.92
CO2	4	75	79	92.94
CO3	3.89	75	78.89	92.81
CO4	3.98	75	78.98	92.92
CO5	3.64	75	78.64	92.52

COURSE ATTAINMENT FOR B.SC., BIOTECHNOLOGY

SUBJECT NAME :BIOSTATISTICS AND BIOSAFETY
SUBJECT CODE :116SCCBT7
NO.OF STUDENTS:46

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	92.92
CO2	92.94
CO3	92.81
CO4	92.92
CO5	92.51

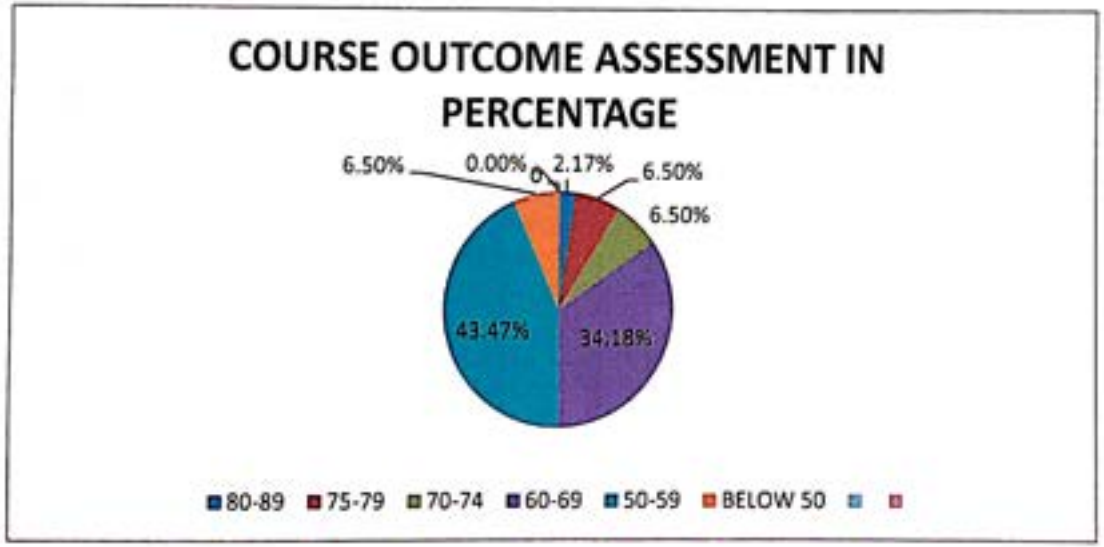


COURSE ATTAINMENT FOR B.Sc., BIOTCHNOLOGY

SUBJECT NAME:BIOSTATISTICS AND BIO SAFETY
SUBJECT CODE: 16SCCBT7
NO. OF STUDENTS: 46

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	**NO. OF STUDENTS**	**STATUS**
90 -100	0	OUTSTANDING
80 - 89	1	EXCELLENT
75-79	3	DISTINCTION
70-74	3	VERY GOOD
60-69	16	GOOD
50-59	20	AVERAGE
BELOW 50	3	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
80-89	2.17%	EXCELLENT
75-79	6.50%	DISTINCTION
70-74	6.50%	VERY GOOD
60-69	34.18%	GOOD
50-59	43.47%	AVERAGE
BELOW 50	6.50%	RA



PRINCIPAL
Bharath College of Science and Management
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THANJAVUR - 613 005.

UG-17

BHARATH COLLEGE OF SCIENCE AND MANAGEMENT
(UGC Recognized 2(f) & 12(B) Institution)
THANJAVUR-5
PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME B.Sc., BIOTECHNOLOGY

PO1	TheCell biology is the study of the structure and function of prokaryotic and eukaryotic cells. In this course the students will learn different areas of cellular biology including the structure and functions of cell, its organelles, synthesis and function of macromolecules such as carbohydrate, protein, lipid, DNA & RNA; membrane structure and function; bioenergetics; cellular communication; and microscopic techniques to understand the cell structure. course about the basic of microbiology dealing types of microbes analyse medical microbiology.
PO2	This course is designed to given an understanding about the basics of molecular biology – classical genetics & molecular aspects.Isolation, preservation and improvement of strains.Food Microbiology-Medical Microbiology,Agricultural Microbiology.
PO3	This courser is planned to give basic knowledge on r DNA Technology,Blotting techques ,pharmaceutical products, Gene therapy.structure functions of biomolecules.Amino Acids and Proteins.Classification of lipids.Fundemental concepts and Anatomy of the immune system.vaccinology-Clinical immunology.Classification of lipids.macro and micro minerals - source and functions.Fundamental Concepts and Anatomy of the Immune System.Vaccinology,Clinical Immunology.to specialize in instruments in centrifugation, chromatography, electrophoresis, spectroscopy and crystallography.
PO4	This course is planned to give basic knowledge about plant tissue culture, transgenesis, genetic modifications in agriculture,Plant Genetic Engineering,Genetic modification in food industry,Production of organic food.This course is planned to impart knowledge on fundamentals of animal cell culture, GMOs, gene therapy & transgenic animals.Biostatistics - Concepts of statistics.
PO5	This course is designed to give an idea about the avenues of exploiting microbes and to study the downstream processes for product recovery in fermentation.Microbes in food processing and production,Fermented foods and beverages.

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COURSE : BIOMOLECULE

CO1	Introduction to monosaccharides,Disaccharides,Homopolysachrides,Heteropolysacchrides
CO2	Amino acids, Peptides, Peptide bond,Structure of proteins
CO3	Biochemical functions of lipids,fatty acids, physical and chemical properties of fatty acids, cholesterol.
CO4	Structure of purine and pyrimidine base, Watson and Crick model and forms of DNA.
CO5	Source, structure, biological role, daily requirement and deficiency manifestation of vitamin A, B, C, D, E and K.

PO → CO↓	PO1	PO2	PO3	PO4	PO5
CO1	1	0	3	3	1
CO2	0	0	3	3	0
CO3	1	1	3	3	0
CO4	0	0	3	3	1
CO5	1	1	2	3	0
AVERAGE	**0.6**	**0.4**	**2.8**	**3**	**0.4**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	CB17S074521	AHILANDESWARI.R	4	4	4	4	4	20	80
2	CB17S074523	ANTONY.A	4	4	4	4	4	20	80
3	CB17S074524	ARAVINDKUMAR.S	4	4	4	4	3	19	76
4	CB17S074525	BHUVANESWARI.S	5	5	5	5	3	23	92
5	CB17S074526	BOOLOGANATHAN.C	4	4	4	4	3	19	76
6	CB17S074527	DEVAYANI.A	5	4	4	5	4	22	88
7	CB17S074528	DEVENDRAN.S	4	4	4	5	4	21	84
8	CB17S074529	DHANALAKSHMI.R	4	4	5	4	4	21	84
9	CB17S074530	DIVYA.R	4	4	4	4	4	20	80
10	CB17S074531	DIVYASREE.S	4	4	4	4	3	19	76
11	CB17S074532	GOWRISANKAR.J	5	5	5	3	5	23	92
12	CB17S074533	ISHWARYA.G	5	5	5	5	3	23	92
14	CB17S074535	JANAKI.M	5	4	4	5	4	22	88
15	CB17S074536	JENIFER.R	5	4	4	4	4	21	84
16	CB17S074537	KARTHIK.S	4	4	4	4	4	20	80
17	CB17S074538	KAVIYA.A	4	4	4	3	4	19	76
18	CB17S074539	KAVIYA.S	5	3	5	5	5	23	92
19	CB17S074540	MADHANKUMAR.S	4	4	4	5	4	21	84
20	CB17S074541	MOHAMMED ASIK.V	5	4	4	5	4	22	88
21	CB17S074542	MURUGESHWARI.V	5	5	5	5	4	24	96
22	CB17S074543	MYTHILI.R	4	4	4	4	5	21	84
	CB17S074544	NANDHINI.G	4	4	4	4	4	20	80

BHARATH COLLEGE OF SCIENCE AND MANAGEMENT
Near: New Bus Stand THANJAVUR-5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	CB17S074521	AHILANDESWARI.R	4	4	4	4	4	20	80
2	CB17S074523	ANTONY.A	4	4	4	4	4	20	80
3	CB17S074524	ARAVINDKUMAR.S	4	4	4	4	3	19	76
4	CB17S074525	BHUVANESWARI.S	5	5	5	5	3	23	92
5	CB17S074526	BOOLOGANATHAN.C	4	4	4	4	3	19	76
6	CB17S074527	DEVAYANI.A	5	4	4	5	4	22	88
7	CB17S074528	DEVENDRAN.S	4	4	4	5	4	21	84
8	CB17S074529	DHANALAKSHMI.R	4	4	5	4	4	21	84
9	CB17S074530	DIVYA.R	4	4	4	4	4	20	80
10	CB17S074531	DIVYASREE.S	4	4	4	4	3	19	76
11	CB17S074532	GOWRISANKAR.J	5	5	5	3	5	23	92
12	CB17S074533	ISHWARYA.G	5	5	5	5	3	23	92
14	CB17S074535	JANAKI.M	5	4	4	5	4	22	88
15	CB17S074536	JENIFER.R	5	4	4	4	4	21	84
16	CB17S074537	KARTHIK.S	4	4	4	4	4	20	80
17	CB17S074538	KAVIYA.A	4	4	4	3	4	19	76
18	CB17S074539	KAVIYA.S	5	3	5	5	5	23	92
19	CB17S074540	MADHANKUMAR.S	4	4	4	5	4	21	84
20	CB17S074541	MOHAMMED ASIK.V	5	4	4	5	4	22	88
21	CB17S074542	MURUGESHWARI.V	5	5	5	5	4	24	96
22	CB17S074543	MYTHILI.R	4	4	4	4	5	21	84
	CB17S074544	NANDHINI.G	4	4	4	4	4	20	80

24	CB17S074545	NANTHAKUMAR.K	4	4	4	4	4	20	80
25	CB17S074546	NANDHINI.M	5	5	5	5	3	23	92
26	CB17S074549	PRASANTH.K	3	3	3	4	4	17	68
27	CB17S074550	PRIYADHARSHINI.R	4	4	4	4	4	20	80
28	CB17S074551	PURUSOTHMAN.R	4	4	4	4	4	20	80
29	CB17S074552	RAHUL.K	5	4	4	5	4	22	88
30	CB17S074553	RAJESH.V	4	4	3	4	4	19	76
31	CB17S074554	RAJESWAR.R	5	4	4	5	4	22	88
32	CB17S074555	RAMANIKANTH.A	5	4	4	5	4	22	88
33	CB17S074556	RAMESHKUMAR.M	3	4	4	3	4	19	76
34	CB17S074557	RATHISH.S	4	4	5	4	4	21	84
35	CB17S074558	SARMILA.D	4	4	4	4	4	20	80
36	CB17S074559	SATHYALAKSHMI.K	5	5	5	5	4	24	96
37	CB17S074561	SHALINI.K	4	4	4	4	3	19	76
38	CB17S074562	SIVA.M	4	4	4	4	4	20	80
39	CB17S074563	SIVASANKARI.C	4	4	4	4	4	20	80
40	CB17S074565	SUNDAR.T	5	4	5	4	4	22	88
41	CB17S074566	SURESH.M	4	3	4	4	4	19	76
42	CB17S074567	SURIYAPRAKASH.P	4	4	4	3	3	18	72
43	CB17S074569	THIRUNAVUKKARASU.S	4	5	4	4	4	21	84
44	CB17S074570	VASANTHAKUMAR.B	5	4	4	4	4	21	84
45	CB17S0745572	VIGNESH.V	3	4	4	4	4	19	76
46	CB17S0745573	VIJAYARAJ.L	3	4	4	3	4	18	72
47	CB17S0745575	YOGAPRIYA.G	5	5	5	4	5	24	96
48	CB17S0745576	YOGAPUTHALVAN.V	4	4	3	4	4	19	76
AVERAGE			**4.2766**	**4.106383**	**4.170213**	**4.1915**	**3.91**		

EXPECTED ATTAINMENT IN EACH CO - 85%

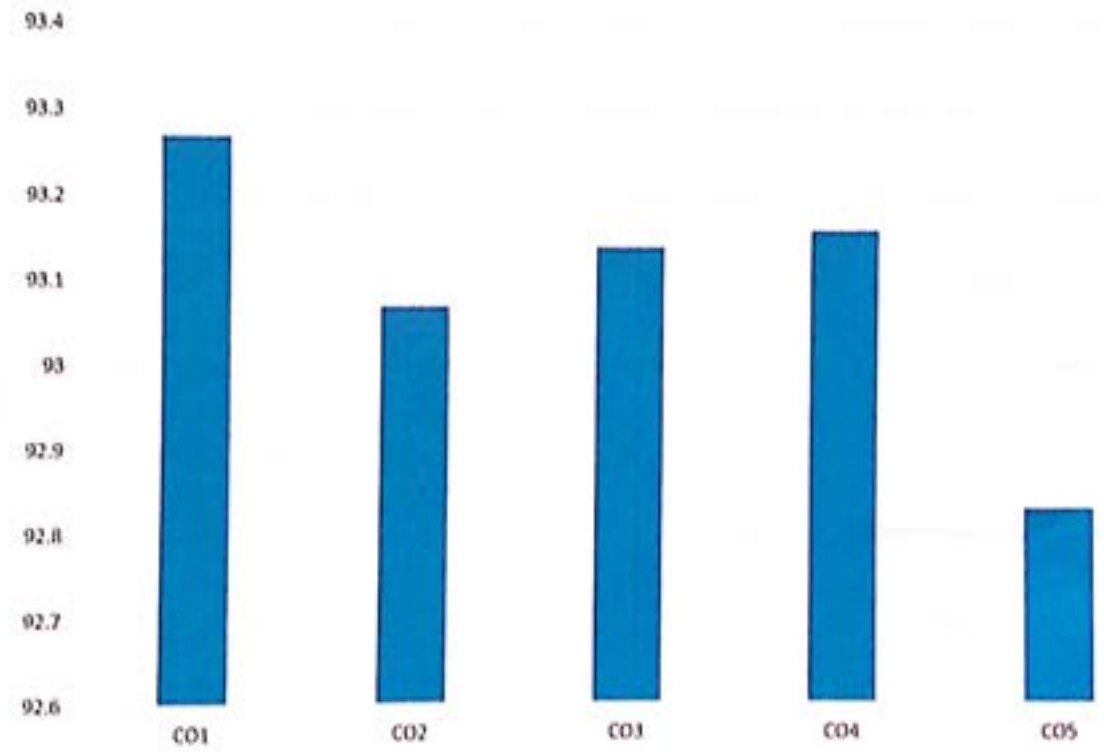
CO	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	4.28	75	79.28	93.2706
CO2	4.11	75	79.11	93.0706
CO3	4.17	75	79.17	93.1412
CO4	4.19	75	79.19	93.1647
CO5	3.91	75	78.91	92.8353

COURSE ATTAINMENT FOR B.Sc., BIOTCHNOLOGY

SUBJECT NAME:BIOMOLECULE
SUBJECT CODE: 16SCCBT1
NO. OF STUDENTS: 48

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	93.27
CO2	93.07
CO3	93.14
CO4	93.16
CO5	92.83

PERCENTAGE OF ATTAINMENT

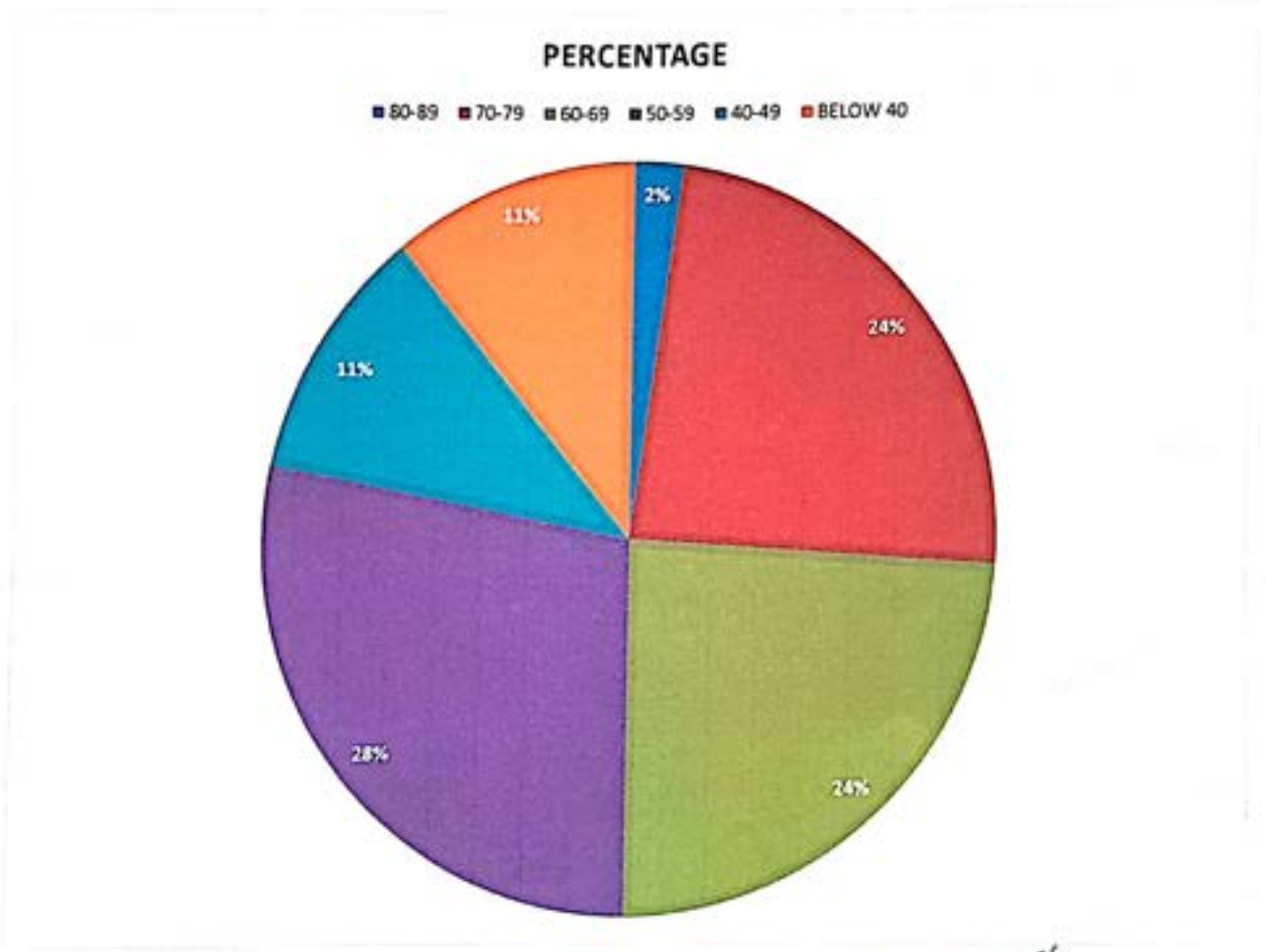


COURSE ATTAINMENT FOR B.Sc., BIOTCHNOLOGY

SUBJECT NAME:BIOMOLECULE
SUBJECT CODE: 16SCCBT1
NO. OF STUDENTS: 48

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	**NO. OF STUDENTS**	**STATUS**
90 & ABOVE	0	OUTSTANDING
80 - 89	1	EXCELLENT
70 - 79	11	DISTINCTION
60 - 69	11	VERY GOOD
50 - 59	13	GOOD
40 - 49	5	AVERAGE
BELOW 40	5	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	**PERCENTAGE**	**STATUS**
80-89	2.08%	EXCELLENT
70-79	22.91%	DISTINCTION
60-69	22.91%	VERY GOOD
50-59	27.08%	GOOD
40-49	10.41%	AVERAGE
BELOW 40	10.41%	RA



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(UGC Recognized 2(f) & 12(B) Institution)
THANJAVUR-5
PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME B.Sc., BIOTECHNOLOGY

PO1	TheCell biology is the study of the structure and function of prokaryotic and eukaryotic cells. In this course the students will learn different areas of cellular biology including the structure and functions of cell, its organelles, synthesis and function of macromolecules such as carbohydrate, protein, lipid, DNA & RNA; membrane structure and function; bioenergetics; cellular communication; and microscopic techniques to understand the cell structure. course about the basic of microbiology dealing types of microbes analyse medical microbiology.
PO2	This course is designed to given an understanding about the basics of molecular biology – classical genetics & molecular aspects.Isolation, preservation and improvement of strains.Food Microbiology-Medical Microbiology,Agricultural Microbiology.
PO3	This courser is planned to give basic knowledge on r DNA Technology,Blotting techques ,pharmaceutical products, Gene therapy.structure functions of biomolecules.Amino Acids and Proteins.Classification of lipids.Fundemental concepts and Anatomy of the immune system.vaccinology-Clinical immunology.Classificationof lipids.macro and micro minerals - source and functions.Fundamental Concepts and Anatomy of the Immune System.Vaccinology,Clinical Immunology.to specialize in instruments in centrifugation, chromatography, electrophoresis, spectroscopy and crystallography.
PO4	This course is planned to give basic knowledge about plant tissue culture, transgenesis, genetic modifications in agriculture,Plant Genetic Engineering,Genetic modification in food industry,Production of organic food.This course is planned to impart knowledge on fundamentals of animal cell culture, GMOs, gene therapy & transgenic animals.Biostatistics - Concepts of statistics.
PO5	This course is designed to give an idea about the avenues of exploiting microbes and to study the downstream processes for product recovery in fermentation.Microbes in food processing and production,Fermented foods and beverages.

COURSE :ANIMAL BIOTECHNOLOGY SUB CODE 16SCCBT6

COURSE OUTCOME

CO1	Embryology-Gametogenesis and fertilization in animals, Molecular events during fertilization.
CO2	Animal cell culture-Fundamentals. Facilities and Applications. Media preparation for Animal cells culture. Types of cell culture: Primary and secondary cell culture.
CO3	Genetic engineering in animals-GMO , methods of DNA transfer into animal cells - calcium phosphate co precipitation, micro-injection, electroporation.
CO4	Gene therapy-Mapping of human genome, Human Genome Project (HGP). RFLP, RAPD and its applications.
CO5	Transgenics-Transgenic animals – Merits and demerits -Ethical issues in animal biotechnology, transgenic microbes and animals.

PO → CO↓	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	0	0	1	3	1
CO2	0	0	0	3	0
CO3	1	1	0	3	0
CO4	0	0	1	3	1
CO5	1	1	0	3	0
AVERAGE	**0.4**	**0.4**	**0.4**	**3**	**0.4**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	CB17S074521	AHILANDESWARI.R	5	3	3	5	4	20	80
2	CB17S074523	ANTONY.A	4	4	4	4	4	20	80
3	CB17S074524	ARAVINDKUMAR.S	4	4	4	4	3	19	76
4	CB17S074525	BHUVANESWARI.S	5	5	5	5	3	23	92
5	CB17S074526	BOOLOGANATHAN.C	2	3	2	2	3	12	48
6	CB17S074527	DEVAYANI.A	5	5	5	3	3	21	84
7	CB17S074528	DEVENDRAN.S	4	4	4	4	4	20	80
8	CB17S074529	DHANALAKSHMI.R	5	5	3	4	3	20	80
9	CB17S074530	DIVYA.R	4	4	4	4	3	19	76
10	CB17S074531	DIVYASREE.S	4	4	4	4	2	18	72

11	CB17S074532	GOWRISANKAR.J	5	4	4	4	4	22	88
12	CB17S074533	ISHWARYA.G	5	4	4	5	4	22	88
14	CB17S074535	JANAKI.M	4	4	4	4	4	20	80
15	CB17S074536	JENIFER.R	4	4	4	4	2	18	72
16	CB17S074537	KARTHIK.S	3	4	4	4	5	20	80
17	CB17S074538	KAVIYA A	4	4	4	4	4	20	80
18	CB17S074539	KAVIYA.S	4	4	4	4	4	20	80
19	CB17S074540	MADHANKUMAR.S	5	4	4	4	5	22	88
20	CB17S074541	MOHAMMED ASIK.V	4	4	4	4	4	20	80
21	CB17S074542	MURUGESHWARI.V	5	5	5	4	4	23	92
22	CB17S074543	MYTHILI.R	3	3	3	5	5	19	76
23	CB17S074544	NANDHINI.G	5	4	4	4	5	22	88
24	CB17S074546	NANDHINI.M	5	5	5	4	3	22	88
25	CB17S074549	PRASANTH.K	2	4	2	3	2	13	52
26	CB17S074550	PRIYADHARSHINI.R	4	4	4	3	3	18	72
27	CB17S074551	PURUSOTHMAN.R	4	4	4	4	4	20	80
28	CB17S074552	RAHUL.K	4	4	4	4	4	20	80
29	CB17S074553	RAJESH.V	5	5	3	3	3	19	76
30	CB17S074554	RAJESWAR.R	5	4	4	3	4	20	80
31	CB17S074555	RAMANIKANTH.A	3	4	4	5	3	19	76
32	CB17S074556	RAMESHKUMAR.M	3	4	4	5	4	20	80
33	CB17S074557	RATHISH.S	3	4	4	5	4	20	80
34	CB17S074558	SARMILA.D	3	4	5	4	4	20	80
35	CB17S074559	SATHYALAKSHMI.K	5	5	4	4	3	23	92
36	CB17S074561	SHALINI.K	4	4	4	4	3	19	76
37	CB17S074562	SIVA.M	4	4	4	5	4	21	84
38	CB17S074563	SIVASANKARI.C	4	4	4	4	3	19	76
39	CB17S074565	SUNDAR.T	3	3	3	5	5	19	76
40	CB17S074566	SURESH.M	3	3	4	4	5	19	76
41	CB17S074567	SURIYAPRAKASH.P	3	3	3	3	3	15	60
42	CB17S074569	THIRUNAVUKKARASU.S	4	5	4	4	3	20	80
43	CB17S0745572	VIGNESH.V	4	4	4	4	4	20	80

44	CB17S0745573	VIJAYARAJ.L	3	3	3	5	4	20	80
45	CB17S0745575	YOGAPRIYA.G	5	5	5	4	4	23	92
46	CB17S0745576	YOGAPUTHALVAN.V	3	3	4	4	5	19	76
AVERAGE			3.978	4.022	3.889	4.044	3.69		

EXPECTED ATTAINMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+	END SEM	TOTAL	%
CO1	4	75	79	92.94
CO2	4.04	75	79.04	92.99
CO3	3.89	75	78.89	92.81
CO4	4.04	75	79.04	92.99
CO5	3.717	75	78.72	92.61

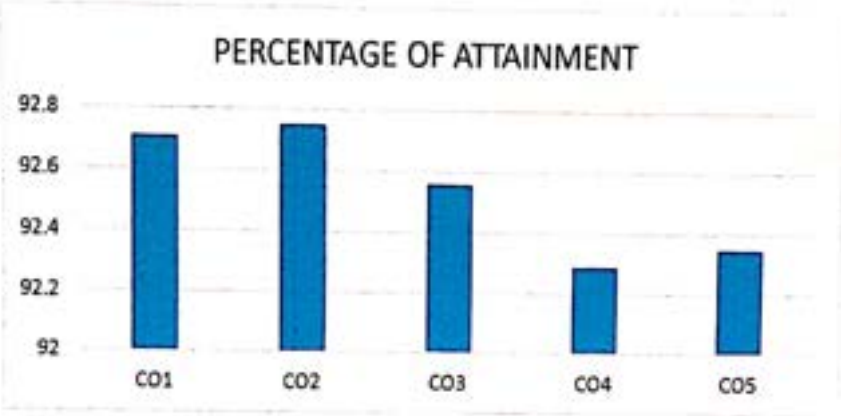
COURSE ATTAINMENT FOR B.SC., BIOTECHNOLOGY

SUBJECT NAME :ANIMAL BIOTEC HNOLOGY

SUBJECT CODE :116SCCBT6

NO.OF STUDENTS:46

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	92.94
CO2	92.99
CO3	92.81
CO4	92.99
CO5	92.61

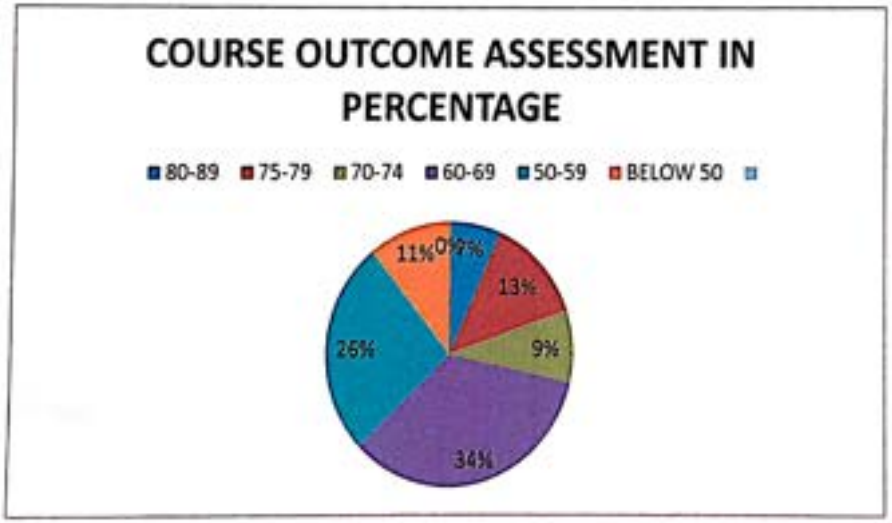


COURSE ATTAINMENT FOR B.Sc., BIOTCHNOLOGY

SUBJECT NAME:ANIMAL BIOTECHNOLOGY
SUBJECT CODE: 16SCCBT6
NO. OF STUDENTS: 46

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO. OF STUDENTS	STATUS
90 -100	0	OUTSTANDING
80 - 89	3	EXCELLENT
75-79	6	DISTINCTION
70-74	4	VERY GOOD
60-69	16	GOOD
50-59	11	AVERAGE
BELOW 50	5	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
80-89	6.50%	EXCELLENT
75-79	13.04%	DISTINCTION
70-74	8.69%	VERY GOOD
60-69	34.18%	GOOD
50-59	26.08%	AVERAGE
BELOW 50	10.86%	RA



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THANJAVUR-5
PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME B.Sc., BIOTECHNOLOGY

PO1	TheCell biology is the study of the structure and function of prokaryotic and cukaryotic cells. In this course the students will learn different areas of cellular biology including the structure and functions of cell, its organelles, synthesis and function of macromolecules such as carbohydrate, protein, lipid, DNA & RNA; membrane structure and function; bioenergetics; cellular communication; and microscopic techniques to understand the cell structure. course about the basic of microbiology dealing types of microbes analyse medical microbiology.
PO2	This course is designed to given an understanding about the basics of molecular biology – classical genetics & molecular aspects.Isolation, preservation and improvement of strains.Food Microbiology-Medical Microbiology,Agricultural Microbiology.
PO3	This courser is planned to give basic knowledge on r DNA Technology,Blotting techques ,pharmaceutical products, Gene therapy.structure functions of biomolecules.Amino Acids and Proteins.Classification of lipids.Fundemental concepts and Anatomy of the immune system.vaccinology-Clinical immunology.Classification of lipids.macro and micro minerals - source and functions.Fundamental Concepts and Anatomy of the Immune System.Vaccinology,Clinical Immunology.to specialize in instruments in centrifugation, chromatography, electrophoresis, spectroscopy and crystallography.
PO4	This course is planned to give basic knowledge about plant tissue culture, transgenesis, genetic modifications in agriculture,Plant Genetic Engineering,Genetic modification in food industry,Production of organic food.This course is planned to impart knowledge on fundamentals of animal cell culture, GMOs, gene therapy & transgenic animals.Biostatistics - Concepts of statistics.
PO5	This course is designed to give an idea about the avenues of exploiting microbes and to study the downstream processes for product recovery in fermentation.Microbes in food processing and production,Fermented foods and beverages.

COURSE :r DNA

CO1	Isolation of genes. Enzymes of rDNA technology exonuclease, DNA modifying enzymes - Polymerase, Transferase, Kinase and Ligase
CO2	Plasmids, Phage vectors, Cosmids, Phagemids, Virus vectors, Shuttle vectors and expression vectors
CO3	Cloning vectors for E. coli., Cloning vectors for Eukaryotes. Methods of transformation.
CO4	DNA amplification using polymerase chain reaction (PCR): key concepts, Analysis of amplified products.
CO5	Analysis of recombinant DNA - Selection methods – antibiotics, expression basis, GUS expression. Sequencing

PO →	PO1	PO2	PO3	PO4	PO5
CO1	1	0	3	3	1
CO2	0	0	3	3	0
CO3	1	1	3	3	0
CO4	0	0	3	3	1
CO5	1	1	2	3	0
AVERAGE	**0.6**	**0.4**	**2.8**	**3**	**0.4**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	IGNMENT
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL
1	CB17S074521	AHILANDESWARI.R	4	4	4	4	4	20
2	CB17S074523	ANTONY.A	4	4	4	4	4	20
3	CB17S074524	ARAVINDKUMAR.S	4	4	4	4	3	19
4	CB17S074525	BHUVANESWARI.S	5	5	5	5	3	23
5	CB17S074526	BOOLOGANATHAN.C	4	3	4	4	3	18
6	CB17S074527	DEVAYANI.A	5	4	4	5	4	22
7	CB17S074528	DEVENDRAN.S	4	4	4	4	4	20
8	CB17S074529	DHANALAKSHMI.R	5	5	3	4	4	21
9	CB17S074530	DIVYA.R	5	5	4	4	3	21
10	CB17S074531	DIVYASREE.S	4	4	4	4	4	20
11	CB17S074532	GOWRISANKAR.J	5	5	5	4	4	23
12	CB17S074533	ISHWARYA.G	5	5	4	5	4	23
14	CB17S074535	JANAKI.M	4	4	4	4	4	22
15	CB17S074536	JENIFER.R	5	4	4	4	4	21
16	CB17S074537	KARTHIK.S	5	4	4	4	4	21
17	CB17S074538	KAVIYA.A	4	4	4	4	4	20
18	CB17S074539	KAVIYA.S	5	4	5	4	5	23
19	CB17S074540	MADHANKUMAR.S	4	4	4	4	4	20
20	CB17S074541	MOHAMMED ASIK.V	5	4	4	5	4	22
21	CB17S074542	MURUGESHWARI.V	5	5	5	5	4	24
22	CB17S074543	MYTHILI.R	4	4	4	5	5	22
23	CB17S074544	NANDHINI.G	5	4	4	5	4	22
24	CB17S074546	NANDHINI.M	4	4	4	4	4	20
25	CB17S074549	PRASANTH.K	5	5	5	5	4	24
26	CB17S074550	PRIYADHARSHINI.R	4	4	4	3	3	18
27	CB17S074551	PURUSOTHMAN.R	4	4	4	4	4	20
28	CB17S074552	RAHUL.K	4	4	4	4	4	20
29	CB17S074553	RAJESH.V	5	4	4	4	4	21
	CB17S074554	RAJESWAR.R	4	4	4	3	4	19

31	CB17S074555	RAMANIKANTH.A	3	5	5	5	5	23
32	CB17S074556	RAMESHKUMAR.M	5	4	4	5	4	22
33	CB17S074557	RATHISH.S	4	4	4	4	4	20
34	CB17S074558	SARMILA.D	5	4	5	4	5	23
35	CB17S074559	SATHYALAKSHMI.K	5	5	5	5	4	24
36	CB17S074561	SHALINI.K	4	4	4	4	4	20
37	CB17S074562	SIVA.M	4	4	4	4	4	20
38	CB17S074563	SIVASANKARI.C	4	4	5	4	4	21
39	CB17S074565	SUNDAR.T	5	5	5	4	4	23
40	CB17S074566	SURESH.M	4	4	4	4	4	20
41	CB17S074567	SURIYAPRAKASH.P	4	4	4	3	3	18
42	CB17S074569	THIRUNAVUKKARASU.S	4	5	4	4	4	21
43	CB17S074570	VASANTHAKUMAR.B	5	4	4	5	4	22
44	CB17S0745572	VIGNESH.V	5	4	4	4	5	22
45	CB17S0745573	VIJAYARAJ.L	4	4	4	4	4	20
46	CB17S0745575	YOGAPRIYA.G	5	5	5	4	5	24
47	CB17S0745576	YOGAPUTHALVAN.V	4	4	4	4	4	20
AVERAGE			4.435	4.239	4.217	4.196	4	

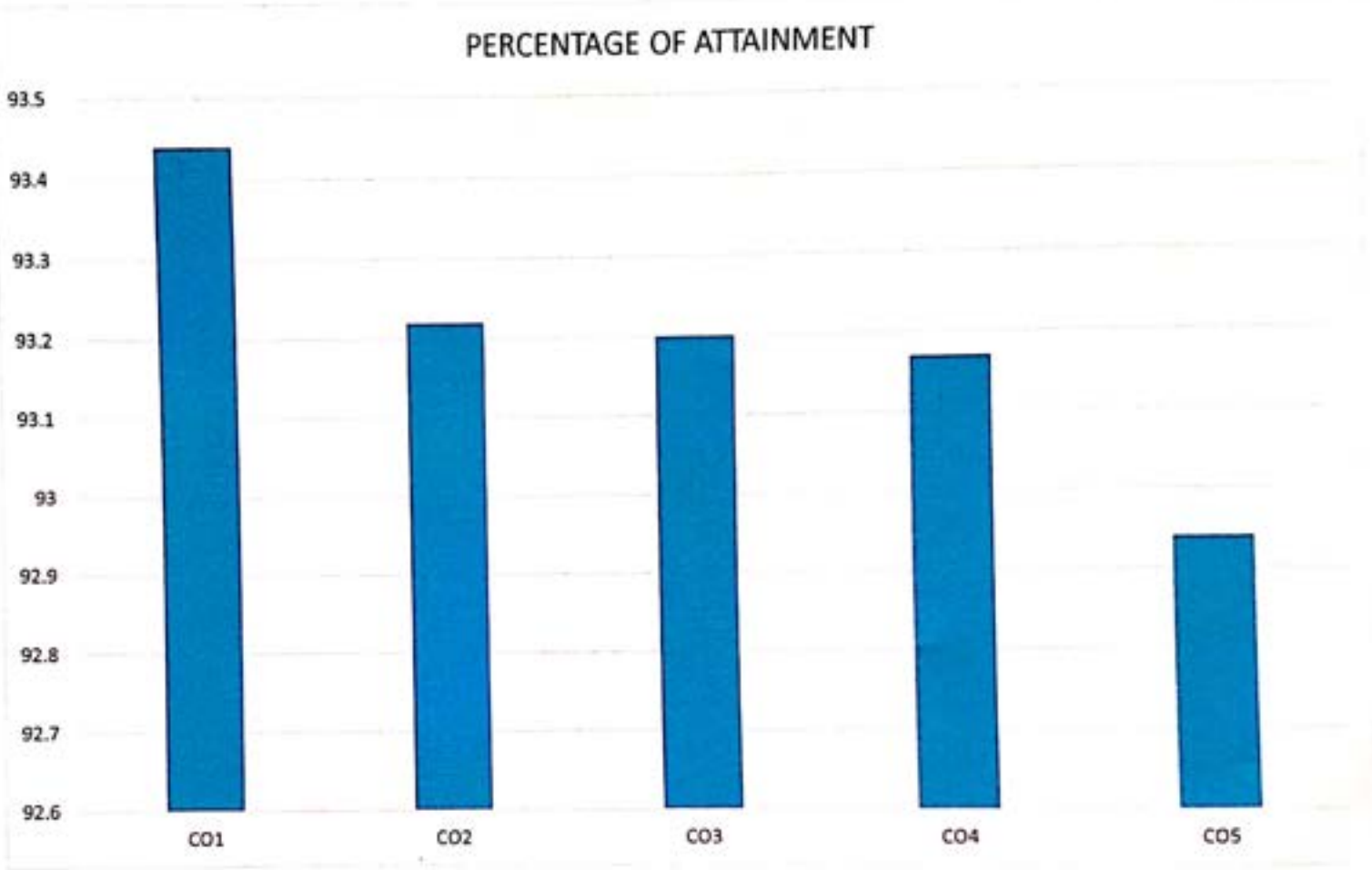
EXPECTED ATTAINMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	4.43	75	79.43	93.45
CO2	4.24	75	79.24	93.22
CO3	4.22	75	79.22	93.2
CO4	4.2	75	79.2	93.18
CO5	4	75	79	92.94

COURSE ATTAINMENT FOR B.Sc., BIOTCHNOLOGY

SUBJECT NAME: r DNA TECHNOLOGY
SUBJECT CODE: 16SCCBT3
NO. OF STUDENTS: 47

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	93.44
CO2	93.22
CO3	93.2
CO4	93.17
CO5	92.94



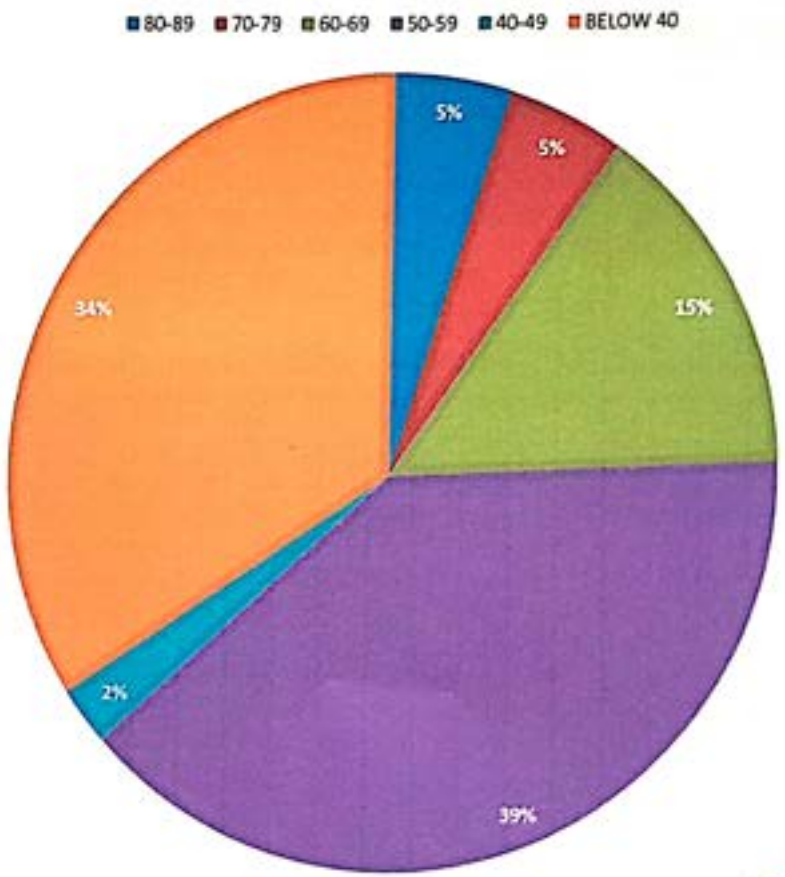
COURSE ATTAINMENT FOR B.Sc., BIOTCHNOLOGY

SUBJECT NAME: r DNA TECHNOLOGY
SUBJECT CODE: 16SCCBT3
NO. OF STUDENTS: 47

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO. OF STUDENTS	STATUS
90 & ABOVE	0	OUTSTANDING
80 - 89	2	EXCELLENT
70 - 79	2	DISTINCTION
60 - 69	6	VERY GOOD
50 - 59	16	GOOD
40 - 49	1	AVERAGE
BELOW 40	14	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
80-89	4.25%	EXCELLENT
70-79	4.25%	DISTINCTION
60-69	12.76%	VERY GOOD
50-59	34.04%	GOOD
40-49	2.12%	AVERAGE
BELOW 40	29.78%	RA

PERCENTAGE



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ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME B.Sc., BIOTECHNOLOGY

PO1	TheCell biology is the study of the structure and function of prokaryotic and eukaryotic cells. In this course the students will learn different areas of cellular biology including the structure and functions of cell, its organelles, synthesis and function of macromolecules such as carbohydrate, protein, lipid, DNA & RNA; membrane structure and function; bioenergetics; cellular communication; and microscopic techniques to understand the cell structure. course about the basic of microbiology dealing types of microbes analyse medical microbiology.
PO2	This course is designed to given an understanding about the basics of molecular biology – classical genetics & molecular aspects.Isolation, preservation and improvement of strains.Food Microbiology-Medical Microbiology,Agricultural Microbiology.
PO3	This courser is planned to give basic knowledge on r DNA Technology,Blotting techques ,pharmaceutical products. Gene therapy.structure functions of biomolecules.Amino Acids and Proteins.Classification of lipids.Fundemental concepts and Anatomy of the immune system.vaccinology-Clinical immunology.Classification of lipids.macro and micro minerals - source and functions.Fundamental Concepts and Anatomy of the Immune System. Vaccinology,Clinical Immunology.to specialize in instruments in centrifugation, chromatography, electrophoresis, spectroscopy and crystallography.
PO4	This course is planned to give basic knowledge about plant tissue culture, transgenesis, genetic modifications in agriculture.Plant Genetic Engineering,Genetic modification in food industry.Production of organic food.This course is planned to impart knowledge on fundamentals of animal cell culture, GMOs, gene therapy & transgenic animals.Biostatistics - Concepts of statistics.
PO5	This course is designed to give an idea about the avenues of exploiting microbes and to study the downstream processes for product recovery in fermentation.Microbes in food processing and production,Fermented foods and beverages.

COURSE : APPLIED BIOCHEMISTRY
COURSE OUTCOME: 16SCCBT2

CO1	Basic principles of sedimentation. Types of centrifuges.Determination of molecular weight - sedimentation velocity.
CO2	General principle of chromatographic separation.GC, GLC and HPLC, GC-MS, LC-MS.
CO3	Basic principle and types of electrophoresis.Technique and uses of agarose gel electrophoresis
CO4	Spectroscopy-Basic design of photoelectric colorimeter and spectrophotometer.
CO5	Crystallography-X-Ray Crystallography – X-ray diffraction.

PO →	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	1	0	3	3	1
CO2	0	0	3	3	0
CO3	1	1	3	3	0
CO4	0	0	3	3	1
CO5	1	1	2	3	0
AVERAGE	**0.6**	**0.4**	**2.8**	**3**	**0.4**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	**INTERNAL (25)**		
	UNIT TEST (15)	**SEMINAR (5)**	**ASSIGNMENT (5)**
CO1	**3**	**1**	**1**
CO2	**3**	**1**	**1**
CO3	**3**	**1**	**1**
CO4	**3**	**1**	**1**
CO5	**3**	**1**	**1**
TOTAL	**15**	**5**	**5**

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	CB17S074521	AHILANDESWARI.R	4	4	4	4	5	21	84
2	CB17S074523	ANTONY.A	4	4	4	4	4	20	80
3	CB17S074524	ARAVINDKUMAR.S	4	4	4	4	4	20	80
4	CB17S074525	BHUVANESWARI.S	5	5	5	5	3	23	92
5	CB17S074526	BOOLOGANATHAN.C	4	4	4	4	4	20	80
6	CB17S074527	DEVAYANI.A	4	4	4	5	4	21	84
7	CB17S074528	DEVENDRAN.S	4	4	4	5	4	21	84
8	CB17S074529	DHANALAKSHMI.R	4	4	4	4	4	20	80
9	CB17S074530	DIVYA.R	4	4	4	4	4	20	80
10	CB17S074531	DIVYASREE.S	4	4	4	4	4	20	80
11	CB17S074532	GOWRISANKAR.J	4	4	4	4	4	20	80
12	CB17S074533	ISHWARYA.G	4	4	4	4	4	20	80
14	CB17S074535	JANAKI.M	5	4	4	4	4	21	84
15	CB17S074536	JENIFER.R	4	4	4	4	4	20	80
16	CB17S074537	KARTHIK.S	4	4	4	4	4	20	80
17	CB17S074538	KAVIYA.A	4	4	4	5	4	21	84
18	CB17S074539	KAVIYA.S	4	4	4	5	4	21	84
19	CB17S074540	MADHANKUMAR.S	4	4	4	4	4	20	80
20	CB17S074541	MOHAMMED ASIK.V	4	4	4	4	4	20	80
21	CB17S074542	MURUGESHWARI.V	5	5	5	5	3	23	92
22	CB17S074543	MYTHILI.R	4	4	4	4	5	21	84
23	CB17S074544	NANDHINI.G	5	5	5	5	3	23	92
24	CB17S074546	NANDHINI.M	5	5	5	5	3	23	92
25	CB17S074549	PRASANTH.K	4	4	4	4	5	21	84
26	CB17S074550	PRIYADHARSHINI.R	4	4	4	4	4	20	80
27	CB17S074551	PURUSOTHMAN.R	4	4	4	4	4	20	80
28	CB17S074552	RAHUL.K	5	4	4	5	5	23	92
29	CB17S074553	RAJESH.V	4	4	4	4	4	20	80
30	CB17S074554	RAJESWAR.R	4	4	4	4	4	20	80
31	CB17S074555	RAMANIKANTH.A	5	4	4	4	4	21	84

32	CB17S074556	RAMESHKUMAR.M	4	4	4	4	4	20	80
33	CB17S074557	RATHISH.S	4	4	4	4	4	20	80
34	CB17S074558	SARMILA.D	5	5	5	5	3	23	92
35	CB17S074559	SATHYALAKSHMI.K	5	5	4	4	4	22	88
36	CB17S074561	SHALINI.K	4	4	4	4	4	20	80
37	CB17S074562	SIVA.M	4	4	4	4	4	20	80
38	CB17S074563	SIVASANKARI.C	4	4	4	4	4	20	80
39	CB17S074565	SUNDAR.T	4	4	4	4	4	20	80
40	CB17S074566	SURESH.M	4	4	4	4	4	20	80
41	CB17S074567	SURIYAPRAKASH.P	4	4	4	4	4	20	80
42	CB17S074569	THIRUNAVUKKARASU.S	4	5	4	4	4	21	84
43	CB17S0745572	VIGNESH.V	4	4	4	4	4	20	80
44	CB17S0745573	VIJAYARAJ.L	4	4	4	4	4	20	80
45	CB17S0745575	YOGAPRIYA.G	5	5	5	4	5	24	96
46	CB17S0745576	YOGAPUTHALVAN.V	4	4	4	4	4	20	80
47	CB17S074276	ROJA.G	4	4	4	4	5	21	
AVERAGE			**4.222**	**4.178**	**4.133**	**4.222**	**4**		

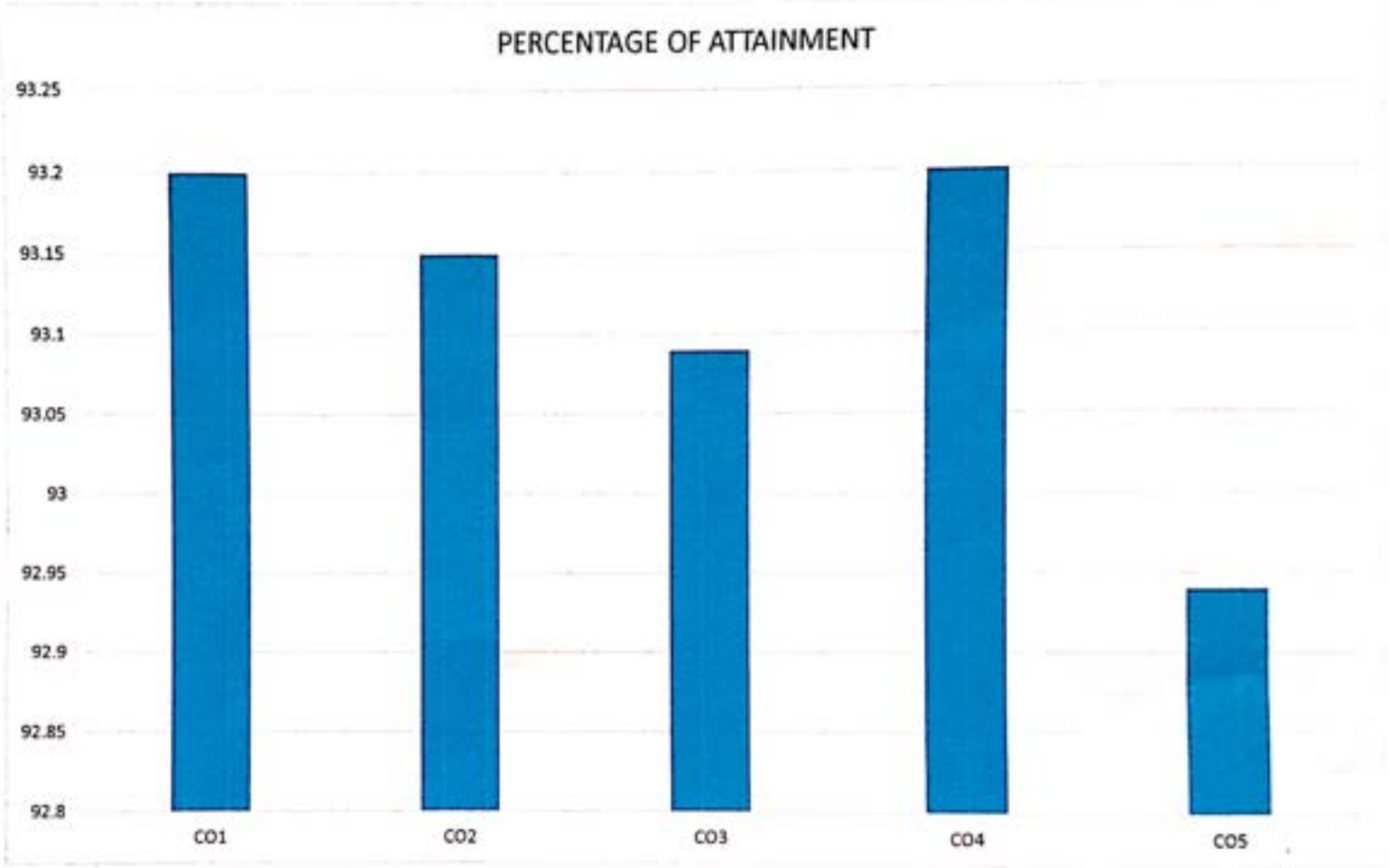
EXPECTED ATTAINMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+ASSIGNMENT	END SEM	TOTAL	%
CO1	4.22	75	79.22	93.2
CO2	4.18	75	79.18	93.15294
CO3	4.13	75	79.13	93.09412
CO4	4.22	75	79.22	93.2
CO5	4	75	79	92.94118

COURSE ATTAINMENT FOR B.Sc., BIOTCHNOLOGY

SUBJECT NAME: APPLIED BIOCHEMISTRY
SUBJECT CODE: 16SCCBT2
NO. OF STUDENTS: 47

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	93.2
CO2	93.15
CO3	93.09
CO4	93.2
CO5	92.94



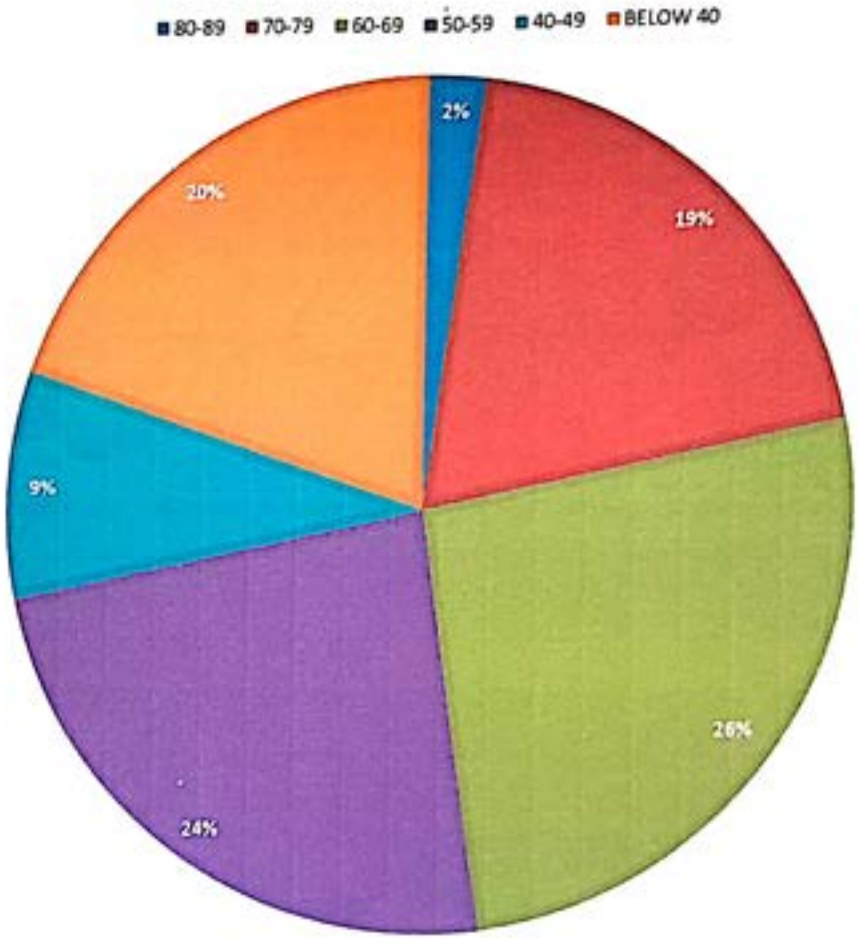
COURSE ATTAINMENT FOR B.Sc., BIOTCHNOLOGY

SUBJECT NAME: APPLIED BIOCHEMISTRY
SUBJECT CODE: 16SCCBT2
NO. OF STUDENTS: 47

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	**NO. OF STUDENTS**	**STATUS**
90 & ABOVE	0	OUTSTANDING
80 - 89	1	EXCELLENT
70 - 79	9	DISTINCTION
60 - 69	12	VERY GOOD
50 - 59	11	GOOD
40 - 49	4	AVERAGE
BELOW 40	10	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	**PERCENTAGE**	**STATUS**
80-89	2.12%	EXCELLENT
70-79	19.14%	DISTINCTION
60-69	25.53%	VERY GOOD
50-59	23.40%	GOOD
40-49	8.51%	AVERAGE
BELOW 40	19.14%	RA

PERCENTAGE



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PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME B.Sc BIOTECHNOLOGY

PO1	TheCell biology is the study of the structure and function of prokaryotic and eukaryotic cells. In this course the students will learn different areas of cellular biology including the structure and functions of cell, its organelles, synthesis and function of macromolecules such as carbohydrate, protein, lipid, DNA & RNA; membrane structure and function; bioenergetics; cellular communication; and microscopic techniques to understand the cell structure. course about the basic of microbiology dealing types of microbes analyse medical microbiology.
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PO5	To learn about fundamentals of animal cell culture,GMOs,Gene therapy and transgenic animals.

COURSE : LAB IN MICROBIALBIOTECHNOLOGY COURSE CODE:16SCCBT6P
COURSE OUTCOME

CO1	Isolation of industrially important microorganisms.
CO2	Enzyme production – amylase production.
CO3	Antibiotic production by different strains of microbes
CO4	Isolation & identification microbes from spoiled food
CO5	Immobilization of yeast cell by alginate beads

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PO →	PO1	PO2	PO3	PO4	PO5
CO1	1	2	1	1	1
CO2	1	1	2	1	1
CO3	2	1	1	2	1
CO4	1	1	2	1	1
CO5	1	2	1	3	1
AVERAGE	**1.2**	**1.4**	**1.4**	**1.6**	**1**

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COURSE : PLANT AND ANIMAL BIOTECHNOLOGY COURSE CODE:16SCCBT5P
COURSE OUTCOME

CO1	Isolation of plant genomic DNA
CO2	Preparation of chloroplast from pea
CO3	Isolation of DNA from Animal liver, Isolation of DNA from human cheek cells
CO4	Quantification of DNA by spectrophotometeric method
CO5	Types of Animal cell culture – Primary, secondary & established

PO →	PO1	PO2	PO3	PO4	PO5
CO1	3	2	1	1	1
CO2	1	1	2	2	1
CO3	2	2	3	2	3
CO4	3	1	2	1	3
CO5	3	2	2	3	2
AVERAGE	**2.4**	**1.6**	**2**	**1.8**	**2**

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PO5	To learn about fundamentals of animal cell culture,GMOs,Gene therapy and transgenic animals.

COURSE : BIOCHEMISTRY COURSE CODE:16SACBT1P
COURSE OUTCOME

CO1	Isolation of Mitochondria from rat liver.
CO2	Separation of amino acids/sugars/nucleic acids/pigments using paper and thin layer chromatography.
CO3	SDS-PAGE analysis of proteins
CO4	Separation of Blood, plasma and serum
CO5	Extraction of Proteins from biological materials, Protein separation methods : Precipitation, chromatographic, electrophoretic techniques.

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PO →	PO1	PO2	PO3	PO4	PO5
CO1	2	1	1	1	1
CO2	2	2	2	3	1
CO3	1	1	3	2	3
CO4	2	3	2	2	2
CO5	3	2	2	1	2
AVERAGE	**2**	**1.8**	**2**	**1.8**	**1.8**

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ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME B.Sc BIOTECHNOLOGY

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PO5	To learn about fundamentals of animal cell culture,GMOs,Gene therapy and transgenic animals.

COURSE : IMMUNOLOGY COURSE CODE:16SCCBT4P
COURSE OUTCOME

CO1	Separation of serum & plasma
CO2	Agglutination - Blood grouping, Latex agglutination, WIDAL
CO3	Breeding & maintenance of laboratory animals. Immunization
CO4	Raising antibody – polyclonal & monoclonal
CO5	Breeding of experimental animals.

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PO →	PO1	PO2	PO3	PO4	PO5
CO1	2	1	1	1	1
CO2	2	1	1	1	2
CO3	2	1	3	2	3
CO4	2	1	2	2	1
CO5	3	1	1	3	2
AVERAGE	**2.2**	**1**	**1.6**	**1.8**	**1.8**

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PROGRAM OUTCOME

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PO5	To learn about fundamentals of animal cell culture,GMOs,Gene therapy and transgenic animals.

COURSE :r DNA TECHNOLOGY COURSE CODE:16SCCBT3P

CO1	Isolation of genomic DNA from plant, animal cells & from bacteria
CO2	Isolation of plasmid DNA – small & large scale
CO3	Restriction digestion – single & double digestion, Ligation.
CO4	Selection & screening of rDNA products – Antibiotic resistance, Blue white colony.
CO5	PCR amplification, Southern blot and northern blot.

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PO →	PO1	PO2	PO3	PO4	PO5
CO1	2	1	1	1	1
CO2	2	2	2	3	1
CO3	1	1	3	2	3
CO4	2	3	2	2	2
CO5	3	2	2	1	2
AVERAGE	**2**	**1.8**	**2**	**1.8**	**1.8**

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COURSE : MOLECULAR BIOLOGY COURSE CODE:16SCCBT2P

CO1	Isolation and purification of genomic DNA from prokaryotes
CO2	Isolation and purification of plasmid DNA.
CO3	Transformation of bacteria – CaCl2 method
CO4	Observation of DNA
CO5	Staining of proteins

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PO →	PO1	PO2	PO3	PO4	PO5
CO1	1	1	1	2	1
CO2	2	2	3	3	3
CO3	3	1	3	2	1
CO4	2	2	2	2	3
CO5	3	2	2	3	2
AVERAGE	**2.2**	**1.6**	**2.2**	**2.4**	**2**

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PO5	To learn about fundamentals of animal cell culture,GMOs,Gene therapy and transgenic animals.

COURSE : MICROBIOLOGY COURSE CODE: 16SACMB1P
COURSE OUTCOME

CO1	Preparation of Microbiological media
CO2	Isolation of microorganisms from various samples
CO3	Biochemical identification of bacteria.
CO4	Staining of fungI
CO5	Identification of algae, fungi, lichens & yeast

PO →	PO1	PO2	PO3	PO4	PO5
CO1	1	1	1	2	1
CO2	2	2	3	2	1
CO3	3	1	1	2	1
CO4	2	3	2	2	3
CO5	2	3	2	3	2
AVERAGE	**2**	**2**	**1.8**	**2.2**	**1.6**

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COURSE : CELL BIOLOGY COURSE CODE: 16SCCBT1P

CO1	Structure observation of Prokaryotic cells Structure observation of Eukaryotic cell
CO2	Motility of an organism
CO3	Cell Staining – Cytochemical methods.
CO4	Structure of purine and pyrimidine base, Watson and Crick model and forms of DNA.
CO5	Cell division – Binary fission of yeast

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PO →	PO1	PO2	PO3	PO4	PO5
CO1	3	2	2	2	1
CO2	3	2	3	2	2
CO3	3	2	1	3	1
CO4	3	3	2	2	2
CO5	3	3	3	3	2
AVERAGE	**3**	**2.4**	**2.2**	**2.4**	**1.6**

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THANJAVUR-5
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ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME M.Sc : BIOTECHNOLOGY

PO1	To know a thorough knowledge about structure and function of cells, cellular signaling, protein trafficking, bio molecules and cellular development.
PO2	To collect, deals with various types of classification of microbes and also throws light on multifarious habitats of microbes and provides information about all the microbial cellular functions and various metabolic pathways in microbes.
PO3	To study the structure, properties and metabolism of different biomolecules and to know the interrelationships between different metabolisms.To understand the basic concepts of immune system, elucidate the immune response of humans to foreign substances and to study the modern techniques of immunology that help determine human protection.
PO4	To study the various principles underlying genetic engineering that forms the basis of rDNA technology and to study the methodologies, and in brief the applications and related issues of rDNA technology and understanding about the basics of Animal cell culture, transgenic animals, pest & animal management, Molecular markers and regulations about the use of Biotechnology.To study the downstream processes for product recovery in fermentation.
PO5	student will get an idea about the basic understanding about Bioinformatics, tools, sequences, algorithms and the analysis of phylogenetic tree and will give an idea about the basic principles and techniques involved in plant cell culture and to understand the concepts of transformation and achievements of biotechnology in Plant systems.To understand the chemical nature and associated microbes of food and to understand the principles of food processing, preservation and manufacture.

COURSE CODE& COURSE TITLE	SUBJECT NAME: PLANT BIOTECHNOLOGY, SUB CODE : P16BT32	
	COURSE OUTCOME	
PLANT BIOTECHNOLOGY (P16BT31)	CO1	Basics of Plant Tissue culture-Plant tissue culture techniques In-vitro pollination and fertilization. Embryo culture and its applications.
	CO2	Protoplast – Culture & Genetic Manipulation
	CO3	Plant Transgenesis - Agrobacterium mediated gene transfer, Agrobacterium based vectors (Ti plasmids and Ri plasmids), viral vectors and their applications.
	CO4	Transgenic plants -Genetically modified foods - application, future applications, ecological impact of transgenic plants.
	CO5	Plant Molecular Biology Techniques- DNA finger printing in plants. Marker assisted selection (MAS) for crop improvement.

PO → CO↓	PO1	PO2	PO3	PO4	PO5
CO1	0	1	0	1	3
CO2	1	0	1	0	3
CO3	0	1	0	1	3
CO4	1	0	1	0	3
CO5	0	1	2	1	3
AVERAGE	**0.4**	**0.6**	**0.8**	**0.6**	**3**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	5
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	P17440151	ARULJOICY.A	4	4	5	5	4	24	96
2	P17440153	DINESH.K	4	4	4	4	4	20	80
3	P17440154	GEORGE LIVINGSTON.S	4	4	4	4	5	21	84
4	P17440155	JEYASURYA.S	5	4	4	4	4	21	84
5	P17440156	MOHANRAJ.R	4	4	4	4	4	20	80
6	P17440157	MUTHUMEENAL.J	5	5	4	4	5	23	92
7	P17440158	NANDHINI.P	5	5	5	5	4	24	96
8	P17440159	RAJAPRIYA.R	4	4	4	4	5	21	84
9	P17440160	SELVAMANI.R	5	5	5	5	4	24	96
10	P17440161	SINTHUJA.G	5	5	5	5	4	24	96
11	P17440162	SIVABAKYALAKSHMI.U	4	4	4	5	4	21	84
12	P17440163	SIVASANKARI.S	4	4	4	5	4	21	84
13	P17440164	SUGANYA.M	5	5	5	4	4	23	92
14	P17440165	THARANI.T	4	4	4	4	4	20	80
15	P17440167	VIDHYA.S	5	5	5	5	4	24	96
16	P17440168	VINITHA.M	5	5	5	4	5	24	96
17	P17440169	VINOTHINI.J	5	5	5	5	5	25	100
18	P17440170	VINOTHKUMAR.B	5	5	5	3	4	22	88
AVERAGE			4.56	4.5	4.5	4.39	4.28		

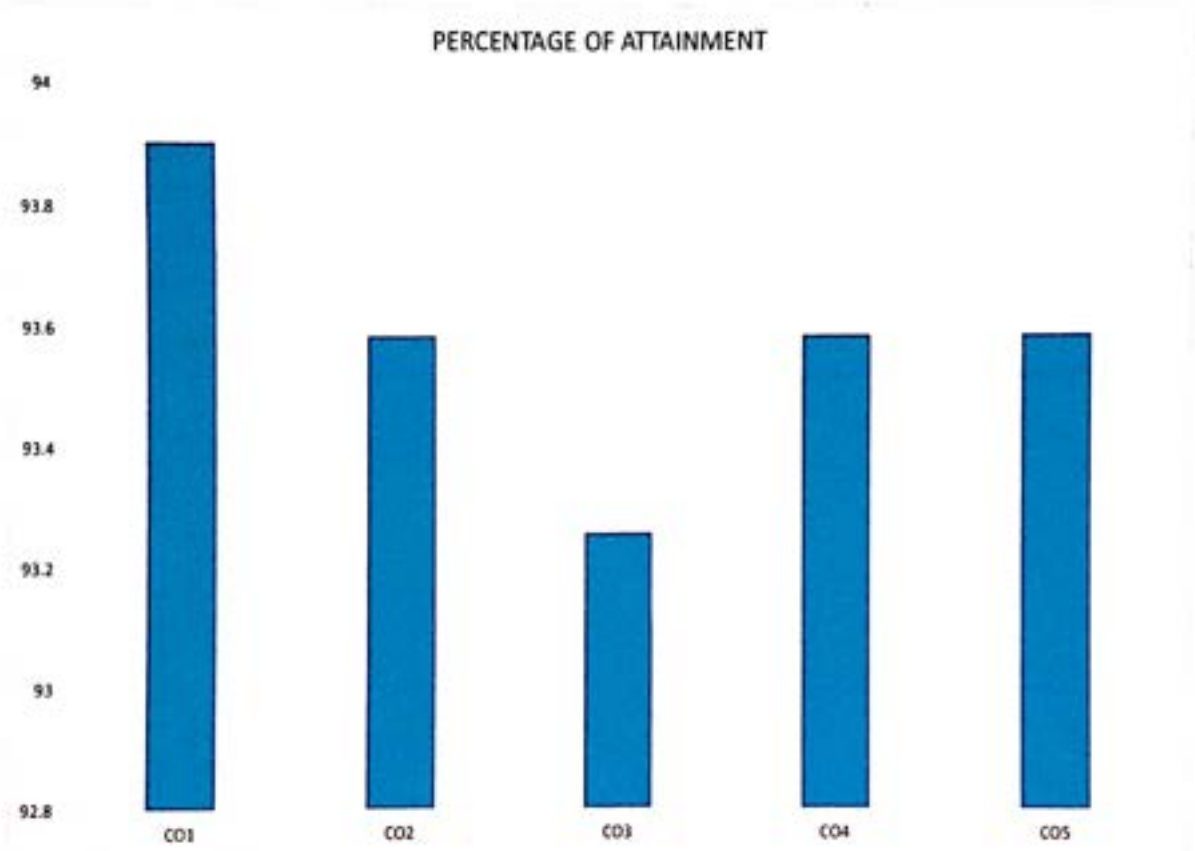
EXPECTED ATTAIMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	4.56	75	79.56	93.6
CO2	4.5	75	79.5	93.52941
CO3	4.5	75	79.5	93.52941
CO4	4.39	75	79.39	93.4
CO5	4.28	75	79.28	93.27059

COURSE ATTAINMENT FOR M.SC., BIOTECHNOLOGY

SUBJECT NAME : PLANT BIOTECHNOLOGY
SUBJECT CODE : P16BT32
NO.OF STUDENTS:18

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	93.9059
CO2	93.5882
CO3	93.2588
CO4	93.5882
CO5	93.5882

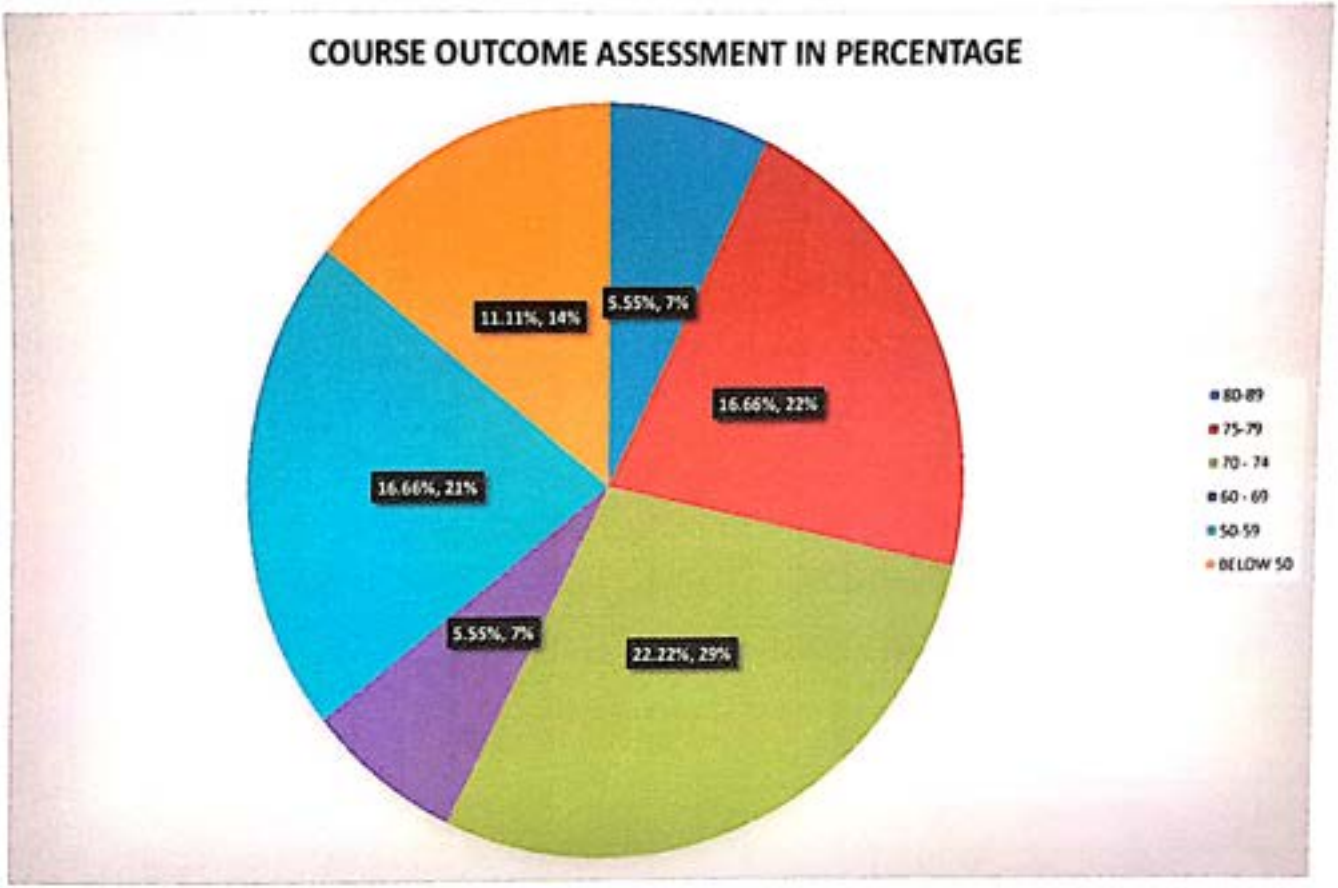


COURSE ATTAINMENT FOR M.Sc., BIOTCHNOLOGY

SUBJECT NAME: PLANT BIOTECHNOLOGY
SUBJECT CODE: P16BT[illegible]
NO. OF STUDENTS: 18

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO. OF STUDENTS	STATUS
90 -100	1	OUTSTANDING
80 - 89	3	EXCELLENT
75-79	4	DISTINCTION
70-74	1	VERY GOOD
60-69	3	GOOD
50-59	4	AVERAGE
BELOW 50	2	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
80-89	5.55%	OUTSTANDING
75-79	16.66%	DISTINCTION
70 - 74	22.22%	VERY GOOD
60 - 69	5.55%	GOOD
50-59	16.66%	AVERAGE
BELOW 50	11.11%	RA



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COURSE - Cell Biology SUB.CODE:(P16BT11)

COURSE OUTCOME

CO1	Cell structure -Introduction to cell,Plasma Membrane:Cell Wall:
CO2	Cell Organelles-Endoplasmic Reticulum,Ribosomes,Mitochondria,Mitochondria,Lysosome,peroxisome :strucutre and function
CO3	Nuclear Material:Cytoskeleton:Microtubules, microfilaments & associated proteins – actin, myosin and intermediate filaments. 3 dimensional organization of cytoskeleton.,nucleus
CO4	Organization of Chromosomes, Cell Division & Cell Cycle,Cell Growth Control:
CO5	Microbial Cell Biology,Structural organization of prokaryotic cell. Cell appendages – cilia, pili, fimbriae & flagella.

Expected Attainment in each CO - 85%

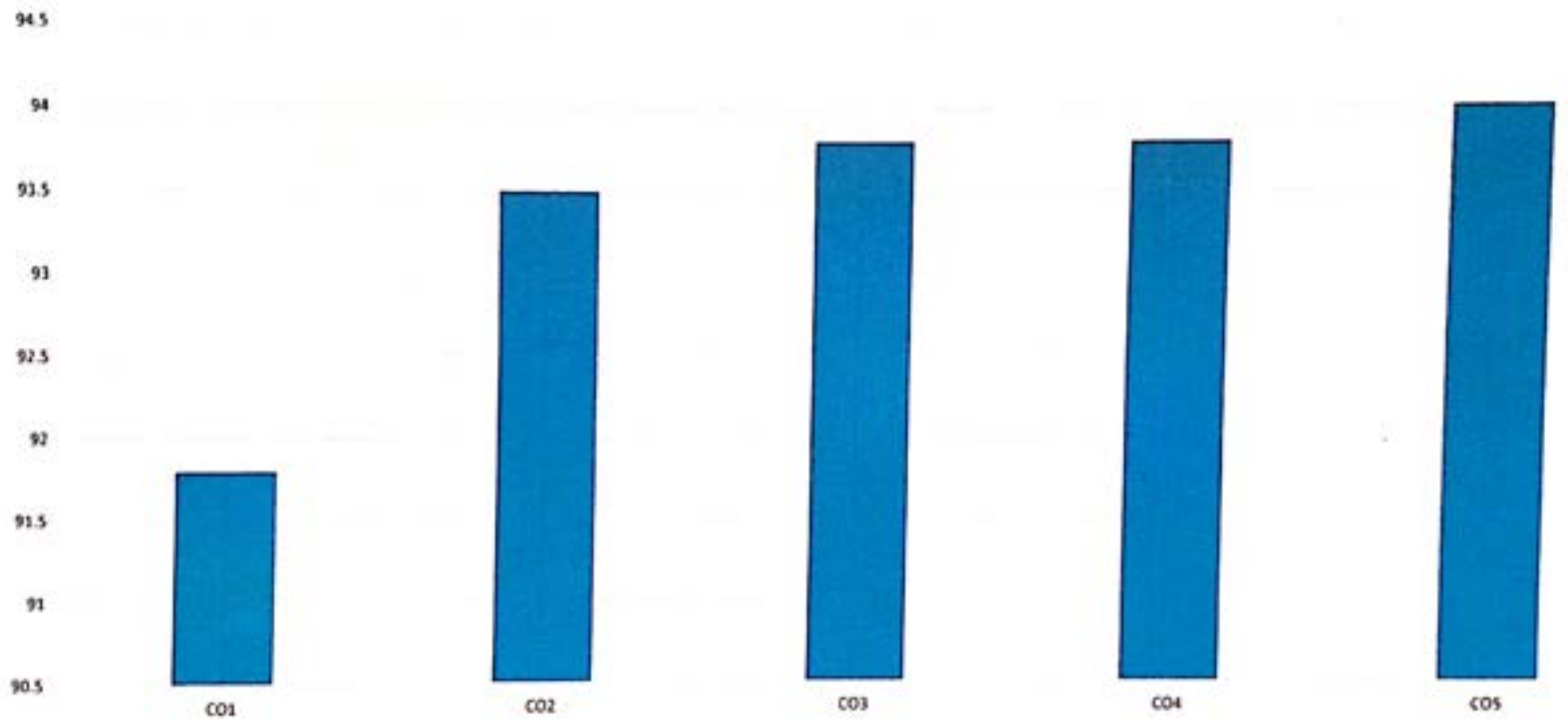
CO	Int. Exam + Assignment	End Sem	Total	%
CO1	3	75	78	91.8
CO2	4.5	75	79.5	93.5
CO3	4.7	75	79.7	93.8
CO4	4.7	75	79.7	93.8
CO5	4.9	75	79.9	94.0

COURSE ATTAINMENT FOR M.SC., BIOTECHNOLOGY

SUBJECT NAME :CELL BIOLOGY
SUBJECT CODE :P16BT11
NO.OF STUDENTS:20

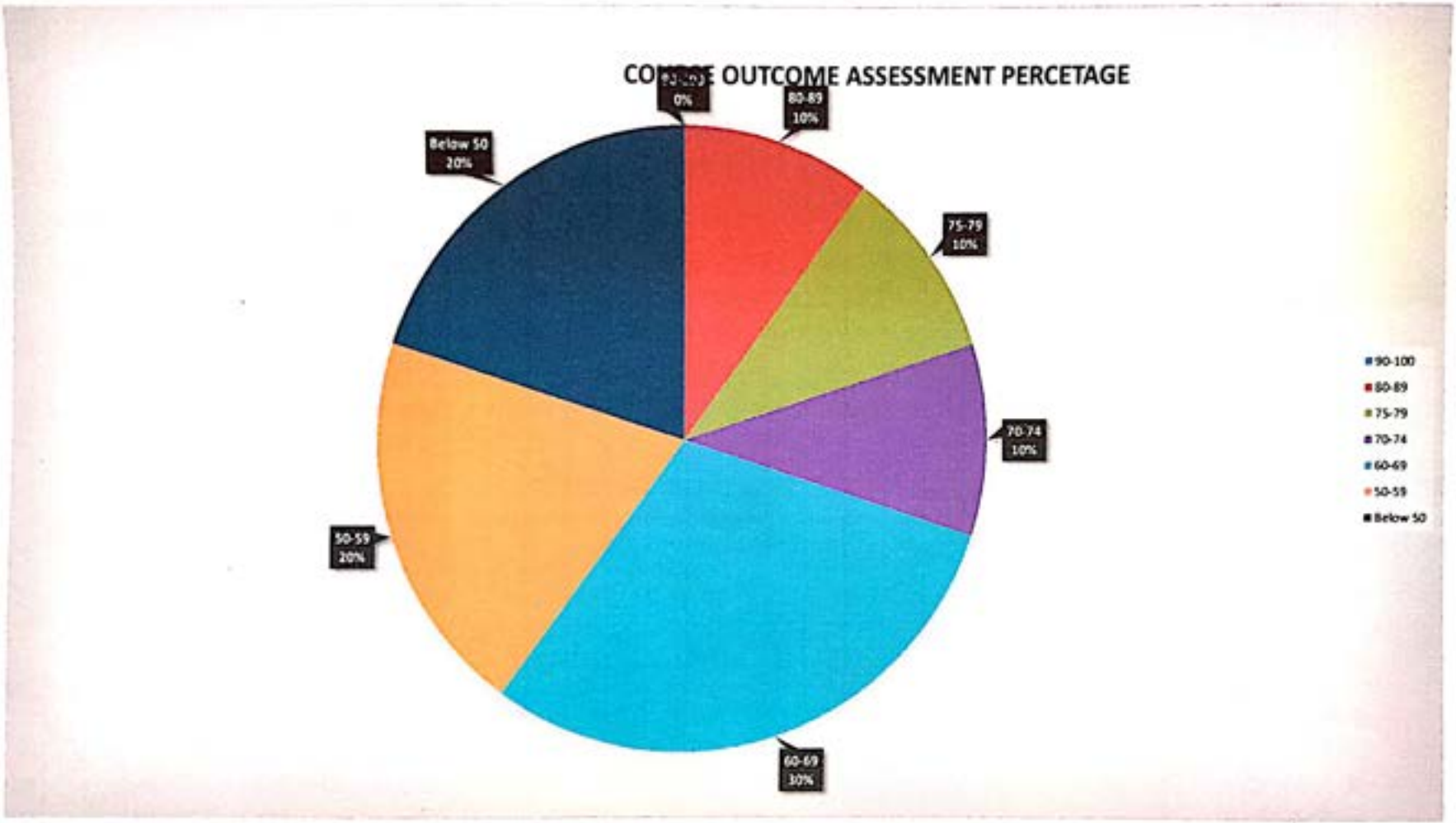
COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	91.8
CO2	93.5
CO3	93.8
CO4	93.8
CO5	94

PERCENTAGE OF ATTAINMENT



COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO.OF STUDENTS	STATUS
90-100	0	OUTSTANDING
80-89	2	EXCELLENT
75-79	2	DISTINCTION
70-74	2	VERY GOOD
60-69	6	GOOD
50-59	4	AVERAGE
0-49	4	REAPPEAR

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	PERCENTAGE%	STATUS
90-100	0	OUTSTANDING
80-89	10	EXCELLENT
75-79	10	DISTINCTION
70-74	10	VERY GOOD
60-69	30	GOOD
50-59	20	AVERAGE
Below 50	20	REAPPEAR



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COURSE - Micro Biology SUB.CODE:(P16BT12)

COURSE OUTCOME

CO1	Discovery of microbial world, the experiment of Pasteur, the era of discovery of antibiotics and anaerobic life. Types and classification of microbes. Isolation, identification, characteristics and ultra structure of microbes – Viruses, Bacteria, Fungi and Algae. Various associations of microbes.
CO2	Origin and evolution of microorganisms. Concepts of species and hierarchical taxa. Bergy's system of classification – Viruses, Bacteria, Fungi. Biological nomenclature - Measurement of species richness and evenness. Simpson's diversity index – Multivariate analysis.Microbial Nutrition and Growth,Molecular Systematics.
CO3	Microbial Metabolism Influence of environment on microbial physiology. Physical factors – radiations, temperature, pH and pressure. Chemical factors – nutrients, water, C, H, O, N, P, S. Growth factors - amino acids, purines, pyrimidines, nucleosides, nucleotides, vitamins, lipids, inorganic nutrients. Antimicrobial compounds, metabolic inhibitors. Response to environment – growth and reproduction; growth inhibition and death, movement, differentiation.
CO4	Methods in Microbiology Isolation of microbes from various sources - serial dilution, pure culture and culture preservation techniques. Microbial culture collection centers. Staining techniques – Simple & differential - Gram, endospore, negative, flagellar staining
CO5	Microbial Genetics Genetic system of bacteria – transformation, transduction, recombination. Extra cellular genetic material - plasmids and transposons. Genetic systems of viruses – Phage I, RNA viruses and retroviruses. Genetic system of fungi – Yeast and Neurospora. Genetic system of protozoa and mycoplasma.

PO→ CO↓	PO1	PO2	PO3	PO4	PO5
CO1	3	2	2	3	2
CO2	3	2	1	4	2
CO3	3	2	2	2	1
CO4	3	2	2	4	2
CO5	3	2	2	2	1
Average	3	2	1.8	3	1.6

Internal Examination Mark Distribution for each Course outcome

CO	Internal	seminar	Assignment
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
Average	**15**	**5**	**5**

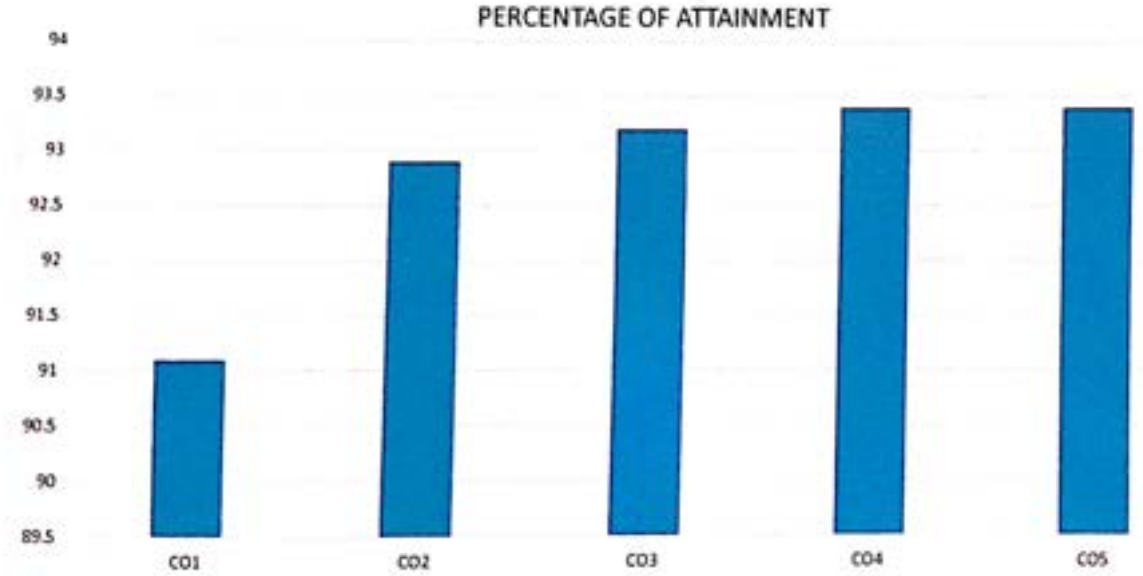
REG.NO	Name	CO1	CO2	CO3	CO4	CO4	Total	Average%
P17440151	ARULJOICY.A	2	5	4	4	5	20	80
P17440152	BALAJI.R	2	3	3	5	5	18	72
P17440153	DINESH.K	2	3	3	5	5	18	72
P17440154	GEORGE LIVINGSTON.S	2	5	5	3	3	18	72
P17440155	JYASURYA.S	2	5	5	3	3	18	72
P17440156	MOHANRAJ.R	2	5	5	3	3	18	72
P17440157	MUTHUMEENAL.J	2	3	5	5	5	20	80
P17440158	NANDHINI.P	4	5	5	5	5	24	96
P17440159	RAJAPRIYA.R	2	3	3	5	5	18	72
P17440160	SELVAMANI.R	4	4	4	4	4	20	80
P17440161	SINTHUJA.G	2	2	4	5	5	18	72
P17440162	SIVABAKYALAKSHMI.U	2	3	3	5	5	18	72
P17440163	SIVASANKARI.S	2	3	3	5	5	18	72
P17440164	SUGANYA.M	2	5	5	3	3	18	72
P17440165	THARANI.T	2	5	5	3	3	18	72
P17440166	VALARMATHI.P	2	3	4	4	4	18	72
P17440167	VIDHYA.S	4	5	5	5	5	24	96
P17440168	VINITHA.M	4	5	5	5	5	24	96
P17440169	VINOTHINI.J	2	3	5	5	5	20	80
P17440170	VINOTHKUMAR.B	3	4	3	5	5	20	80
	Average	2.45	3.95	4.20	4.35	4.40		

Expected Attainment in each CO - 85%

CO	Int. Exam + Assignment	End Sem	Total	%
CO1	2.45	75	77.45	91.1
CO2	3.95	75	78.95	92.9
CO3	4.2	75	79.2	93.2
CO4	4.35	75	79.35	93.4
CO5	4.4	75	79.4	93.4

SUBJECT NAME : Micro Biology
SUBJECT CODE :P16BT12
NO.OF STUDENTS:20

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	91.1
CO2	92.9
CO3	93.2
CO4	93.4
CO5	93.4



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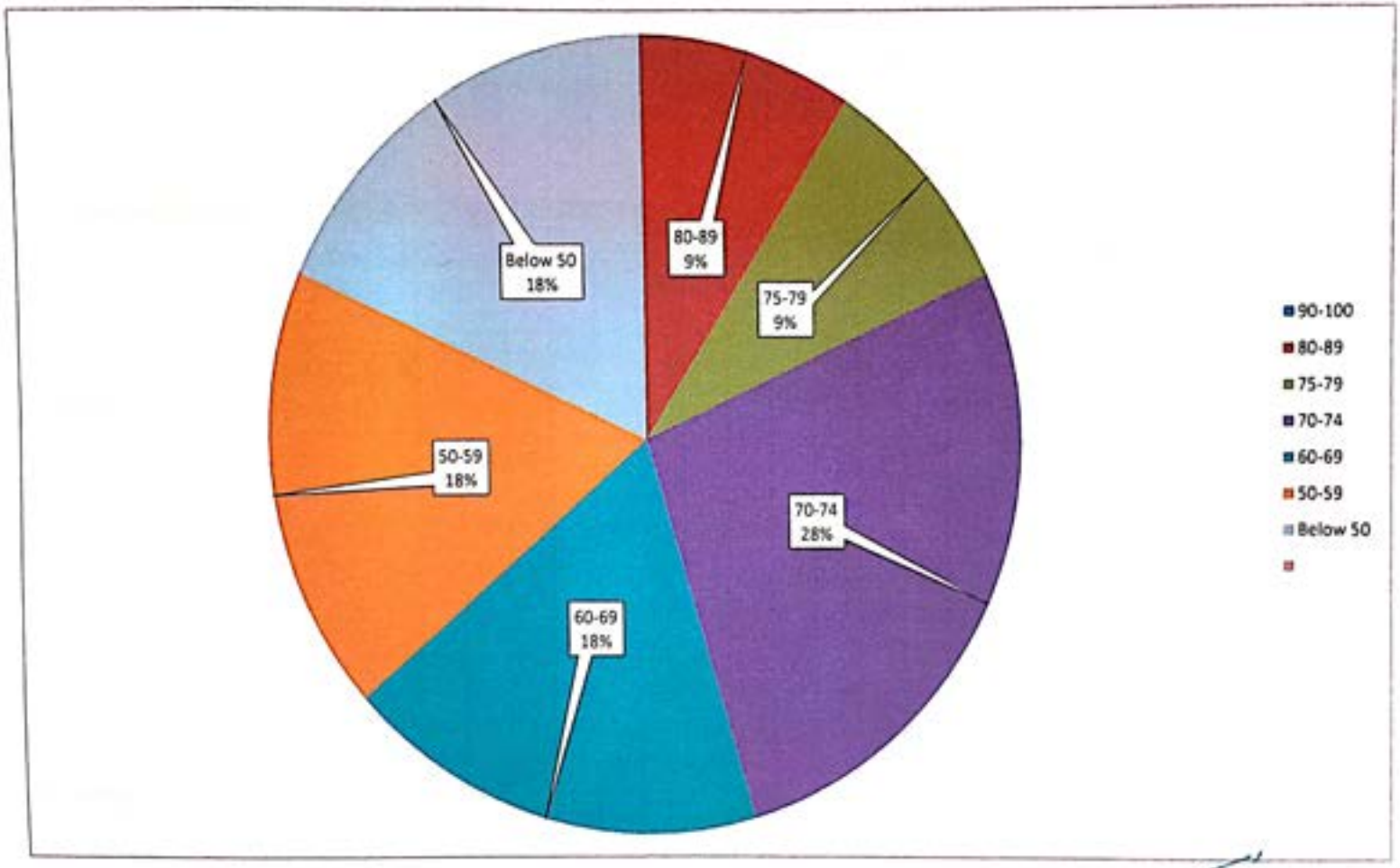
CATEGORY (MARKS)	NO.OF STUDENTS	STATUS
90-100	0	OUTSTANDING
80-89	2	EXCELLENT
75-79	2	DISTINCTION
70-74	2	VERY GOOD
60-69	6	GOOD
50-59	4	AVERAGE
BELOW 50	4	REAPPEAR

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	PERCENTAGE%	STATUS
90-100	0	OUTSTANDING
80-89	10	EXCELLENT
75-79	10	DISTINCTION
70-74	30	VERY GOOD
60-69	20	GOOD
50-59	20	AVERAGE
Below 50	20	REAPPEAR



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Near New Bus Stand THANJAVUR-5

COURSE :LAB IN BIOPROCESS TECHNOLOGY AND FOOD TECHNOLOGY
SUB.CODE:P16BT43P
COURSE OUTCOME

CO1	Isolation of industrially important microorganisms. Selective isolation of actinomycetes – study their growth characteristics. Isolation and enumeration of lactic acid bacteria. Ethanol production by yeast.
CO2	Wine production by yeast – setting up a lab experiment. Estimation of alcohol content by colorimetric method and GLC. Enzyme production – amylase production.. Production of organic acids – citric acid production by solid state fermentation.
CO3	Antibiotic production by different strains of microbes (Theory). Test for sensitivity of microorganisms. Down stream processes of enzymes – dialysis. Ion exchange chromatography – drying – cellulose column chromatography
CO4	Immobilization of yeast cell by alginate beads. Bioassay techniques for antibiotics. Large scale production of organic acids, large scale production of solvents using fermentor (Demo).
CO5	Visit to Distillery unit; alcohol production and pharmacological industries. Pasteur Institute (Field visit). Isolation & identification microbes from spoiled food. Production of yogurt, butter.

PO→ CO↓	PO1	PO2	PO3	PO4	P05
CO1	5	5	5	5	5
CO2	5	5	4	5	4
CO3	5	5	5	5	5
CO4	5	4	5	4	5
CO5	5	5	5	4	4
Avera	5	4.8	4.8	4.6	4.6

BHARATH COLLEGE OF SCIENCE AND MANAGEMENT
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COURSE :LAB IN PLANT AND ANIMAL BIOTECHNOLOGY COURSE CODE:P16BT33P

COURSE OUTCOME

CO1	Introduction to the laboratory and general Safety Practices for plant cell, Plant growth and development. Laboratory Report Guidelines (Theory & Demo). Aseptic culture techniques for establishment and maintenance of cultures (Hands on).Tissue culture media preparation: Preparation of stock solutions of Murashige Skoog basal medium and plant growth regulator stocks (Hands on). Mechanical isolation of protoplast. Enzymatic isolation of protoplast and culture (Hands on). Isolation of plant genomic DNA by modified CTAB method (Hands on).
CO2	The cell cycle, plant vascular system & Photoperiodism. Transformation of leaf discs with Agrobacterium (Hands on). Expression of foreign genes into plant cells: use of Agrobacterium tumefaciens (Theory). Morphogenesis in tobacco leaf tissue (Hands on). Regeneration abilities of the Shoot Apical Meristem (SAM). Preparation of chloroplast from pea (Hands on). Effect of different light wavelengths on germinating corn embryos (Hands on)
CO3	Measurement of photosynthesis (Hands on). Stomata conductance & transpiration (Hands on) Separation of thylakoid and stromal proteins by SDS-Gel electrophoresis. Isolation of DNA & RNA from light and dark –grown seedlings.
CO4	Isolation of DNA from Animal liver. Isolation of DNA from human cheek cells. Isolation of DNA from blood
CO5	Quantification of DNA by spectrophotometeric method. Size analysis of DNA by Agarose gell electrophoresis. Isolation & identification of stem cells

PO→ CO↓	PO1	PO2	PO3	PO4	P05
CO1	5	5	5	5	5
CO2	5	5	4	5	4
CO3	5	5	5	5	5
CO4	5	4	5	4	5
CO5	5	5	5	4	4
Average	5	4.8	4.8	4.6	4.6

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PO5	Student will get an idea about the basic understanding about Bioinformatics, tools, sequences, algorithms and the analysis of phylogenic tree.

BHARATH COLLEGE OF SCIENCE AND MANAGEMENT Near New Bus Stand THANJAVUR-5

COURSE :LAB IN CELL BIOLOGY,MICROBIOLOGY,BIOCHEMISTRY AND MOLECULAR BIOLOGY COURSE CODE:P16BT15P

COURSE OUTCOME

CO1	Prokaryotic & eukaryotic cell - structure observation. Cell count - prokaryotic & eukaryotic.Types of cells - parenchyma, collenchyma, sclerenchyma, columnar epithelium,squamous epithelium. Leishman staining
CO2	Total (WBC, RBC) & differential count of human blood cells.Separation of Peripheral Blood Mononuclear Cells from blood.Osmosis and Tonicity.Cell Division - Cytological preparations of tissues (onion) for mitosis..Cell Division - Cytological preparations of tissues (Tradescantia) for meiosis.Cell Division - Binary fission of yeast . Polytene and diplotene chromosomes.Temporary and permanent slide preparation.Sub-cellular fractionation.
CO3	Microscopy - Observation of different microbes.Sterilization techniques – physical, chemical, filtration and irradiation techniques. Preparation of media - simple media and complex media. Isolation of microorganisms from air, soil & water - spread plate, pour plate, streak plate technique. Staining methods – simple, differential, acid - fast & negative Identification - Macroscopic, microscopic, biochemical, serological & generic level. Bacterial growth curve - colony counting, cell counting, spectrophotometric method. Preservation & maintenance. Antibiotic sensitivity test –
CO4	Preparation of solutions – Molar, Normal, Percentage, Stock, Working etc. Preparation of buffers – PBS, Tris and Acetate buffer.Identification of sugars - reducing & non-reducing sugars.Estimation of mono saccharine (glucose) by Nelson, Somogi method & polysaccharide (starch) by iodine method. Estimation of amino acid by Ninhydrin method. Estimation of protein by Lowry's method and Barford Method Estimation of nucleic acids by absorbance at 260 nm and hyperchromic effect.Enzyme assay: Estimation of salivary amylase from saliva & phosphatase from potato.
CO5	Isolation and purification of genomic DNA from prokaryotes. Isolation and purification of genomic DNA from eukaryotes. Isolation and purification of plasmid DNAObservation of DNA - Agarose gel electrophoresis.Quantification of nucleic acids – DNA & RNA – Chemical and UV method. Separation of protein by SDS PAGE Protein staining techniques. Amido black, coomosic brilliant blue & AgNO3. Transfer of protein - Western blot. Observation of transferred protein – staining (Indian ink), immunoblot.Bacterial mutagenesis – physical & chemical. Preparation of E. coli competent cells.Transformation of bacteria – CaCl2 method.Bacterial conjugation.Transduction

PO →	PO1	PO2	PO3	PO4	PO5
CO1	3	2	1	1	1
CO2	1	1	2	2	1
CO3	2	2	3	2	3
CO4	3	1	2	1	3
CO5	3	2	2	3	2
AVERAGE	**2.4**	**1.6**	**2**	**1.8**	**2**

BHARATH COLLEGE OF SCIENCE AND MANAGEMENT
Near New Bus Stand THANJAVUR-5

PRINCIPAL
Bharath College of Science and Management
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THANJAVUR - 613 005.

BHARATH COLLEGE OF SCIENCE AND MANAGEMENT
(UGC Recognized 2(f) & 12(B) Institution)
THANJAVUR-5
PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME M.Sc BIOTECHNOLOGY

PO1	To know a thorough knowledge about structure and function of cells, cellular signaling, protein trafficking, bio molecules and cellular development.
PO2	To collect, deals with various types of classification of microbes and also throws light on multifarious habitats of microbes and provides information about all the microbial cellular functions and various metabolic pathways in microbes.
PO3	To study the structure, properties and metabolism of different biomolecules and to know the interrelationships between different metabolisms.To understand the basic concepts of immune system, elucidate the immune response of humans to foreign substances and to study the modern techniques of immunology that help determine human protection.
PO4	To study the various principles underlying genetic engineering that forms the basis of rDNA technology and to study the methodologies, and in brief the applications and related issues of rDNA technology and understanding about the basics of Animal cell culture, transgenic animals, pest & animal management, Molecular markers and regulations about the use of Biotechnology.To study the downstream processes for product recovery in fermentation.
PO5	Student will get an idea about the basic understanding about Bioinformatics, tools, sequences, algorithms and the analysis of phylogenetic tree.

COURSE :LAB IN rDNA TECHNOLOGY & IMMUNOLOGY COURSE CODE:P16BT23P

COURSE OUTCOME

CO1	Isolation of plasmids – small & large scale. Size analysis of plasmids by agarose gel electrophoresis. Restriction digestion, ligation. Preparation of competent E.coli cells & transformation of E.coli with recombinantDNA. Selection methods (Blue white selection, insertional inactivation). Primer design and PCR amplification of β(beta)- galactosidase. Cloning of PCR product into pBR322. Introduction of cloned genes and analysis by SDS – PAGE.
CO2	Southern blotting. RFLP Analysis of 18s rRNA of the genome. Genetic diversity of Pseudomonas by RAPD. Reporter gene assay (GUS/ β(beta)- galactosidase). Northen blotting.
CO3	Basics - Bleeding, separation of serum, plasma. (Hands on). Precipitation techniques – Agar gel diffusion, counter immuno-eletrophoresis, single radial immuno-diffusion, rocket immuno-electrophoresis (Hands on). Agglutination techniques Blood grouping and Rh factor; Latex agglutination – RF, ASLO, HBsAg and CRP (Hands on); Heme agglutination - RPHA / IHA (Hands on) Labeled Assays Enzyme Linked Immunosorbent Assay (ELISA) (Hands on) Immunoflouresence (IF) (Hands on). Immunohistochemistry (IH) (Demonstration). Immunoperoxidase (PAP) staining. Radioimmunoassays (RIA) (Theory).
CO4	Preparation of tissue culture media. Separation of Human PBMC & analysis. Types of culture. Maintenance of culture
CO5	Breeding and maintenance of experimental animals. Surgical and experimental techniques – thymectomy, spleenectomy and harvesting of lymphnodes. Isolation and enumeration of immune reactive cells. Immunization techniques and use of adjuvants. Choice of animals, form and dose of antigen, route of immunization, immunization

PO→ CO↓	PO1	PO2	PO3	PO4	P05
CO1	3	3	4	4	4
CO2	4	4	4	4	4
CO3	4	3	4	3	4
CO4	3	4	4	3	4
CO5	4	4	4	4	4
Average	3.6	3.6	4	3.6	4

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ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME B.Sc.,BIOTECHNOLOGY

PO1	TheCell biology is the study of the structure and function of prokaryotic and eukaryotic cells. Functions of cell, its organelles, synthesis and function of macromolecules ,carbohydrate, protein, lipid, DNA & RNA and microscopic techniques to understand the cell structure. Basic of microbiology dealing types of microbes analyse medical microbiology.
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PO5	This course is designed to give an idea about the avenues of exploiting microbes and to study the downstream processes for product recovery in fermentation.Microbes in food processing and production.Fermented foods and beverages.

COURSE : CELL BIOLOGY SUB CODE:16SCCBT1

COURSE OUTCOME

CO1	Fundamentals of cell structure.Prokaryotic and eukaryotic cells.Cell division:
CO2	Cellular membranes and matrices.Dynamic nature of membranes;cytoskeleton – structure and function.
CO3	Cellular organelles in metabolism.Morphology and functions of peroxisomes and glyoxisomes;
CO4	Cellular organelles in energy metabolism,Mitochondria,Chloroplast – structure and function.structure of nucleic acids.
CO5	Methods in cell biology.Microscopy,Use of radioisotopes.

COURSE ATTAINMENT FOR M.Sc., BIOTCHNOLOGY

SUBJECT NAME : BIOCHEMISTRY
SUBJECT CODE : P16BT13
NO. OF STUDENTS: 11

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO. OF STUDENTS	STATUS
90 -100	0	OUTSTANDING
80 - 89	6	EXCELLENT
75-79	4	DISTINCTION
70-74	1	VERY GOOD
60-69	0	GOOD
50-59	0	AVERAGE
BELOW 50	0	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
80-89	54.54%	EXCELLENT
75-79	36.36%	DISTINCTION
70 - 74	9.09%	VERY GOOD

SNO	REG. NO	NAME	CO1	CO2	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	CB18S075716	ABI.A	3	3	3	3	15	60
2	CB18S075717	ABINAYA.V	3	3	3	4	16	64
3	CB18S075718	ADHITHA.M	3	3	4	4	18	72
4	CB18S075719	ARUN.S	3	3	3	3	15	60
5	CB18S075720	ARUNMOZHI.S	3	3	4	4	17	68
6	CB18S075721	BHUVANESWARI.S	4	4	3	3	18	72
7	CB18S0757122	CHANDRU.S	4	3	3	5	18	72
8	CB18S0757123	DEVADHARSHINI.N.S	4	4	5	5	22	88
9	CB18S075724	EZHILRASAN.A	3	3	5	4	19	76
10	CB18S075725	GOPINATH.V	3	3	3	3	15	60
11	CB18S075726	GUNASEKARAN.B	3	3	3	3	15	60
12	CB18S075727	HEMALATHA.S	3	3	3	3	15	60
13	CB18S075728	JAIKIRTI.S	3	4	4	5	20	80
14	CB18S075729	KARTHI.M	5	4	5	4	22	88
15	CB18S075730	KEERTHIKA.M	4	5	3	3	19	76
16	CB18S075731	KOWSHIKAN.V	5	4	3	3	19	76
17	CB18S075732	LAKSHMI PRIYA.M	5	4	3	3	19	76
18	CB18S075733	LOKESHKUMAR.M	3	4	5	5	22	88
19	CB18S075734	MATHAVAN.T	4	4	3	3	18	72

20	CB18S075735	MAHESHWARAN.C	3	3	3	4	16	64
21	CB18S075736	MANIKANDAN.S	4	4	4	2	17	68
22	CB18S075737	NARMATHA.S	3	3	3	4	17	68
23	CB18S075738	NISHA.P	4	4	3	2	16	64
24	CB18S075739	PARTHIBAN.S	5	4	3	3	19	76
25	CB18S075740	PRADEEPA.P	3	4	5	5	20	80
26	CB18S075741	PRAKASH.K	5	5	3	2	19	76
27	CB18S075742	SATHASIVAM.B	5	4	2	2	17	68
28	CB18S075743	SAKTHIVEL.S	4	4	3	3	18	72
29	CB18S075744	SANJAI KUMAR.E	4	4	3	3	18	72
30	CB18S075745	SHANTHI.P	5	4	4	5	22	88
31	CB18S075746	SOWMIYA.A	4	5	2	5	19	76
32	CB18S075747	SRIGOWTHAMAN.M	3	4	3	3	16	64
33	CB18S075748	SUBHA.P	3	5	3	3	18	72
34	CB18S075749	THAHIRUN NISHA.M	5	5	4	3	22	88
35	CB18S075750	VENGADESH.K	4	4	3	4	19	76
36	CB18S075751	VENKATESAN.C	3	3	3	3	15	60
37	CB18S075752	VIDHYA.R	3	4	5	4	19	76
38	CB18S075753	YUVARAJ.A	3	3	3	3	15	60
AVERAGE			**3.711**	**3.76**	**3.42**	**3.5**		

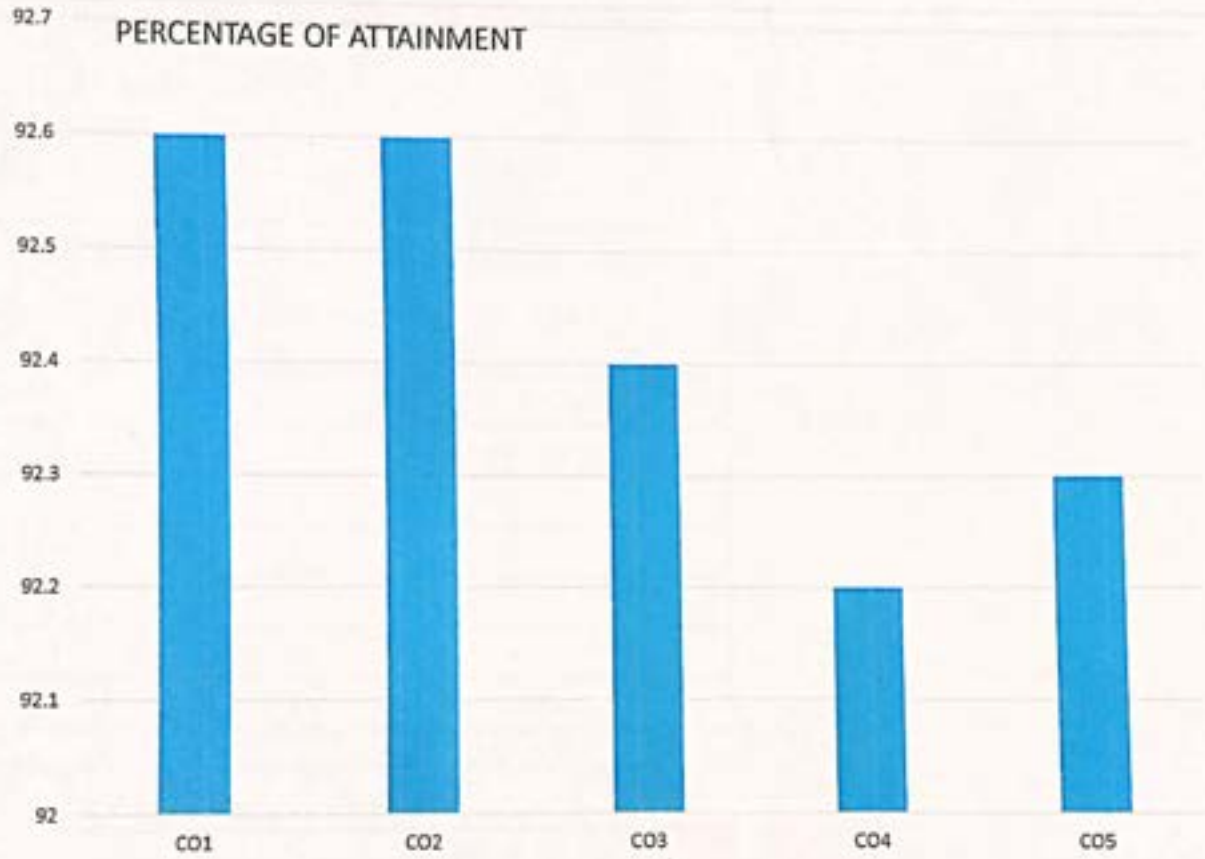
EXPECTED ATTAINMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+	END SEM	TOTAL	%
CO1	3.71	75	78.71	92.6
CO2	3.76	75	78.76	92.659
CO3	3.61	75	78.61	92.482
CO4	3.42	75	78.42	92.259
CO5	3.5	75	78.5	92.353

COURSE ATTAINMENT FOR B.SC., BIOTECHNOLOGY

SUBJECT NAME :CELL BIOLOGY
SUBJECT CODE :16SCCBT1
NO.OF STUDENTS:38

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	92.6
CO2	92.6
CO3	92.4
CO4	92.2
CO5	92.3



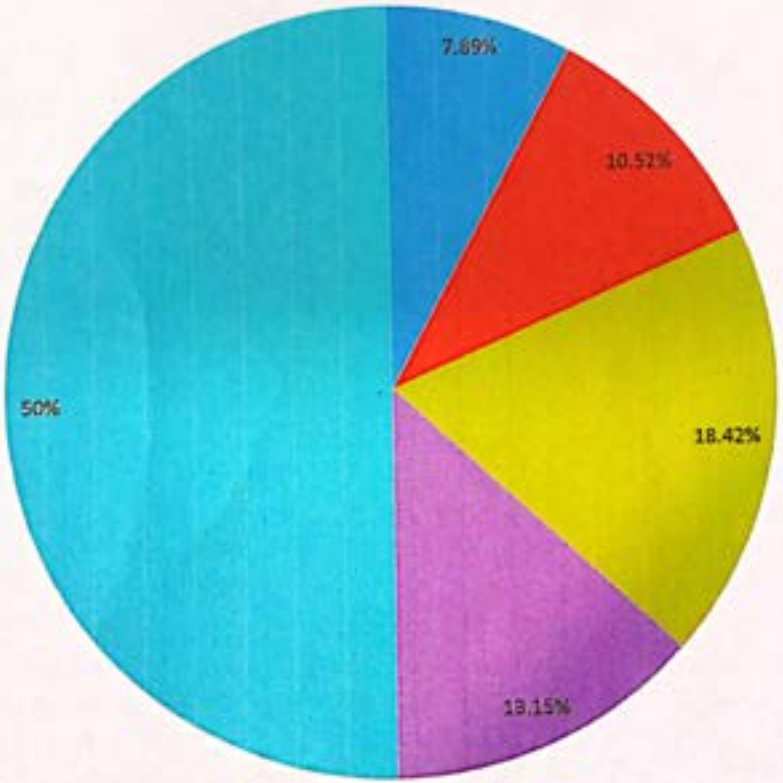
COURSE ATTAINMENT FOR B.SC., BIOTECHNOLOGY

SUBJECT NAME :CELL BIOLOGY
SUBJECT CODE :16SCCBT1
NO.OF STUDENTS:38

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO.OF STUDENTS	STATUS
90-100	0	OUTSTANDING
80-89	0	EXCELLENT
70-79	3	DISTINCTION
60-69	4	VERY GOOD
50-59	7	GOOD
40-49	5	AVERAGE
Below 40	19	REAPPEAR

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
70-79	7.89%	DISTINCTION
60-69	10.52%	VERY GOOD
50-59	18.42%	GOOD
40-49	13.15%	AVERAGE
Below 40	50%	REAPPEAR

COURSE OUTCOME ASSESSMENT IN PERCENTAGE



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PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME B.Sc:BIOTECHNOLOGY

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PO5	This course is designed to give an idea about the avenues of exploiting microbes and to study the downstream processes for product recovery in fermentation.Microbes in food processing and production,Fermented foods and beverages.

COURSE :BASIC MICROBOLOGY SUB CODE:16SACMB1

COURSE OUTCOME

CO1	Establishment of fields of medical microbiology.Immunology and environmental microbiology.
CO2	Whittaker's five kingdom.Diversity of Microbial world.
CO3	History of phycology.ultra structure, pigments, flagella.cycle of Chlamydomonas and Spirogyra.
CO4	Historical developments in the field of Mycology .Fungal cell ultra-structure.Sexual and asexual reproduction.
CO5	Protozoa, Viruses, Viroids and Prions.TMV, poliovirus.

PO → CO↓	PO1	PO2	PO3	PO4	PO5
CO1	3	3	1	2	1
CO2	2	3	2	2	3
CO3	3	3	1	3	2
CO4	2	2	1	2	2
CO5	3	1	2	2	3
AVERAGE	**2.6**	**2.4**	**1.4**	**2.2**	**2.2**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

S.NO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	CB18S075716	ABI.A	5	3	3	5	3	19	76
2	CB18S075717	ABINAYA.V	5	3	5	3	3	19	76
3	CB18S075718S	ADHITHA.M	5	3	5	3	3	19	76
4	CB18S075719	ARUN.S	5	3	5	3	3	19	76
5	CB18S075720	ARUNMOZHI.S	5	3	5	5	5	23	92
6	CB18S075721	BHUVANESWARI.S	5	5	5	3	5	23	92
7	CB18S0757122	CHANDRU.S	5	5	5	3	5	23	92
8	CB18S0757123	DEVADHARSHINI.N.S	5	5	5	5	3	23	92
9	CB18S075724	EZHILRASAN.A	4	4	4	4	4	20	80
10	CB18S075725	GOPINATH.V	4	4	4	4	4	20	80
11	CB18S075726	GUNASEKARAN.B	4	4	4	4	4	20	80

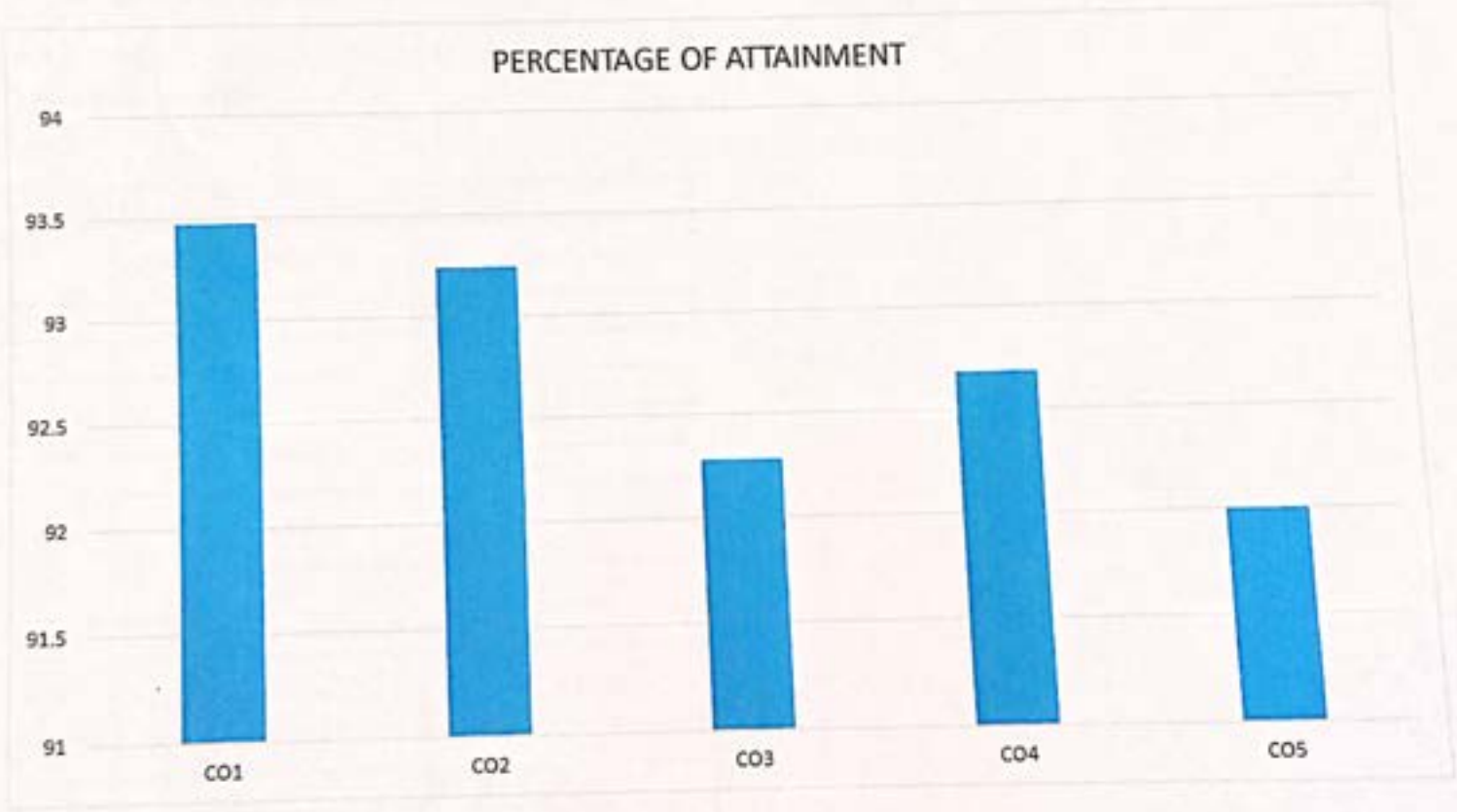
12	CB18S075727	HEMALATHA.S	4	5	4	3	3	19	76
13	CB18S075728	JAIKIRTI.S	5	5	5	5	3	23	92
14	CB18S075729	KARTHI.M	5	5	5	5	3	23	92
15	CB18S075730	KEERTHIKA.M	4	4	4	4	4	20	80
16	CB18S075731	KOWSHIKAN.V	3	4	3	3	5	18	72
17	CB18S075732	LAKSHMI PRIYA.M	5	5	5	3	5	23	92
18	CB18S075733	LOKESHKUMAR.M	3	3	4	4	5	19	76
19	CB18S075734	MATHAVAN.T	4	4	4	3	4	19	76
20	CB18S075735	MAHESHWARAN.C	3	3	3	5	5	19	76
21	CB18S075736	MANIKANDAN.S	4	4	4	4	4	20	80
22	CB18S075737	NARMATHA.S	5	5	5	3	5	23	92
23	CB18S075738	NISHA.P	5	5	5	3	5	23	92
24	CB18S075739	PARTHIBAN.S	5	5	5	3	5	23	92
25	CB18S075740	PRADEEPA.P	3	3	5	5	5	21	84
26	CB18S075741	PRAKASH.K	5	5	4	3	3	20	80
27	CB18S075742	SATHASIVAM.B	5	5	4	3	3	20	80
28	CB18S075743	SAKTHIVEL.S	5	5	4	3	3	20	80
29	CB18S075744	SANJAI KUMAR.E	5	5	4	3	3	20	80
30	CB18S075745	SHANTHI.P	5	5	3	5	5	23	92
31	CB18S075746	SOWMIYA.A	5	5	3	5	5	23	92
32	CB18S075747	SRIGOWTHAMAN.M	5	4	5	3	4	21	84
33	CB18S075748	SUBHA.P	3	5	4	4	4	22	88
34	CB18S075749	THAHIRUN NISHA.M	5	5	5	4	5	24	96
35	CB18S075750	VENGADESH.K	4	4	4	4	4	20	80
36	CB18S075751	VENKATESAN.C	4	4	4	4	4	20	80
37	CB18S075752	VIDHYA.R	4	4	4	4	4	20	80
38	CB18S075753	YUVARAJ.A	4	4	4	4	4	20	80
AVERAGE			**4.45**	**4.26**	**4.289**	**3.79**	**4.05**		

EXPECTED ATTAIMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+	END SEM	TOTAL	%
CO1	4.45	75	79.45	93.47
CO2	4.26	75	79.26	93.25
CO3	4.29	75	79.29	93.28
CO4	3.78	75	78.78	92.68
CO5	4.053	75	79.053	93.00

SUBJECT NAME: BASIC MICROBIOLOGY
SUBJECT CODE: 16SACMB1
NO. OF STUDENTS:38

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	93.47
CO2	93.24
CO3	92.28
CO4	92.68
CO5	92

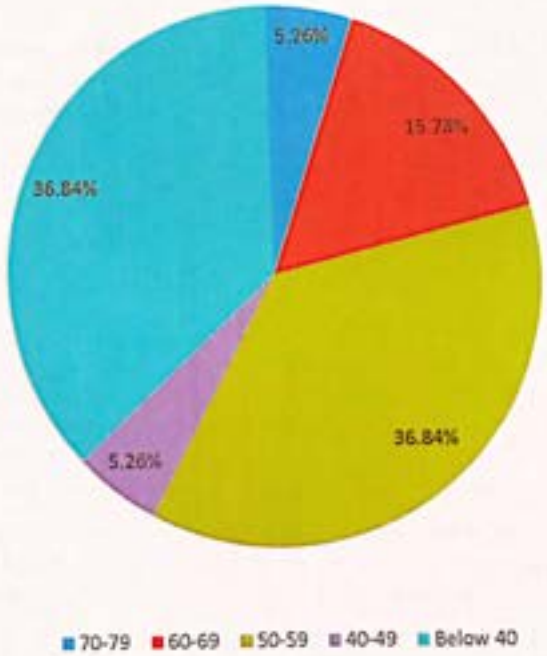


COURSE ATTAINMENT FOR B.SC., BIOTECHNOLOGY

SUBJECT NAME :BASIC MICROBIOLOGY
SUBJECT CODE :16SACMB1
NO.OF STUDENTS:38

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO.OF STUDENTS	STATUS
90-100	0	OUTSTANDING
80-89	0	EXCELLENT
70-79	2	DISTINCTION
60-69	6	VERY GOOD
50-59	14	GOOD
40-49	2	AVERAGE
Below 40	14	REAPPEAR

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
70-79	5.26%	DISTINCTION
60-69	15.78%	VERY GOOD
50-59	36.84%	GOOD
40-49	5.26%	AVERAGE
Below 40	36.84%	REAPPEAR



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COURSE : MOLECULAR BIOLOGY SUB CODE 16SCCBT2
COURSE OUTCOME

CO1	Nucleus & Chromosomes,3 dimensional organization of cytoskeleton,chromatin,allele, loci, gene. Nuclear division.
CO2	Organization of Chromosomes,chromosomal abnormalities and qualitative inheritance.Somatic cell genetics.
CO3	Central dogma of Molecular Biology,Transcription – Prokaryotic & Eukaryotic Transcription.Translation - Factors involved in translation.
CO4	Prokaryotic and Eukaryotic DNA replication.Mechanism of DNA replication.Enzymes & proteins involved in DNA replication.
CO5	Regulation of gene expression.gene loss, gene amplification, gene rearrangement.

PO → CO↓	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	2	3	1	2	2
CO2	3	3	3	1	2
CO3	2	3	2	3	1
CO4	2	3	2	2	2
CO5	3	3	3	1	2
AVERAGE	**2.4**	**3**	**2.2**	**1.8**	**1.8**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	CB18S075716	ABLA	3	3	3	3	3	18	72
2	CB18S075717	ABINAYA.V	3	3	3	3	3	18	72
3	CB18S075718S	ADHITHA.M	3	3	3	3	3	18	72
4	CB18S075719	ARUN.S	4	3	2	4	4	17	68
5	CB18S075720	ARUNMOZHI.S	4	4	4	4	4	20	80
6	CB18S075721	BHUVANESWARI.S	4	4	3	3	3	17	68
7	CB18S0757122	CHANDRU.S	5	5	5	4	3	22	88
8	CB18S0757123	DEVADHARSHINI.N.S	3	3	3	3	4	16	64
9	CB18S075724	EZHILRASAN.A	3	3	3	3	4	16	64
10	CB18S075725	GOPINATH.V	3	3	3	3	4	16	64

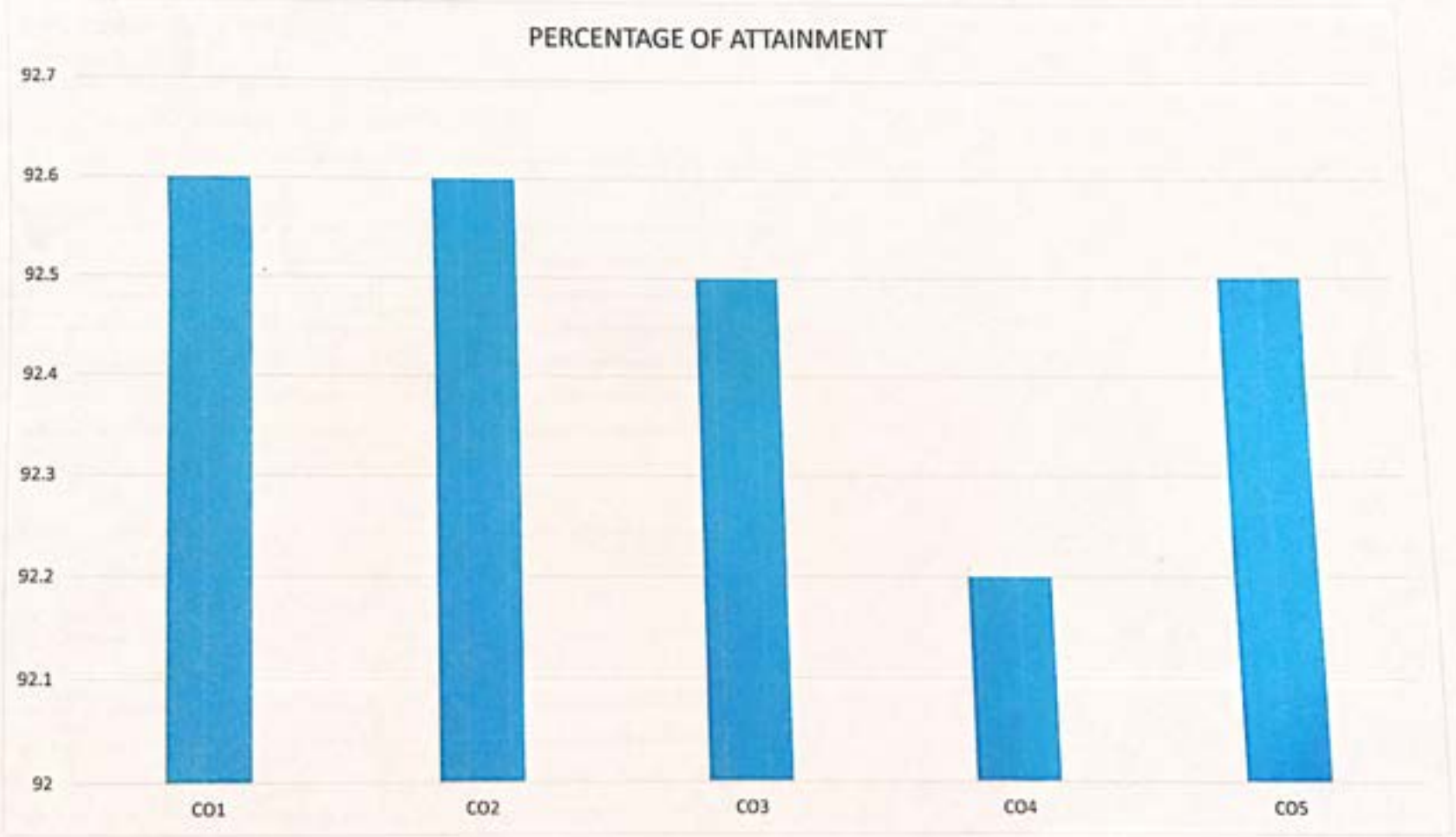
11	CB18S075726	GUNASEKARAN.B	3	3	4	4	4	18	72
12	CB18S075727	HEMALATHA.S	3	4	4	4	4	19	76
13	CB18S075728	JAIKIRTI.S	4	4	4	5	5	22	88
14	CB18S075729	KARTHI.M	5	4	4	3	4	20	80
15	CB18S075730	KEERTHIKA.M	3	5	4	3	3	18	72
16	CB18S075731	KOWSHIKAN.V	5	4	4	3	4	20	80
17	CB18S075732	LAKSHMI PRIYA.M	4	4	4	3	5	22	88
18	CB18S075733	LOKESHKUMAR.M	4	3	3	3	3	16	64
19	CB18S075734	MATHAVAN.T	4	4	4	3	3	18	72
20	CB18S075735	MAHESHWARAN.C	4	4	3	3	4	18	72
21	CB18S075736	MANIKANDAN.S	5	5	5	4	3	22	88
22	CB18S075737	NARMATHA.S	5	3	4	4	4	20	80
23	CB18S075738	NISHA.P	4	4	4	4	4	20	80
24	CB18S075739	PARTHIBAN.S	3	4	4	4	4	19	76
25	CB18S075740	PRADEEPA.P	3	4	3	5	3	18	72
26	CB18S075741	PRAKASH.K	5	5	4	3	2	19	76
27	CB18S075742	SATHASIVAM.B	5	4	4	2	3	18	72
28	CB18S075743	SAKTHIVEL.S	4	4	4	3	4	19	76
29	CB18S075744	SANJAI KUMAR.E	4	3	3	3	3	16	64
30	CB18S075745	SHANTHI.P	5	5	5	5	5	25	100
31	CB18S075746	SOWMIYA.A	4	5	3	2	5	19	76
32	CB18S075747	SRIGOWTHAMAN.M	3	4	3	3	3	16	64
33	CB18S075748	SUBHA.P	3	2	4	3	4	16	64
34	CB18S075749	THAHIRUN NISHA.M	3	4	5	4	3	19	76
35	CB18S075750	VENGADESH.K	3	4	4	3	4	18	72
36	CB18S075751	VENKATESAN.C	3	3	3	4	4	17	68
37	CB18S075752	VIDHYA.R	4	4	4	4	4	20	80
38	CB18S075753	YUVARAJ.A	3	4	4	3	3	17	68
		AVERAGE	**3.763**	**3.789**	**3.684**	**3.421**	**3.66**		

EXPECTED ATTAINMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+	END SEM	TOTAL	%
CO1	3.76	75	78.76	92.65882
CO2	3.79	75	78.79	92.69412
CO3	3.68	75	78.68	92.56471
CO4	3.42	75	78.42	92.25882
CO5	3.65	75	78.65	92.52941

SUBJECT NAME: MOLECULAR BIOLOGY
SUBJECT CODE: 16SCCBT2
NO. OF STUDENTS:38

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	92.6
CO2	92.6
CO3	92.5
CO4	92.2
CO5	92.5



COURSE ATTAINMENT FOR B.SC., BIOTECHNOLOGY

SUBJECT NAME:MOLECULAR BIOLOGY

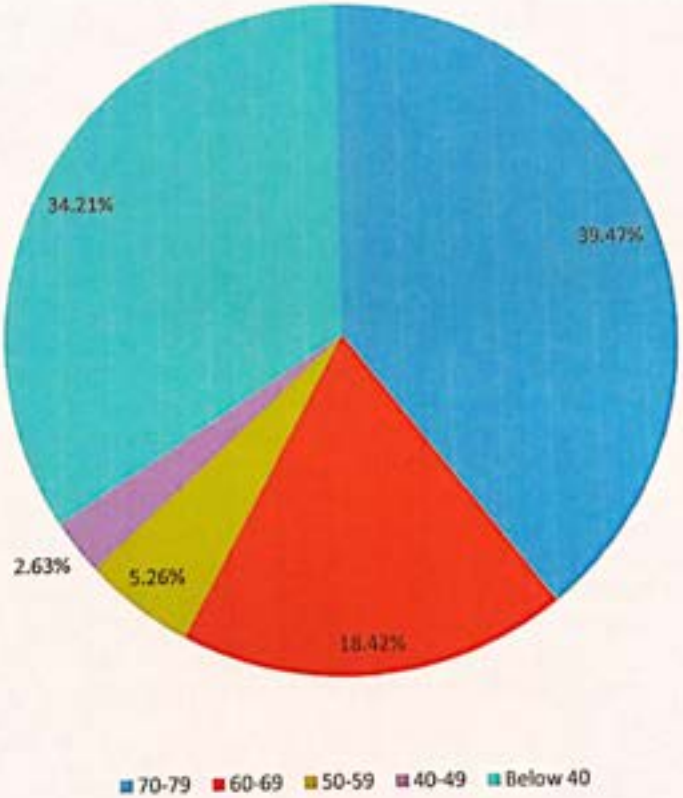
SUBJECT CODE :16SACBT2

NO.OF STUDENTS:38

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO.OF STUDENTS	STATUS
90-100	0	OUTSTANDING
80-89	0	EXCELLENT
70-79	15	DISTINCTION
60-69	7	VERY GOOD
50-59	2	GOOD
40-49	1	AVERAGE
Below 40	13	REAPPEAR

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
70-79	39.47%	DISTINCTION
60-69	18.42%	VERY GOOD
50-59	5.26%	GOOD
40-49	2.63%	AVERAGE
Below 40	34.21%	REAPPEAR

COURSE OUTCOME ASSESSMENT IN PERCENTAGE PERCENTAGE (MARKS)



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THANJAVUR-5
PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME M.Sc : BIOTECHNOLOGY

PO1	To know a thorough knowledge about structure and function of cells, cellular signaling, protein trafficking, bio molecules and cellular development.
PO2	To collect, deals with various types of classification of microbes and also throws light on multifarious habitats of microbes and provides information about all the microbial cellular functions and various metabolic pathways in microbes.
PO3	To study the structure, properties and metabolism of different biomolecules and to know the interrelationships between different metabolisms.To understand the basic concepts of immune system, elucidate the immune response of humans to foreign substances and to study the modern techniques of immunology that help determine human protection.
PO4	To study the various principles underlying genetic engineering that forms the basis of rDNA technology and to study the methodologies, and in brief the applications and related issues of rDNA technology and understanding about the basics of Animal cell culture, transgenic animals, pest & animal management, Molecular markers and regulations about the use of Biotechnology.To study the downstream processes for product recovery in fermentation. Technology and understanding about the basics of Animal cell culture, transgenic animals, pest & animal management, Molecular markers and regulations about the use of Biotechnology.
PO5	Student will get an idea about the basic understanding about Bioinformatics, tools, sequences, algorithms and the analysis of phylogenetic tree and will give an idea about the basic principles and techniques involved in plant cell culture and to understand the concepts of transformation and achievements of biotechnology in Plant systems.To understand the chemical nature and associated microbes of food and to understand the principles of food processing, preservation and manufacture.

CODE& COURSE	NAME OF THE PROGRAMME:M.Sc : BIOTECHNOLOGY	
	COURSE OUTCOME	
BIOCHEMISTRY (P16BT13)	CO1	Basics of Food Technology -Food chemistry: constituents of food - contribution to texture, flavour and organoleptic properties of food.
	CO2	Microbiology of Food -Sources and activity of microorganisms associated with food. Food fermentation & food chemicals.
	CO3	Food Processing -Raw material characteristics; cleaning, sorting and grading of foods; physical conversion operations - mixing, emulsification.
	CO4	Food Preservation -Use of high temperatures.
	CO5	Manufacture of Food Products -Bread and baked foods. Dairy products - milk processing, cheese, butter, ice-cream.

PO → CO↓	PO1	PO2	PO3	PO4	PO5
CO1	0	0	0	1	3
CO2	0	2	1	1	3
CO3	0	1	0	0	3
CO4	0	0	0	1	2
CO5	0	0	1	0	3
AVERAGE	0	0.6	0.4	0.6	2.8

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	P18440061	ABINAYA.P	5	4	5	5	4	23	92
2	P18440062	AKALYA.A	5	4	5	4	5	23	92
3	P18440063	DHARANYA.M	5	5	5	5	4	24	96
4	P18440064	GAYATHRI.M	5	5	5	4	5	24	96
5	P18440065	HARISUTHAN.E	5	5	4	5	5	24	96
5	P18440066	JAYANTHI.J	4	4	5	5	5	23	92
6	P18440067	KARKUZHALI.G	5	4	4	5	4	23	92
7	P18440068	LAVANSIYA MARY.S	5	4	5	4	5	23	92
8	P18440069	LEELA DEVI.K	5	4	5	5	4	23	92
10	P18440070	MONISALOMIA.S	5	4	4	4	5	22	88
11	P18440071	MUHILA.M	4	5	4	5	4	22	88
AVERAGE			4.81818	4.36364	4.636364	4.6363636	4.545		

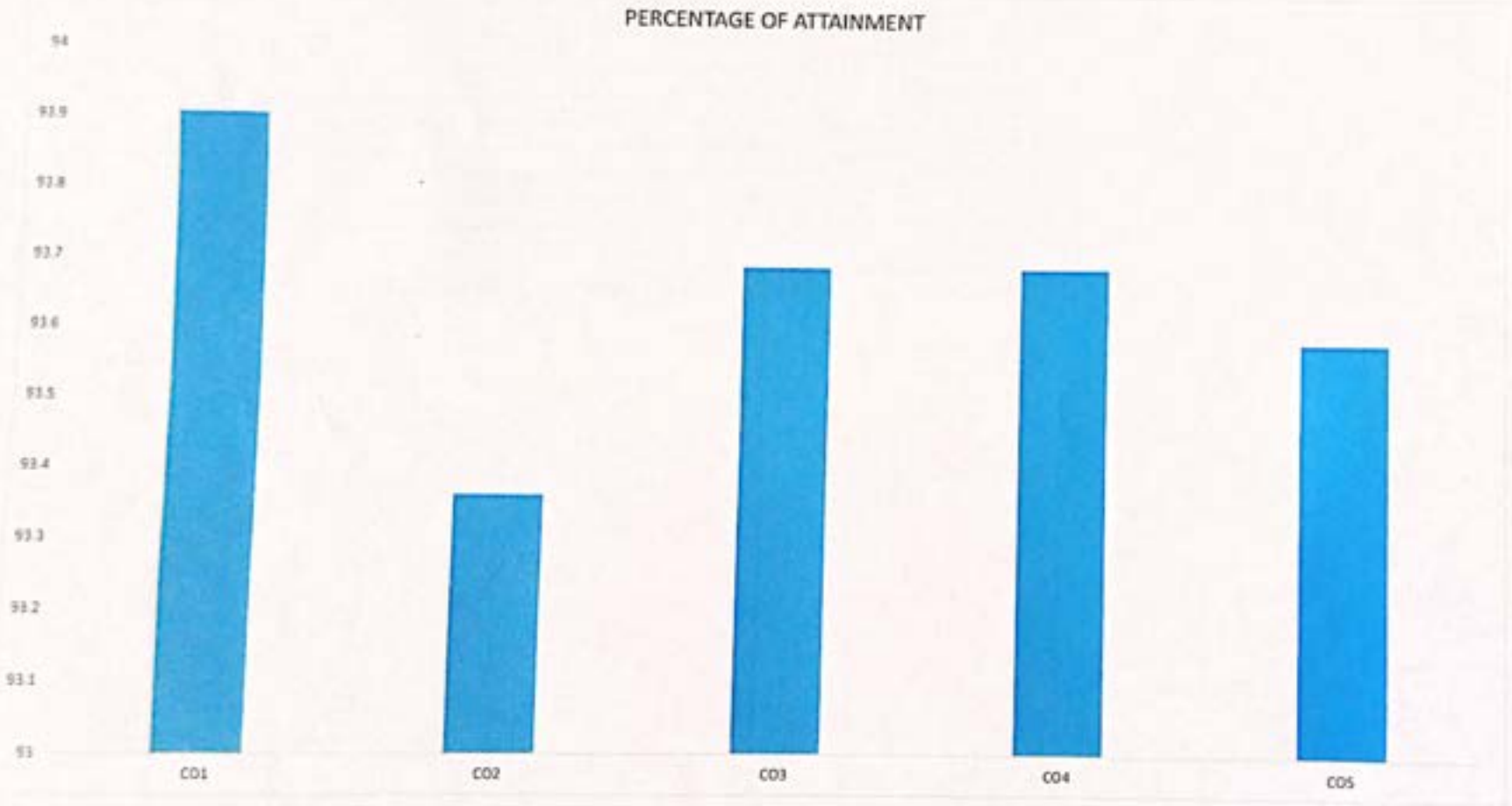
EXPECTED ATTAIMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	4.82	75	79.82	93.90588
CO2	4.36	75	79.36	93.36471
CO3	4.64	75	79.64	93.69412
CO4	4.64	75	79.64	93.69412
CO5	4.55	75	79.55	93.58824

COURSE ATTAINMENT FOR M.Sc., BIOTCHNOLOGY

SUBJECT NAME: BIOCHEMISTRY
SUBJECT CODE: P16BT13
NO. OF STUDENTS: 11

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	93.9059
CO2	93.3647
CO3	93.6941
CO4	93.6941
CO5	93.5882

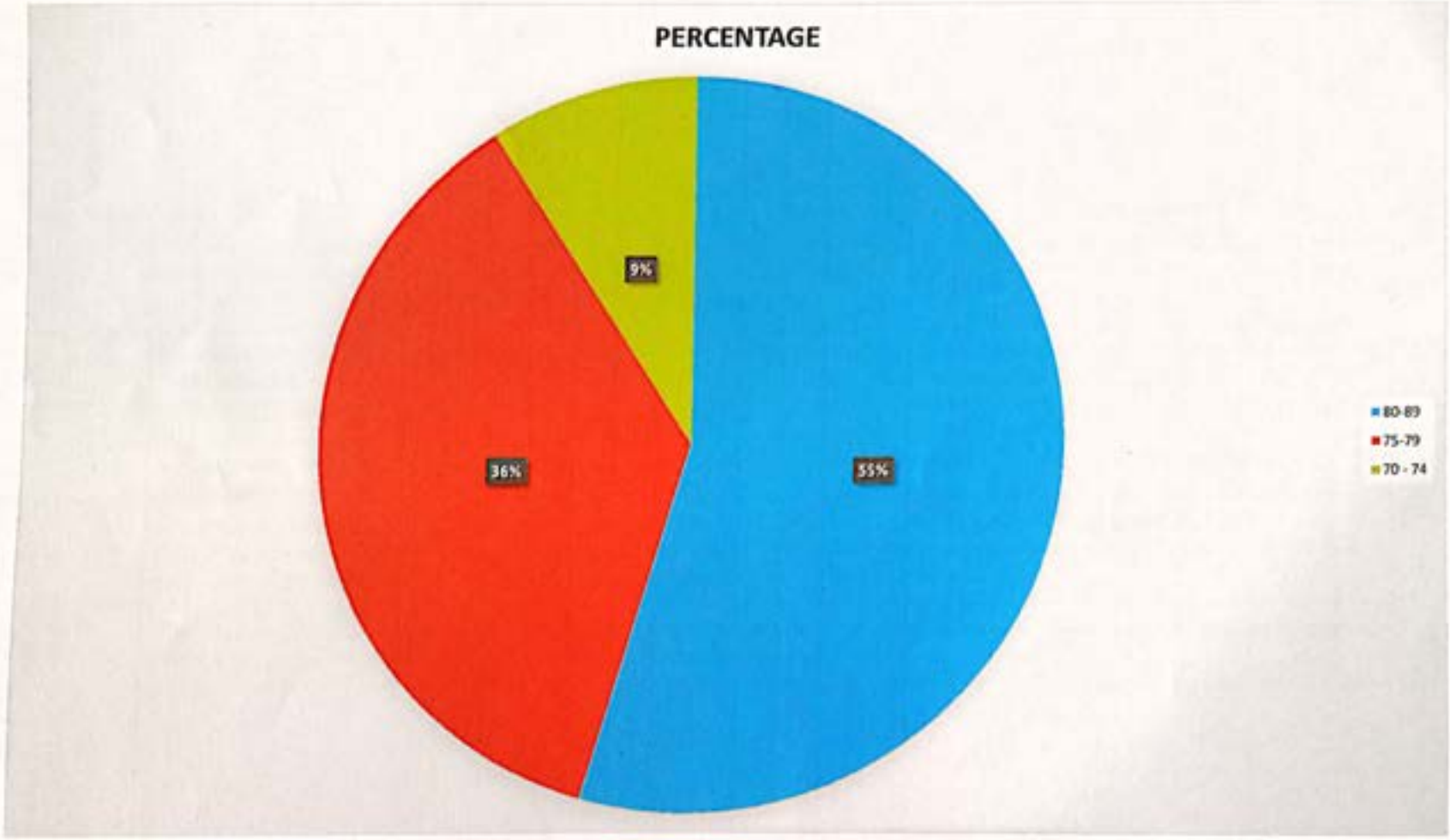


COURSE ATTAINMENT FOR M.Sc., BIOTECHNOLOGY

SUBJECT NAME: BIOCHEMISTRY
SUBJECT CODE: P16BT13
NO.OF STUDENTS: 11

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO.OF STUDENTS	STATUS
90 -100	0	OUTSTANDING
80 - 89	6	EXCELLENT
75-79	4	DISTINCTION
70-74	1	VERY GOOD
60-69	0	GOOD
50-59	0	AVERAGE
BELOW 50	0	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
80-89	54.54%	EXCELLENT
75-79	36.36%	DISTINCTION
70 - 74	9.09%	VERY GOOD



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PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME B.Sc:BIOTECHNOLOGY

PO1	TheCell biology is the study of the structure and function of prokaryotic and eukaryotic cells. Functions of cell, its organelles, synthesis and function of macromolecules ,carbohydrate, protein, lipid, DNA & RNA and microscopic techniques to understand the cell structure. Basic of microbiology dealing types of microbes analyse medical microbiology.
PO2	This course is designed to given an understanding about the basics of molecular biology – classical genetics & molecular aspects.Isolation, preservation and improvement of strains.Food Microbiology-Medical Microbiology,Agricultural Microbiology.
PO3	This courser is planned to basic knowledge on r DNA Technology,Blotting techques ,pharmaceutical products, Gene therapy.structure functions of biomolecules.Amino Acids and Proteins.Anatomy of the immune system.vaccinology-Clinical immunology.Classification of lipids.macro and micro minerals , Anatomy of the Immune System.Vaccinology,Clinical Immunology, Instruments in centrifugation, chromatography, electrophoresis, spectroscopy and crystallography.
PO4	This course is planned to give basic knowledge about plant tissue culture, transgenesis, genetic modifications in agriculture,Plant Genetic Engineering.Genetic modification in food industry,Production of organic food.This course is planned to impart knowledge on fundamentals of animal cell culture, GMOs, gene therapy & transgenic animals.Biostatistics - Concepts of statistics.
PO5	This course is designed to give an idea about the avenues of exploiting microbes and to study the downstream processes for product recovery in fermentation.Microbes in food processing and production,Fermented foods and beverages.

COURSE :APPLIED BIOCHEMISTRY SUB CODE:16SACBT2

COURSE OUTCOME

CO1	Basic principles of sedimentation. Types of centrifuges.Determination of molecular weight - sedimentation velocity.
CO2	General principle of chromatographic separation.GC, GLC and HPLC, GC-MS, LC-MS.
CO3	Basic principle and types of electrophoresis.Technique and uses of agarose gel electrophoresis.
CO4	Spectroscopy-Basic design of photoelectric colorimeter and spectrophotometer.
CO5	Crystallography-X-Ray Crystallography – X-ray diffraction.

PO → CO↓	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	2	1	3	1	2
CO2	2	3	2	2	2
CO3	3	1	3	1	2
CO4	2	2	2	2	1
CO5	2	1	2	3	2
AVERAGE	**2.2**	**1.6**	**2.4**	**1.8**	**1.8**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	END SEM(15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	CB18S075716	ABI.A	4	4	4	4	4	20	80
2	CB18S075718	ADHITHA.M	5	4	4	4	4	21	84
3	CB18S075719	ARUN.S	5	4	4	4	4	21	84
4	CB18S075720	ARUNMOZHI.S	5	4	4	4	4	20	80
5	CB18S075721	BHUVANESWARI.S	5	5	5	4	4	23	92
6	CB18S0757122	CHANDRU.S	5	5	5	3	3	21	84
7	CB18S075724	EZHILRASAN.A	4	4	4	4	4	20	80
8	CB18S075725	GOPINATH.V	4	4	4	4	4	20	80
9	CB18S075726	GUNASEKARAN.B	5	4	4	4	4	21	84
10	CB18S075727	HEMALATHA.S	5	4	4	4	4	21	84

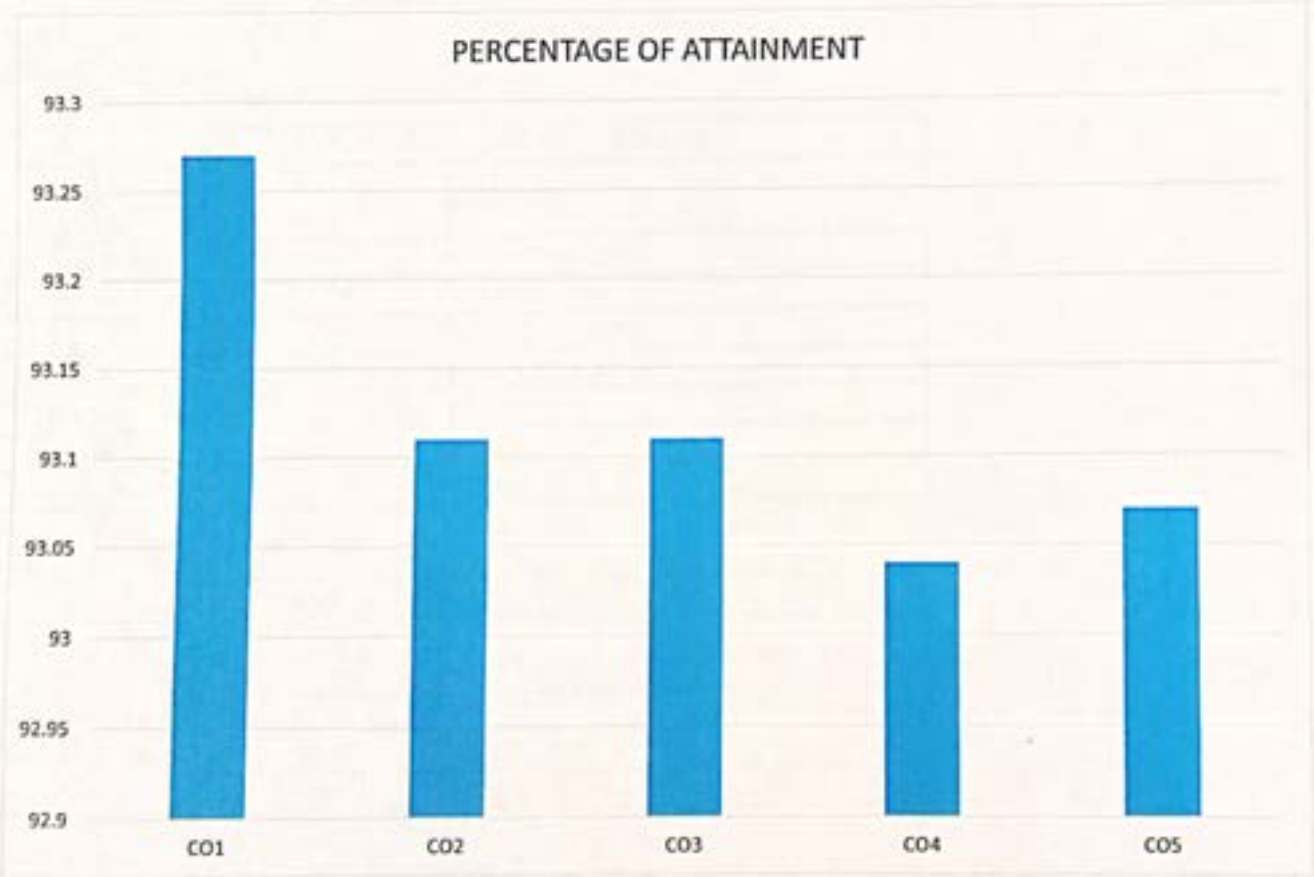
11	CB18S075728	JAIKIRTI.S	4	4	4	5	5	22	88
12	CB18S075729	KARTHI.M	5	4	4	5	5	23	92
13	CB18S075730	KEERTHIKA.M	4	5	4	3	5	21	84
14	CB18S075731	KOWSHIKAN.V	4	4	4	4	4	20	80
15	CB18S075732	LAKSHMI PRIYA.M	4	4	4	4	4	20	80
16	CB18S075733	LOKESHKUMAR.M	3	4	5	5	5	22	88
17	CB18S075734	MATHAVAN.T	4	4	4	4	4	20	80
18	CB18S075736	MANIKANDAN.S	4	4	4	4	4	20	80
19	CB18S075737	NARMATHA.S	5	4	4	4	4	21	84
20	CB18S075738	NISHA.P	4	4	4	4	4	20	80
21	CB18S075739	PARTHIBAN.S	4	4	4	4	4	20	80
22	CB18S075740	PRADEEPA.P	5	4	4	4	4	21	84
23	CB18S075741	PRAKASH.K	4	4	4	4	4	20	80
24	CB18S075742	SATHASIVAM.B	4	4	4	4	4	20	80
25	CB18S075743	SAKTHIVEL.S	4	4	4	4	4	20	80
26	CB18S075744	SANJAI KUMAR.E	4	4	4	4	4	20	80
27	CB18S075745	SHANTHI.P	3	5	5	5	5	23	92
28	CB18S075746	SOWMIYA.A	4	4	4	4	4	20	80
29	CB18S075747	SRIGOWTHAMAN.M	4	4	4	4	4	20	80
30	CB18S075749	THAHIRUN NISHA.M	5	5	5	5	3	23	92
31	CB18S075750	VENGADESH.K	4	4	4	4	4	20	80
32	CB18S075751	VENKATESAN.C	4	4	4	4	4	20	80
33	CB18S075752	VIDHYA.R	4	4	4	4	4	21	84
34	CB18S075753	YUVARAJ.A	5	4	4	4	4	21	84
35	CB18S075845	SANJEEVI.R	4	4	4	4	5	21	84
AVERAGE			**4.29**	**4.14**	**4.14**	**4.09**	**4.11**		

EXPECTED ATTAIMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+		TOTAL	%
CO1	4.28	75	79.28	93.27
CO2	4.14	75	79.14	93.11
CO3	4.14	75	79.14	93.11
CO4	4.08	75	79.08	93.04
CO5	4.11	75	79.11	93.07

SUBJECT NAME: APPLIED BIOCHEMISTRY
SUBJECT CODE: 16SACBT2
NO. OF STUDENTS:36

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	93.27
CO2	93.11
CO3	93.11
CO4	93.04
CO5	93.07



COURSE ATTAINMENT FOR B.SC., BIOTECHNOLOGY

SUBJECT NAME:APPLIED BIOCHEMISTRY

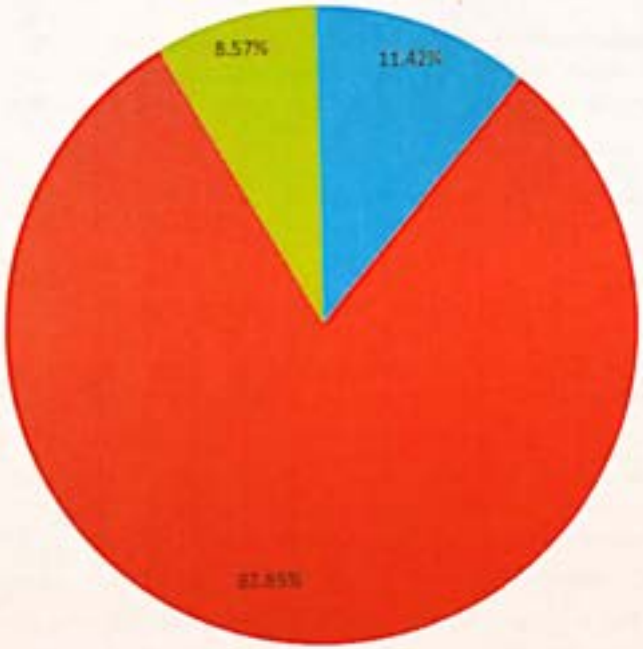
SUBJECT CODE :16SACBT2

NO.OF STUDENTS:36

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO.OF STUDENTS	STATUS
90 and above	4	OUTSTANDING
80-89	29	EXCELLENT
70-79	0	DISTINCTION
60-69	3	VERY GOOD
50-59	0	GOOD
40-49	0	AVERAGE
Below 40	0	REAPPEAR

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
90 and above	11.42%	OUTSTANDING
80-89	82.85%	EXCELLENT
60-69	8.57%	VERY GOOD

COURSE OUTCOME ASSESSMENT IN PERCENTAGE



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ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME B.Sc:BIOTECHNOLOGY

PO1	TheCell biology is the study of the structure and function of prokaryotic and eukaryotic cells. Functions of cell, its organelles, synthesis and function of macromolecules ,carbohydrate, protein, lipid, DNA & RNA and microscopic techniques to understand the cell structure. Basic of microbiology dealing types of microbes analyse medical microbiology.
PO2	This course is designed to given an understanding about the basics of molecular biology – classical genetics & molecular aspects.Isolation, preservation and improvement of strains.Food Microbiology-Medical Microbiology,Agricultural Microbiology.
PO3	This courser is planned to basic knowledge on r DNA Technology,Blotting techniques ,pharmaceutical products, Gene therapy.structure functions of biomolecules.Amino Acids and Proteins.Anatomy of the immune system.vaccinology-Clinical immunology.Classification of lipids.macro and micro minerals , Anatomy of the Immune System.Vaccinology,Clinical Immunology, Instruments in centrifugation, chromatography, electrophoresis, spectroscopy and crystallography.
PO4	This course is planned to give basic knowledge about plant tissue culture, transgenesis, genetic modifications in agriculture,Plant Genetic Engineering.Genetic modification in food industry,Production of organic food.This course is planned to impart knowledge on fundamentals of animal cell culture, GMOs, gene therapy & transgenic animals.Biostatistics - Concepts of statistics.
PO5	This course is designed to give an idea about the avenues of exploiting microbes and to study the downstream processes for product recovery in fermentation.Microbes in food processing and production,Fermented foods and beverages.

COURSE : APPLIED MICROBOLOGY SUB CODE : 16SACMB2

COURSE OUTCOME

CO1	Isolation, preservation and improvement of strains. Handling and development of inoculum for various fermentation process.
CO2	Microbial Energetic-Energy from inorganic compounds.Energy from hydrocarbons
CO3	Food Microbiology,Food poisoning – Food borne diseases.culture, microscopy and sampling methods.
CO4	Medical Microbiology,Infectious Diseases – viral, bacterial, fungal & protozoan.pathogenicity and laboratory diagnosis of Gram positive organisms
CO5	Environmental and Agricultural Microbiology.Waste management - waste water treatment, organic compost, biogas production,

PO → CO↓	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	2	2	3	2	2
CO2	2	2	3	3	2
CO3	1	3	3	3	2
CO4	2	2	3	2	3
CO5	2	3	3	1	2
AVERAGE	**1.8**	**2.4**	**3**	**2.2**	**2.2**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	CB18S075716	ABI.A	3	3	3	4	5	18	72
2	CB18S075717	ABINAYA.V	3	3	3	4	5	18	72
3	CB18S075718	ADHITHA.M	3	3	3	4	5	18	72
4	CB18S075719	ARUN.S	3	3	2	4	5	17	68
5	CB18S075720	ARUNMOZHI.S	4	4	4	4	4	20	80
6	CB18S075721	BHUVANESWARI.S	4	4	3	3	3	17	68
7	CB18S0757122	CHANDRU.S	5	5	5	4	3	22	88
8	CB18S0757123	DEVADHARSHINI.N.S	3	3	3	3	4	16	64
9	CB18S075724	EZHILRASAN.A	3	3	3	3	4	16	64
10	CB18S075725	GOPINATH.V	3	3	3	3	4	16	64
11	CB18S075726	GUNASEKARAN.B	3	3	4	4	4	18	72

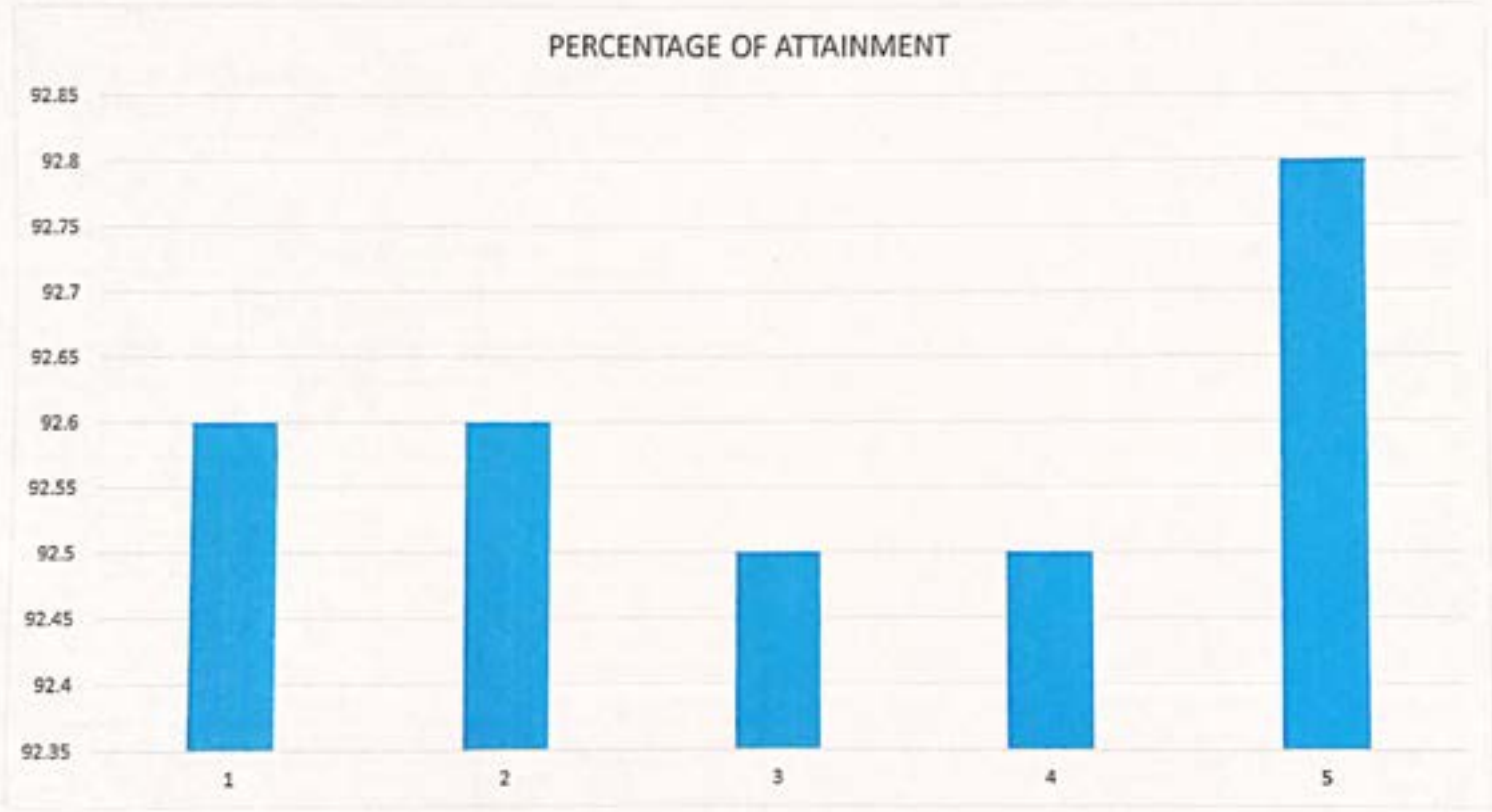
12	CB18S075727	HEMALATHA.S	3	4	4	4	4	19	76
13	CB18S075728	JAIKIRTI.S	4	4	4	5	5	22	88
14	CB18S075729	KARTHI.M	5	4	4	5	4	22	88
15	CB18S075730	KEERTHIKA.M	4	5	4	3	4	20	80
16	CB18S075731	KOWSHIKAN.V	4	4	4	3	3	18	72
17	CB18S075732	LAKSHMI PRIYA.M	4	4	4	4	4	20	80
18	CB18S075733	LOKESHKUMAR.M	3	4	5	5	5	22	88
19	CB18S075734	MATHAVAN.T	3	3	4	3	3	16	64
20	CB18S075735	MAHESHWARAN.C	4	4	3	3	4	18	72
21	CB18S075736	MANIKANDAN.S	4	3	3	4	4	18	72
22	CB18S075737	NARMATHA.S	4	4	4	4	4	20	80
23	CB18S075738	NISHA.P	4	4	4	5	5	22	88
24	CB18S075739	PARTHIBAN.S	5	4	4	3	4	20	80
25	CB18S075740	PRADEEPA.P	3	4	3	5	5	20	80
26	CB18S075741	PRAKASH.K	5	5	4	3	2	19	76
27	CB18S075742	SATHASIVAM.B	5	4	4	2	3	18	72
28	CB18S075743	SAKTHIVEL.S	4	4	4	3	4	19	76
29	CB18S075744	SANJAI KUMAR.E	4	3	3	3	3	16	64
30	CB18S075745	SHANTHI.P	5	5	5	5	5	25	100
31	CB18S075746	SOWMIYA.A	4	5	3	2	5	19	76
32	CB18S075747	SRIGOWTHAMAN.M	3	4	3	3	3	16	64
33	CB18S075748	SUBHA.P	3	4	3	3	3	16	64
34	CB18S075749	THAHIRUN NISHA.M	4	4	4	4	3	19	76
35	CB18S075750	VENGADESH.K	3	3	4	4	4	18	72
36	CB18S075751	VENKATESAN.C	3	3	3	4	4	17	68
37	CB18S075752	VIDHYA.R	4	4	4	4	4	20	80
38	CB18S075753	YUVARAJ.A	3	4	4	3	3	17	68
AVERAGE			**3.711**	**3.789**	**3.632**	**3.658**	**3.95**		

EXPECTED ATTAINMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+	END SEM	TOTAL	%
CO1	3.71	75	78.71	92.6
CO2	3.79	75	78.79	92.694
CO3	3.63	75	78.63	92.506
CO4	3.66	75	78.66	92.541
CO5	3.94	75	78.94	92.871

SUBJECT NAME: APPLIED MICROBIOLOGY
SUBJECT CODE: 16SACMB2
NO. OF STUDENTS:38

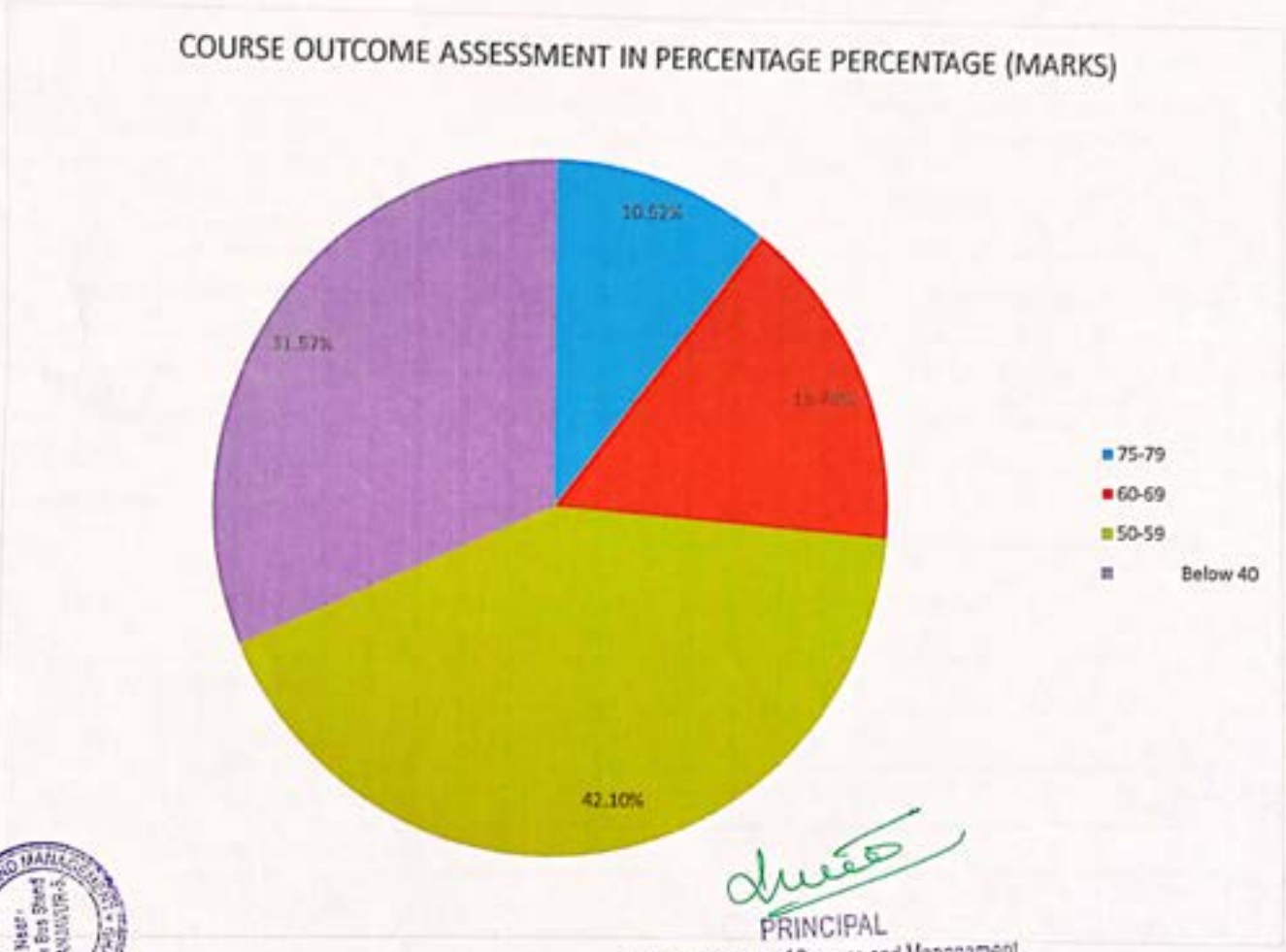
COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	92.6
CO2	92.6
CO3	92.5
CO4	92.5
CO5	92.8



COURSE ATTAINMENT FOR B.SC., BIOTECHNOLOGY
SUBJECT NAME:APPLIED MICROBIOLOGY
SUBJECT CODE :16SACMB2
NO.OF STUDENTS:38

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO.OF STUDENTS	STATUS
90-100	0	OUTSTANDING
80-89	0	EXCELLENT
75-79	4	DISTINCTION
60-69	6	GOOD
50-59	16	AVERAGE
Below 40	12	REAPPEAR

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
75-79	10.52%	DISTINCTION
60-69	15.78%	GOOD
50-59	42.10%	AVERAGE
Below 40	31.57%	REAPPEAR



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THANJAVUR-5
PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME B.Sc BIOTECHNOLOGY

PO1	TheCell biology is the study of the structure and function of prokaryotic and eukaryotic cells. In this course the students will learn different areas of cellular biology including the structure and functions of cell, its organelles, synthesis and function of macromolecules such as carbohydrate, protein, lipid, DNA & RNA; membrane structure and function; bioenergetics; cellular communication; and microscopic techniques to understand the cell structure. course about the basic of microbiology dealing types of microbes analyse medical microbiology.
PO2	This course is designed to given an understanding about the basics of molecular biology – classical genetics & molecular aspects.
PO3	This courser is planned to give basic knowledge on r DNA Technology,Blotting techques ,pharmaceutical products, Gene therapy.
PO4	This course is designed to give basic concepts of immunology.Fundemental concepts and Anatomy of the immune system.vaccinology-Clinical immunology.
PO5	To learn about fundamentals of animal cell culture,GMOs,Gene therapy and transgenic animals.

COURSE : LAB IN MICROBIALBIOTECHNOLOGY COURSE CODE:16SCCBT6P
COURSE OUTCOME

CO1	Isolation of industrially important microorganisms.
CO2	Enzyme production – amylase production.
CO3	Antibiotic production by different strains of microbes
CO4	Isolation & identification microbes from spoiled food
CO5	Immobilization of yeast cell by alginate beads

PO →	PO1	PO2	PO3	PO4	PO5
CO1	1	2	1	1	1
CO2	1	1	2	1	1
CO3	2	1	1	2	1
CO4	1	1	2	1	1
CO5	1	2	1	3	1
AVERAGE	**1.2**	**1.4**	**1.4**	**1.6**	**1**

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ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME B.Sc BIOTECHNOLOGY

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COURSE : PLANT AND ANIMAL BIOTECHNOLOGY COURSE CODE:16SCCBT5P
COURSE OUTCOME

CO1	Isolation of plant genomic DNA
CO2	Preparation of chloroplast from pea
CO3	Isolation of DNA from Animal liver, Isolation of DNA from human cheek cells
CO4	Quantification of DNA by spectrophotometeric method
CO5	Types of Animal cell culture – Primary, secondary & established

PO →	PO1	PO2	PO3	PO4	PO5
CO1	3	2	1	1	1
CO2	1	1	2	2	1
CO3	2	2	3	2	3
CO4	3	1	2	1	3
CO5	3	2	2	3	2
AVERAGE	**2.4**	**1.6**	**2**	**1.8**	**2**

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ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME B.Sc BIOTECHNOLOGY

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COURSE : BIOCHEMISTRY COURSE CODE:16SACBT1P
COURSE OUTCOME

CO1	Isolation of Mitochondria from rat liver.
CO2	Separation of amino acids/sugars/nucleic acids/pigments using paper and thin layer chromatography.
CO3	SDS-PAGE analysis of proteins
CO4	Separation of Blood, plasma and serum
CO5	Extraction of Proteins from biological materials, Protein separation methods : Precipitation, chromatographic, electrophoretic techniques.

PO →	PO1	PO2	PO3	PO4	PO5
CO1	2	1	1	1	1
CO2	2	2	2	3	1
CO3	1	1	3	2	3
CO4	2	3	2	2	2
CO5	3	2	2	1	2
AVERAGE	**2**	**1.8**	**2**	**1.8**	**1.8**

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ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME B.Sc BIOTECHNOLOGY

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COURSE : IMMUNOLOGY COURSE CODE:16SCCBT4P
COURSE OUTCOME

CO1	Separation of serum & plasma
CO2	Agglutination - Blood grouping, Latex agglutination, WIDAL
CO3	Breeding & maintenance of laboratory animals. Immunization
CO4	Raising antibody – polyclonal & monoclonal
CO5	Breeding of experimental animals.

PO →	PO1	PO2	PO3	PO4	PO5
CO1	2	1	1	1	1
CO2	2	1	1	1	2
CO3	2	1	3	2	3
CO4	2	1	2	2	1
CO5	3	1	1	3	2
AVERAGE	**2.2**	**1**	**1.6**	**1.8**	**1.8**

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PROGRAM OUTCOME

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COURSE :r DNA TECHNOLOGY COURSE CODE:16SCCBT3P

CO1	Isolation of genomic DNA from plant, animal cells & from bacteria
CO2	Isolation of plasmid DNA – small & large scale
CO3	Restriction digestion – single & double digestion, Ligation.
CO4	Selection & screening of rDNA products – Antibiotic resistance, Blue white colony.
CO5	PCR amplification, Southern blot and northern blot.

Near New Bus Stand THANJAVUR-5

PO →	PO1	PO2	PO3	PO4	PO5
CO1	2	1	1	1	1
CO2	2	2	2	3	1
CO3	1	1	3	2	3
CO4	2	3	2	2	2
CO5	3	2	2	1	2
AVERAGE	**2**	**1.8**	**2**	**1.8**	**1.8**

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ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME B.SC BIOTECHNOLOGY

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PO5	To learn about fundamentals of animal cell culture,GMOs,Gene therapy and transgenic animals.

COURSE : MOLECULAR BIOLOGY COURSE CODE:16SCCBT2P

CO1	Isolation and purification of genomic DNA from prokaryotes
CO2	Isolation and purification of plasmid DNA.
CO3	Transformation of bacteria – CaCl2 method
CO4	Observation of DNA
CO5	Staining of proteins

PO →	PO1	PO2	PO3	PO4	PO5
CO1	1	1	1	2	1
CO2	2	2	3	3	3
CO3	3	1	3	2	1
CO4	2	2	2	2	3
CO5	3	2	2	3	2
AVERAGE	**2.2**	**1.6**	**2.2**	**2.4**	**2**

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PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME B.SC BIOTECHNOLOGY

PO1	TheCell biology is the study of the structure and function of prokaryotic and eukaryotic cells. In this course the students will learn different areas of cellular biology including the structure and functions of cell, its organelles, synthesis and function of macromolecules such as carbohydrate, protein, lipid, DNA & RNA; membrane structure and function; bioenergetics; cellular communication; and microscopic techniques to understand the cell structure. course about the basic of microbiology dealing types of microbes analyse medical microbiology.
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PO4	This course is designed to give basic concepts of immunology.Fundemental concepts and Anatomy of the immune system.vaccinology-
PO5	To learn about fundamentals of animal cell culture,GMOs,Gene therapy and transgenic animals.

COURSE : MICROBIOLOGY COURSE CODE: 16SACMB1P
COURSE OUTCOME

CO1	Preparation of Microbiological media
CO2	Isolation of microorganisms from various samples
CO3	Biochemical identification of bacteria.
CO4	Staining of fungI
CO5	Identification of algae, fungi, lichens & yeast

PO →	PO1	PO2	PO3	PO4	PO5
CO1	1	1	1	2	1
CO2	2	2	3	2	1
CO3	3	1	1	2	1
CO4	2	3	2	2	3
CO5	2	3	2	3	2
AVERAGE	**2**	**2**	**1.8**	**2.2**	**1.6**

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ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME B.Sc BIOTECHNOLOGY

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PO5	To learn about fundamentals of animal cell culture,GMOs,Gene therapy and transgenic animals.

COURSE : CELL BIOLOGY COURSE CODE: 16SCCBT1P

CO1	Structure observation of Prokaryotic cells Structure observation of Eukaryotic cell
CO2	Motility of an organism
CO3	Cell Staining – Cytochemical methods.
CO4	Structure of purine and pyrimidine base, Watson and Crick model and forms of DNA.
CO5	Cell division – Binary fission of yeast

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PO →	PO1	PO2	PO3	PO4	PO5
CO1	3	2	2	2	1
CO2	3	2	3	2	2
CO3	3	2	1	3	1
CO4	3	3	2	2	2
CO5	3	3	3	3	2
AVERAGE	**3**	**2.4**	**2.2**	**2.4**	**1.6**

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PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME M.Sc : BIOTECHNOLOGY

PO1	To know a thorough knowledge about structure and function of cells, cellular signaling, protein trafficking, bio molecules and cellular development.
PO2	To collect, deals with various types of classification of microbes and also throws light on multifarious habitats of microbes and provides information about all the microbial cellular functions and various metabolic pathways in microbes.
PO3	To study the structure, properties and metabolism of different biomolecules and to know the interrelationships between different metabolisms.To understand the basic concepts of immune system, elucidate the immune response of humans to foreign substances and to study the modern techniques of immunology that help determine human protection.
PO4	To study the various principles underlying genetic engineering that forms the basis of rDNA technology and to study the methodologies, and in brief the applications and related issues of rDNA technology and understanding about the basics of Animal cell culture, transgenic animals, pest & animal management, Molecular markers and regulations about the use of Biotechnology.To study the downstream processes for product recovery in fermentation. Technology and understanding about the basics of Animal cell culture, transgenic animals, pest & animal management, Molecular markers and regulations about the use of Biotechnology..
PO5	student will get an idea about the basic understanding about Bioinformatics, tools, sequences, algorithms and the analysis of phylogenetic tree and will give an idea about the basic principles and techniques involved in plant cell culture and to understand the concepts of transformation and achievements of biotechnology in Plant systems.To understand the chemical nature and associated microbes of food and to understand the principles of food processing, preservation and manufacture.

COURSE CODE& COURSE TITLE	NAME OF THE PROGRAMME:M.Sc : BIOTECHNOLOGY	
	COURSE OUTCOME	
ANIMAL BIOTECHNOLOGY (P16BT32)	CO1	Animal Cell, Tissue and Organ Culture-Transformation of animal cells – Cloning vectors – Restriction Endonucleases, expression vectors – RTPCR - animal viral vectors and yeast vectors.
	CO2	Transgenic Animals-Development and uses - mice, cattle, goat, fish and sheep and transgenic pets. Tendered meat production.
	CO3	Pest and Animal Management-Biotechnological approach to the production of live feed.
	CO4	Molecular Markers-Use of nucleic acid probes and antibodies in clinical diagnosis and tissue typing.
	CO5	Regulating the use of Biotechnology-Regulating DNA technology – DNA barcoding. Regulating food and food ingredients. Human gene therapy.

PO → CO↓	PO1	PO2	PO3	PO4	PO5
CO1	1	0	1	3	1
CO2	0	0	3	3	0
CO3	2	1	1	3	1
CO4	1	0	2	3	2
CO5	0	0	3	3	0
AVERAGE	**0.8**	**0.2**	**2**	**3**	**0.8**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	5
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	P18440061	ABINAYA.P	4	4	5	5	4	22	88
2	P18440062	AKALYA.A	5	4	5	4	5	23	92
3	P18440063	DHARANYA.M	5	5	5	5	4	24	96
4	P18440064	GAYATHRI.M	5	5	4	4	4	22	88
5	P18440065	HARISUTHAN.E	5	5	4	5	5	24	96
5	P18440066	JAYANTHI.J	5	4	4	5	5	23	92
6	P18440067	KARKUZHALI.G	5	4	4	5	4	22	88
7	P18440068	LAVANSIYA MARY.S	5	5	4	4	5	23	92
8	P18440069	LEELA DEVI.K	5	5	4	4	5	23	92
10	P18440070	MONISALOMIA.S	5	4	4	4	5	22	88
11	P18440071	MUHILA.M	4	5	4	5	4	22	88
AVERAGE			4.818	4.55	4.273	4.545	4.545		

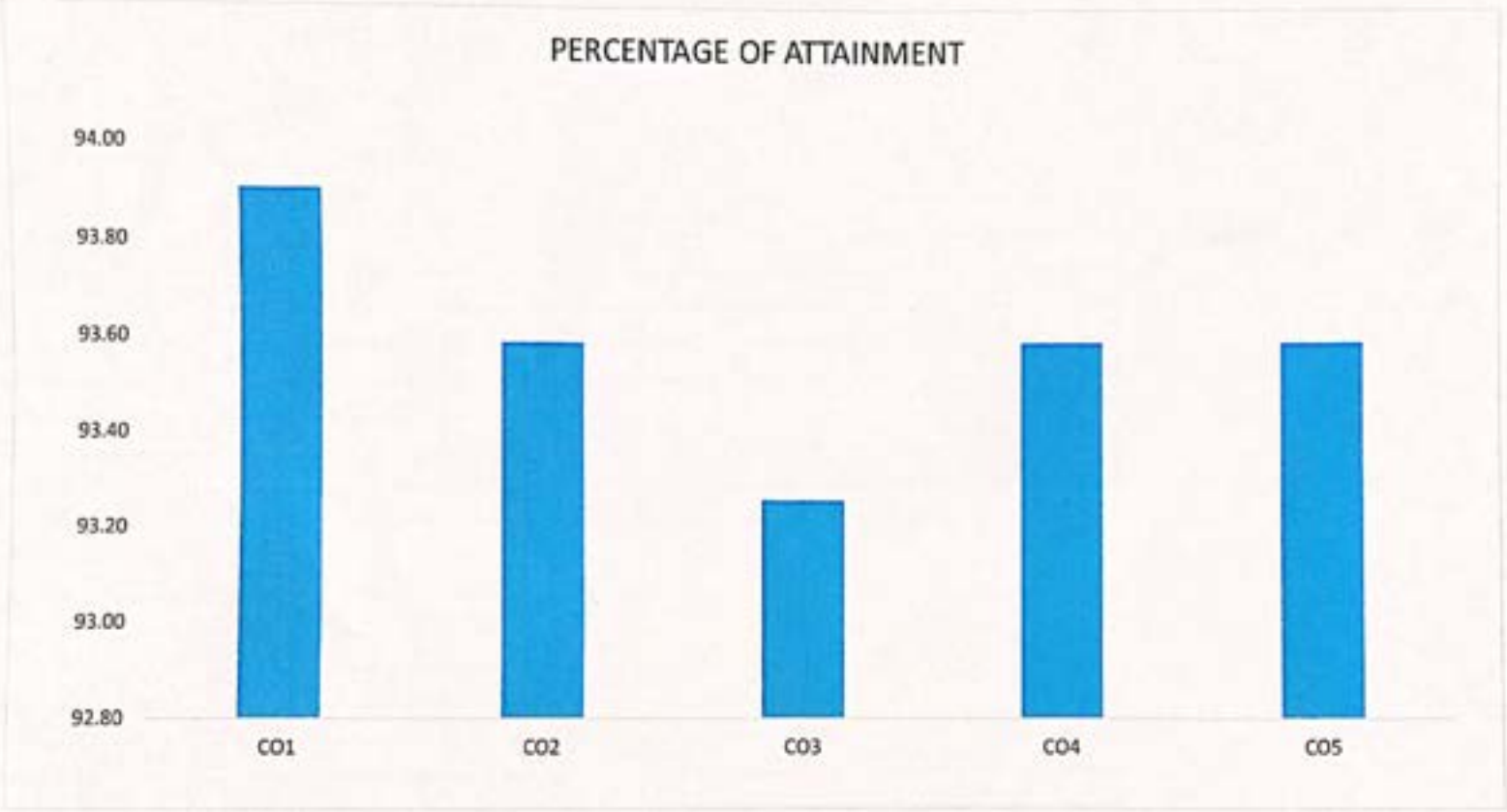
EXPECTED ATTAIMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	4.82	75	79.82	93.91
CO2	4.55	75	79.55	93.59
CO3	4.27	75	79.27	93.26
CO4	4.55	75	79.55	93.59
CO5	4.55	75	79.55	93.59

COURSE ATTAINMENT FOR M.Sc., BIOTCHNOLOGY

SUBJECT NAME: ANIMAL BIOTECHNOLOGY
SUBJECT CODE: P16BT32
NO. OF STUDENTS: 11

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	93.91
CO2	93.59
CO3	93.26
CO4	93.59
CO5	93.59

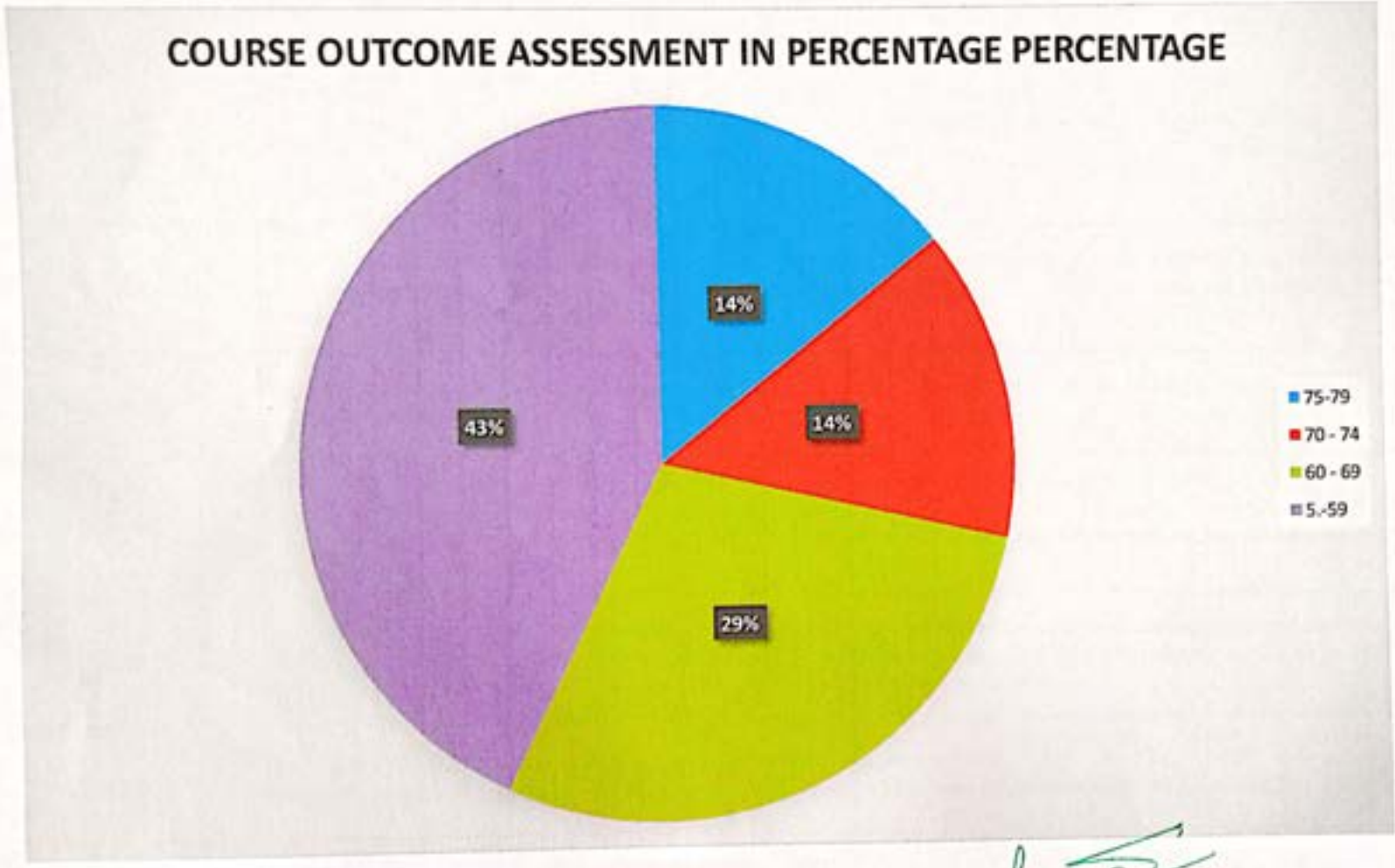


COURSE ATTAINMENT FOR M.Sc., BIOTCHNOLOGY

SUBJECT NAME: ANIMAL BIOTECHNOLOGY
SUBJECT CODE: P16BT32
NO. OF STUDENTS: 11

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO. OF STUDENTS	STATUS
90 -100	0	OUTSTANDING
80 - 89	0	EXCELLENT
75-79	1	DISTINCTION
70-74	1	VERY GOOD
60-69	2	GOOD
50-59	3	AVERAGE
BELOW 50	0	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
75-79	9.09%	DISTINCTION
70 - 74	9.09%	VERY GOOD
60 - 69	18.18%	GOOD
5.-59	27.27%	AVERAGE



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(UGC Recognized 2(f) & 12(B) Institution)
THANJAVUR-5
PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME

PO1	TheCell biology is the study of the structure and function of prokaryotic and eukaryotic cells. Functions of cell, its organelles, synthesis and function of macromolecules ,carbohydrate, protein, lipid, DNA & RNA and microscopic techniques to understand the cell structure. Basic of microbiology dealing types of microbes analyse medical microbiology.
PO2	This course is designed to given an understanding about the basics of molecular biology – classical genetics & molecular aspects.Isolation, preservation and improvement of strains.Food Microbiology-Medical Microbiology,Agricultural Microbiology.
PO3	This courser is planned to basic knowledge on r DNA Technology,Blotting techques ,pharmaceutical products, Gene therapy.structure functions of biomolecules.Amino Acids and Proteins.Anatomy of the immune system.vaccinology-Clinical immunology.Classification of lipids.macro and micro minerals , Anatomy of the Immune System.Vaccinology,Clinical Immunology, Instruments in centrifugation, chromatography, electrophoresis, spectroscopy and crystallography.
PO4	This course is planned to give basic knowledge about plant tissue culture, transgenesis, genetic modifications in agriculture,Plant Genetic Engineering,Genetic modification in food industry,Production of organic food.This course is planned to impart knowledge on fundamentals of animal cell culture, GMOs, gene therapy & transgenic animals.Biostatistics - Concepts of statistics.
PO5	This course is designed to give an idea about the avenues of exploiting microbes and to study the downstream processes for product recovery in fermentation.Microbes in food processing and production,Fermented foods and beverages.

COURSE :ANIMAL BIOTECHNOLOGY SUB CODE:16SCCBT6

COURSE OUTCOME

CO1	Embryology,Gametogenesis and fertilization in animals,Fertilization methods (IVF, IUF, ICSI) and embryo transfer.
CO2	Animal cell culture,Primary and secondary cell culture,cell viability and cytotoxicity.
CO3	Genetic engineering in animals,Biological vectors and Vaccine production.
CO4	Gene therapy,Molecular diagnosis of Genetic disorders.
CO5	Transgenics,Production and recovery of products from animal tissue cultures.Transgenic microbes and animals.

PO → CO↓	PO1	PO2	PO3	PO4	PO5
CO1	3	2	2	2	1
CO2	3	2	3	2	2
CO3	3	3	1	3	1
CO4	3	2	2	2	2
CO5	3	2	3	3	2
AVERAGE	**3**	**2.2**	**2.2**	**2.4**	**1.6**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	CB1RS075716	ABLA	4	4	4	4	4	22	88
2	CB1RS075[illegible]5	ADHITHAM	5	5	5	5	3	23	92
3	CB1RS075719	ARUN S	3	5	5	5	3	23	92
4	CB1RS075720	ARUNMOZHI S	4	4	4	5	5	22	88
5	CB1RS075721	BHUVANESWARI S	3	5	5	5	5	23	92
6	CB1RS075722	CHANDRU S	3	5	5	5	5	23	92
7	CB1RS075724	EZHILRASAN A	3	4	4	5	5	21	84
8	CB1RS075725	GOPINATH V	5	4	4	4	4	21	84
9	CB1RS075726	GUNASEKARAN B	4	4	4	5	5	22	88
10	CB1RS075727	HEMALATHA S	3	5	5	5	5	23	92

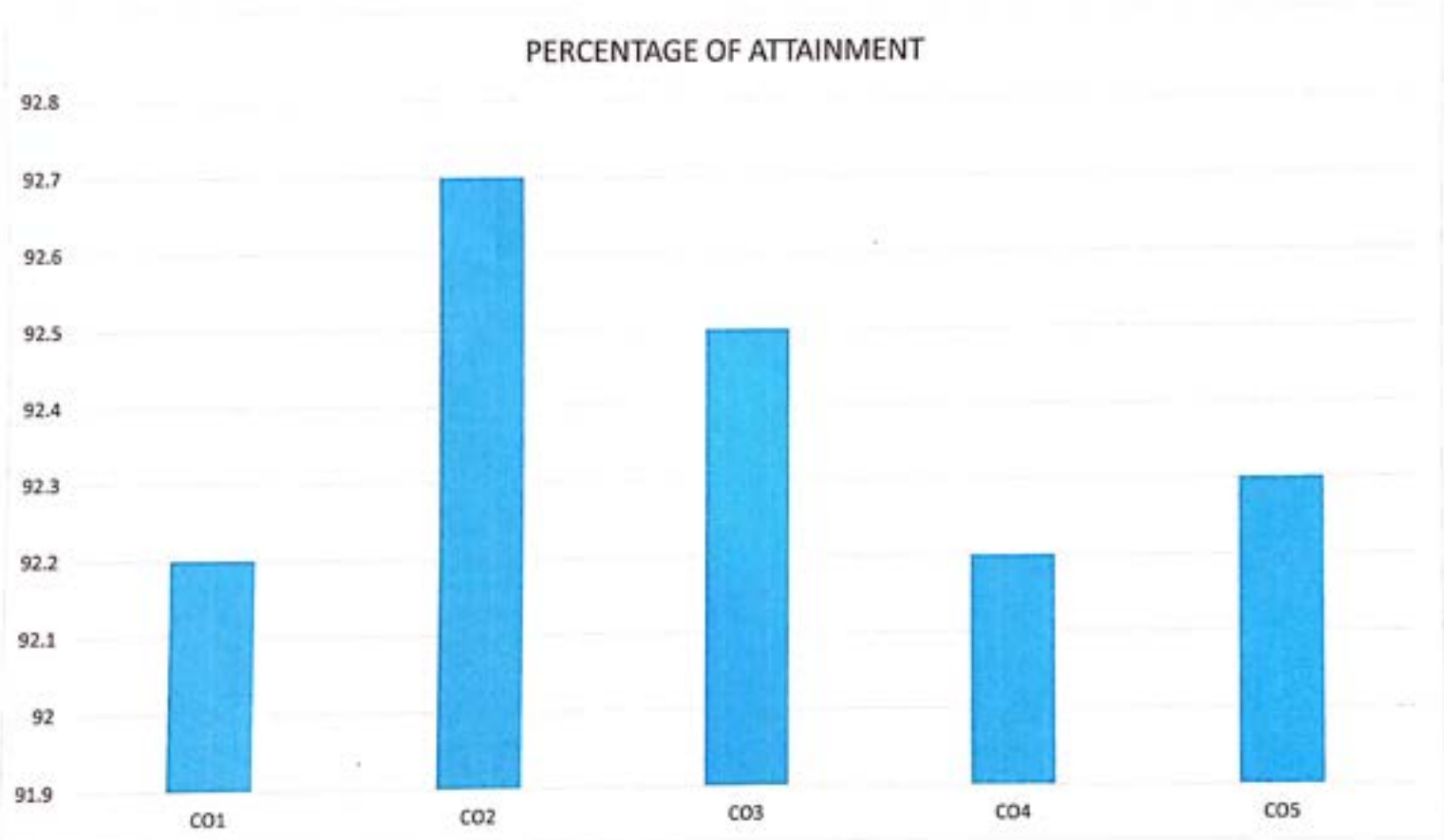
11	CB18S075728	JAIKIRTI.S	3	5	5	5	5	23	92
12	CB18S075729	KARTHI.M	5	5	5	5	3	23	92
13	CB18S075730	KEERTHIKA.M	5	5	5	5	3	23	92
14	CB18S075731	KOWSHIKAN.V	5	5	5	4	3	22	88
15	CB18S075732	LAKSHMI PRIYA.M	5	5	5	5	3	23	92
16	CB18S075733	LOKESHKUMAR.M	4	5	5	5	5	24	96
17	CB18S075736	MANIKANDAN.S	4	4	5	5	5	23	92
18	CB18S075737	NARMATHA.S	5	5	5	5	3	23	92
19	CB18S075738	NISHA.P	5	5	5	5	3	23	92
20	CB18S075739	PARTHIBAN.S	5	5	5	5	3	23	92
21	CB18S075740	PRADEEPA.P	5	5	5	5	3	23	92
22	CB18S075741	PRAKASH.K	5	5	5	5	3	23	92
23	CB18S075742	SATHASIVAM.B	5	5	5	5	3	23	92
24	CB18S075743	SAKTHIVEL.S	5	5	5	5	3	23	92
25	CB18S075744	SANJAI KUMAR.E	5	5	5	5	3	23	92
26	CB18S075745	SHANTHI.P	5	4	4	4	5	23	92
27	CB18S075746	SOWMIYA.A	4	5	3	2	5	23	92
28	CB18S075747	SRIGOWTHAMAN.M	3	5	5	5	5	20	80
29	CB18S075749	THAHIRUN NISHA.M	3	5	5	5	5	24	96
30	CB18S075750	VENGADESH.K	4	3	5	5	5	22	88
31	CB18S075751	VENKATESAN.C	4	4	4	5	5	22	88
32	CB18S075752	VIDHYA.R	5	5	5	5	3	23	92
33	CB18S075753	YUVARAJ.A	3	5	5	5	5	23	92
34	CB18S075845	SANJEEVI.R	5	5	5	4	3	22	88
AVERAGE			**4.235**	**4.71**	**4.735**	**4.765**	**4**		

EXPECTED ATTAIMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM (15)	TOTAL	%
CO1	4.24	75	79.24	93.22
CO2	4.71	75	79.71	93.77
CO3	3.68	75	78.68	92.56
CO4	3.45	75	78.45	92.29
CO5	3.5	75	78.5	92.35

SUBJECT NAME: ANIMAL BIOTECHNOLOGY
SUBJECT CODE: 16SCCBT6
NO. OF STUDENTS:34

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	92.2
CO2	92.7
CO3	92.5
CO4	92.2
CO5	92.3



COURSE ATTAINMENT FOR B.SC., BIOTECHNOLOGY

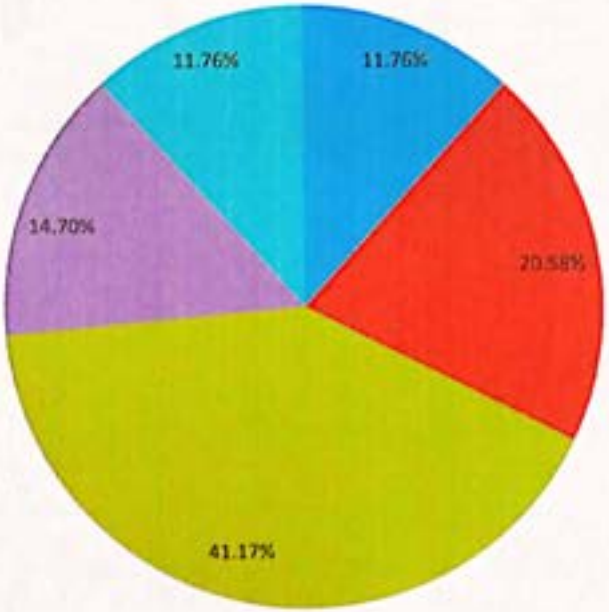
SUBJECT NAME: ANIMAL BIOTECHNOLOGY

SUBJECT CODE :16SCCBT6

NO.OF STUDENTS:34

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO.OF STUDENTS	STATUS
90 and above	0	OUTSTANDING
80-89	4	EXCELLENT
70-79	7	DISTINCTION
60-69	14	VERY GOOD
50-59	5	GOOD
40-49	0	AVERAGE
Below 40	4	REAPPEAR
CATEGORY (MARKS)	PERCENTAGE	STATUS
80-89	11.76%	EXCELLENT
75-79	20.58%	DISTINCTION
60-69	41.17%	VERY GOOD
50-59	14.70%	GOOD
Below 40	11.76%	REAPPEAR

PERCENTAGE



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PROGRAM OUTCOME

PO1	TheCell biology is the study of the structure and function of prokaryotic and eukaryotic cells. Functions of cell, its organelles, synthesis and function of macromolecules ,carbohydrate, protein, lipid, DNA & RNA and microscopic techniques to understand the cell structure. Basic of microbiology dealing types of microbes analyse medical microbiology.
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PO5	This course is designed to give an idea about the avenues of exploiting microbes and to study the downstream processes for product recovery in fermentation.Microbes in food processing and production,Fermented foods and beverages.

COURSE :BIOSTASTISTICS AND BIOSAFETY SUB CODE: 16SCCBT7

COURSE OUTCOME

CO1	Biostatistics - Concepts of statistics-basic principles.Variables - measurements,Sampling design – essentials of sampling
CO2	Measures of central tendency.Mean, median, mode and geometric mean;
CO3	Inferential statistics.Hypothesis,Sampling distribution and errors,
CO4	Biosafety,Primary Containment for Biohazards,Biosafety Levels of Specific Microorganisms.
CO5	Biosafety Guidelines.Biosafety guidelines and regulations of Government of India.

PO → CO↓	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	2	3	2	2	1
CO2	2	3	3	2	2
CO3	3	3	1	3	1
CO4	2	3	2	2	2
CO5	3	3	3	3	2
AVERAGE	**2.4**	**2.2**	**2.2**	**2.4**	**1.6**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST(15	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	CB18S075716	ABI.A	4	4	4	4	4	22	88
2	CB18S075718	ADHITHA.M	5	5	5	5	3	23	92
3	CB18S075719	ARUN.S	4	4	4	4	4	22	88
4	CB18S075720	ARUNMOZHI.S	4	4	4	4	4	22	88
5	CB18S075721	BHUVANESWARI.S	4	4	5	5	5	23	92
6	CB18S0757122	CHANDRU.S	5	5	5	4	5	24	96
7	CB18S075724	EZHILRASAN.A	4	4	4	4	4	20	80
8	CB18S075725	GOPINATH.V	4	4	4	4	4	20	80
9	CB18S075726	GUNASEKARAN.B	3	3	4	4	4	20	80
10	CB18S075727	HEMALATHA.S	3	5	5	5	5	23	92

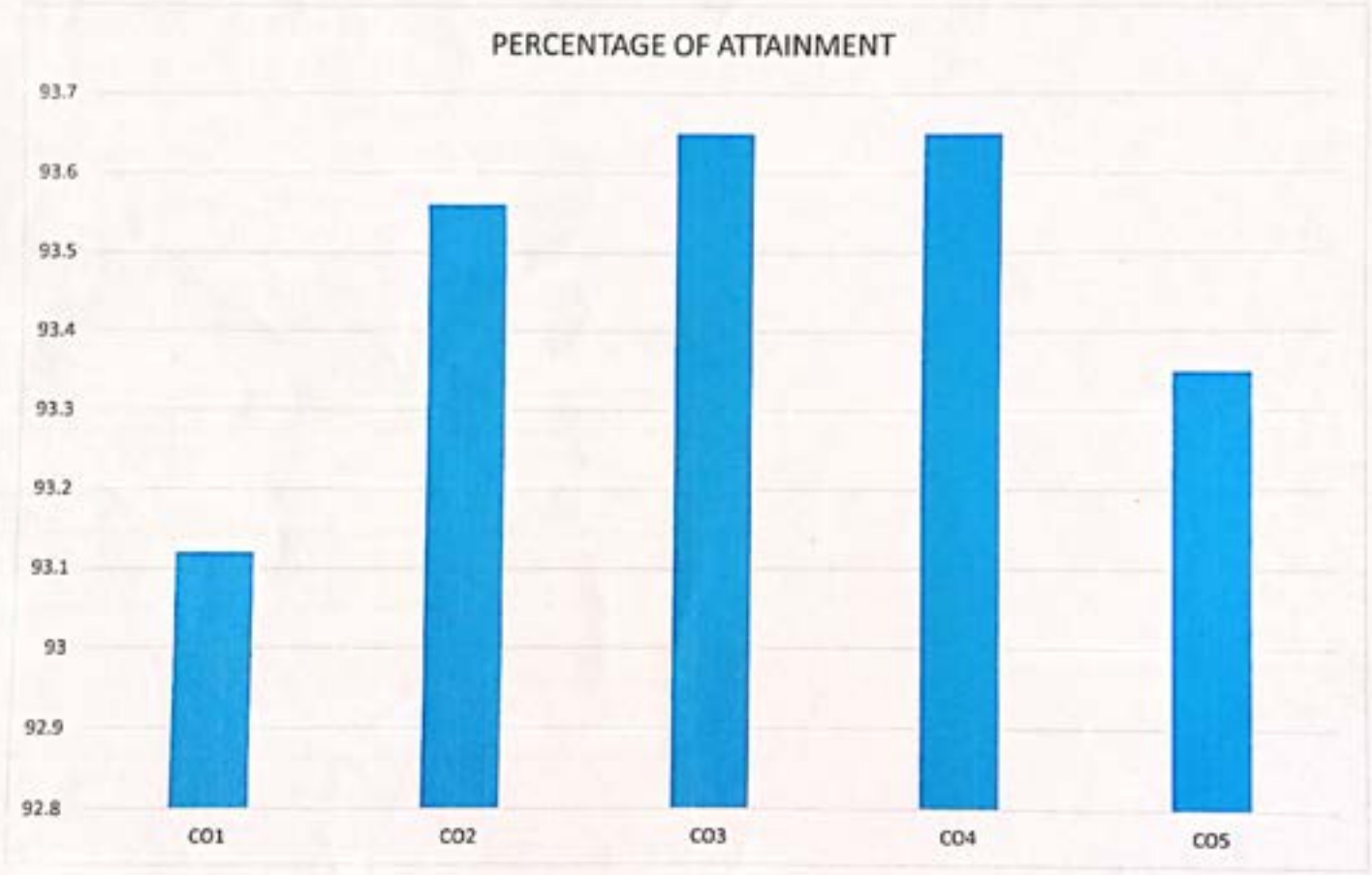
11	CB18S075728	JAIKIRTI.S	5	5	5	5	5	25	100
12	CB18S075729	KARTHI.M	5	5	5	5	3	23	92
13	CB18S075730	KEERTHIKA.M	5	5	5	5	5	25	100
14	CB18S075731	KOWSHIKAN.V	4	4	4	4	4	22	88
15	CB18S075732	LAKSHMI PRIYA.M	3	5	5	5	5	23	92
16	CB18S075733	LOKESHKUMAR.M	4	5	5	5	5	24	96
17	CB18S07536	MANIKANDAN.S	4	4	4	4	4	22	88
18	CB18S075737	NARMATHA.S	4	5	5	5	5	24	96
19	CB18S075738	NISHA.P	4	5	5	5	5	24	96
20	CB18S075739	PARTHIBAN.S	3	4	5	5	5	22	88
21	CB18S075740	PRADEEPA.P	5	5	5	5	4	24	96
22	CB18S075741	PRAKASH.K	5	5	5	5	3	23	92
23	CB18S075742	SATHASIVAM.B	5	5	5	4	3	22	88
24	CB18S075743	SAKTHIVEL.S	5	5	5	4	3	22	88
25	CB18S075744	SANJAI KUMAR.E	3	4	5	5	5	22	88
26	CB18S075745	SHANTHI.P	5	5	5	5	5	25	100
27	CB18S075746	SOWMIYA.A	3	5	5	5	5	23	92
28	CB18S075747	SRIGOWTHAMAN.M	4	4	4	4	5	21	84
29	CB18S075749	THAHIRUN NISHA.M	5	5	5	5	5	25	100
30	CB18S075750	VENGADESH.K	5	5	4	4	4	22	88
31	CB18S075751	VENKATESAN.C	4	4	4	4	4	22	88
32	CB18S075752	VIDHYA.R	3	5	5	5	5	23	92
33	CB18S075753	YUVARAJ.A	4	4	4	4	4	22	88
34	CB18S075845	SANJEEVI.R	4	4	4	5	5	22	88
AVERAGE			4.15	4.53	4.62	4.56	4.35		

EXPECTED ATTAIMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+	END SEM	TOTAL	%
CO1	4.15	75	79.15	93.12
CO2	4.53	75	79.53	93.56
CO3	4.6	75	79.6	93.65
CO4	4.6	75	79.6	93.65
CO5	4.35	75	79.35	93.35

SUBJECT NAME: BIOSTATSISTICS
SUBJECT CODE: 16SCCBT7
NO. OF STUDENTS:34

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	93.12
CO2	93.56
CO3	93.65
CO4	93.65
CO5	93.35



COURSE ATTAINMENT FOR B.SC., BIOTECHNOLOGY

SUBJECT NAME:BIOSTATISTICS

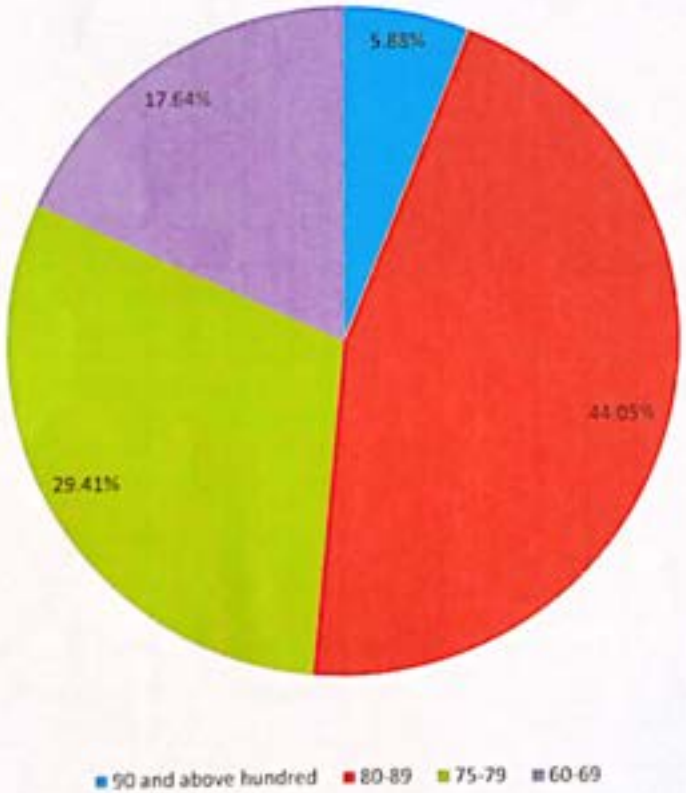
SUBJECT CODE :16SCCBT7

NO.OF STUDENTS:34

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO.OF STUDENTS	STATUS
90-100	2	OUTSTANDING
80-89	16	EXCELLENT
75-79	10	DISTINCTION
60-69	6	GOOD
50-59	0	AVERAGE
0-49	0	REAPPEAR

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
90 and above hundred	5.88%	OUTSTANDING
80-89	44.05%	EXCELLENT
75-79	29.41%	DISTINCTION
60-69	17.64%	VERY GOOD

COURSE OUTCOME ASSESSMENT IN PERCENTAGE PERCENTAGE (MARKS)



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PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME M.Sc : BIOTECHNOLOGY

PO1	To know a thorough knowledge about structure and function of cells, cellular signaling, protein trafficking, bio molecules and cellular development.
PO2	To collect, deals with various types of classification of microbes and also throws light on multifarious habitats of microbes and provides information about all the microbial cellular functions and various metabolic pathways in microbes.
PO3	To study the structure, properties and metabolism of different biomolecules and to know the interrelationships between different metabolisms.To understand the basic concepts of immune system, elucidate the immune response of humans to foreign substances and to study the modern techniques of immunology that help determine human protection.
PO4	TTo study the various principles underlying genetic engineering that forms the basis of rDNA technology and to study the methodologies, and in brief the applications and related issues of rDNA technology and understanding about the basics of Animal cell culture, transgenic animals, pest & animal management, Molecular markers and regulations about the use of Biotechnology.To study the downstream processes for product recovery in fermentation. Technology and understanding about the basics of Animal cell culture, transgenic animals, pest & animal management, Molecular markers and regulations about the use of Biotechnology.
PO5	Student will get an idea about the basic understanding about Bioinformatics, tools, sequences, algorithms and the analysis of phylogenetic tree and will give an idea about the basic principles and techniques involved in plant cell culture and to understand the concepts of transformation and achievements of biotechnology in Plant systems.To understand the chemical nature and associated microbes of food and to understand the principles of food processing, preservation and manufacture.

COURSE CODE& COURSE TITLE	NAME OF THE PROGRAMME:M.Sc : BIOTECHNOLOGY	
	COURSE OUTCOME	
IMMUNOLOGY (P16BT22)	CO1	Basics Concepts-DNA structure and properties. Restriction enzymes, DNA ligase, klenow enzyme, T4 DNA polymerase, polynucleotide kinase.
	CO2	Cloning Vectors -Plasmids, bacteriophages, M13 mp vectors, PUC19 and blue script vectors.
	CO3	Cloning Methodologies -Insertion of foreign DNA into host cells, transformation, construction of libraries, isolation of mRNA and total RNA.
	CO4	PCR and its Applications-Primer design, fidelity of thermostable enzymes, DNA polymerases, types of PCR.
	CO5	Sequencing Methods-Transgenics, cDNA and intragenic arrays, differential gene expression and protein array.

PO →	PO1	PO2	PO3	PO4	PO5
CO1	1	0	1	3	0
CO2	0	1	0	3	0
CO3	1	0	1	3	1
CO4	0	1	1	3	0
CO5	1	1	1	2	1
AVERAGE	**0.6**	**0.6**	**0.8**	**3**	**0.4**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	P18440061	ABINAYA.P	4	5	4	3	5	21	84
2	P18440062	AKALYA.A	5	4	4	5	4	22	88
3	P18440063	DHARANYA.M	5	5	4	5	4	23	92
4	P18440064	GAYATHRI.M	4	4	5	4	5	22	88
5	P18440065	HARISUTHAN.E	4	5	4	5	4	22	88
5	P18440066	JAYANTHI.J	5	4	5	4	5	23	92
6	P18440067	KARKUZHALI.G	4	5	4	5	4	22	88
7	P18440068	LAVANSIYA MARY.S	5	4	5	4	4	22	88
8	P18440069	LEELA DEVI.K	5	4	4	5	5	23	92
10	P18440070	MONISALOMIA.S	4	5	4	5	4	22	88
11	P18440071	MUHILA.M	4	5	4	5	4	22	88
AVERAGE			4.455	4.545	4.273	4.545	4.364		

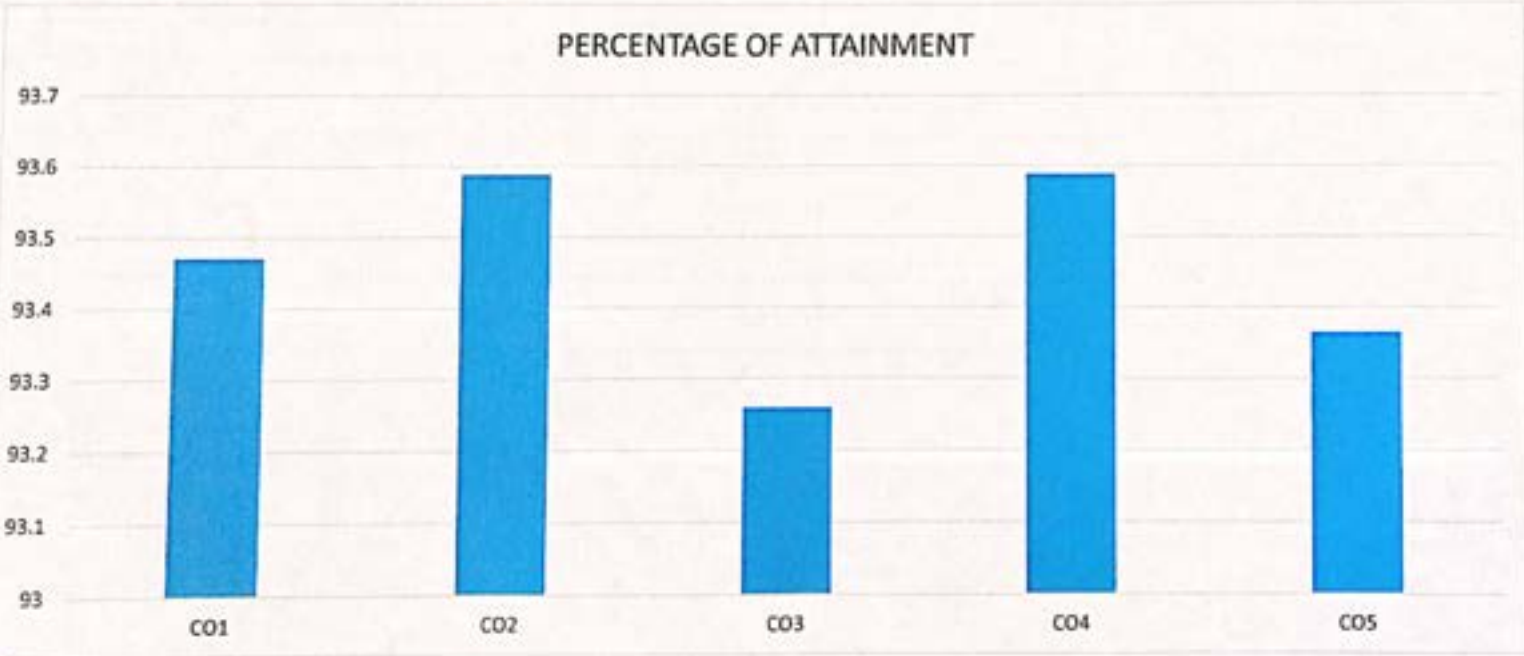
EXPECTED ATTAIMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	4.45	75	79.45	93.47059
CO2	4.55	75	79.55	93.58824
CO3	4.27	75	79.27	93.25882
CO4	4.55	75	79.55	93.58824
CO5	4.36	75	79.36	93.36471

COURSE ATTAINMENT FOR M.Sc., BIOTCHNOLOGY

SUBJECT NAME: BIOSTATISTICS BIOETHICS AND IPR
SUBJECT CODE: P16BTE3
NO. OF STUDENTS: 11

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	93.4706
CO2	93.5882
CO3	93.2588
CO4	93.5882
CO5	93.3647

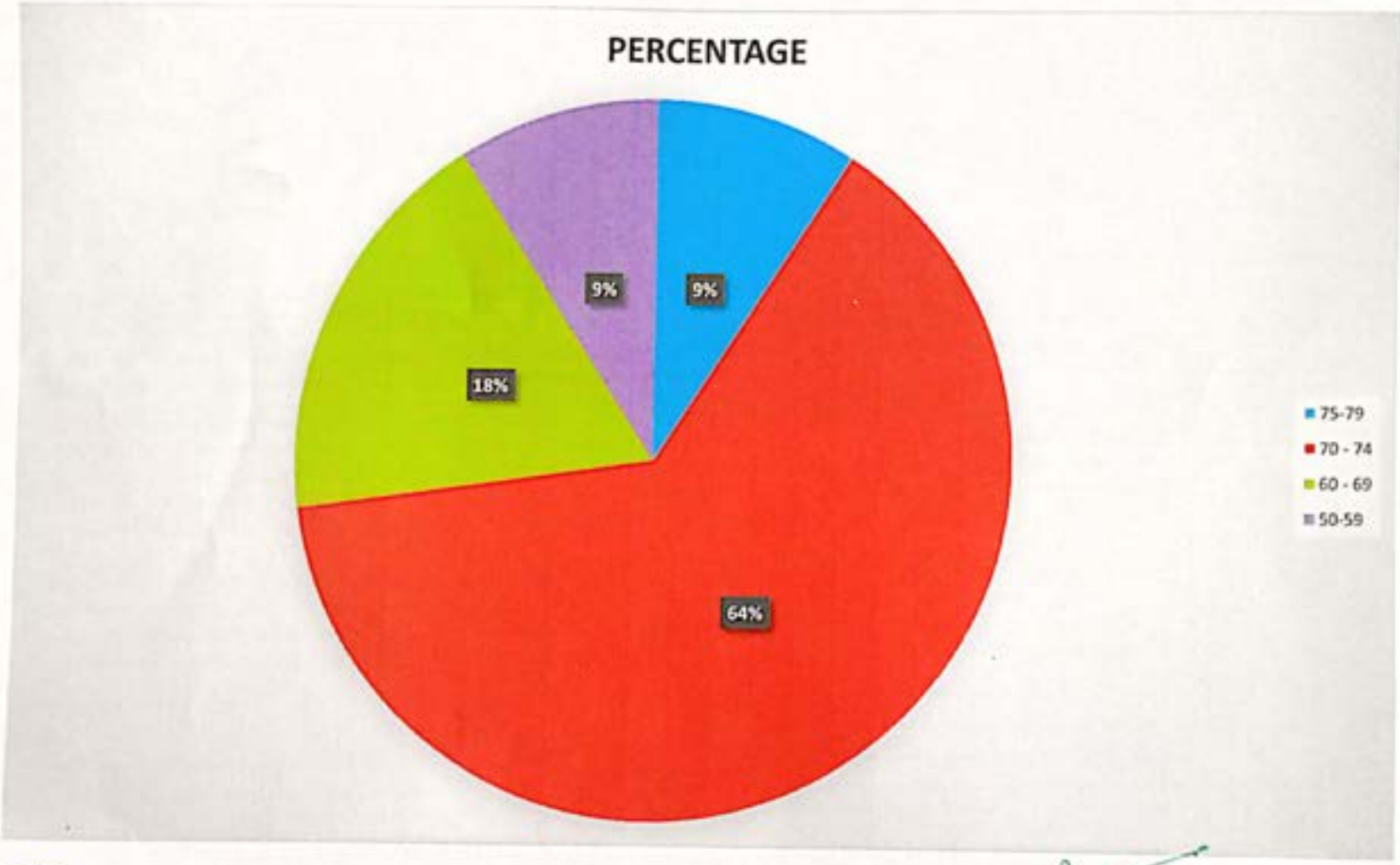


COURSE ATTAINMENT FOR M.Sc., BIOTCHNOLOGY

SUBJECT NAME: BIOSTATISTICS BIOETHICS AND IPR
SUBJECT CODE: P16BTE3
NO. OF STUDENTS: 11

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO. OF STUDENTS	STATUS
90 -100	0	OUTSTANDING
80 - 89	0	EXCELLENT
75-79	1	DISTINCTION
70-74	7	VERY GOOD
60-69	2	GOOD
50-59	1	AVERAGE
BELOW 50	0	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
75-79	9.09%	DISTINCTION
70 - 74	63.63%	VERY GOOD
60 - 69	18.18%	GOOD
50-59	9.09%	RA



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PO3	To study the structure, properties and metabolism of different biomolecules and to know the interrelationships between different metabolisms.To understand the basic concepts of immune system, elucidate the immune response of humans to foreign substances and to study the modern techniques of immunology that help determine human protection.
PO4	To study the various principles underlying genetic engineering that forms the basis of rDNA technology and to study the methodologies, and in brief the applications and related issues of rDNA technology and understanding about the basics of Animal cell culture, transgenic animals, pest & animal management, Molecular markers and regulations about the use of Biotechnology.To study the downstream processes for product recovery in fermentation. Technology and understanding about the basics of Animal cell culture, transgenic animals, pest & animal management, Molecular markers and regulations about the use of Biotechnology.
PO5	Student will get an idea about the basic understanding about Bioinformatics, tools, sequences, algorithms and the analysis of phylogenetic tree and will give an idea about the basic principles and techniques involved in plant cell culture and to understand the concepts of transformation and achievements of biotechnology in Plant systems.To understand the chemical nature and associated microbes of food and to understand the principles of food processing, preservation and manufacture.

CODE& COURSE TITLE	NAME OF THE PROGRAMME:M.Sc : BIOTECHNOLOGY	
	COURSE OUTCOME	
Cell Biology (P16BT11)	CO1	Cell structure -Prokaryotic, akaryotic and eukaryotic cell. Plasma Membrane-Cell Wall.
	CO2	Cell Organelles-Endoplasmic Reticulum-Ribosomes-Mitochondria-Chloroplast-Lysosomes-Peroxisomes.
	CO3	Nuclear Material-Cytoskeleton-Nucleus.
	CO4	Organization of Chromosomes, Cell Division & Cell Cycle-Cell Division-Cell Cycle and Cell Growth Control.
	CO5	Microbial Cell Biology-Structural organization of prokaryotic cell.

PO → CO↓	PO1	PO2	PO3	PO4	PO5
CO1	3	1	1	2	0
CO2	3	0	0	1	1
CO3	3	1	0	0	0
CO4	3	0	1	1	1
CO5	3	1	1	0	0
AVERAGE	3	0.6	0.6	0.8	0.4

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	P18440061	ABINAYA.P	4	4	4	4	4	20	80
2	P18440062	AKALYA.A	4	4	4	4	4	20	80
3	P18440063	DHARANYA.M	4	5	4	5	4	22	88
4	P18440064	GAYATHRI.M	4	4	4	4	4	20	80
5	P18440065	HARISUTHAN.E	5	5	4	5	5	24	96
5	P18440066	JAYANTHI.J	5	4	5	5	4	23	92
6	P18440067	KARKUZHALI.G	4	4	4	4	4	20	80
7	P18440068	LAVANSIYA MARY.S	4	4	4	4	4	20	80
8	P18440069	LEELA DEVI.K	4	4	3	5	5	21	84
10	P18440070	MONISALOMIA.S	3	5	4	4	5	21	84
11	P18440071	MUHILA.M	4	5	4	5	3	21	84
AVERAGE			4.091	4.364	4	4.455	4.182		

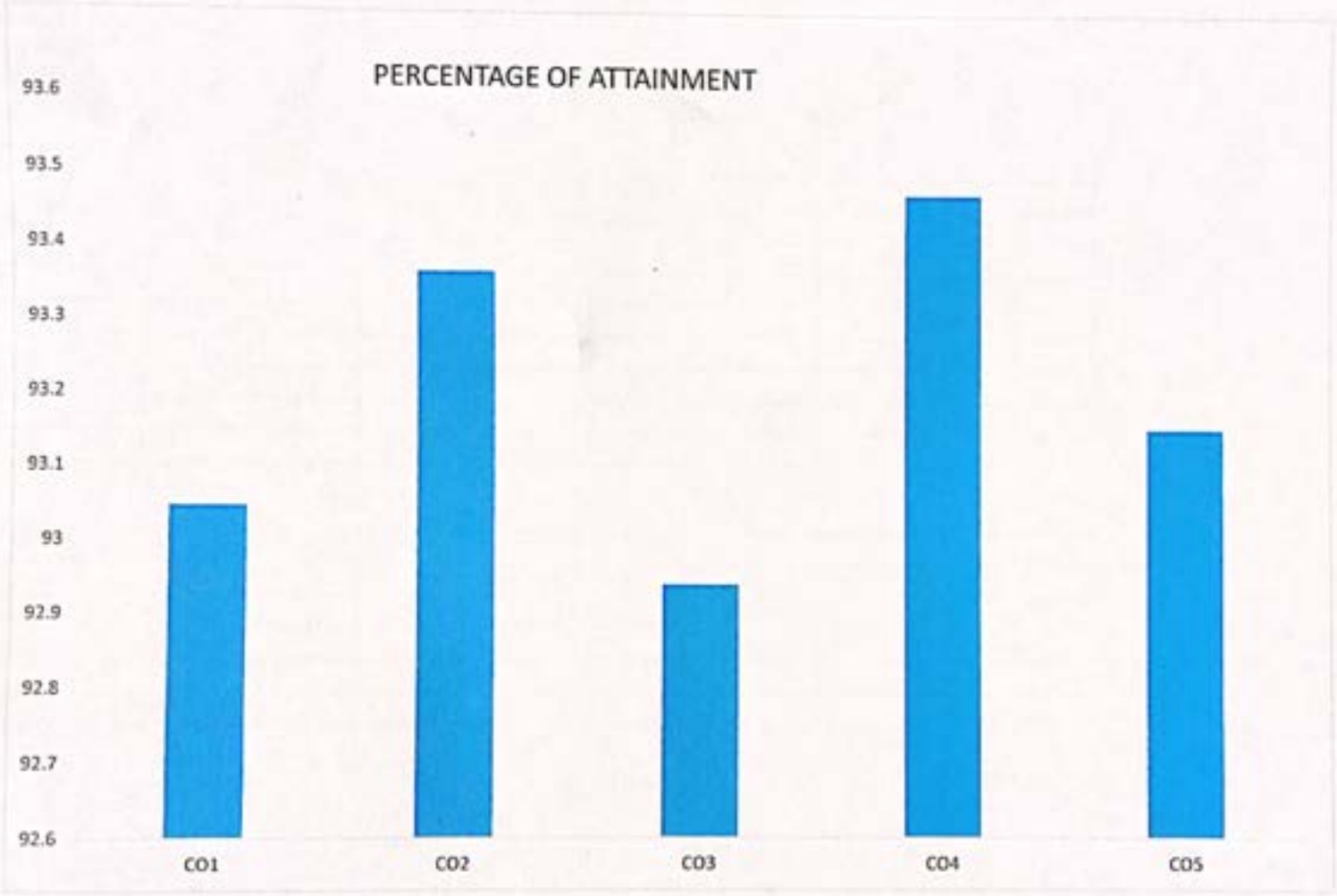
EXPECTED ATTAIMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	4.09	75	79.09	93.04706
CO2	4.36	75	79.36	93.36471
CO3	4	75	79	92.94118
CO4	4.45	75	79.45	93.47059
CO5	4.18	75	79.18	93.15294

COURSE ATTAINMENT FOR M.Sc., BIOTCHNOLOGY

SUBJECT NAME: CELL BIOLOGY
SUBJECT CODE: P16BT11
NO. OF STUDENTS: 11

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	93.0471
CO2	93.3647
CO3	92.9412
CO4	93.4706
CO5	93.1529

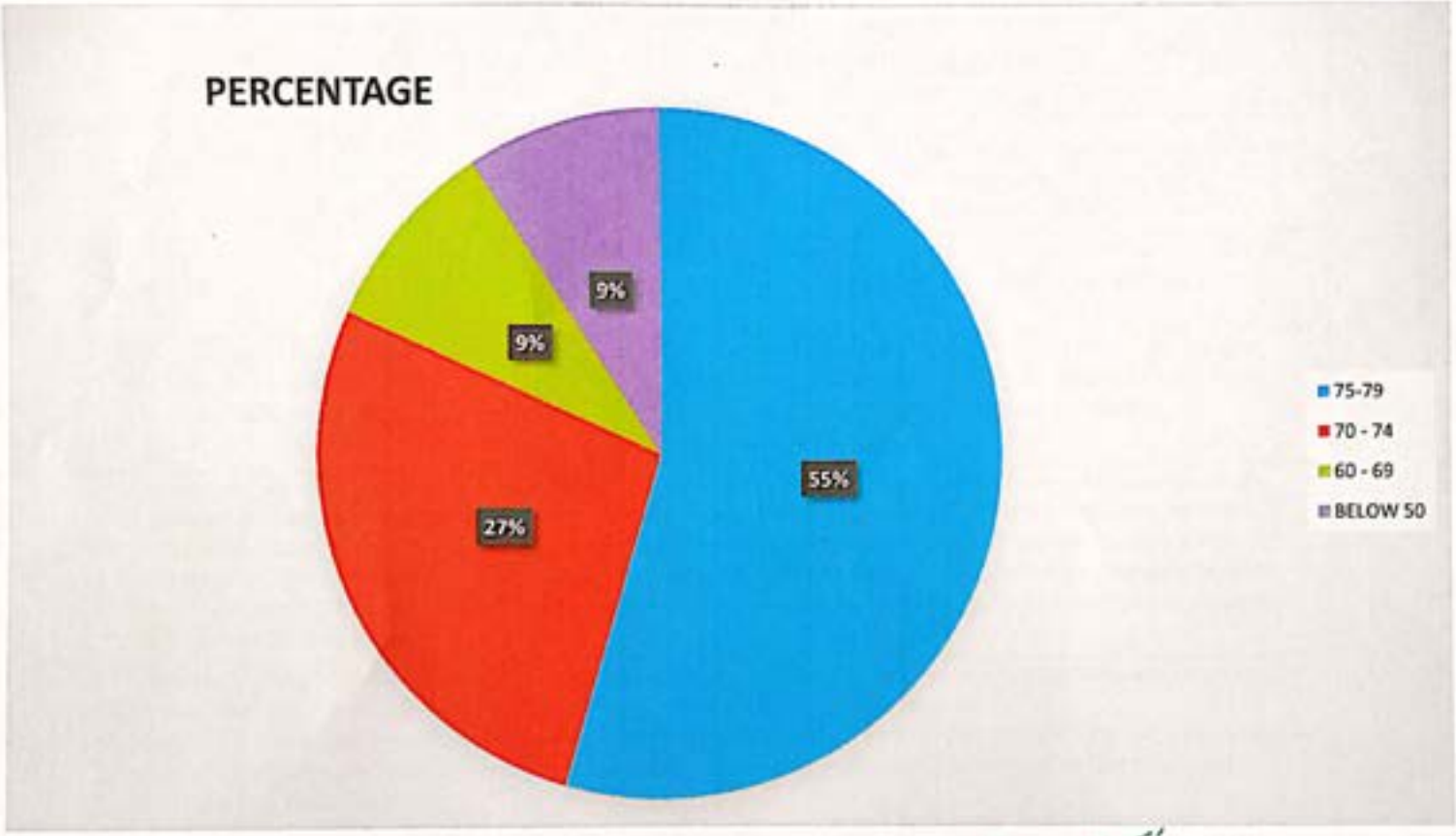


COURSE ATTAINMENT FOR M.Sc., BIOTCHNOLOGY

SUBJECT NAME: CELL BIOLOGY
SUBJECT CODE: P16BT11
NO. OF STUDENTS: 11

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO. OF STUDENTS	STATUS
90 -100	0	OUTSTANDING
80 - 89	0	EXCELLENT
75-79	6	DISTINCTION
70-74	3	VERY GOOD
60-69	1	GOOD
50-59	0	AVERAGE
BELOW 50	1	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
75-79	54.54%	DISTINCTION
70 - 74	27.27%	VERY GOOD
60 - 69	9.09%	GOOD
BELOW 50	9.09%	RA



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Bharath College of Science and Management
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THANJAVUR - 613 005.

BHARATH COLLEGE OF SCIENCE AND MANAGEMENT
(UGC Recognized 2(f) & 12(B) Institution)
THANJAVUR-5
PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME M.Sc : BIOTECHNOLOGY

PO1	To know a thorough knowledge about structure and function of cells, cellular signaling, protein trafficking, bio molecules and cellular development.
PO2	To collect, deals with various types of classification of microbes and also throws light on multifarious habitats of microbes and provides information about all the microbial cellular functions and various metabolic pathways in microbes.
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PO5	Student will get an idea about the basic understanding about Bioinformatics, tools, sequences, algorithms and the analysis of phylogenetic tree and will give an idea about the basic principles and techniques involved in plant cell culture and to understand the concepts of transformation and achievements of biotechnology in Plant systems.To understand the chemical nature and associated microbes of food and to understand the principles of food processing, preservation and manufacture.

COURSE CODE& COURSE TITLE	NAME OF THE PROGRAMME:M.Sc : BIOTECHNOLOGY	
	COURSE OUTCOME	
PLANT BIOTECHNOLOGY (P16BT31)	CO1	Basics of Plant Tissue culture-Plant tissue culture techniques. In-vitro pollination and fertilization. Embryo culture and its applications.
	CO2	Protoplast – Culture & Genetic Manipulation
	CO3	Plant Transgenesis - Agrobacterium mediated gene transfer, Agrobacterium based vectors (Ti plasmids and Ri plasmids), viral vectors and their applications.
	CO4	Transgenic plants -Genetically modified foods - application, future applications, ecological impact of transgenic plants.
	CO5	Plant Molecular Biology Techniques-. DNA finger printing in plants. Marker assisted selection (MAS) for crop improvement.

PO →	PO1	PO2	PO3	PO4	PO5
CO1	0	1	0	1	3
CO2	1	0	1	0	3
CO3	0	1	0	1	3
CO4	1	0	1	0	3
CO5	0	1	2	1	3
AVERAGE	**0.4**	**0.6**	**0.8**	**0.6**	**3**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	P18440061	ABINAYA.P	4	4	5	5	4	22	88
2	P18440062	AKALYA.A	4	4	5	4	5	22	88
3	P18440063	DHARANYA.M	5	5	5	5	4	24	96
4	P18440064	GAYATHRI.M	5	5	4	4	4	22	88
5	P18440065	HARISUTHAN.E	5	5	4	5	5	24	96
5	P18440066	JAYANTHI.J	4	4	4	5	5	22	88
6	P18440067	KARKUZHALI.G	5	4	4	5	4	22	88
7	P18440068	LAVANSIYA MARY.S	5	4	4	4	5	22	88
8	P18440069	LEELA DEVI.K	5	5	5	5	3	23	92
10	P18440070	MONISALOMIA.S	5	4	4	4	5	22	88
11	P18440071	MUHILA.M	4	5	4	5	4	22	88
AVERAGE			4.636	4.455	4.364	4.636	4.364		

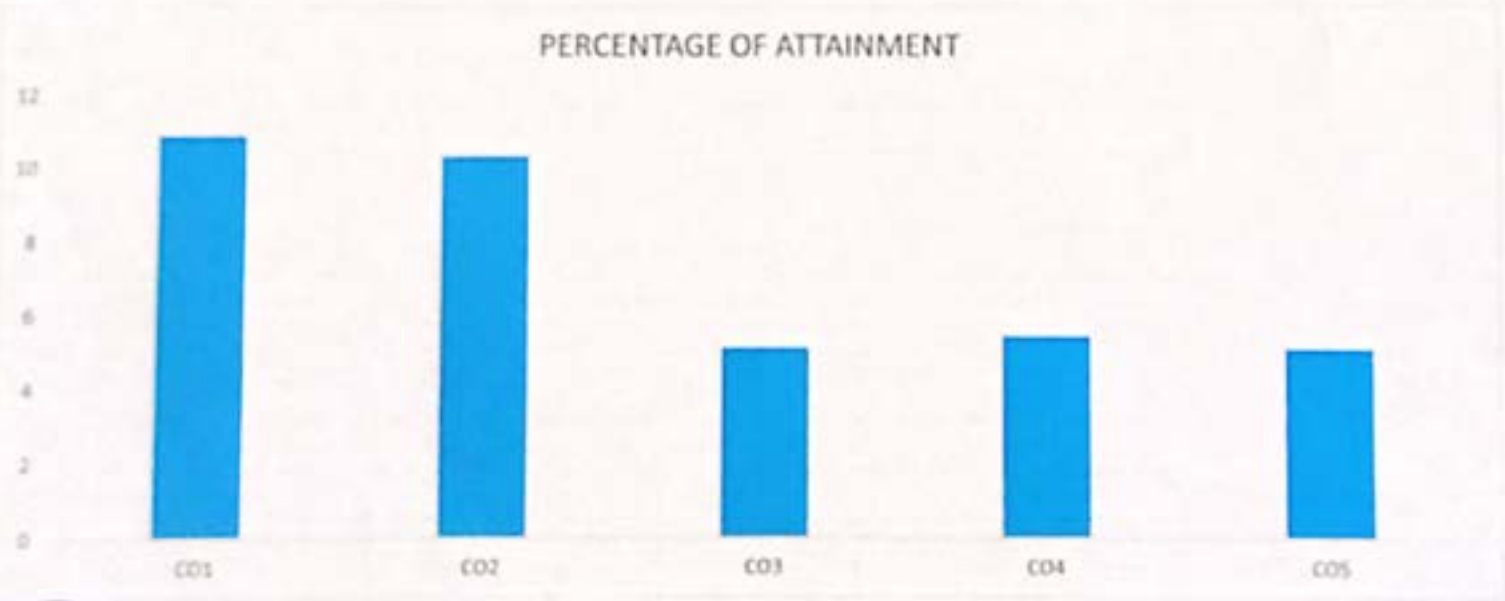
EXPECTED ATTAIMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	4.64	75	9.28	10.92
CO2	4.45	75	8.81	10.36
CO3	4.36	75	4.36	5.13
CO4	4.64	75	4.64	5.46
CO5	4.36	75	4.36	5.13

COURSE ATTAINMENT FOR M.Sc., BIOTCHNOLOGY

SUBJECT NAME: PLANT BIOTECHNOLOGY
SUBJECT CODE: P16BT31
NO. OF STUDENTS: 11

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	10.9176
CO2	10.3647
CO3	5.12941
CO4	5.45882
CO5	5.12941

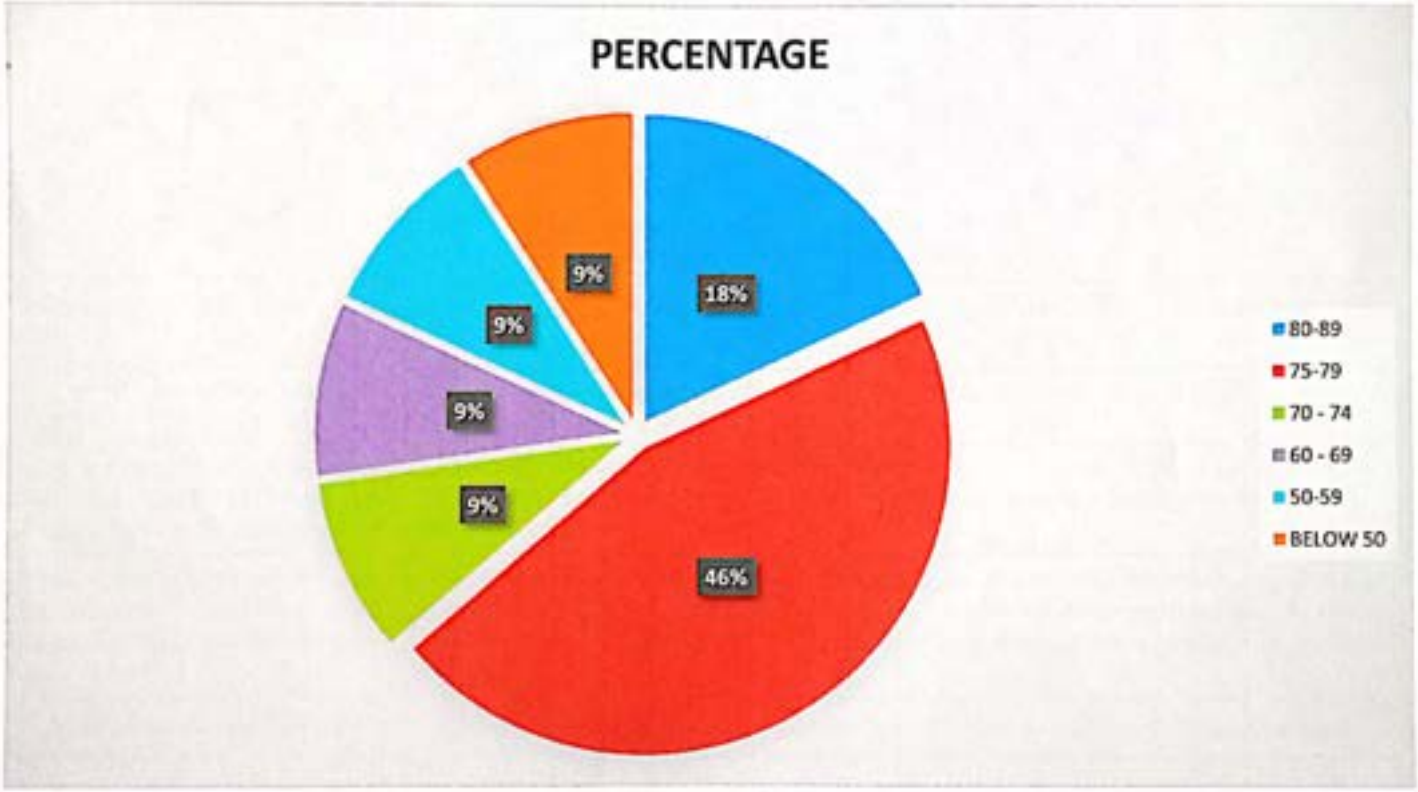


COURSE ATTAINMENT FOR M.Sc., BIOTCHNOLOGY

SUBJECT NAME: PLANT BIOTECHNOLOGY
SUBJECT CODE: P16BT31
NO. OF STUDENTS: 11

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO. OF STUDENTS	STATUS
90 -100	0	OUTSTANDING
80 - 89	2	EXCELLENT
75-79	5	DISTINCTION
70-74	1	VERY GOOD
60-69	1	GOOD
50-59	1	AVERAGE
BELOW 50	1	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
80-89	18.18%	
75-79	45.45%	DISTINCTION
70 - 74	9.09%	VERY GOOD
60 - 69	9.09%	GOOD
50-59	9.09%	AVERAGE
BELOW 50	9.09%	RA



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(UGC Recognized 2(f) & 12(B) Institution)
THANJAVUR-5
PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME M.Sc BIOTECHNOLOGY

PO1	To know a thorough knowledge about structure and function of cells, cellular signaling, protein trafficking, bio molecules and cellular development.
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PO4	To study the various principles underlying genetic engineering that forms the basis of rDNA technology and to study the methodologies, and to brief the applications and related issues of rDNA technology and understanding about the basics of Animal cell culture, transgenic animals, pest & animal management, Molecular markers and regulations about the use of Biotechnology.To study the downstream processes for product recovery in fermentation.
PO5	Student will get an idea about the basic understanding about Bioinformatics, tools, sequences, algorithms and the analysis of phylogenetic tree.

COURSE :LAB IN PLANT AND ANIMAL BIOTECHNOLOGY COURSE CODE:P16BT33P

COURSE OUTCOME

CO1	Introduction to the laboratory and general Safety Practices for plant cell, Plant growth and development. Laboratory Report Guidelines (Theory & Demo). Aseptic culture techniques for establishment and maintenance of cultures (Hands on).Tissue culture media preparation: Preparation of stock solutions of Murashige Skoog basal medium and plant growth regulator stocks (Hands on). Mechanical isolation of protoplast. Enzymatic isolation of protoplast and culture (Hands on). Isolation of plant genomic DNA by modified CTAB method (Hands on).
CO2	The cell cycle, plant vascular system & Photoperiodism. Transformation of leaf discs with Agrobacterium (Hands on). Expression of foreign genes into plant cells: use of Agrobacterium tumefaciens (Theory). Morphogenesis in tobacco leaf tissue (Hands on). Regeneration abilities of the Shoot Apical Meristem (SAM). Preparation of chloroplast from pea (Hands on). Effect of different light wavelengths on germinating corn embryos (Hands on)
CO3	Measurement of photosynthesis (Hands on). Stomata conductance & transpiration (Hands on) Separation of thylakoid and stromal proteins by SDS-Gel electrophoresis. Isolation of DNA & RNA from light and dark –grown seedlings.
CO4	Isolation of DNA from Animal liver. Isolation of DNA from human cheek cells. Isolation of DNA from blood
CO5	Quantification of DNA by spectrophotometeric method. Size analysis of DNA by Agarose gell electrophoresis. Isolation & identification of stem cells

CO's	PO1	PO2	PO3	PO4	PO5
CO1	5	5	5	5	5
CO2	5	5	4	5	4
CO3	5	5	5	5	5
CO4	5	4	5	4	5
CO5	5	5	5	4	4
Average	5	4.8	4.8	4.6	4.6

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COURSE :LAB IN BIOPROCESS TECHNOLOGY AND FOOD TECHNOLOGY
SUB.CODE:P16BT43P
COURSE OUTCOME

CO1	Isolation of industrially important microorganisms. Selective isolation of actinomycetes – study their growth characteristics. Isolation and enumeration of lactic acid bacteria. Ethanol production by yeast.
CO2	Wine production by yeast – setting up a lab experiment. Estimation of alcohol content by colorimetric method and GLC. Enzyme production – amylase production.. Production of organic acids – citric acid production by solid state fermentation.
CO3	Antibiotic production by different strains of microbes (Theory). Test for sensitivity of microorganisms. Down stream processes of enzymes – dialysis. Ion exchange chromatography – drying – cellulose column chromatography
CO4	Immobilization of yeast cell by alginate beads. Bioassay techniques for antibiotics. Large scale production of organic acids, large scale production of solvents using fermentor (Demo).
CO5	Visit to Distillery unit; alcohol production and pharmacological industries. Pasteur Institute (Field visit). Isolation & identification microbes from spoiled food. Production of yogurt, butter.

PO→ CO↓	PO1	PO2	PO3	PO4	PO5
CO1	5	5	5	5	5
CO2	5	5	4	5	4
CO3	5	5	5	5	5
CO4	5	4	5	4	5
CO5	5	5	5	4	4
Average	5	4.8	4.8	4.6	4.6

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PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME M.Sc BIOTECHNOLOGY

PO1	To know a thorough knowledge about structure and function of cells, cellular signaling, protein trafficking, bio molecules and cellular development.
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PO4	To study the various principles underlying genetic engineering that forms the basis of rDNA technology and to study the methodologies, and in brief the applications and related issues of rDNA technology and understanding about the basics of Animal cell culture, transgenic animals, pest & animal management, Molecular markers and regulations about the use of Biotechnology.To study the downstream processes for product recovery in fermentation.
PO5	Student will get an idea about the basic understanding about Bioinformatics, tools, sequences, algorithms and the analysis of phylogenic tree.

COURSE :LAB IN CELL BIOLOGY,MICROBIOLOGY,BIOCHEMISTRY AND MOLECULAR BIOLOGY COURSE CODE:P16BT15P

COURSE OUTCOME

CO1	Prokaryotic & eukaryotic cell - structure observation. Cell count - prokaryotic & eukaryotic.Types of cells - parenchyma, collenchyma, sclerenchyma, columnar epithelium,squamous epithelium. Leishman staining
CO2	Total (WBC, RBC) & differential count of human blood cells.Separation of Peripheral Blood Mononuclear Cells from blood.Osmosis and Tonicity.Cell Division - Cytological preparations of tissues (onion) for mitosis..Cell Division - Cytological preparations of tissues (Tradescantia) for meiosis.Cell Division - Binary fission of yeast . Polytene and diplotene chromosomes.Temporary and permanent slide preparation.Sub-cellular fractionation.
CO3	Microscopy - Observation of different microbes.Sterilization techniques – physical, chemical, filtration and irradiation techniques. Preparation of media - simple media and complex media. Isolation of microorganisms from air, soil & water - spread plate, pour plate, streak plate technique. Staining methods – simple, differential, acid - fast & negative Identification - Macroscopic, microscopic, biochemical, serological & generic level. Bacterial growth curve - colony counting, cell counting, spectrophotometric method. Preservation & maintenance. Antibiotic sensitivity test –
CO4	Preparation of solutions – Molar, Normal, Percentage, Stock, Working etc. Preparation of buffers – PBS, Tris and Acetate buffer.Identification of sugars - reducing & non-reducing sugars.Estimation of mono saccharine (glucose) by Nelson, Somogi method & polysaccharide (starch) by iodine method. Estimation of amino acid by Ninhydrin method. Estimation of protein by Lowry's method and Barford Method Estimation of nucleic acids by absorbance at 260 nm and hyperchromic effect.Enzyme assay: Estimation of salivary amylase from saliva & phosphatase from potato.
CO5	Isolation and purification of genomic DNA from prokaryotes. Isolation and purification of genomic DNA from eukaryotes. Isolation and purification of plasmid DNAObservation of DNA - Agarose gel electrophoresis.Quantification of nucleic acids – DNA & RNA – Chemical and UV method. Separation of protein by SDS PAGE Protein staining techniques. Amido black, coomosic brilliant blue & AgNO3. Transfer of protein - Western blot. Observation of transferred protein – staining (Indian ink), immunoblot.Bacterial mutagenesis – physical & chemical. Preparation of E. coli competent cells.Transformation of bacteria – CaCl2 method.Bacterial conjugation.Transduction

PO →	PO1	PO2	PO3	PO4	PO5
CO1	3	2	1	1	1
CO2	1	1	2	2	1
CO3	2	2	3	2	3
CO4	3	1	2	1	3
CO5	3	2	2	3	2
AVERAGE	**2.4**	**1.6**	**2**	**1.8**	**2**

PRINCIPAL
Khadir College of Science and Management
Bypass Avenue (Near New Bus Stand)
THANJAVUR - 613 005

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THANJAVUR-5
PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME M.Sc BIOTECHNOLOGY

PO1	To know a thorough knowledge about structure and function of cells, cellular signaling, protein trafficking, bio molecules and cellular development.
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PO5	Student will get an idea about the basic understanding about Bioinformatics, tools, sequences, algorithms and the analysis of phylogenetic tree.

COURSE :LAB IN rDNA TECHNOLOGY & IMMUNOLOGY COURSE CODE:P16BT23P

COURSE OUTCOME

CO1	Isolation of plasmids – small & large scale. Size analysis of plasmids by agarose gel electrophoresis. Restriction digestion, ligation. Preparation of competent E.coli cells & transformation of E.coli with recombinantDNA. Selection methods (Blue white selection, insertional inactivation). Primer design and PCR amplification of β(beta)- galactosidase. Cloning of PCR product into pBR322. Introduction of cloned genes and analysis by SDS – PAGE.
CO2	Southern blotting. RFLP Analysis of 18s rRNA of the genome. Genetic diversity of Pseudomonas by RAPD. Reporter gene assay (GUS/ β(beta)- galactosidase). Northen blotting.
CO3	Basics - Bleeding, separation of serum, plasma. (Hands on). Precipitation techniques – Agar gel diffusion, counter immuno-eletrophoresis, single radial immuno-diffusion, rocket immuno-electrophoresis (Hands on). Agglutination techniques Blood grouping and Rh factor; Latex agglutination – RF, ASLO, HBsAg and CRP (Hands on); Heme agglutination - RPHA / IHA (Hands on) Labeled Assays Enzyme Linked Immunosorbent Assay (ELISA) (Hands on) Immunoflouresence (IF) (Hands on). Immunohistochemistry (IH) (Demonstration). Immunoperoxidase (PAP) staining. Radioimmunoassays (RIA) (Theory).
CO4	Preparation of tissue culture media. Separation of Human PBMC & analysis. Types of culture. Maintenance of culture
CO5	Breeding and maintenance of experimental animals. Surgical and experimental techniques – thymectomy, spleenectomy and harvesting of lymphnodes. Isolation and enumeration of immune reactive cells. Immunization techniques and use of adjuvants. Choice of animals, form and dose of antigen, route of immunization, immunization

PO→ CO↓	PO1	PO2	PO3	PO4	P05
CO1	3	3	4	4	4
CO2	4	4	4	4	4
CO3	4	3	4	3	4
CO4	3	4	4	3	4
CO5	4	4	4	4	4
Average	3.6	3.6	4	3.6	4

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THANJAVUR-5
PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME B.Sc:BIOTECHNOLOGY

PO1	TheCell biology is the study of the structure and function of prokaryotic and eukaryotic cells. Functions of cell, its organelles, synthesis and function of macromolecules ,carbohydrate, protein, lipid, DNA & RNA and microscopic techniques to understand the cell structure. Basic of microbiology dealing types of microbes analyse medical microbiology.
PO2	This course is designed to given an understanding about the basics of molecular biology – classical genetics & molecular aspects.Isolation, preservation and improvement of strains.Food Microbiology-Medical Microbiology,Agricultural Microbiology.
PO3	This courser is planned to basic knowledge on r DNA Technology,Blotting techniques ,pharmaceutical products, Gene therapy.structure functions of biomolecules.Amino Acids and Proteins.Anatomy of the immune system.vaccinology-Clinical immunology.Classification of lipids.macro and micro minerals , Anatomy of the Immune System.Vaccinology,Clinical Immunology, Instruments in centrifugation, chromatography, electrophoresis, spectroscopy and crystallography.
PO4	This course is planned to give basic knowledge about plant tissue culture, transgenesis, genetic modifications in agriculture,Plant Genetic Engineering,Genetic modification in food industry,Production of organic food.This course is planned to impart knowledge on fundamentals of animal cell culture, GMOs, gene therapy & transgenic animals.Biostatistics - Concepts of statistics.This course is planned to give basic knowledge about plant tissue culture, transgenesis, genetic modifications in agriculture,Plant Genetic Engineering,Genetic modification in food industry,Production of organic food.This course is planned to impart knowledge on fundamentals of animal cell culture, GMOs, gene therapy & transgenic animals.Biostatistics - Concepts of statistics.
PO5	This course is designed to give an idea about the avenues of exploiting microbes and to study the downstream processes for product recovery in fermentation.Microbes in food processing and production,Fermented foods and beverages.

COURSE :BASIC MICROBOLOGY SUB CODE:16SACMB1

COURSE OUTCOME

CO1	Establishment of fields of medical microbiology.Immunology and environmental microbiology.
CO2	Whittaker's five kingdom.Diversity of Microbial world.
CO3	History of phycology.ultra structure, pigments, flagella.cycle of Chlamydomonas and Spirogyra.
CO4	Historical developments in the field of Mycology .Fungal cell ultra-structure.Sexual and asexual reproduction.
CO5	Protozoa, Viruses, Viroids and Prions.TMV, poliovirus.

PO → CO↓	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	3	3	1	2	1
CO2	2	3	2	2	3
CO3	3	3	1	3	2
CO4	2	2	1	2	2
CO5	3	1	2	2	3
AVERAGE	**2.6**	**2.4**	**1.4**	**2.2**	**2.2**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

S.NO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	CB19S076696	ABDUL KALAM. A	5	3	3	5	3	22	88
2	CB19S076697	ARUNKUMAR. A	5	3	5	3	3	17	68
3	CB19S076698	ARUNPANDI. D	5	3	5	3	3	17	68
4	CB19S076699	ASHOKKUMAR. P	5	3	5	3	3	20	80
5	CB19S076700	BHAVANI. R	5	3	5	5	5	23	92

6	CB19S076701	DEEPIKA. R	5	5	5	3	5	17	68
7	CB19S076702	DINESH KUMAR K	5	5	5	3	5	15	60
8	CB19S076703	HARIHARAN. K	5	5	5	5	3	18	72
9	CB19S076704	HARIHARAN. K	4	4	4	4	4	20	80
10	CB19S076705	HARINI. A	4	4	4	4	4	24	96
11	CB19S076706	JANANISRI. C	4	4	4	4	4	20	80
12	CB19S076707	KAMALESH. G	4	5	4	3	3	16	64
13	CB19S076708	KARTHICK. C	5	5	5	5	3	15	60
14	CB19S076709	KAVIYA. V	5	5	5	5	3	21	84
15	CB19S076710	KUMARAGURU. K	4	4	4	4	4	22	88
16	CB19S076711	LOGESH. A	3	4	3	3	5	15	60
17	CB19S076712	MANIKANDAN. K	5	5	5	3	5	20	80
18	CB19S076713	MANIKANDAN. K	3	3	4	4	5	20	80
19	CB19S076714	MANIKANDAN. R	4	4	4	3	4	15	60
20	CB19S076715	MOHAMEDALI. A	3	3	3	5	5	15	60
21	CB19S076716	PRADHANYA. A	4	4	4	4	4	23	92

EXPECTED ATTAIMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	4.47	75	79.47	93.49
CO2	4.27	75	79.27	93.26
CO3	4.31	75	79.31	93.31
CO4	3.77	75	78.77	92.67
CO5	4.05	75	79.05	93

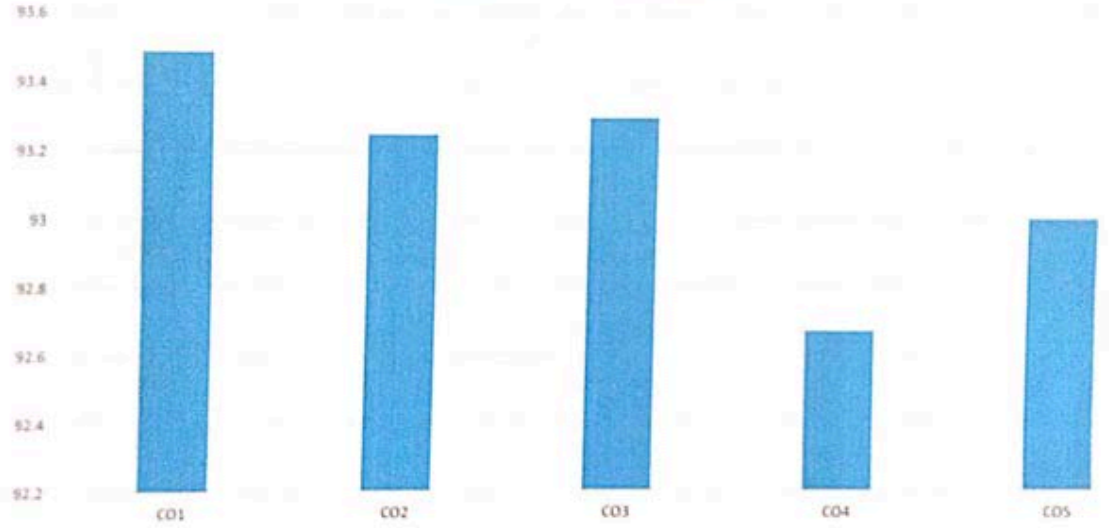
COURSE ATTAINMENT FOR B.SC., BIOTECHNOLOGY

SUBJECT NAME :BASIC MICROBIOLOGY
SUBJECT CODE :16SACMB1

NO.OF STUDENTS:36

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	93.49
CO2	93.25
CO3	93.3
CO4	92.67
CO5	93

PERCENTAGE OF ATTAINMENT

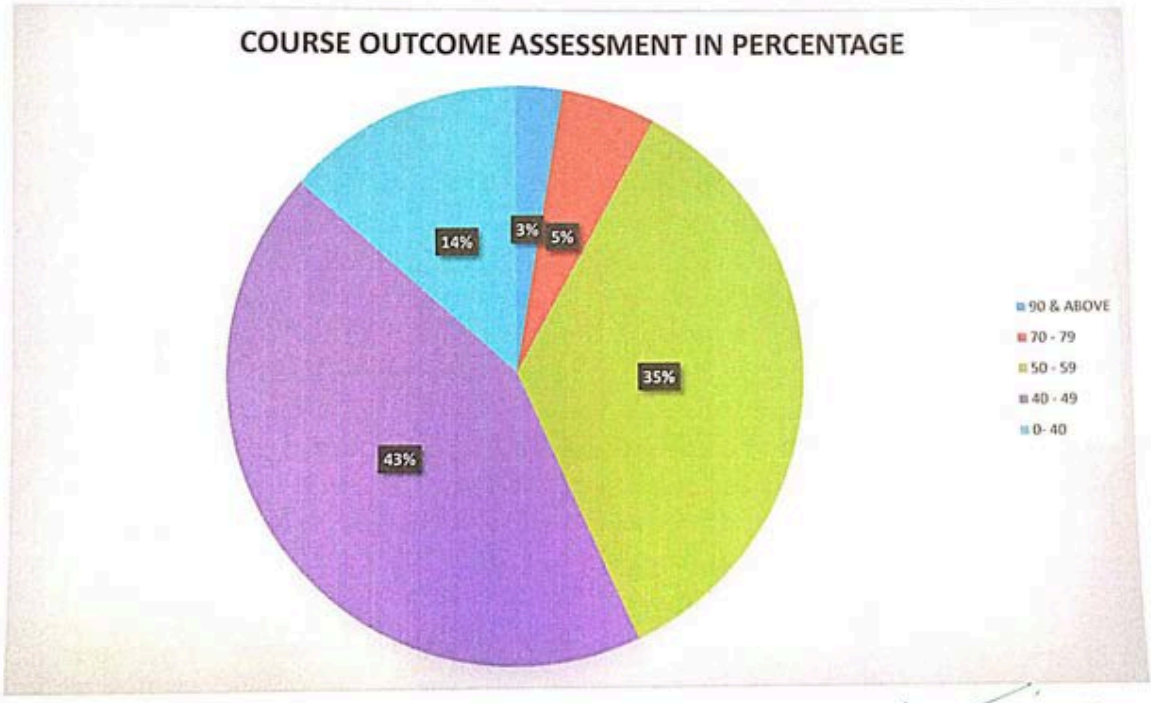


COURSE ATTAINMENT FOR B.Sc. BIOTECHNOLOGY

SUBJECT NAME: BASIC MICROBIOLOGY
SUBJECT CODE: 16SACMB1
NO. OF STUDENTS: 36

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO. OF STUDENTS	STATUS
90 & ABOVE	1	OUTSTANDING
80 - 89	0	EXCELLENT
70 - 79	2	DISTINCTION
60 - 69	0	VERY GOOD
50 - 59	13	GOOD
40 - 49	16	AVERAGE
BELOW 40	5	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
90 & ABOVE	2.70%	OUTSTANDING
70 - 79	5.50%	DISTINCTION
50 - 59	36%	GOOD
40 - 49	44.40%	AVERAGE
0- 40	13.80%	RA



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(UGC Recognized 2(f) & 12(B) Institution)
THANJAVUR-5
PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME B.Sc., BIOTECHNOLOGY

PO1	TheCell biology is the study of the structure and function of prokaryotic and eukaryotic cells. In this course the students will learn different areas of cellular biology including the structure and functions of cell, its organelles, synthesis and function of macromolecules such as carbohydrate, protein, lipid, DNA & RNA; membrane structure and function; bioenergetics; cellular communication; and microscopic techniques to understand the cell structure. course about the basic of microbiology dealing types of microbes analyse medical microbiology.
PO2	This course is designed to given an understanding about the basics of molecular biology – classical genetics & molecular aspects.Isolation, preservation and improvement of strains.Food Microbiology-Medical Microbiology,Agricultural Microbiology.
PO3	This courser is planned to give basic knowledge on r DNA Technology,Blotting techques ,pharmaceutical products, Gene therapy.structure functions of biomolecules.Amino Acids and Proteins.Classification of lipids.Fundemental concepts and Anatomy of the immune system.vaccinology-Clinical immunology.Classification of lipids.macro and micro minerals - source and functions.Fundamental Concepts and Anatomy of the Immune System.Vaccinology,Clinical Immunology.to specialize in instruments in centrifugation, chromatography, electrophoresis, spectroscopy and crystallography.
PO4	This course is planned to give basic knowledge about plant tissue culture, transgenesis, genetic modifications in agriculture,Plant Genetic Engineering,Genetic modification in food industry,Production of organic food.This course is planned to impart knowledge on fundamentals of animal cell culture, GMOs, gene therapy & transgenic animals.Biostatistics - Concepts of statistics.
PO5	This course is designed to give an idea about the avenues of exploiting microbes and to study the downstream processes for product recovery in fermentation.Microbes in food processing and production,Fermented foods and beverages.

COURSE :ANIMAL BIOTECHNOLOGY

CO1	Embryology-Gametogenesis and fertilization in animals, Molecular events during fertilization.
CO2	Animal cell culture-Fundamentals. Facilities and Applications. Media preparation for Animal cells culture. Types of cell culture: Primary and secondary cell culture.
CO3	Genetic engineering in animals-GMO , methods of DNA transfer into animal cells - calcium phosphate co precipitation, micro-injection, electroporation.
CO4	Gene therapy-Mapping of human genome, Human Genome Project (HGP). RFLP, RAPD and its applications.
CO5	Transgenics-Transgenic animals – Merits and demerits -Ethical issues in animal biotechnology, transgenic microbes and animals.

PO →	PO1	PO2	PO3	PO4	PO5
CO1	0	0	1	3	1
CO2	0	0	0	3	0
CO3	1	1	0	3	0
CO4	0	0	1	3	1
CO5	1	1	0	3	0
AVERAGE	**0.4**	**0.4**	**0.4**	**3**	**0.4**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	CB19S076696	ABDUL KALAM. A	5	5	5	5	3	23	92
2	CB19S076697	ARUNKUMAR. A	4	4	4	4	4	20	80
3	CB19S076698	ARUNPANDI. D	4	4	4	4	4	20	80
4	CB19S076699	ASHOKKUMAR. P	4	4	4	4	4	20	80
5	CB19S076700	BHAVANI. R	5	5	5	5	3	23	92
6	CB19S076701	DEEPIKA. R	5	5	5	5	3	23	92
7	CB19S076702	DINESH KUMAR K	2	5	5	5	5	22	88
8	CB19S076703	HARIHARAN. K	5	5	3	5	5	23	92
9	CB19S076704	HARIHARAN. K	2	5	5	5	5	23	92
10	CB19S076705	HARINI. A	5	5	5	5	3	23	92
11	CB19S076706	JANANISRI. C	5	5	5	5	3	23	92
12	CB19S076707	KAMALESH. G	5	5	5	5	3	23	92
13	CB19S076708	KARTHICK. C	5	5	5	5	3	23	92
14	CB19S076709	KAVIYA. V	5	5	5	5	2	22	88
15	CB19S076710	KUMARAGURU. K	3	5	5	5	5	23	92
16	CB19S076711	LOGESH. A	1	4	4	4	4	21	84
17	CB19S076712	MANIKANDAN. K	1	4	4	4	4	21	84
18	CB19S076713	MANIKANDAN. K	5	4	4	4	4	21	84
19	CB19S076714	MANIKANDAN. R	5	4	4	4	4	21	84
20	CB19S076715	MOHAMEDALI. A	5	4	4	4	4	21	84
21	CB19S076716	PRADHANYA. A	5	5	5	5	3	23	92
22	CB19S076717	PREMKUMAR. S	5	4	4	4	5	22	88
23	CB19S076718	PREMY. R	5	5	5	5	5	25	100
24	CB19S076719	PRIYA. P	5	5	5	5	5	25	100
25	CB19S076720	RAGAVAN. K	5	5	5	4	3	22	88
26	CB19S076721	RAJASURIYAN. S	5	5	5	5	2	22	88
27	CB19S076722	RASIKA. D	4	4	3	5	5	23	92
28	CB19S076723	SARANYA. R	5	5	5	5	3	23	92

29	CB19S076724	SILAMBARASAN. R	5	4	5	3	4	21	84
30	CB19S076725	SIVAKUMAR. P	4	5	5	5	5	24	96
31	CB19S076726	SOUNDHARYA. B	5	5	5	5	2	22	88
32	CB19S076727	TAMILPRIYAN. R	5	5	5	5	3	23	92
33	CB19S076728	TAMILSELVI. M	3	4	5	5	5	22	88
34	CB19S076729	VENKADESH. M	3	4	5	5	5	22	88
35	CB19S076730	VISHNUVARDHAN V	5	5	5	5	3	23	92
36	CB19S076731	YOUGGESH. S	3	5	5	5	5	23	92
AVERAGE			4.25	4.6389	4.64	4.67	3.83		

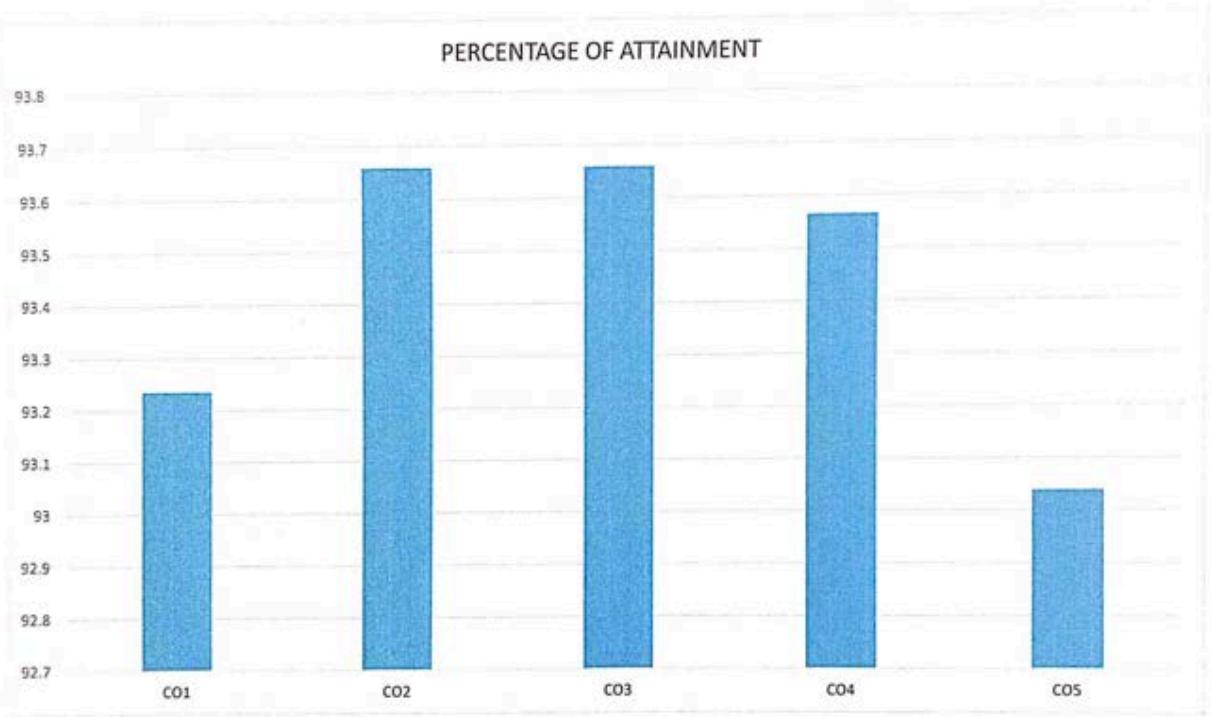
EXPECTED ATTAINMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	4.25	75	79.25	93.235294
CO2	4.61	75	79.61	93.658824
CO3	4.61	75	79.61	93.658824
CO4	4.53	75	79.53	93.564706
CO5	4.083	75	79.083	93.038824

COURSE ATTAINMENT FOR B.SC., BIOTECHNOLOGY

SUBJECT NAME :ANIMAL BIOTECHNOLOGY
SUBJECT CODE :16SCCBT6
NO.OF STUDENTS:36

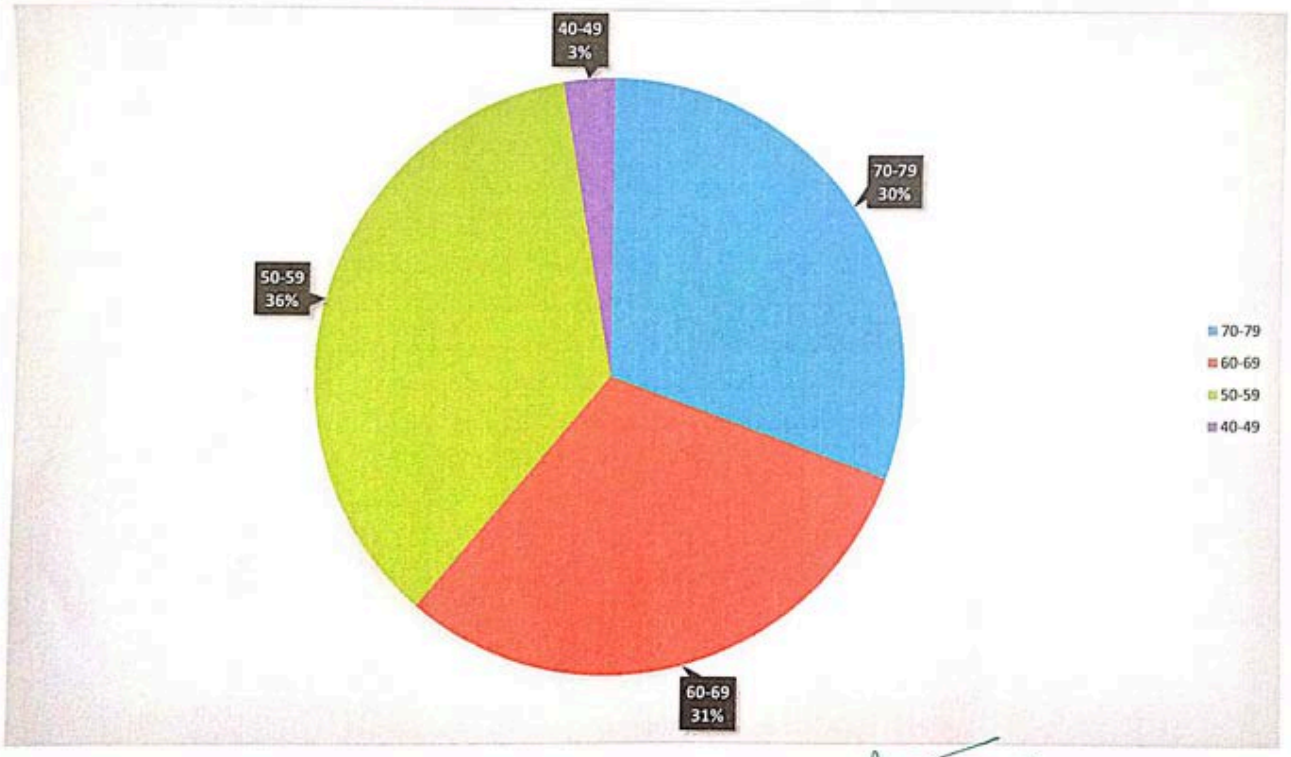
COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	93.2353
CO2	93.6588
CO3	93.6588
CO4	93.5647
CO5	93.0388


PERCENTAGE OF ATTAINMENT
93.8
93.7
93.6
93.5
93.4
93.3
93.2
93.1
93
92.9
92.8
92.7
CO1
CO2
CO3
CO4
CO5

COURSE ATTAINMENT FOR B.Sc. BIOTECHNOLOGY
SUBJECT NAME: ANIMAL BIOTECHNOLOGY
SUBJECT CODE: 16SCCBT6
NO. OF STUDENTS: 36

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO. OF STUDENTS	STATUS
90 - 100	0	OUTSTANDING
80 - 89	0	EXCELLENT
70 - 79	11	DISTINCTION
60 - 69	11	VERY GOOD
50 - 59	13	GOOD
40 - 49	1	AVERAGE
BELOW 40	0	RA

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	PERCENTAGE%	STATUS
70-79	30.56	DISTINCTION
60-69	30.56	VERY GOOD
50-59	36.11	GOOD
40-49	2.78	AVERAGE



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ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME B.Sc:BIOTECHNOLOGY

PO1	TheCell biology is the study of the structure and function of prokaryotic and eukaryotic cells. Functions of cell, its organelles, synthesis and function of macromolecules ,carbohydrate, protein, lipid, DNA & RNA and microscopic techniques to understand the cell structure. Basic of microbiology dealing types of microbes analyse medical microbiology.
PO2	This course is designed to given an understanding about the basics of molecular biology – classical genetics & molecular aspects.Isolation, preservation and improvement of strains.Food Microbiology-Medical Microbiology,Agricultural Microbiology.
PO3	his courser is planned to basic knowledge on r DNA Technology,Blotting techques ,pharmaceutical products, Gene therapy.structure functions of biomolecules.Amino Acids and Proteins.Anatomy of the immune system.vaccinology-Clinical immunology.Classification of lipids.macro and micro minerals , Anatomy of the Immune System.Vaccinology,Clinical Immunology, Instruments in centrifugation, chromatography, electrophoresis, spectroscopy and crystallography.
PO4	This course is planned to give basic knowledge about plant tissue culture, transgenesis, genetic modifications in agriculture,Plant Genetic Engineering,Genetic modification in food industry,Production of organic food.This course is planned to impart knowledge on fundamentals of animal cell culture, GMOs, gene therapy & transgenic animals.Biostatistics - Concepts of statistics.
PO5	This course is designed to give an idea about the avenues of exploiting microbes and to study the downstream processes for product recovery in fermentation.Microbes in food processing and production,Fermented foods and beverages.

COURSE : MOLECULAR BIOLOGY SUB CODE 16SCCBT2

COURSE OUTCOME

CO1	Nucleus & Chromosomes,3 dimensional organization of cytoskeleton,chromatin,allele, loci, gene. Nuclear division.
CO2	Organization of Chromosomes,chromosomal abnormalities and qualitative inheritance.Somatic cell genetics.
CO3	Central dogma of Molecular Biology,Transcription – Prokaryotic & Eukaryotic Transcription.Translation - Factors involved in translation.
CO4	Prokaryotic and Eukaryotic DNA replication.Mechanism of DNA replication.Enzymes & proteins involved in DNA replication.
CO5	Regulation of gene expression.gene loss, gene amplification, gene rearrangement.

PO → CO↓	PO1	PO2	PO3	PO4	PO5
CO1	2	3	1	2	2
CO2	3	3	3	1	2
CO3	2	3	2	3	1
CO4	2	3	2	2	2
CO5	3	3	3	1	2
AVERAGE	**2.4**	**3**	**2.2**	**1.8**	**1.8**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	CB19S076696	ABDUL KALAM. A	5	5	4	4	5	23	92
2	CB19S076697	ARUNKUMAR. A	4	4	4	4	4	20	80
3	CB19S076698	ARUNPANDI. D	4	4	4	4	4	20	80
4	CB19S076699	ASHOKKUMAR. P	4	4	4	4	4	20	80
5	CB19S076700	BHAVANI. R	4	5	4	5	5	23	92
6	CB19S076701	DEEPIKA. R	4	4	4	4	4	20	80
7	CB19S076702	DINESH KUMAR K	0	0	0	0	0	0	0
8	CB19S076703	HARIHARAN. K	3	3	3	3	4	21	84
9	CB19S076704	HARIHARAN. K	3	3	3	3	4	21	84

10	CB19S076705	HARINI. A	5	5	5	5	4	24	96
11	CB19S076706	JANANISRI. C	4	4	4	4	4	20	80
12	CB19S076707	KAMALESH. G	4	4	4	4	4	20	80
13	CB19S076708	KARTHICK. C	0	0	0	0	0	0	0
14	CB19S076709	KAVIYA. V	5	4	4	5	4	22	88
15	CB19S076710	KUMARAGURU. K	5	5	5	5	3	23	92
16	CB19S076711	LOGESH. A	5	4	4	3	4	20	80
15	CB19S076712	MANIKANDAN. K	4	4	4	4	5	21	84
16	CB19S076713	MANIKANDAN. K	4	4	4	4	4	20	80
17	CB19S076714	MANIKANDAN. R	4	4	4	4	4	20	80
18	CB19S076715	MOHAMEDALI. A	4	4	4	4	4	20	80
19	CB19S076716	PRADHANYA. A	5	5	5	4	5	24	96
20	CB19S076717	PREMKUMAR. S	5	3	4	4	4	20	80
21	CB19S076718	PREMY. R	4	4	4	5	5	22	88
22	CB19S076719	PRIYA. P	4	5	5	5	5	24	96
23	CB19S076720	RAGAVAN. K	3	4	4	5	5	21	84
24	CB19S076721	RAJASURIYAN. S	4	4	4	4	4	20	80
25	CB19S076722	RASIKA. D	4	4	4	4	4	20	80
26	CB19S076723	SARANYA. R	4	5	5	3	4	21	84
27	CB19S076724	SILAMBARASAN. R	4	4	4	4	4	20	80
28	CB19S076725	SIVAKUMAR. P	4	5	3	4	4	20	80
29	CB19S076726	SOUNDHARYA. B	4	5	3	5	5	21	84
30	CB19S076728	TAMILPRIYAN R	4	4	4	4	4	20	80
31	CB19S076730	TAMILSELVI. M	4	4	4	4	4	20	80
32	CB19S076729	VENKADESH. M	0	0	0	0	0	0	0
33	CB19S076730	VISHNUVARDHAN V	4	4	4	4	4	20	80
34	CB19S076731	YOUGGESH. S	5	4	4	4	4	21	84
AVERAGE			**3.806**	**3.833**	**3.694**	**3.778**	**3.861**		

EXPECTED ATTAINMENT IN EACH CO - 85%

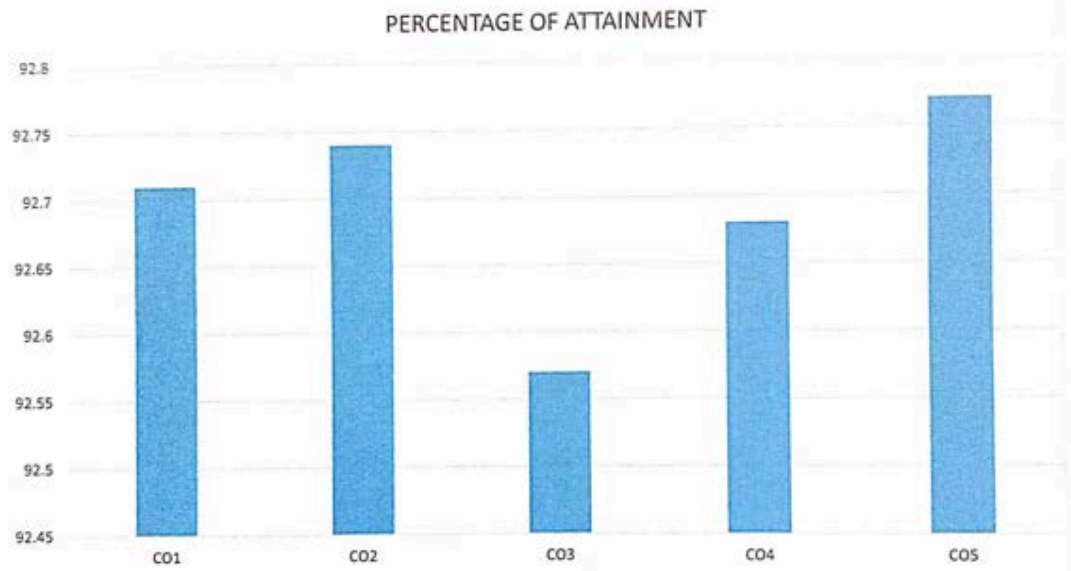
CO	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	3.81	75	78.81	92.72
CO2	3.83	75	78.83	92.74
CO3	3.69	75	78.69	92.58
CO4	3.78	75	78.78	92.68
CO5	3.86	75	78.86	92.78

COURSE ATTAINMENT FOR B.SC., BIOTECHNOLOGY

SUBJECT NAME :MOLECULAR BIOLOGY
SUBJECT CODE :16SCCBT2

NO.OF STUDENTS:34

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	92.71
CO2	92.74
CO3	92.57
CO4	92.68
CO5	92.77


PERCENTAGE OF ATTAINMENT
92.8
92.75
92.7
92.65
92.6
92.55
92.5
92.45
CO1
CO2
CO3
CO4
CO5

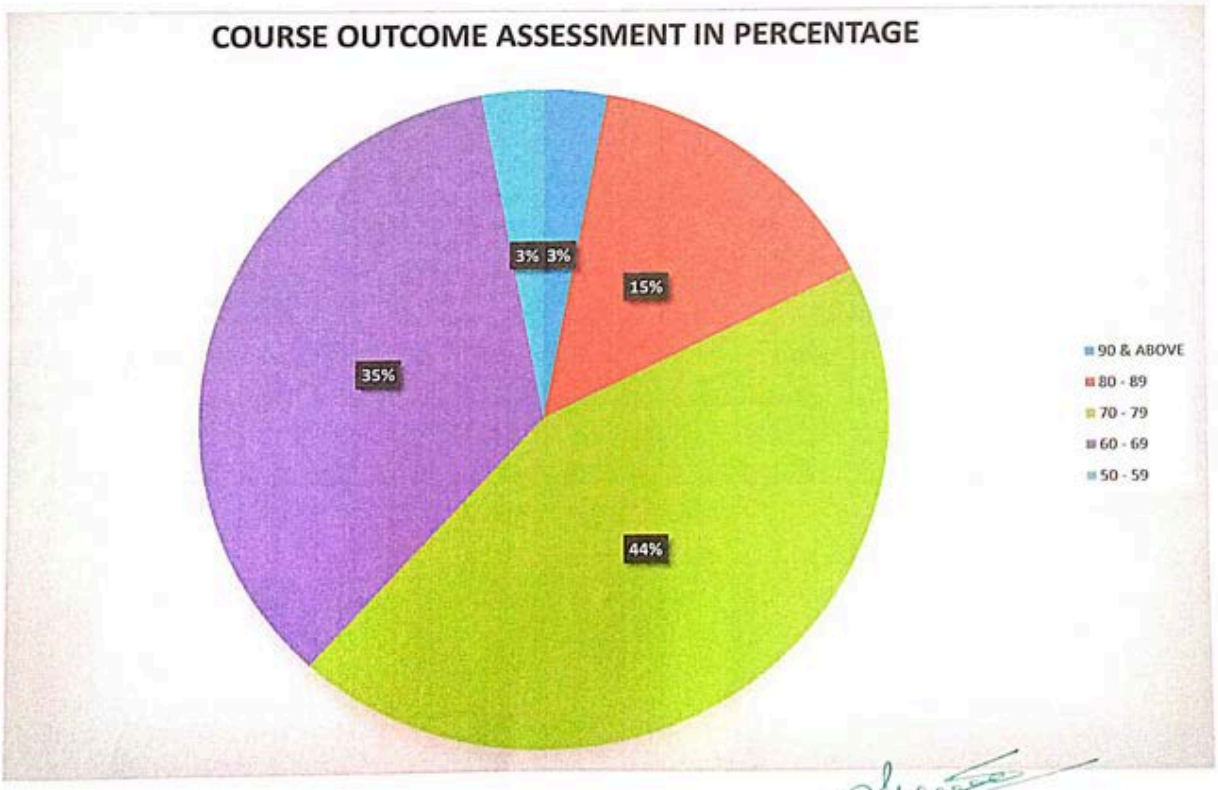
COURSE ATTAINMENT FOR B.Sc. BIOTECHNOLOGY

SUBJECT NAME: MOLECULAR BIOLOGY
SUBJECT CODE: 16SCCBT2
NO. OF STUDENTS: 34

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO. OF STUDENTS	STATUS
90 & ABOVE	1	OUTSTANDING
80 - 89	5	EXCELLENT
70 - 79	15	DISTINCTION
60 - 69	12	VERY GOOD
50 - 59	1	GOOD
40 - 49	0	AVERAGE
BELOW 40		RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
90 & ABOVE	2.94%	OUTSTANDING
80 - 89	14.70%	EXCELLENT
70 - 79	44.10%	DISTINCTION
60 - 69	35.20%	VERY GOOD
50 - 59	3%	GOOD

COURSE OUTCOME ASSESSMENT IN PERCENTAGE



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PROGRAM OUTCOME B.Sc.,BIOTECHNOLOGY

PO1	TheCell biology is the study of the structure and function of prokaryotic and eukaryotic cells. Functions of cell, its organelles, synthesis and function of macromolecules ,carbohydrate, protein, lipid, DNA & RNA and microscopic techniques to understand the cell structure. Basic of microbiology dealing types of microbes analyse medical microbiology.
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PO4	This course is planned to give basic knowledge about plant tissue culture, transgenesis, genetic modifications in agriculture,Plant Genetic Engineering,Genetic modification in food industry,Production of organic food.This course is planned to impart knowledge on fundamentals of animal cell culture, GMOs, gene therapy & transgenic animals.Biostatistics - Concepts of statistics.
PO5	This course is designed to give an idea about the avenues of exploiting microbes and to study the downstream processes for product recovery in fermentation.Microbes in food processing and production,Fermented foods and beverages.

COURSE : CELL BIOLOGY SUB CODE:16SCCBT1

COURSE OUTCOME

CO1	Fundamentals of cell structure.Prokaryotic and eukaryotic cells.Cell division:
CO2	Cellular membranes and matrices.Dynamic nature of membranes;cytoskeleton – structure and function.
CO3	Cellular organelles in metabolism.Morphology and functions of peroxisomes and glyoxisomes;
CO4	Cellular organelles in energy metabolism,Mitochondria,Chloroplast – structure and function.structure of nucleic acids.
CO5	Methods in cell biology.Microscopy,Use of radioisotopes.

EXPECTED ATTAIMENT IN EACH CO - 85%

PO → CO↓	PO1	PO2	PO3	PO4	PO5
CO1	3	2	2	2	1
CO2	3	2	3	3	2
CO3	3	2	1	2	1
CO4	3	2	1	2	2
CO5	3	3	3	3	1
AVERAGE	**3**	**2.2**	**2**	**2.4**	**1.4**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	CB19S076696	ABDUL KALAM. A	5	4	4	5	4	22	88
2	CB19S076697	ARUNKUMAR. A	3	3	3	4	4	17	68
3	CB19S076698	ARUNPANDI. D	3	3	3	3	4	16	64
4	CB19S076699	ASHOKKUMAR. P	4	4	4	4	4	20	80
5	CB19S076700	BHAVANI. R	5	5	5	5	4	24	96
6	CB19S076701	DEEPIKA. R	3	3	3	4	4	17	68
7	CB19S076702	DINESH KUMAR K	3	3	3	3	3	15	60
8	CB19S076703	HARIHARAN. K	4	3	3	3	5	18	72
	CB19S076704	HARIHAARAN.K	4	4	4	4	4	20	80

10	CB19S076705	HARINI. A	5	5	4	5	5	24	96
11	CB19S076706	JANANISRI. C	3	3	4	4	4	18	72
12	CB19S076707	KAMALESH. G	3	3	3	3	4	16	64
13	CB19S076708	KARTHICK. C	3	3	3	3	3	15	60
14	CB19S076709	KAVIYA. V	3	4	5	4	5	21	84
15	CB19S076710	KUMARAGURU. K	5	4	4	5	4	22	88
16	CB19S076711	LOGESH. A	3	3	3	3	3	15	60
17	CB19S076712	MANIKANDAN. K	5	4	4	4	3	20	80
18	CB19S076713	MANIKANDAN. K	3	3	3	3	3	15	60
19	CB19S076714	MANIKANDAN. R	3	3	3	3	3	15	60
20	CB19S076715	MOHAMEDALI. A	3	3	3	3	3	15	60
21	CB19S076716	PRADHANYA. A	4	5	5	5	5	24	96
22	CB19S076717	PREMKUMAR. S	4	3	3	3	3	16	64
23	CB19S076718	PREMY. R	4	4	4	4	4	20	80
24	CB19S076719	PRIYA. P	4	5	5	5	5	24	96
25	CB19S076720	RAGAVAN. K	4	4	4	4	4	20	80
26	CB19S076721	RAJASURIYAN. S	3	3	3	3	5	17	68
27	CB19S076722	RASIKA. D	3	4	4	3	4	18	72
28	CB19S076723	SARANYA. R	4	4	4	4	4	20	80
29	CB19S076724	SILAMBARASAN. R	3	3	3	3	4	16	64
30	CB19S076725	SIVAKUMAR. P	3	3	3	3	3	15	60
31	CB19S076726	SOUNDHARYA. B	4	4	4	4	4	20	80
32	CB19S076727	TAMILPRIYAN. R	3	4	3	3	3	16	64
33	CB19S076728	TAMILSELVI. M	4	3	3	3	4	17	68
34	CB19S076729	VENKADESH. M	3	3	3	3	3	15	60
35	CB19S076730	VISHNUVARDHAN V	4	4	4	3	3	18	72
36	CB19S076731	YOUGGESH. S	3	4	3	3	3	20	80
		AVERAGE	**3.61**	**3.61**	**3.58**	**3.64**	**3.81**		

EXPECTED ATTAIMENT IN EACH CO - 85%	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	3.61	75	78.61	92.48
CO2	3.61	75	78.61	92.48
CO3	3.58	75	78.58	92.45
CO4	3.63	75	78.63	92.51
CO5	3.8	75	78.8	92.71

COURSE ATTAINMENT FOR B.SC., BIOTECHNOLOGY

SUBJECT NAME :CELL BIOLOGY

SUBJECT CODE :16SCCBT1

NO.OF STUDENTS: 36

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	92.48
CO2	92.48
CO3	92.44
CO4	92.5
CO5	92.7

EXPECTED ATTAIMENT IN EACH CO - 85%	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	3.61	75	78.61	92.48
CO2	3.61	75	78.61	92.48
CO3	3.58	75	78.58	92.45
CO4	3.63	75	78.63	92.51
CO5	3.8	75	78.8	92.71

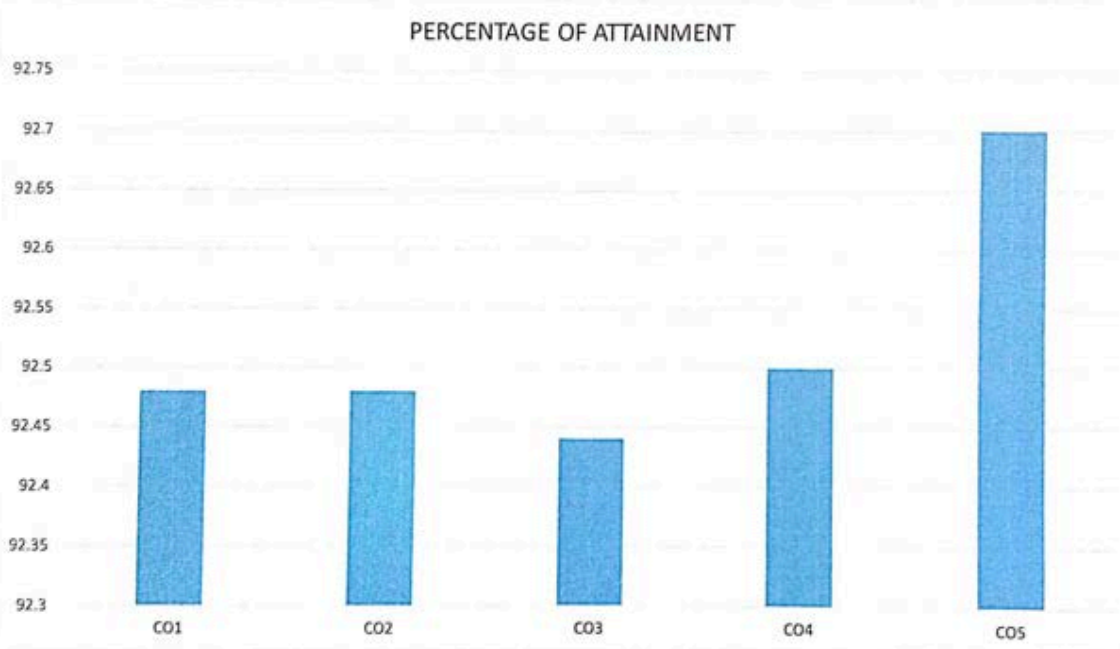
COURSE ATTAINMENT FOR B.SC., BIOTECHNOLOGY

SUBJECT NAME :CELL BIOLOGY

SUBJECT CODE :16SCCBT1

NO.OF STUDENTS: 36

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	92.48
CO2	92.48
CO3	92.44
CO4	92.5
CO5	92.7

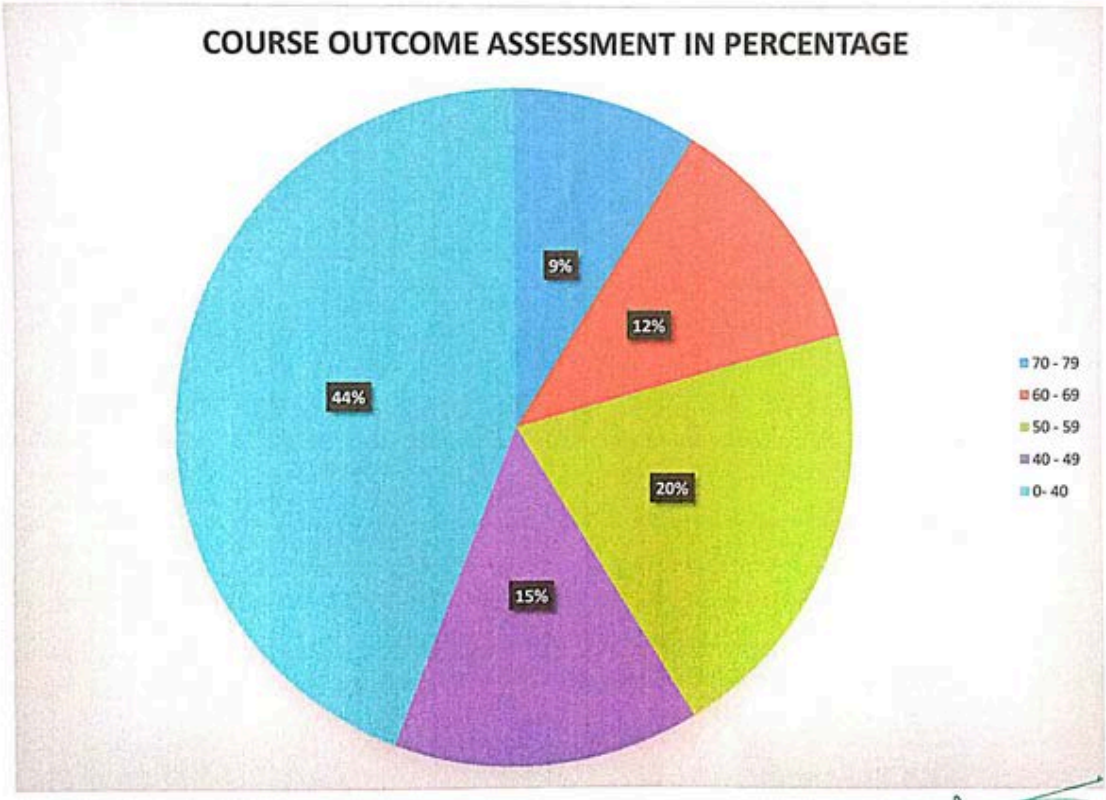

PERCENTAGE OF ATTAINMENT
92.75
92.7
92.65
92.6
92.55
92.5
92.45
92.4
92.35
92.3
CO1
CO2
CO3
CO4
CO5

COURSE ATTAINMENT FOR B.Sc. BIOTECHNOLOGY

SUBJECT NAME: CELL BIOLOGY
SUBJECT CODE: 16SCCBT1
NO. OF STUDENTS: 36

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO. OF STUDENTS	STATUS
90 & ABOVE	0	OUTSTANDING
80 - 89	0	EXCELLENT
70 - 79	3	DISTINCTION
60 - 69	4	VERY GOOD
50 - 59	8	GOOD
40 - 49	6	AVERAGE
BELOW 40	15	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
70 - 79	8.30%	DISTINCTION
60 - 69	11.10%	VERY GOOD
50 - 59	19%	GOOD
40 - 49	13.80%	AVERAGE
0- 40	41.60%	RA



PRINCIPAL
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THANJAVUR - 613 005.

BHARATH COLLEGE OF SCIENCE AND MANAGEMENT
(UGC Recognized 2(f) & 12(B) Institution)
THANJAVUR-5
DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME

PO1	TheCell biology is the study of the structure and function of prokaryotic and eukaryotic cells. Functions of cell, its organelles, synthesis and function of macromolecules ,carbohydrate, protein, lipid, DNA & RNA and microscopic techniques to understand the cell structure. Basic of microbiology dealing types of microbes analyse medical microbiology.
PO2	This course is designed to given an understanding about the basics of molecular biology – classical genetics & molecular aspects.Isolation, preservation and improvement of strains.Food Microbiology-Medical Microbiology,Agricultural Microbiology.
PO3	This courser is planned to basic knowledge on r DNA Technology, Blotting techniques ,pharmaceutical products, Gene therapy.structure functions of biomolecules.Amino Acids and Proteins.Anatomy of the immune system.Vaccinology-Clinical immunology.Classification of lipids.macro and micro minerals , Anatomy of the Immune System.Vaccinology,Clinical Immunology, Instruments in centrifugation, chromatography, electrophoresis, spectroscopy and crystallography.
PO4	This course is planned to give basic knowledge about plant tissue culture,transgenesis, genetic modifications in agriculture,Plant Genetic Engineering,Genetic modification in food industry,Production of organic food.This course is planned to impart knowledge on fundamentals of animal cell culture, GMOs, gene therapy & transgenic animals.Biostatistics - Concepts of statistics.
PO5	This course is designed to give an idea about the avenues of exploiting microbes and to study the downstream processes for product recovery in fermentation.Microbes in food processing and production,Fermented foods and beverages.

COURSE : MICROBIAL BIOTECHNOLOGY SUB CODE:16SCCBT8

COURSE OUTCOME

CO1	isolation and maintainance of Industrially important microorganisms.Microbial growth and death kinetics
CO2	To acquire the knowledge about the design of bioreactors.Understand the principles of fermentation processing and its scope in downstream processing.
CO3	Added the informations about the upstream processing
CO4	Gaining added information on the production of media formulations and production of value added products from microorganisms.
CO5	Gaining the knowledge about purification of fermented foods

PO → CO↓	PO1	PO2	PO3	PO4	PO5
CO1	3	1	2	2	1
CO2	3	2	3	2	2
CO3	3	1	1	2	1
CO4	3	3	2	2	2
CO5	1	3	3	3	3
AVERAGE	**2.6**	**2**	**2.2**	**2.2**	**1.8**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	CB19S076696	ABDUL KALAM. A	3	5	5	5	5	23	92
2	CB19S076697	ARUN KUMAR. A	3	4	2	5	4	18	72
3	CB19S076698	ARUN PANDI.D	4	4	4	4	5	21	84
4	CB19S076699	ASHOK KUMAR.P	5	4	4	4	5	22	88
5	CB19S076700	BHAVANI.R	5	5	5	5	5	25	100
6	CB19S076701	DEEPIKA.R	4	5	5	4	5	23	92
7	CB19S076703	HARIHARAN.K	5	5	4	4	4	22	88
8	CB19S076704	HARIHARAN.K	4	4	4	4	5	21	84
9	CB19S076705	HARINI.A	5	5	5	5	5	25	100
10	CB19S076706	JANANISRI.C	4	5	5	5	5	24	96
11	CB19S076707	KAMALESH G	4	5	5	5	5	24	96
12	CB19S076709	KAVIYA V	4	4	4	4	5	21	84
13	CB19S076710	KUMARAGURU.K	5	5	5	5	4	24	96
14	CB19S076711	LOGESH.A	3	3	5	5	2	18	72
15	CB19S076712	MANIKANDAN K	4	4	4	4	4	20	80
16	CB19S076713	MANIKANDAN.K	4	4	5	4	4	21	84
17	CB19S076714	MANIKANDAN.R	4	4	4	4	4	20	80
18	CB19S076715	MOHAMED ALI.A	4	4	4	4	4	20	80
19	CB19S076716	PRADHANYA .A	5	4	5	5	5	24	96
20	CB19S076717	PREMKUMAR .S	4	5	5	4	4	22	88
21	CB19S076718	PREMY.R	4	4	5	5	5	23	92
22	CB19S076719	PRIYA P	4	5	5	5	5	24	96
23	CB19S076720	RAGAVAN.K	5	5	4	4	5	23	92
24	CB19S076721	RAJASURIYAN.S	4	4	4	5	5	22	88
25	CB19S076722	RASIKA.D	5	5	4	4	5	22	88
26	CB19S076723	SARANYA.R	4	4	5	5	5	23	92
27	CB19S076724	SILAMBARASAN.R	4	4	4	4	4	20	80
28	CB19S076726	SOUNDARYA.B	4	4	5	5	5	23	92
29	CB19S076727	TAMIL PRIYAN.R	5	5	5	4	4	23	92
30	CB19S076728	TAMIL SELVI.M	4	4	4	5	5	22	88

31	CB19S076730	VISHNUVARDHAN.V	5	5	5	5	4	24	96
32	CB19S076731	YOUGGESH.S	4	4	4	5	5	22	88
AVERAGE			4.22	4.41	4.47	4.53	4.56		

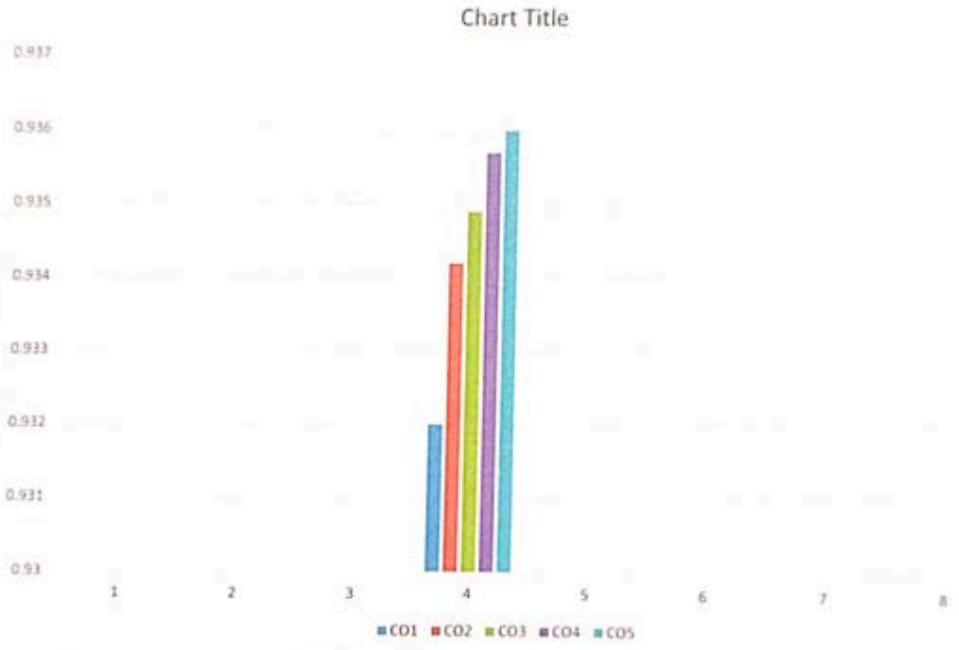
EXPECTED ATTAIMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	4.22	75	79.22	93.20
CO2	4.41	75	79.41	93.42
CO3	4.47	75	79.47	93.49
CO4	4.53	75	79.53	93.57
CO5	4.56	75	79.56	93.60

COURSE ATTAINMENT FOR UG BIOTECHNOLOGY

SUBJECT NAME: MICROBIAL BIOTECHNOLOGY
SUBJECT CODE: 16SCCBT8
NO. OF STUDENTS: 32

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	93.20%
CO2	93.42%
CO3	93.49%
CO4	93.57%
CO5	93.60%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0.935
0.934
0.933
0.932
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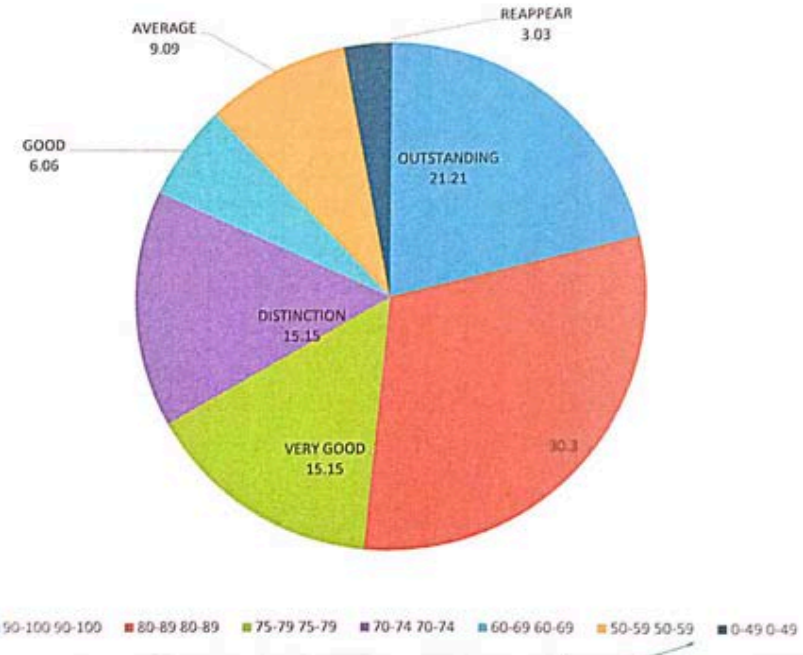
0.93
1
2
3
4
5
6
7
8
CO1
CO2
CO3
CO4
CO5

SUBJECT NAME: MICROBIAL BIOTECHNOLOGY
SUBJECT CODE: 16SCCBT8
NO. OF STUDENTS: 32

CATEGORY (MARKS)	NO. OF STUDENTS	STATUS
90 -100	7	OUTSTANDING
80 - 89	10	EXCELLENT
70 - 79	5	DISINCTION
60 - 69	5	GOOD
50 - 59	2	VERY GOOD
40 - 49	3	AVERAGE
BELOW 40	0	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE			
CATEGORY (MARKS)		PERCENTAGE	STATUS
90-100	90-100	21.21	OUTSTANDING
80-89	80-89	30.3	EXCELLENT
75-79	75-79	15.15	DISINCTION
70-74	70-74	15.15	GOOD
60-69	60-69	6.06	VERY GOOD
50-59	50-59	9.09	AVERAGE
0-49	0-49	3.03	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE



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THANJAVUR-5
PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME B.Sc., BIOTECHNOLOGY

PO1	TheCell biology is the study of the structure and function of prokaryotic and eukaryotic cells. In this course the students will learn different areas of cellular biology including the structure and functions of cell, its organelles, synthesis and function of macromolecules such as carbohydrate, protein, lipid, DNA & RNA; membrane structure and function; bioenergetics; cellular communication; and microscopic techniques to understand the cell structure. course about the basic of microbiology dealing types of microbes analyse medical microbiology.
PO2	This course is designed to given an understanding about the basics of molecular biology – classical genetics & molecular aspects.Isolation, preservation and improvement of strains.Food Microbiology-Medical Microbiology,Agricultural Microbiology.
PO3	This courser is planned to give basic knowledge on r DNA Technology,Blotting techques ,pharmaceutical products, Gene therapy.structure functions of biomolecules.Amino Acids and Proteins.Classification of lipids.Fundemental concepts and Anatomy of the immune system.vaccinology-Clinical immunology.Classification of lipids.macro and micro minerals - source and functions.Fundamental Concepts and Anatomy of the Immune System.Vaccinology,Clinical Immunology.to specialize in instruments in centrifugation, chromatography, electrophoresis, spectroscopy and crystallography.
PO4	This course is planned to give basic knowledge about plant tissue culture, transgenesis, genetic modifications in agriculture,Plant Genetic Engineering,Genetic modification in food industry,Production of organic food.This course is planned to impart knowledge on fundamentals of animal cell culture, GMOs, gene therapy & transgenic animals.Biostatistics - Concepts of statistics.
PO5	This course is designed to give an idea about the avenues of exploiting microbes and to study the downstream processes for product recovery in fermentation.Microbes in food processing and production,Fermented foods and beverages.

COURSE :PLANT BIOTECHNOLOGY
COURSE OUTCOME

CO1	Plant tissue culture-Plant tissue culture techniques, in-vitro pollination and fertilization, embryo culture and its applications.
CO2	Genetic manipulation of plants-Protoplast and tissue culture manipulation for genetic manipulation of plants.
CO3	Applications of Plant Genetic Engineering-Genetic engineering & crop improvement, herbicide resistance, insect resistance, virus resistance, plants as bioreactors.
CO4	Genetic modification in Agriculture-Genetic modification in food industry – background, history, controversies over risks, application, future applications.
CO5	Organic food-Production of organic food, types of organic food, identification of organic food, organic food & preservatives.

PO →	PO1	PO2	PO3	PO4	PO5
CO1	3	2	1	3	3
CO2	1	3	1	3	3
CO3	3	1	2	2	2
CO4	2	3	1	3	3
CO5	3	1	2	2	3
AVERAGE	**2.4**	**2**	**1.4**	**2.6**	**2.8**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

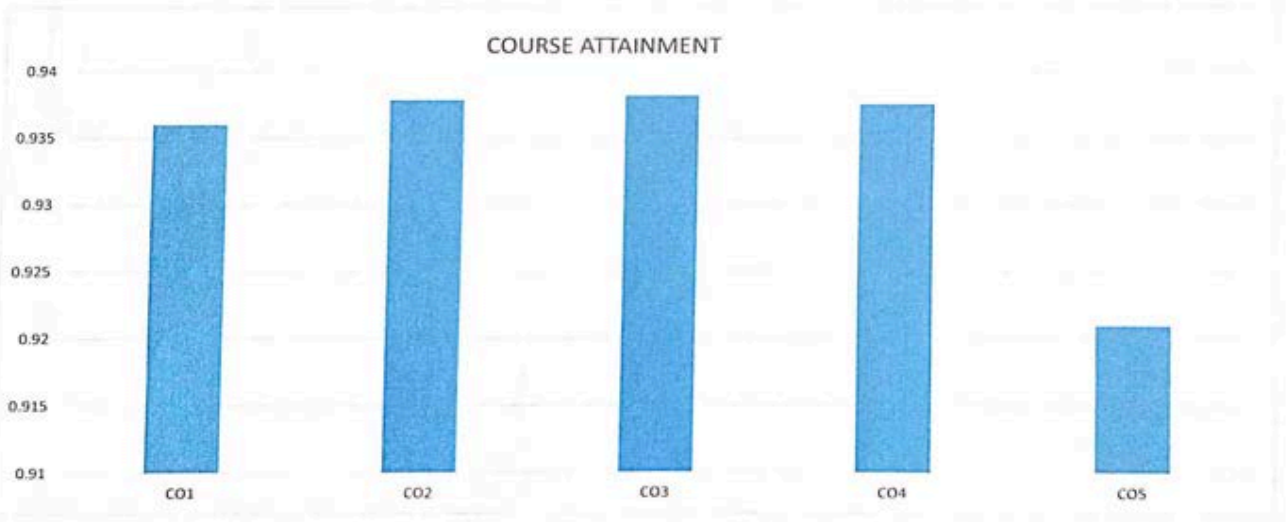
SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	CB19S076696	ABDUL KALAM. A	5	5	5	5	3	23	92
2	CB19S076697	ARUNKUMAR. A	4	4	4	4	3	19	76
3	CB19S076698	ARUNPANDI. D	4	4	4	4	4	20	80
4	CB19S076699	ASHOKKUMAR. P	4	4	4	4	4	20	80
5	CB19S076700	BHAVANI. R	5	5	5	5	5	25	100
6	CB19S076701	DEEPIKA. R	5	5	5	4	3	22	88
7	CB19S076702	DINESH KUMAR K	5	5	5	5	2	22	88
8	CB19S076703	HARIHARAN. K	5	5	5	5	2	22	88
9	CB19S076704	HARIHARAN. K	5	5	5	5	5	25	100
10	CB19S076705	HARINI. A	5	5	5	5	3	23	92
11	CB19S076706	JANANISRI. C	5	5	5	5	3	23	92
12	CB19S076707	KAMALESH. G	5	5	5	5	2	22	88
14	CB19S076708	KARTHICK. C	5	5	5	5	3	23	92
15	CB19S076709	KAVIYA. V	5	5	5	5	2	22	88
16	CB19S076710	KUMARAGURU. K	3	4	4	4	4	22	88

17	CB19S076711	LOGESH. A	4	4	4	4	4	20	80
18	CB19S076712	MANIKANDAN. K	5	5	5	5	2	22	88
19	CB19S076713	MANIKANDAN. K	5	5	5	5	2	22	88
20	CB19S076714	MANIKANDAN. R	5	5	5	5	2	22	88
21	CB19S076715	MOHAMEDALI. A	3	3	4	5	4	19	76
22	CB19S076716	PRADHANYA. A	3	5	5	5	5	23	92
23	CB19S076717	PREMKUMAR. S	5	5	5	5	2	22	88
24	CB19S076718	PREMY. R	5	5	5	5	5	25	100
25	CB19S076719	PRIYA. P	5	5	5	5	5	25	100
26	CB19S076720	RAGAVAN. K	5	5	5	5	2	22	88
27	CB19S076721	RAJASURIYAN. S	2	5	5	5	5	22	88
28	CB19S076722	RASIKA. D	5	5	5	5	2	22	88
29	CB19S076723	SARANYA. R	5	5	5	5	3	23	92
30	CB19S076724	SILAMBARASAN. R	4	4	4	4	4	20	80
31	CB19S076725	SIVAKUMAR. P	4	4	4	4	4	20	80
32	CB19S076726	SOUNDHARYA. B	5	5	5	5	3	23	92
33	CB19S076727	TAMILPRIYAN. R	5	5	5	5	2	22	88
34	CB19S076728	TAMILSELVI. M	5	5	5	5	3	23	92
35	CB19S076729	VENKADESH. M	4	4	4	4	4	20	80
36	CB19S076730	VISHNUVARDHAN V	5	5	5	5	2	22	88
37	CB19S076731	YOUGGESH. S	5	5	5	3	5	23	92
AVERAGE			4.556	4.722	4.75	4.694	3.278		

EXPECTED ATTAINMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	4.56	75	79.56	93.6
CO2	4.72	75	79.72	93.78824
CO3	4.75	75	79.75	93.82353
CO4	4.69	75	79.69	93.75294
CO5	3.28	75	78.278	92.09176

S.NO	CO	COURSE ATTAINMENT
1	CO1	93.60%
2	CO2	93.79%
3	CO3	93.82%
4	CO4	93.75%
5	CO5	92.09%



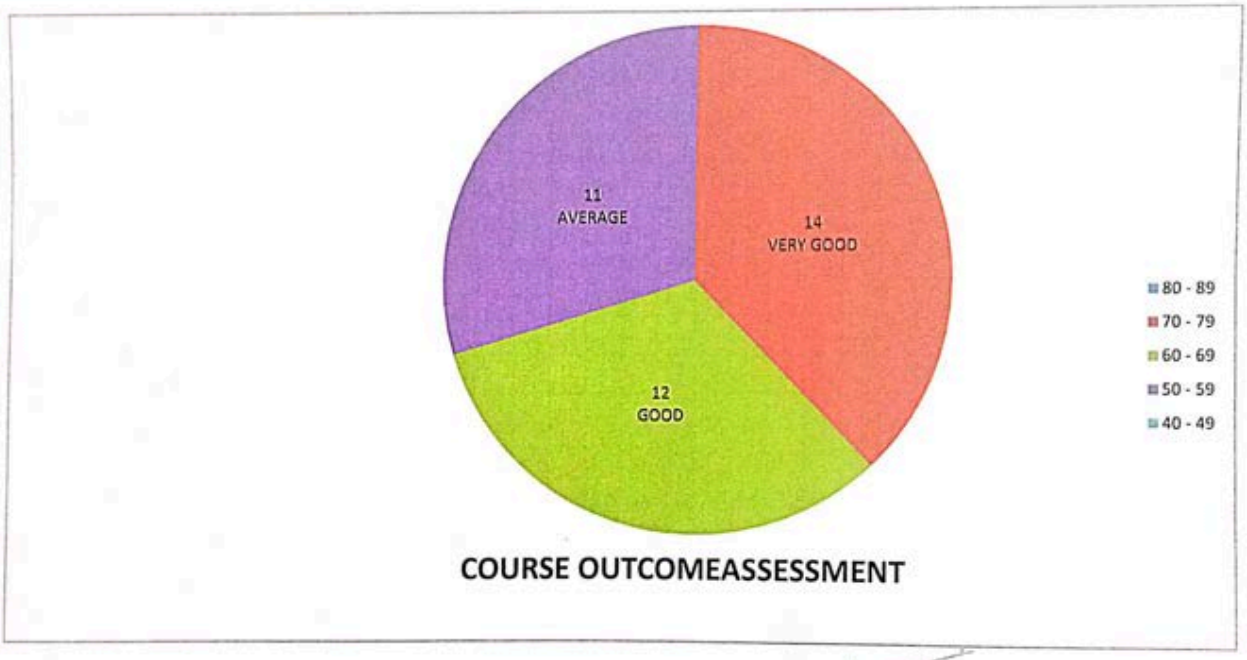
SUBJECT NAME :PLANT BIOTECHNOLOGY

SUBJECT CODE:16SCCBT5

TOTAL NO OF STUDENT :37

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO. OF STUDENTS	STATUS
90 - 100	0	OUTSTANDING
80 - 89	0	EXCELLENT
70 - 79	14	DISTINCTION
60 - 69	12	VERY GOOD
50 - 59	11	GOOD
40 - 49	0	AVERAGE
BELOW 40	0	RA

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	PERCENTAGE%	STATUS
90-100	0	OUTSTANDING
80-89	0	EXCELLENT
70-79	38.89	DISTINCTION
60-69	30.56	VERY GOOD
50-59	30.56	GOOD
40-49	2.78	AVERAGE
BELOW 40	0	REAPPEAR



COURSE OUTCOMEASSESSMENT

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BHARATH COLLEGE OF SCIENCE AND MANAGEMENT
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THANJAVUR-5
PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME B.Sc BIOTECHNOLOGY

PO1	TheCell biology is the study of the structure and function of prokaryotic and eukaryotic cells. In this course the students will learn different areas of cellular biology including the structure and functions of cell, its organelles, synthesis and function of macromolecules such as carbohydrate, protein, lipid, DNA & RNA; membrane structure and function; bioenergetics; cellular communication; and microscopic techniques to understand the cell structure. course about the basic of microbiology dealing types of microbes analyse medical microbiology.
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PO5	To learn about fundamentals of animal cell culture,GMOs,Gene therapy and transgenic animals.

COURSE : LAB IN MICROBIALBIOTECHNOLOGY COURSE CODE:16SCCBT6P
COURSE OUTCOME

CO1	Isolation of industrially important microorganisms.
CO2	Enzyme production – amylase production.
CO3	Antibiotic production by different strains of microbes
CO4	Isolation & identification microbes from spoiled food
CO5	Immobilization of yeast cell by alginate beads

PO →	PO1	PO2	PO3	PO4	PO5
CO1	1	2	1	1	1
CO2	1	1	2	1	1
CO3	2	1	1	2	1
CO4	1	1	2	1	1
CO5	1	2	1	3	1
AVERAGE	**1.2**	**1.4**	**1.4**	**1.6**	**1**

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PROGRAM OUTCOME B.Sc BIOTECHNOLOGY

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COURSE : PLANT AND ANIMAL BIOTECHNOLOGY COURSE CODE:16SCCBT5P
COURSE OUTCOME

CO1	Isolation of plant genomic DNA
CO2	Preparation of chloroplast from pea
CO3	Isolation of DNA from Animal liver, Isolation of DNA from human cheek cells
CO4	Quantification of DNA by spectrophotometeric method
CO5	Types of Animal cell culture – Primary, secondary & established

PO →	PO1	PO2	PO3	PO4	PO5
CO1	3	2	1	1	1
CO2	1	1	2	2	1
CO3	2	2	3	2	3
CO4	3	1	2	1	3
CO5	3	2	2	3	2
AVERAGE	2.4	1.6	2	1.8	2

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COURSE : BIOCHEMISTRY COURSE CODE:16SACBT1P
COURSE OUTCOME

CO1	Isolation of Mitochondria from rat liver.
CO2	Separation of amino acids/sugars/nucleic acids/pigments using paper and thin layer chromatography.
CO3	SDS-PAGE analysis of proteins
CO4	Separation of Blood, plasma and serum
CO5	Extraction of Proteins from biological materials, Protein separation methods : Precipitation, chromatographic, electrophoretic techniques.

PO →	PO1	PO2	PO3	PO4	PO5
CO1	2	1	1	1	1
CO2	2	2	2	3	1
CO3	1	1	3	2	3
CO4	2	3	2	2	2
CO5	3	2	2	1	2
AVERAGE	**2**	**1.8**	**2**	**1.8**	**1.8**

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COURSE : IMMUNOLOGY COURSE CODE:16SCCBT4P
COURSE OUTCOME

CO1	Separation of serum & plasma
CO2	Agglutination - Blood grouping, Latex agglutination, WIDAL
CO3	Breeding & maintenance of laboratory animals. Immunization
CO4	Raising antibody – polyclonal & monoclonal
CO5	Breeding of experimental animals.

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PO →	PO1	PO2	PO3	PO4	PO5
CO1	2	1	1	1	1
CO2	2	1	1	1	2
CO3	2	1	3	2	3
CO4	2	1	2	2	1
CO5	3	1	1	3	2
AVERAGE	**2.2**	**1**	**1.6**	**1.8**	**1.8**

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COURSE :r DNA TECHNOLOGY COURSE CODE:16SCCBT3P

CO1	Isolation of genomic DNA from plant, animal cells & from bacteria
CO2	Isolation of plasmid DNA – small & large scale
CO3	Restriction digestion – single & double digestion, Ligation.
CO4	Selection & screening of rDNA products – Antibiotic resistance, Blue white colony.
CO5	PCR amplification, Southern blot and northern blot.

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PO →	PO1	PO2	PO3	PO4	PO5
CO1	2	1	1	1	1
CO2	2	2	2	3	1
CO3	1	1	3	2	3
CO4	2	3	2	2	2
CO5	3	2	2	1	2
AVERAGE	**2**	**1.8**	**2**	**1.8**	**1.8**

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COURSE : MOLECULAR BIOLOGY COURSE CODE:16SCCBT2P

CO1	Isolation and purification of genomic DNA from prokaryotes
CO2	Isolation and purification of plasmid DNA.
CO3	Transformation of bacteria – CaCl2 method
CO4	Observation of DNA
CO5	Staining of proteins

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PO →	PO1	PO2	PO3	PO4	PO5
CO1	1	1	1	2	1
CO2	2	2	3	3	3
CO3	3	1	3	2	1
CO4	2	2	2	2	3
CO5	3	2	2	3	2
AVERAGE	2.2	1.6	2.2	2.4	2

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PO5	To learn about fundamentals of animal cell culture,GMOs,Gene therapy and transgenic animals.

COURSE : MICROBIOLOGY COURSE CODE: 16SACMB1P
COURSE OUTCOME

CO1	Preparation of Microbiological media
CO2	Isolation of microorganisms from various samples
CO3	Biochemical identification of bacteria.
CO4	Staining of fungI
CO5	Identification of algae, fungi, lichens & yeast

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PO →	PO1	PO2	PO3	PO4	PO5
CO1	1	1	1	2	1
CO2	2	2	3	2	1
CO3	3	1	1	2	1
CO4	2	3	2	2	3
CO5	2	3	2	3	2
AVERAGE	**2**	**2**	**1.8**	**2.2**	**1.6**

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COURSE : CELL BIOLOGY COURSE CODE: 16SCCBT1P

CO1	Structure observation of Prokaryotic cells Structure observation of Eukaryotic cell
CO2	Motility of an organism
CO3	Cell Staining – Cytochemical methods.
CO4	Structure of purine and pyrimidine base, Watson and Crick model and forms of DNA.
CO5	Cell division – Binary fission of yeast

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PO →	PO1	PO2	PO3	PO4	PO5
CO1	3	2	2	2	1
CO2	3	2	3	2	2
CO3	3	2	1	3	1
CO4	3	3	2	2	2
CO5	3	3	3	3	2
AVERAGE	**3**	**2.4**	**2.2**	**2.4**	**1.6**

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PO4	To study the various principles underlying genetic engineering that forms the basis of rDNA technology and to study the methodologies, and in brief the applications and related issues of rDNA technology and understanding about the basics of Animal cell culture, transgenic animals, pest & animal management, Molecular markers and regulations about the use of Biotechnology.To study the downstream processes for product recovery in fermentation. Technology and understanding about the basics of Animal cell culture, transgenic animals, pest & animal management, Molecular markers and regulations about the use of Biotechnology.
PO5	Student will get an idea about the basic understanding about Bioinformatics, tools, sequences, algorithms and the analysis of phylogenetic tree and will give an idea about the basic principles and techniques involved in plant cell culture and to understand the concepts of transformation and achievements of biotechnology in Plant systems.To understand the chemical nature and associated microbes of food and to understand the principles of food processing, preservation and manufacture.

COURSE CODE& COURSE TITLE	NAME OF THE PROGRAMME:M.Sc : BIOTECHNOLOGY	
	COURSE OUTCOME	
BIOCHEMISTRY (P16BT13)	CO1	Chemical basis of life and composition of living matter. Biomolecules - chemical composition and bonding. Properties of water, acids, gases and buffer. pH, ionization and hydrophobicity
	CO2	Amino acids - Structure and functional group, properties. Biosynthesis, types, properties and metabolism of amino acids. Proteins - Peptides and covalent structure of proteins.Enzyme-Nomenclature, classification, properties, structure and functional relationship. Enzyme catalysis and general principles of catalysis.
	CO3	Carbohydrates - Structure and classification. Sugars - mono, di, and polysaccharides, chemical composition and bonding.Glycolysis, Kreb's cycle, Gluconeogenesis and HMP pathway.Lipids - Structure, classification and properties. Lipid metabolism. Oxidation - Fatty acids and cholesterol. Biosynthesis of lipids.
	CO4	Nucleic acids - Structure, diversity and function. Sequencing of nucleic acids. Brief overview of central dogma.Vitamins - Classification and derivatives. Secondary metabolites from plants.
	CO5	Bioenergetics - basic principles, equilibrium and concept of free energy, redox potential and their applications. Coupled processes - process of photosynthesis.

PO → CO↓	PO1	PO2	PO3	PO4	PO5
CO1	3	1	1	2	0
CO2	3	0	0	1	1
CO3	3	1	0	0	0
CO4	3	0	1	1	1
CO5	3	1	1	0	0
AVERAGE	**3**	**0.6**	**0.6**	**0.8**	**0.4**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	P19440201	AISHWARYA.G	4	4	5	4	4	21	84
2	P19440202	ARUN.A	4	5	4	4	4	21	84
3	P19440203	ARUN PRAKASH.K	5	4	4	4	4	21	84
4	P19440204	GOPINATH.P	4	5	3	4	4	20	80
5	P19440205	HARIKARAN.K	5	5	4	4	5	23	92
6	P19440206	MADHAVI.R	5	4	4	4	4	21	84
7	P19440207	MELIA DEPHILA.J	5	5	4	5	4	23	92
8	P19440208	NIVEDHA.G	4	5	4	4	4	21	84
9	P19440209	PARKAVI.A	4	4	5	4	4	21	84
10	P19440210	POOJA.A	5	4	5	4	4	22	88
11	P19440211	SIVASANGARI.A	4	3	4	3	3	17	68
12	P19440212	SOUNDARYA.M	5	4	5	4	4	22	88
13	P19440213	THASLIMA NASRIN.M	5	4	5	5	4	23	92
14	P19440214	VENNILA.R	4	5	4	4	4	21	84
15	P19440215	VINOTHA.E	4	4	4	5	4	21	84
16	P19440216	VISALACHI.M	4	5	4	4	4	21	84
AVERAGE			4.4	4.4	4.3	4.1	4.0		

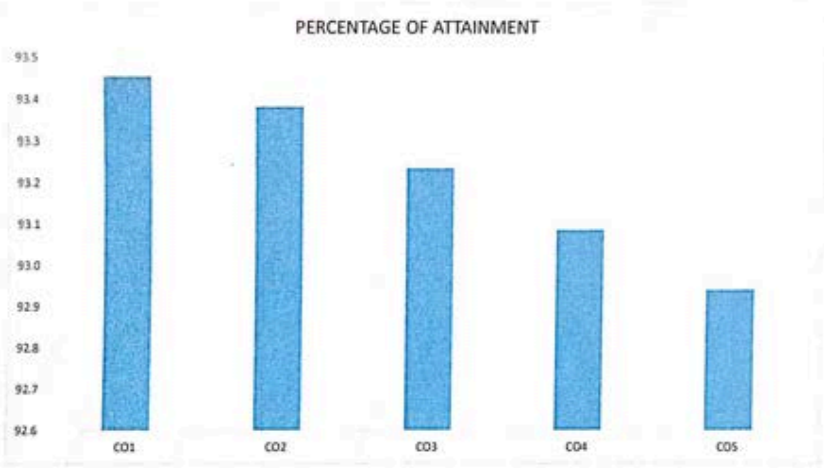
EXPECTED ATTAIMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	4.4	75	79.44	93.46
CO2	4.4	75	79.38	93.38
CO3	4.3	75	79.25	93.24
CO4	4.1	75	79.13	93.09
CO5	4.0	75	79.00	92.94

COURSE ATTAINMENT FOR M.Sc., BIOTCHNOLOGY

SUBJECT NAME: BIOCHEMISTRY
SUBJECT CODE: P16BT13
NO. OF STUDENTS: 16

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	93.5
CO2	93.4
CO3	93.2
CO4	93.1
CO5	92.9



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COURSE ATTAINMENT FOR M.Sc., BIOTCHNOLOGY

SUBJECT NAME: BIOCHEMISTRY
SUBJECT CODE: P16BT13
NO. OF STUDENTS: 16

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO.OF STUDENTS	STATUS
90-100	0	OUTSTANDING
80-89	0	EXCELLENT
75-79	3	DISTINCTION
70-74	3	VERY GOOD
60-69	5	GOOD
50-59	0	AVERAGE
0-49	4	REAPPEAR

COURSE ATTAINMENT FOR M.Sc., BIOTCHNOLOGY

SUBJECT NAME: BIOCHEMISTRY
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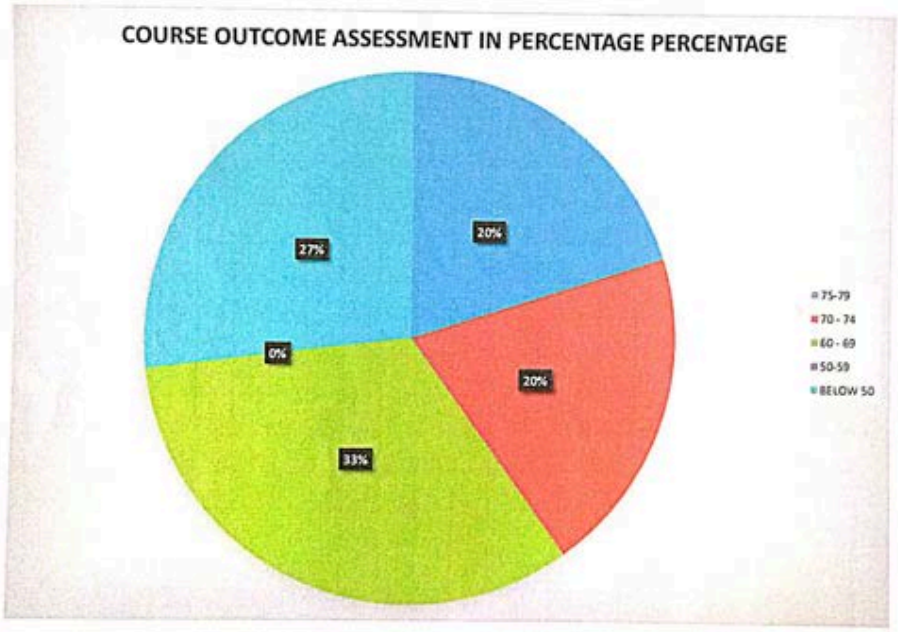
COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO. OF STUDENTS	STATUS
90 -100	0	OUTSTANDING
80 - 89	0	EXCELLENT
75-79	3	DISTINCTION
70-74	3	VERY GOOD
60-69	5	GOOD
50-59	0	AVERAGE
BELOW 50	4	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
75-79	20.00%	DISTINCTION
70 - 74	20.00%	VERY GOOD
60 - 69	33.00%	GOOD
50-59	0.00%	AVERAGE
BELOW 50	27.00%	RA



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COURSE CODE& COURSE TITLE	NAME OF THE PROGRAMME:M.Sc : BIOTECHNOLOGY	
	COURSE OUTCOME	
BIOSTATISTICS, BIOETHICS AND IPR (P16BTE3)	CO1	Introduction to Biostatistics – sample, population and statistical inference.statistical treatment to proportion data.
	CO2	Bioethics-Ethics and the law issues - genetic engineering, stem cells, cloning, medical techniques, transhumanism and bioweapons.
	CO3	Basics of patents, types of patents. Global scenario of patents and Indian position, patenting of biological materials.
	CO4	Patent Filling and Infringement.Patent infringement - meaning, scope, litigation.
	CO5	Biological safetycabinets, primary containment for biohazards, biosafety levels.

PO → CO↓	PO1	PO2	PO3	PO4	PO5
CO1	3	1	1	2	0
CO2	3	0	0	1	1
CO3	3	1	0	0	0
CO4	3	0	1	1	1
CO5	3	1	1	0	0
AVERAGE	**3**	**0.6**	**0.6**	**0.8**	**0.4**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	P19440201	AISHWARYA.G	4	5	5	4	5	23	92
2	P19440202	ARUN.A	5	4	5	5	5	24	96
3	P19440203	ARUN PRAKASH.K	5	4	5	5	4	23	92
4	P19440204	GOPINATH.P	5	4	4	4	5	22	88
5	P19440205	HARIKARAN.K	5	4	5	5	5	24	96
5	P19440206	MADHAVI.R	5	5	5	4	5	24	96
6	P19440207	MELIA DEPHILA.J	4	5	5	5	5	24	96
7	P19440208	NIVEDHA.G	5	4	5	5	4	23	92
8	P19440209	PARKAVI.A	5	4	4	4	5	22	88
10	P19440210	POOJA.A	4	5	5	4	4	22	88
11	P19440212	SOUNDARYA.M	5	4	5	4	5	23	92
12	P19440213	THASLIMA NASRIN.M	5	5	4	5	5	24	96
13	P19440214	VENNILA.R	5	4	4	4	5	22	88
14	P19440215	VINOTHA.E	4	5	5	4	4	22	88
15	P19440216	VISALACHI.M	5	4	5	4	5	23	92
AVERAGE			4.73	4.40	4.73	4.40	4.73		

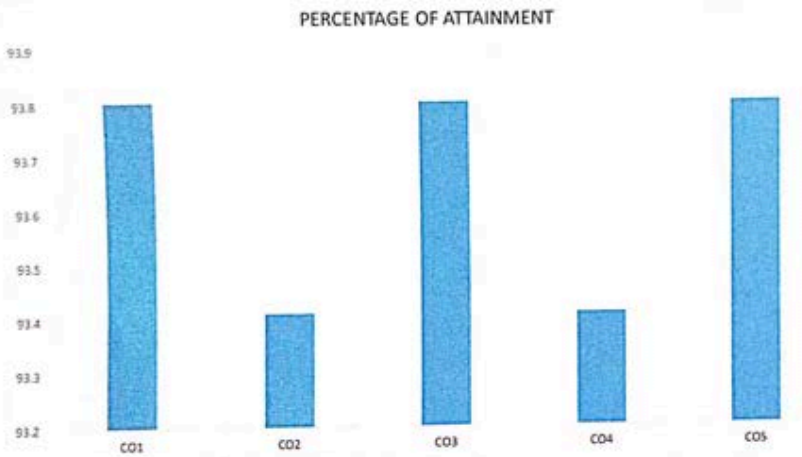
EXPECTED ATTAIMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	4.73	75	79.73	93.80
CO2	4.40	75	79.40	93.41
CO3	4.73	75	79.73	93.80
CO4	4.40	75	79.40	93.41
CO5	4.73	75	79.73	93.80

COURSE ATTAINMENT FOR M.Sc., BIOTCHNOLOGY

SUBJECT NAME: BIOSTATISTICS, BIOETHICS AND IPR
SUBJECT CODE: P16BTE3
NO. OF STUDENTS: 15

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	93.8
CO2	93.4
CO3	93.8
CO4	93.4
CO5	93.8


PERCENTAGE OF ATTAINMENT
93.9
93.8
93.7
93.6
93.5
93.4
93.3
93.2
CO1
CO2
CO3
CO4
CO5

COURSE ATTAINMENT FOR M.Sc., BIOTCHNOLOGY

SUBJECT NAME: BIOSTATISTICS, BIOETHICS AND IPR
SUBJECT CODE: P16BTE3
NO. OF STUDENTS: 15

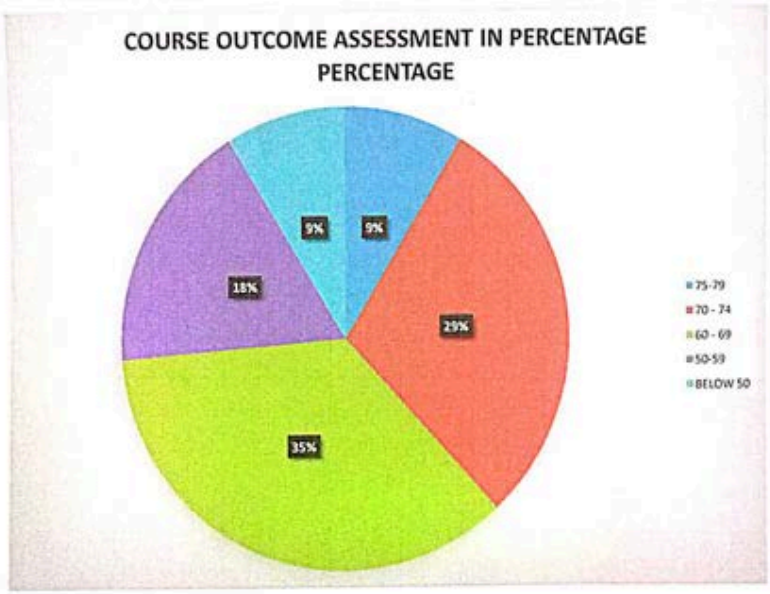
COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO.OF STUDENTS	STATUS
90-100	0	OUTSTANDING
80-89	0	EXCELLENT
75-79	1	DISTINCTION
70-74	5	VERY GOOD
60-69	6	GOOD
50-59	3	AVERAGE
0-49	1	REAPPEAR

COURSE ATTAINMENT FOR M.Sc., BIOTCHNOLOGY

SUBJECT NAME: BIOSTATISTICS, BIOETHICS AND IPR
SUBJECT CODE: P16BTE3
NO. OF STUDENTS: 15

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO. OF STUDENTS	STATUS
90 -100	0	OUTSTANDING
80 - 89	0	EXCELLENT
75-79	1	DISTINCTION
70-74	5	VERY GOOD
60-69	6	GOOD
50-59	3	AVERAGE
BELLOW 50	1	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
75-79	9.09%	DISTINCTION
70 - 74	31.25%	VERY GOOD
60 - 69	37.50%	GOOD
50-59	18.75%	AVERAGE
BELLOW 50	9.09%	RA



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THANJAVUR-5
PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME M.Sc : BIOTECHNOLOGY

PO1	To know a thorough knowledge about structure and function of cells, cellular signaling, protein trafficking, bio molecules and cellular development.
PO2	To collect, deals with various types of classification of microbes and also throws light on multifarious habitats of microbes and provides information about all the microbial cellular functions and various metabolic pathways in microbes.
PO3	To study the structure, properties and metabolism of different biomolecules and to know the interrelationships between different metabolisms.To understand the basic concepts of immune system, elucidate the immune response of humans to foreign substances and to study the modern techniques of immunology that help determine human protection.
PO4	To study the various principles underlying genetic engineering that forms the basis of rDNA technology and to study the methodologies, and in brief the applications and related issues of rDNA technology and understanding about the basics of Animal cell culture, transgenic animals, pest & animal management, Molecular markers and regulations about the use of Biotechnology.To study the downstream processes for product recovery in fermentation. Technology and understanding about the basics of Animal cell culture, transgenic animals, pest & animal management, Molecular markers and regulations about the use of Biotechnology.
PO5	Student will get an idea about the basic understanding about Bioinformatics, tools, sequences, algorithms and the analysis of phylogenetic tree and will give an idea about the basic principles and techniques involved in plant cell culture and to understand the concepts of transformation and achievements of biotechnology in Plant systems.To understand the chemical nature and associated microbes of food and to understand the principles of food processing, preservation and manufacture.

CODE& COURSE	NAME OF THE PROGRAMME:M.Sc : BIOTECHNOLOGY	
	COURSE OUTCOME	
Cell Biology (P16BT11)	CO1	Cell structure -Prokaryotic, akaryotic and eukaryotic cell. Plasma Membrane-Cell Wall.
	CO2	Cell Organelles-Endoplasmic Reticulum-Ribosomes-Mitochondria-Chloroplast-Lysosomes-Peroxisomes.
	CO3	Nuclear Material-Cytoskeleton-Nucleus.
	CO4	Organization of Chromosomes, Cell Division & Cell Cycle-Cell Division-Cell Cycle and Cell Growth Control.
	CO5	Microbial Cell Biology-Structural organization of prokaryotic cell.

PO → CO↓	PO1	PO2	PO3	PO4	PO5
CO1	3	1	1	2	0
CO2	3	0	0	1	1
CO3	3	1	0	0	0
CO4	3	0	1	1	1
CO5	3	1	1	0	0
AVERAGE	**3**	**0.6**	**0.6**	**0.8**	**0.4**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	P19440201	AISHWARYA.G	5	5	4	4	4	22	88
2	P19440202	ARUN.A	5	4	5	4	4	22	88
3	P19440203	ARUN PRAKASH.K	4	5	3	4	4	20	80
4	P19440204	GOPINATH.P	4	4	4	4	4	20	80
5	P19440205	HARIKARAN.K	5	4	5	4	5	23	92
6	P19440206	MADHAVI.R	5	4	4	4	4	21	84
7	P19440207	MELIA DEPHILA.J	5	5	4	5	5	24	96
8	P19440208	NIVEDHA.G	4	4	5	4	4	21	84
9	P19440209	PARKAVI.A	4	4	5	3	4	20	80
10	P19440210	POOJA.A	5	4	5	4	4	22	88
11	P19440211	SIVASANGARI.A	4	3	3	4	3	17	68
12	P19440212	SOUNDARYA.M	5	4	4	4	5	22	88
13	P19440213	THASLIMA NASRIN.M	5	5	4	5	5	24	96
14	P19440214	VENNILA.R	5	4	4	4	4	21	84
15	P19440215	VINOTHA.E	4	4	4	5	4	21	84
16	P19440216	VISALACHI.M	4	4	5	4	4	21	84
AVERAGE			4.56	4.19	4.25	4.13	4.19		

EXPECTED ATTAIMENT IN EACH CO - 85%

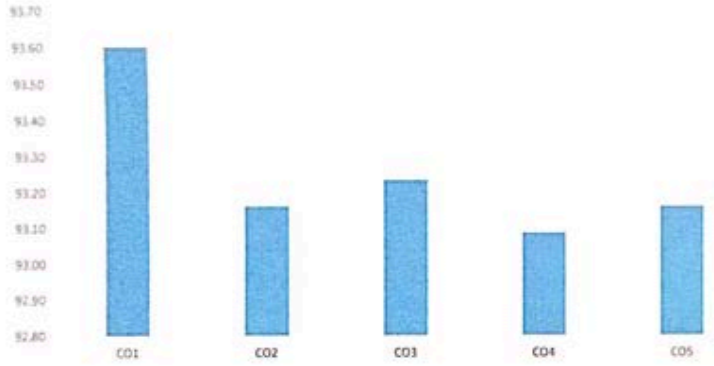
CO	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	4.56	75	79.56	93.60
CO2	4.19	75	79.19	93.16
CO3	4.25	75	79.25	93.24
CO4	4.13	75	79.13	93.09
CO5	4.19	75	79.19	93.16

COURSE ATTAINMENT FOR M.Sc., BIOTCHNOLOGY

SUBJECT NAME: MOLECULAR BIOLOGY
SUBJECT CODE: P16BT14
NO. OF STUDENTS: 16

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	93.60
CO2	93.16
CO3	93.24
CO4	93.09
CO5	93.16

PERCENTAGE OF ATTAINMENT



COURSE ATTAINMENT FOR M.Sc., BIOTCHNOLOGY

SUBJECT NAME: CELL BIOLOGY
SUBJECT CODE: P16BT11
NO. OF STUDENTS: 16

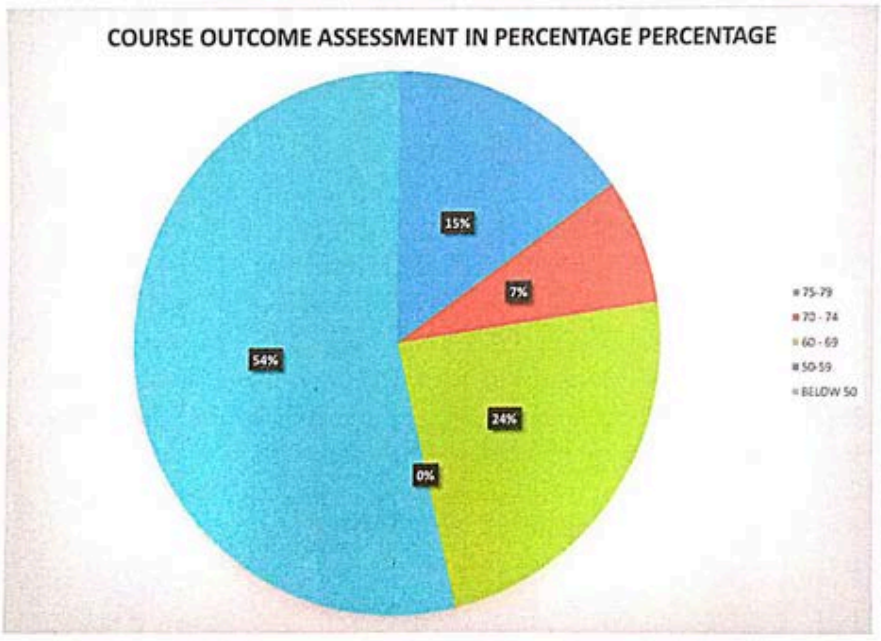
COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO.OF STUDENTS	STATUS
90-100	0	OUTSTANDING
80-89	0	EXCELLENT
75-79	1	DISTINCTION
70-74	5	VERY GOOD
60-69	6	GOOD
50-59	3	AVERAGE
0-49	1	REAPPEAR

COURSE ATTAINMENT FOR M.Sc., BIOTCHNOLOGY

SUBJECT NAME: CELL BIOLOGY
SUBJECT CODE: P16BT11
NO. OF STUDENTS: 16

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO. OF STUDENTS	STATUS
90 -100	0	OUTSTANDING
80 - 89	0	EXCELLENT
75-79	1	DISTINCTION
70-74	5	VERY GOOD
60-69	6	GOOD
50-59	3	AVERAGE
BELOW 50	1	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
75-79	9.09%	DISTINCTION
70 - 74	31.25%	VERY GOOD
60 - 69	37.50%	GOOD
50-59	18.75%	AVERAGE
BELOW 50	9.09%	RA



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PROGRAM OUTCOME M.Sc : BIOTECHNOLOGY

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COURSE CODE& COURSE TITLE	NAME OF THE PROGRAMME:M.Sc : BIOTECHNOLOGY	
	COURSE OUTCOME	
Cell Biology (P16BT11)	CO1	Cell structure -Prokaryotic, akaryotic and eukaryotic cell. Plasma Membrane-Cell Wall.
	CO2	Cell Organelles-Endoplasmic Reticulum-Ribosomes-Mitochondria-Chloroplast-Lysosomes-Peroxisomes.
	CO3	Nuclear Material-Cytoskeleton-Nucleus.
	CO4	Organization of Chromosomes, Cell Division & Cell Cycle-Cell Division-Cell Cycle and Cell Growth Control.
	CO5	Microbial Cell Biology-Structural organization of prokaryotic cell.

PO →	PO1	PO2	PO3	PO4	PO5
CO1	3	1	1	2	0
CO2	3	0	0	1	1
CO3	3	1	0	0	0
CO4	3	0	1	1	1
CO5	3	1	1	0	0
AVERAGE	**3**	**0.6**	**0.6**	**0.8**	**0.4**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	P19440201	AISHWARYA.G	4	4	4	5	5	22	88
2	P19440202	ARUN.A	5	4	5	4	4	22	88
3	P19440203	ARUN PRAKASH.K	4	4	4	5	4	21	84
4	P19440204	GOPINATH.P	4	4	5	4	4	21	84
5	P19440205	HARIKARAN.K	4	5	4	5	4	22	88
5	P19440206	MADHAVI.R	4	4	4	5	4	21	84
6	P19440207	MELIA DEPHILA.J	5	4	5	4	5	23	92
7	P19440208	NIVEDHA.G	5	4	4	5	4	22	88
8	P19440209	PARKAVI.A	4	4	3	5	5	21	84
10	P19440210	POOJA.A	4	5	4	4	5	22	88
11	P19440211	SIVASANGARI.A	4	3	3	3	4	17	68
12	P19440212	SOUNDARYA.M	4	5	4	5	4	22	88
13	P19440213	THASLIMA NASRIN.M	5	4	4	5	5	23	92
14	P19440214	VENNILA.R	4	4	5	4	5	22	88
15	P19440215	VINOTHA.E	5	4	5	5	4	23	92
16	P19440216	VISALACHI.M	5	4	5	4	4	22	88
AVERAGE			4.375	4.125	4.25	4.5	4.375		

EXPECTED ATTAIMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	4.38	75	79.38	93.38824
CO2	4.13	75	79.13	93.09412
CO3	4.25	75	79.25	93.23529
CO4	4.5	75	79.5	93.52941
CO5	4.38	75	79.38	93.38824

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	P19440201	AISHWARYA.G	4	4	4	5	5	22	88
2	P19440202	ARUN.A	5	4	5	4	4	22	88
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4	P19440204	GOPINATH.P	4	4	5	4	4	21	84
5	P19440205	HARIKARAN.K	4	5	4	5	4	22	88
5	P19440206	MADHAVI.R	4	4	4	5	4	21	84
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EXPECTED ATTAIMENT IN EACH CO - 85%

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4	P19440204	GOPINATH.P	4	4	5	4	4	21	84
5	P19440205	HARIKARAN.K	4	5	4	5	4	22	88
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COURSE ATTAINMENT FOR M.Sc., BIOTCHNOLOGY

SUBJECT NAME: CELL BIOLOGY
SUBJECT CODE: P16BT11
NO. OF STUDENTS: 16

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO. OF STUDENTS	STATUS
90 -100	0	OUTSTANDING
80 - 89	0	EXCELLENT
75-79	1	DISTINCTION
70-74	5	VERY GOOD
60-69	6	GOOD
50-59	3	AVERAGE
BELOW 50	1	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
75-79	9.09%	DISTINCTION
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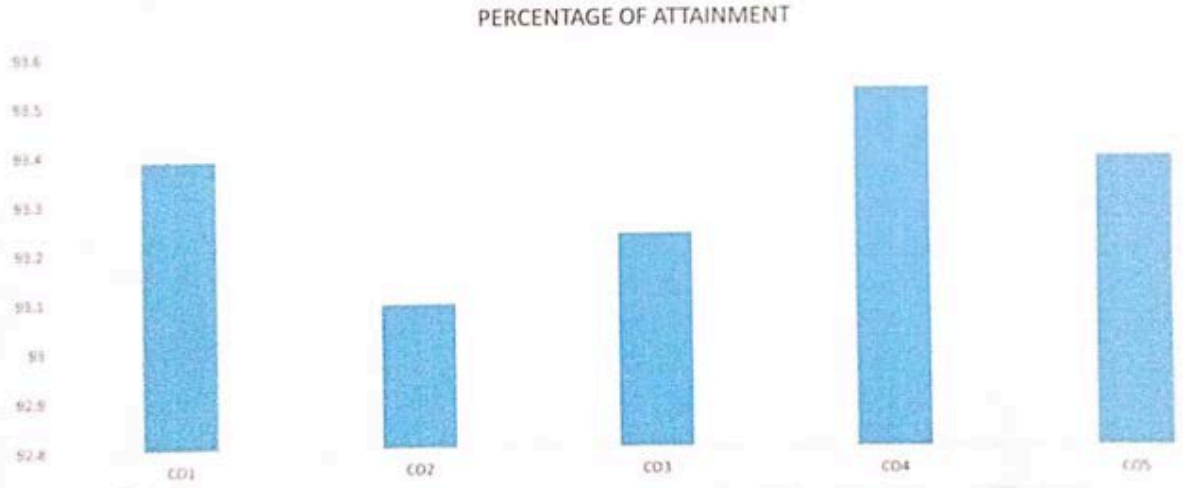
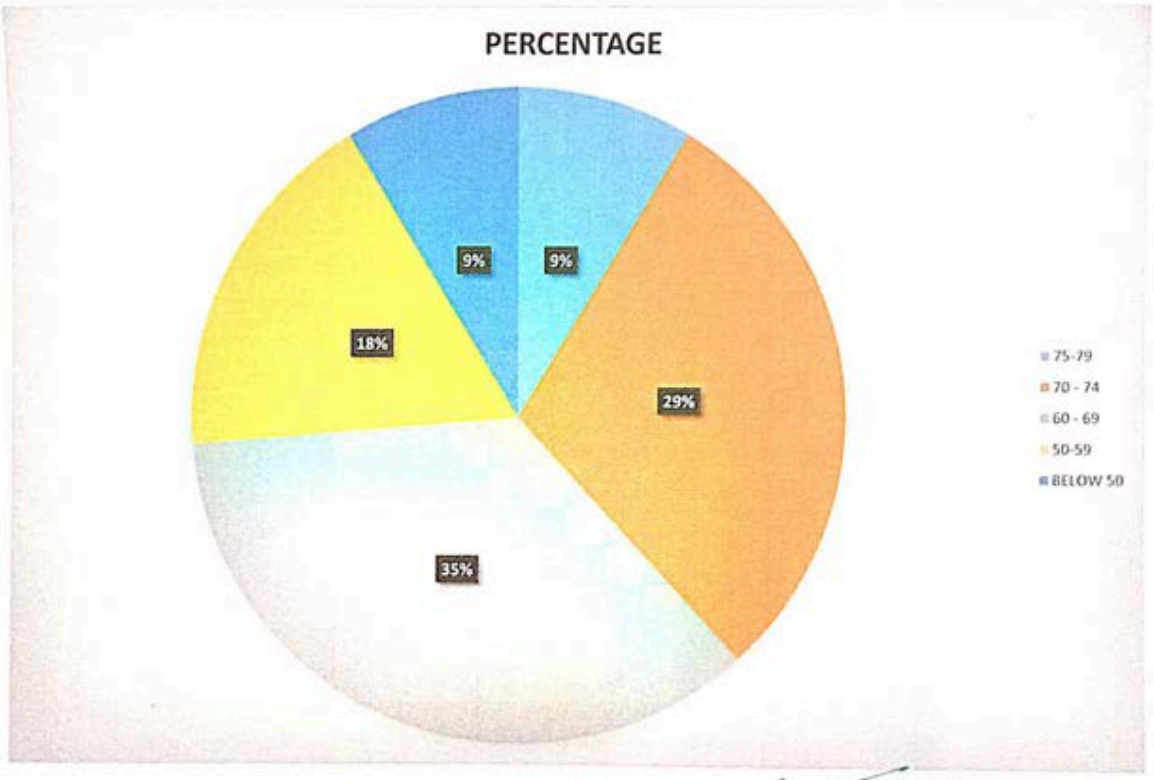
COURSE ATTAINMENT FOR M.Sc., BIOTCHNOLOGY

SUBJECT NAME: CELL BIOLOGY
SUBJECT CODE: P16BT11
NO. OF STUDENTS: 16

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	93.3882
CO2	93.0941
CO3	93.2353
CO4	93.5294
CO5	93.3882





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PO3	To study the structure, properties and metabolism of different biomolecules and to know the interrelationships between different metabolisms.To understand the basic concepts of immune system, elucidate the immune response of humans to foreign substances and to study the modern techniques of immunology that help determine human protection
PO4	To study the various principles underlying genetic engineering that forms the basis of rDNA technology and to study the methodologies, and in brief the applications and related issues of rDNA technology and understanding about the basics of Animal cell culture, transgenic animals, pest & animal management, Molecular markers and regulations about the use of Biotechnology.To study the downstream processes for product recovery in fermentation Technology and understanding about the basics of Animal cell culture, transgenic animals, pest & animal management, Molecular markers and regulations about the use of Biotechnology.
PO5	Student will get an idea about the basic understanding about Bioinformatics, tools, sequences, algorithms and the analysis of phylogenetic tree and will give an idea about the basic principles and techniques involved in plant cell culture and to understand the concepts of transformation and achievements of biotechnology in Plant systems.To understand the chemical nature and associated microbes of food and to understand the principles of food processing, preservation and manufacture.

COURSE CODE& COURSE TITLE	NAME OF THE PROGRAMME:M.Sc : BIOTECHNOLOGY	
	COURSE OUTCOME	
ANIMAL BIOTECHOLOGY (P16BT32)	CO1	Animal Cell, Tissue and Organ Culture-Transformation of animal cells – Cloning vectors – Restriction Endonucleases, expression vectors – RTPCR - animal viral vectors and yeast vectors.
	CO2	Transgenic Animals-Development and uses - mice, cattle, goat, fish and sheep and transgenic pets. Tendered meat production.
	CO3	Pest and Animal Management-Biotechnological approach to the production of live feed.
	CO4	Molecular Markers-Use of nucleic acid probes and antibodies in clinical diagnosis and tissue typing.
	CO5	Regulating the use of Biotechnology-Regulating DNA technology – DNA barcoding. Regulating food and food ingredients. Human gene therapy.

PO → CO↓	PO1	PO2	PO3	PO4	PO5
CO1	3	1	1	2	0
CO2	3	0	0	1	1
CO3	3	1	0	0	0
CO4	3	0	1	1	1
CO5	3	1	1	0	0
AVERAGE	**3**	**0.6**	**0.6**	**0.8**	**0.4**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	P19440201	AISHWARYA.G	5	5	4	5	5	24	96
2	P19440202	ARUN.A	5	5	4	5	4	23	92
3	P19440203	ARUN PRAKASH.K	5	4	5	5	5	24	96
4	P19440204	GOPINATH.P	4	5	4	5	5	23	92
5	P19440205	HARIKARAN.K	5	4	5	5	5	24	96
6	P19440206	MADHAVI.R	5	4	5	5	4	23	92
7	P19440207	MELIA DEPHILA.J	4	5	5	5	5	24	96
8	P19440208	NIVEDHA.G	5	4	5	5	4	23	92
9	P19440209	PARKAVI.A	4	4	5	4	4	21	84
10	P19440210	POOJA.A	4	4	4	5	5	22	88
11	P19440212	SOUNDARYA.M	5	5	4	5	5	24	96
12	P19440213	THASLIMA NASRIN.M	4	5	5	5	5	24	96
13	P19440214	VENNILA.R	4	5	4	5	4	22	88
14	P19440215	VINOTHA.E	5	4	5	4	4	22	88
15	P19440216	VISALACHI.M	5	5	4	5	4	23	92
AVERAGE			4.6	4.533	4.533	4.867	4.533		

EXPECTED ATTAIMENT IN EACH CO - 85%

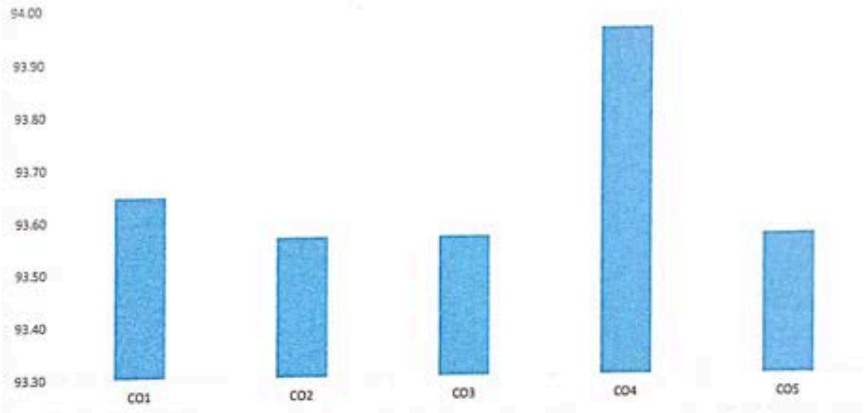
CO	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	4.60	75	79.60	93.65
CO2	4.53	75	79.53	93.57
CO3	4.53	75	79.53	93.57
CO4	4.87	75	79.87	93.96
CO5	4.53	75	79.53	93.57

COURSE ATTAINMENT FOR M.Sc., BIOTCHNOLOGY

SUBJECT NAME: ANIMAL BIOTECHOLOGY
SUBJECT CODE: P16BT32
NO. OF STUDENTS: 15

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	93.65
CO2	93.57
CO3	93.57
CO4	93.96
CO5	93.57

PERCENTAGE OF ATTAINMENT



COURSE ATTAINMENT FOR M.Sc., BIOTCHNOLOGY

SUBJECT NAME: ANIMAL BIOTECHOLOGY
SUBJECT CODE: P16BT32
NO. OF STUDENTS: 15

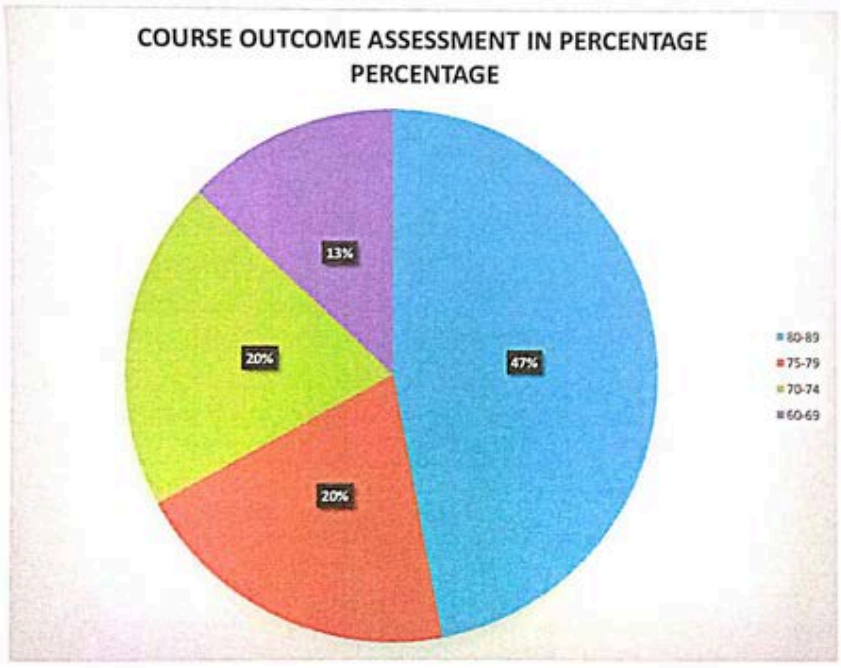
COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO.OF STUDENTS	STATUS
90-100	0	OUTSTANDING
80-89	7	EXCELLENT
75-79	3	DISTINCTION
70-74	3	VERY GOOD
60-69	2	GOOD
50-59	0	AVERAGE
0-49	0	REAPPEAR

COURSE ATTAINMENT FOR M.Sc., BIOTCHNOLOGY

SUBJECT NAME: ANIMAL BIOTECHOLOGY
SUBJECT CODE: P16BT32
NO. OF STUDENTS: 15

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO. OF STUDENTS	STATUS
90 -100	0	OUTSTANDING
80 - 89	7	EXCELLENT
75-79	3	DISTINCTION
70-74	3	VERY GOOD
60-69	2	GOOD
50-59	0	AVERAGE
BELOW 50	0	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
80-89	47.00%	DISTINCTION
75-79	20.00%	VERY GOOD
70-74	20.00%	GOOD
60-69	13.00%	AVERAGE



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THANJAVUR-5
PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME B.Sc.,BIOTECHNOLOGY

PO1	TheCell biology is the study of the structure and function of prokaryotic and eukaryotic cells. Functions of cell, its organelles, synthesis and function of macromolecules ,carbohydrate, protein, lipid, DNA & RNA and microscopic techniques to understand the cell structure. Basic of microbiology dealing types of microbes analyse medical microbiology.
PO2	This course is designed to given an understanding about the basics of molecular biology – classical genetics & molecular aspects.Isolation, preservation and improvement of strains.Food Microbiology-Medical Microbiology,Agricultural Microbiology.
PO3	This courser is planned to basic knowledge on r DNA Technology,Blotting techques ,pharmaceutical products, Gene therapy.structure functions of biomolecules.Amino Acids and Proteins.Anatomy of the immune system.vaccinology-Clinical immunology.Classification of lipids.macro and micro minerals , Anatomy of the Immune System.Vaccinology,Clinical Immunology, Instruments in centrifugation, chromatography, electrophoresis, spectroscopy and crystallography.
PO4	This course is planned to give basic knowledge about plant tissue culture, transgenesis, genetic modifications in agriculture,Plant Genetic Engineering,Genetic modification in food industry,Production of organic food.This course is planned to impart knowledge on fundamentals of animal cell culture, GMOs, gene therapy & transgenic animals.Biostatistics - Concepts of statistics.
PO5	This course is designed to give an idea about the avenues of exploiting microbes and to study the downstream processes for product recovery in fermentation.Microbes in food processing and production,Fermented foods and beverages.

COURSE : CELL BIOLOGY SUB CODE:16SCCBT1

COURSE OUTCOME

CO1	Fundamentals of cell structure.Prokaryotic and eukaryotic cells.Cell division:
CO2	Cellular membranes and matrices.Dynamic nature of membranes;cytoskeleton – structure and function.
CO3	Cellular organelles in metabolism.Morphology and functions of peroxisomes and glyoxisomes;
CO4	Cellular organelles in energy metabolism,Mitochondria,Chloroplast – structure and function.structure of nucleic acids.
CO5	Methods in cell biology.Microscopy,Use of radioisotopes.

EXPECTED ATTAIMENT IN EACH CO - 85%

PO → CO↓	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	3	2	2	2	1
CO2	3	2	3	3	2
CO3	3	2	1	2	1
CO4	3	2	1	2	2
CO5	3	3	3	3	1
AVERAGE	**3**	**2.2**	**2**	**2.4**	**1.4**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	CB19S076696	ABDUL KALAM. A	5	4	4	5	4	22	88
2	CB19S076697	ARUNKUMAR. A	3	3	3	4	4	17	68
3	CB19S076698	ARUNPANDI. D	3	3	3	3	4	16	64
4	CB19S076699	ASHOKKUMAR. P	4	4	4	4	4	20	80
5	CB19S076700	BHAVANI. R	5	5	5	5	4	24	96
6	CB19S076701	DEEPIKA. R	3	3	3	4	4	17	68
7	CB19S076702	DINESH KUMAR K	3	3	3	3	3	15	60
8	CB19S076703	HARIHARAN. K	4	3	3	3	5	18	72

9	CB19S076704	HARIHAARAN.K	4	4	4	4	4	20	80
10	CB19S076705	HARINI. A	5	5	4	5	5	24	96
11	CB19S076706	JANANISRI. C	3	3	4	4	4	18	72
12	CB19S076707	KAMALESH. G	3	3	3	3	4	16	64
13	CB19S076708	KARTHICK. C	3	3	3	3	3	15	60
14	CB19S076709	KAVIYA. V	3	4	5	4	5	21	84
15	CB19S076710	KUMARAGURU. K	5	4	4	5	4	22	88
16	CB19S076711	LOGESH. A	3	3	3	3	3	15	60
17	CB19S076712	MANIKANDAN.K	5	4	4	4	3	20	80
18	CB19S076713	MANIKANDAN. K	3	3	3	3	3	15	60
19	CB19S076714	MANIKANDAN. R	3	3	3	3	3	15	60
20	CB19S076715	MOHAMEDALI. A	3	3	3	3	3	15	60
21	CB19S076716	PRADHANYA. A	4	5	5	5	5	24	96
22	CB19S076717	PREMKUMAR. S	4	3	3	3	3	16	64
23	CB19S076718	PREMY. R	4	4	4	4	4	20	80
24	CB19S076719	PRIYA. P	4	5	5	5	5	24	96
25	CB19S076720	RAGAVAN. K	4	4	4	4	4	20	80
26	CB19S076721	RAJASURIYAN. S	3	3	3	3	5	17	68
27	CB19S076722	RASIKA. D	3	4	4	3	4	18	72
28	CB19S076723	SARANYA. R	4	4	4	4	4	20	80
29	CB19S076724	SILAMBARASAN. R	3	3	3	3	4	16	64
30	CB19S076725	SIVAKUMAR. P	3	3	3	3	3	15	60
31	CB19S076726	SOUNDHARYA. B	4	4	4	4	4	20	80
32	CB19S076727	TAMILPRIYAN. R	3	4	3	3	3	16	64
33	CB19S076728	TAMILSELVI. M	4	3	3	3	4	17	68
34	CB19S076729	VENKADESH. M	3	3	3	3	3	15	60
35	CB19S076730	VISHNUVARDHAN V	4	4	4	3	3	18	72
36	CB19S076731	YOUGGESH. S	3	4	3	3	3	20	80
		AVERAGE	**3.61**	**3.61**	**3.58**	**3.64**	**3.81**		

EXPECTED ATTAIMENT IN EACH CO - 85%	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	3.61	75	78.61	92.48
CO2	3.61	75	78.61	92.48
CO3	3.58	75	78.58	92.45
CO4	3.63	75	78.63	92.51
CO5	3.8	75	78.8	92.71

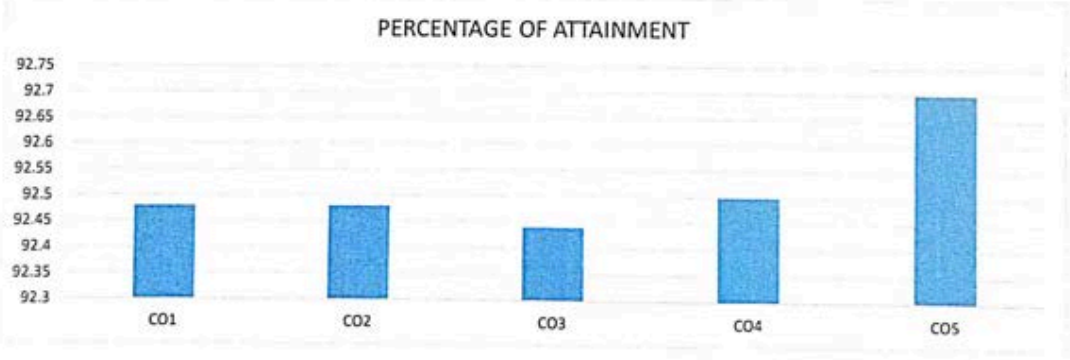
COURSE ATTAINMENT FOR B.SC., BIOTECHNOLOGY

SUBJECT NAME :CELL BIOLOGY

SUBJECT CODE :16SCCBT1

NO.OF STUDENTS: 36

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	92.48
CO2	92.48
CO3	92.44
CO4	92.5
CO5	92.7

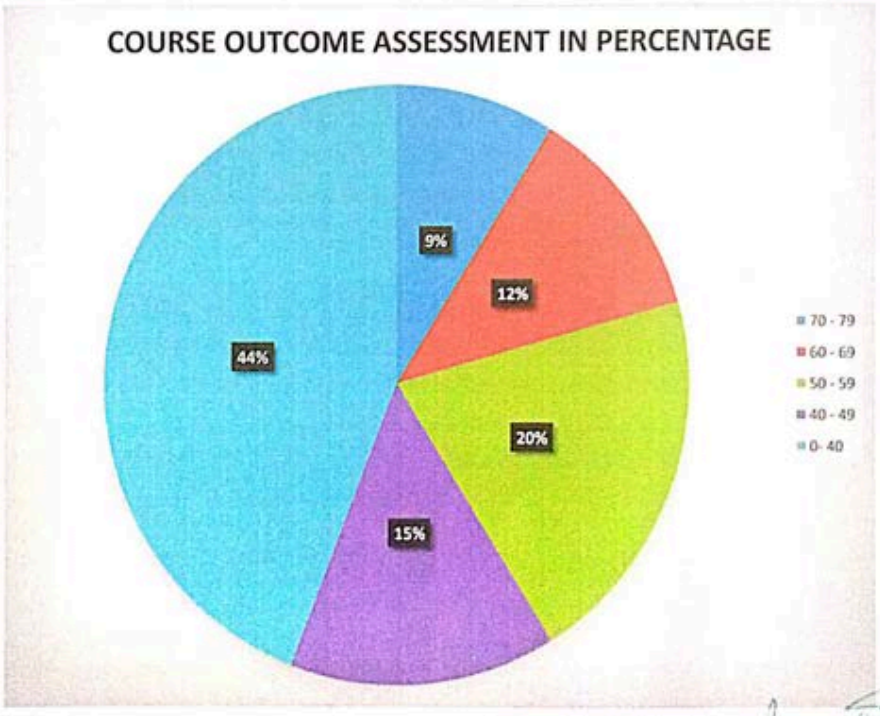


COURSE ATTAINMENT FOR B.Sc. BIOTECHNOLOGY

SUBJECT NAME: CELL BIOLOGY
SUBJECT CODE: 16SCCBT1
NO. OF STUDENTS: 36

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO. OF STUDENTS	STATUS
90 & ABOVE	0	OUTSTANDING
80 - 89	0	EXCELLENT
70 - 79	3	DISTINCTION
60 - 69	4	VERY GOOD
50 - 59	8	GOOD
40 - 49	6	AVERAGE
BELOW 40	15	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
70 - 79	8.30%	DISTINCTION
60 - 69	11.10%	VERY GOOD
50 - 59	19%	GOOD
40 - 49	13.80%	AVERAGE
0- 40	41.60%	RA



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THANJAVUR-5
PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME B.Sc., BIOTECHNOLOGY

PO1	TheCell biology is the study of the structure and function of prokaryotic and eukaryotic cells. In this course the students will learn different areas of cellular biology including the structure and functions of cell, its organelles, synthesis and function of macromolecules such as carbohydrate, protein, lipid, DNA & RNA; membrane structure and function; bioenergetics; cellular communication; and microscopic techniques to understand the cell structure. course about the basic of microbiology dealing types of microbes analyse medical microbiology.
PO2	This course is designed to given an understanding about the basics of molecular biology – classical genetics & molecular aspects.Isolation, preservation and improvement of strains.Food Microbiology-Medical Microbiology,Agricultural Microbiology.
PO3	This courser is planned to give basic knowledge on r DNA Technology,Blotting techques ,pharmaceutical products, Gene therapy.structure functions of biomolecules.Amino Acids and Proteins.Classification of lipids.Fundemental concepts and Anatomy of the immune system.vaccinology-Clinical immunology.Classification of lipids.macro and micro minerals - source and functions.Fundamental Concepts and Anatomy of the Immune System.Vaccinology,Clinical Immunology.to specialize in instruments in centrifugation, chromatography, electrophoresis, spectroscopy and crystallography.
PO4	This course is planned to give basic knowledge about plant tissue culture, transgenesis, genetic modifications in agriculture,Plant Genetic Engineering,Genetic modification in food industry,Production of organic food.This course is planned to impart knowledge on fundamentals of animal cell culture, GMOs, gene therapy & transgenic animals.Biostatistics - Concepts of statistics.
PO5	This course is designed to give an idea about the avenues of exploiting microbes and to study the downstream processes for product recovery in fermentation.Microbes in food processing and production,Fermented foods and beverages.

COURSE :BIOSTATISTICS AND BIOSAFETY SUB CODE :16SCCBT7

COURSE OUTCOME

CO1	Biostatistics - Concepts of statistics-basic principles-Variables - measurements, functions and limitation; Data -types of data.
CO2	Measures of central tendency-Mean, median, mode and geometric mean; Measures of dispersion - range, mean deviations.
CO3	Inferential statistics-Hypothesis - definition, types (0ne tailed, two tailed);Sampling distribution and errors.
CO4	Biosafety-Introduction, biosafety issues in biotechnology-historical background; Introduction to Biological Safety Cabinets.
CO5	Biosafety Guidelines-Biosafety guidelines and regulations, operation of biosafety guidelines and regulations of Government of India.

PO →	PO1	PO2	PO3	PO4	PO5
CO1	0	0	1	3	1
CO2	0	0	0	3	0
CO3	1	1	0	3	0
CO4	0	0	1	3	1
CO5	1	1	0	3	0
AVERAGE	**0.4**	**0.4**	**0.4**	**3**	**0.4**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	CB19S076696	ABDUL KALAM. A	4	4	4	4	4	20	80
2	CB19S076697	ARUNKUMAR. A	4	4	4	4	1	17	68
3	CB19S076698	ARUNPANDI. D	4	4	4	4	2	18	72
4	CB19S076699	ASHOKKUMAR. P	4	4	4	4	4	20	80
5	CB19S076700	BHAVANI. R	5	5	5	5	4	24	96
6	CB19S076701	DEEPIKA. R	5	5	5	5	3	23	92
7	CB19S076702	DINESH KUMAR K	5	5	5	5	2	22	88
8	CB19S076703	HARIHARAN. K	5	5	5	5	2	22	88
9	CB19S076704	HARIHARAN. K	5	5	5	5	4	24	96

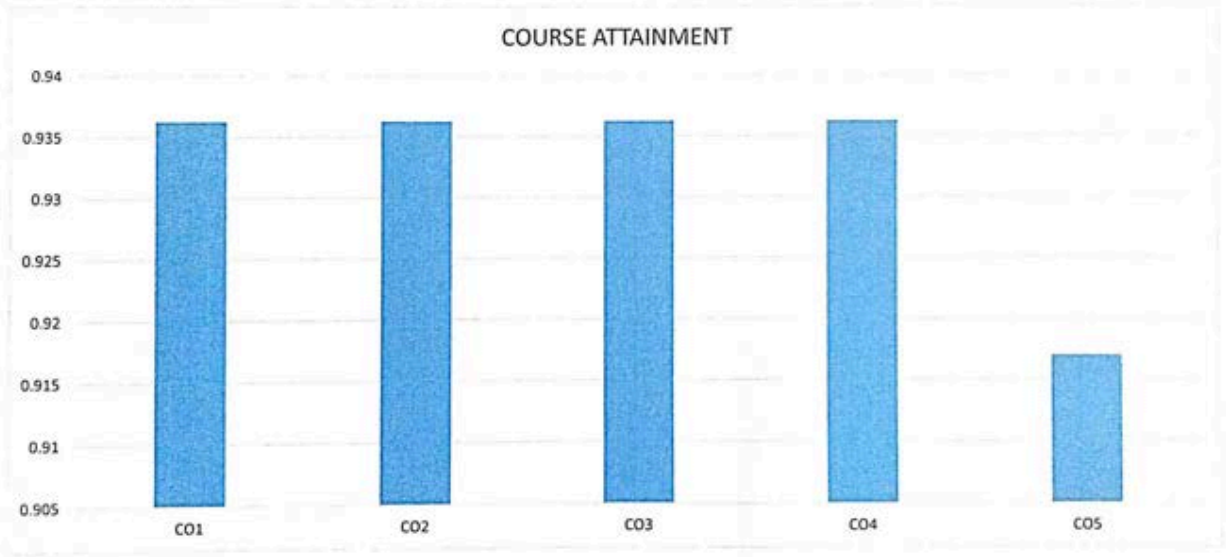
10	CB19S076705	HARINI. A	5	5	5	5	4	24	96
11	CB19S076706	JANANISRI. C	4	4	4	4	4	20	80
12	CB19S076707	KAMALESH. G	4	4	4	4	4	20	80
14	CB19S076708	KARTHICK. C	5	5	5	5	3	23	92
15	CB19S076709	KAVIYA. V	5	5	5	5	3	23	92
16	CB19S076710	KUMARAGURU. K	4	4	4	4	2	18	72
17	CB19S076711	LOGESH. A	5	5	5	5	5	18	72
18	CB19S076712	MANIKANDAN. K	4	4	4	4	4	20	80
19	CB19S076713	MANIKANDAN. K	4	4	4	4	4	20	80
20	CB19S076714	MANIKANDAN. R	4	4	4	4	4	20	80
21	CB19S076715	MOHAMEDALI. A	4	4	4	4	4	20	80
22	CB19S076716	PRADHANYA. A	5	5	5	5	3	23	92
23	CB19S076717	PREMKUMAR. S	4	4	4	4	2	18	72
24	CB19S076718	PREMY. R	5	5	5	5	3	23	92
25	CB19S076719	PRIYA. P	5	5	5	5	4	24	96
26	CB19S076720	RAGAVAN. K	5	5	5	5	1	21	84

27	CB19S076721	RAJASURIYAN. S	5	5	5	5	1	21	84
28	CB19S076722	RASIKA. D	5	5	5	5	3	23	92
29	CB19S076723	SARANYA. R	5	5	5	5	3	23	92
30	CB19S076724	SILAMBARASAN. R	4	4	4	4	1	17	68
31	CB19S076725	SIVAKUMAR. P	4	4	4	4	1	17	68
32	CB19S076726	SOUNDHARYA. B	5	5	5	5	3	23	92
33	CB19S076727	TAMILPRIYAN. R	5	5	5	5	3	23	92
	CB19S076728	TAMILSELVI. M	5	5	5	5	3	23	92
34	CB19S076729	VENKADESH. M	4	4	4	4	1	17	68
35	CB19S076730	VISHNUVARDHAN V	5	5	5	5	4	24	96
36	CB19S076731	YOUGGESH. S	5	5	5	5	3	23	92
AVERAGE			4.583	4.583	4.583	4.583	2.944		

EXPECTED ATTAINMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	4.58	75	79.58	93.62
CO2	4.58	75	79.58	93.62
CO3	4.58	75	79.58	93.62
CO4	4.58	75	79.58	93.62
CO5	2.944	75	77.944	91.70

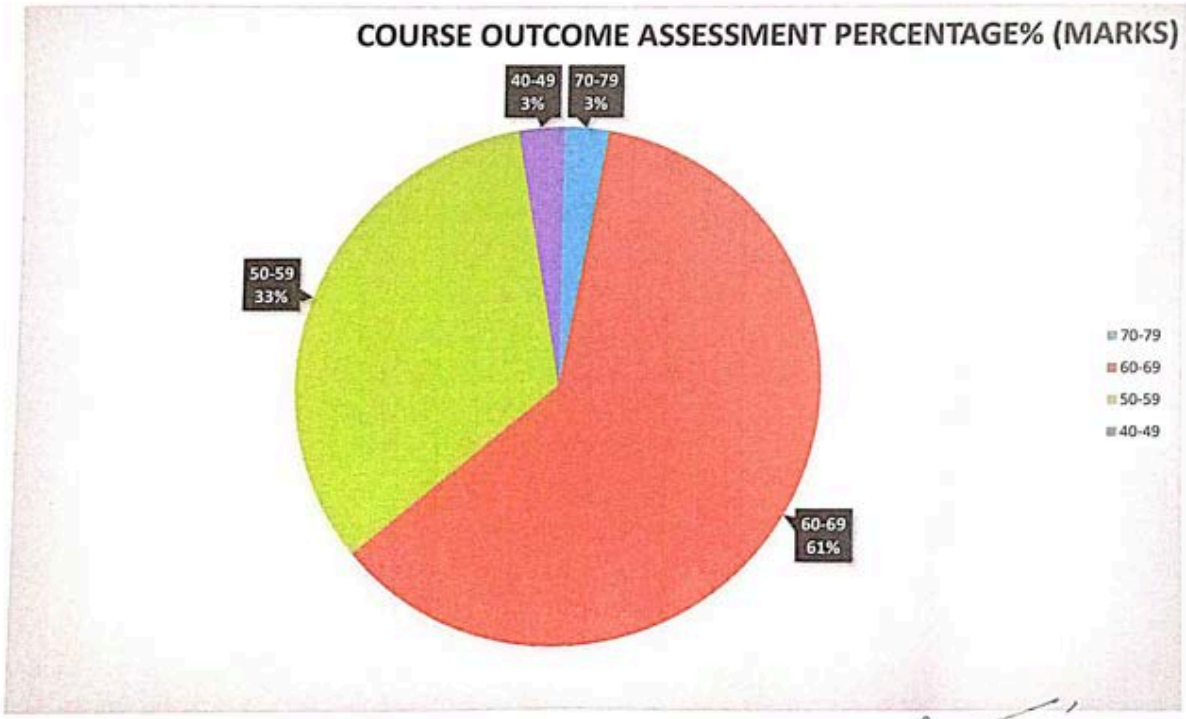
S.NO	CO	COURSE ATTAINMENT
1	CO1	93.62%
2	CO2	93.62%
3	CO3	93.62%
4	CO4	93.62%
5	CO5	91.70%



COURSE ATTAINMENT FOR B.Sc. BIOTECHNOLOGY
SUBJECT NAME: BIOSTAISTICS AND BIOSAFETY
SUBJECT CODE: 16SCCBT7
NO. OF STUDENTS: 36

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO. OF STUDENTS	STATUS
90 - 100	0	OUTSTANDING
80 - 89	0	EXCELLENT
70 - 79	1	DISTINCTION
60 - 69	22	VERY GOOD
50 - 59	12	GOOD
40 - 49	1	AVERAGE
BELOW 40	0	RA

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	PERCENTAGE%	STATUS
70-79	2.78	DISTINCTION
60-69	61.11	VERY GOOD
50-59	33.33	GOOD
40-49	2.78	AVERAGE



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ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME M.Sc : BIOTECHNOLOGY

PO1	To know a thorough knowledge about structure and function of cells, cellular signaling, protein trafficking, bio molecules and cellular development.
PO2	To collect, deals with various types of classification of microbes and also throws light on multifarious habitats of microbes and provides information about all the microbial cellular functions and various metabolic pathways in microbes.
PO3	To study the structure, properties and metabolism of different biomolecules and to know the interrelationships between different metabolisms.To understand the basic concepts of immune system, elucidate the immune response of humans to foreign substances and to study the modern techniques of immunology that help determine human protection.
PO4	To study the various principles underlying genetic engineering that forms the basis of rDNA technology and to study the methodologies, and in brief the applications and related issues of rDNA technology and understanding about the basics of Animal cell culture, transgenic animals, pest & animal management, Molecular markers and regulations about the use of Biotechnology.To study the downstream processes for product recovery in fermentation. Technology and understanding about the basics of Animal cell culture, transgenic animals, pest & animal management, Molecular markers and regulations about the use of Biotechnology.
PO5	Student will get an idea about the basic understanding about Bioinformatics, tools, sequences, algorithms and the analysis of phylogenetic tree and will give an idea about the basic principles and techniques involved in plant cell culture and to understand the concepts of transformation and achievements of biotechnology in Plant systems.To understand the chemical nature and associated microbes of food and to understand the principles of food processing, preservation and manufacture.

COURSE CODE& COURSE TITLE	NAME OF THE PROGRAMME:M.Sc : BIOTECHNOLOGY COURSE OUTCOME	
PLANT BIOTECHNOLOGY (P16BT31)	CO1	Basics of Plant Tissue culture-Plant tissue culture techniques. In-vitro pollination and fertilization. Embryo culture and its applications.
	CO2	Protoplast – Culture & Genetic Manipulation
	CO3	Plant Transgenesis - Agrobacterium mediated gene transfer, Agrobacterium based vectors (Ti plasmids and Ri plasmids), viral vectors and their applications.
	CO4	Transgenic plants -Genetically modified foods - application, future applications, ecological impact of transgenic plants.
	CO5	Plant Molecular Biology Techniques- DNA finger printing in plants. Marker assisted selection (MAS) for crop improvement.

PO → CO↓	PO1	PO2	PO3	PO4	PO5
CO1	3	1	1	2	0
CO2	3	0	0	1	1
CO3	3	1	0	0	0
CO4	3	0	1	1	1
CO5	3	1	1	0	0
AVERAGE	**3**	**0.6**	**0.6**	**0.8**	**0.4**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	P19440201	AISHWARYA.G	5	5	5	5	4	24	96
2	P19440202	ARUN.A	5	4	5	5	4	23	92
3	P19440203	ARUN PRAKASH.K	5	4	4	5	5	23	92
4	P19440204	GOPINATH.P	5	4	5	5	4	23	92
5	P19440205	HARIKARAN.K	5	5	5	5	4	24	96
6	P19440206	MADHAVI.R	4	5	4	5	5	23	92
7	P19440207	MELIA DEPHILA.J	4	5	5	5	5	24	96
8	P19440208	NIVEDHA.G	5	4	5	5	5	24	96
9	P19440209	PARKAVI.A	5	4	4	4	4	21	84
10	P19440210	POOJA.A	5	4	5	4	5	23	92
11	P19440212	SOUNDARYA.M	4	5	5	5	4	23	92
12	P19440213	THASLIMA NASRIN.M	5	5	5	4	5	24	96
13	P19440214	VENNILA.R	5	5	4	5	4	23	92
14	P19440215	VINOTHA.E	5	5	4	4	5	23	92
15	P19440216	VISALACHI.M	5	5	4	5	5	24	96
AVERAGE			4.8	4.6	4.6	4.733	4.533		

EXPECTED ATTAIMENT IN EACH CO - 85%

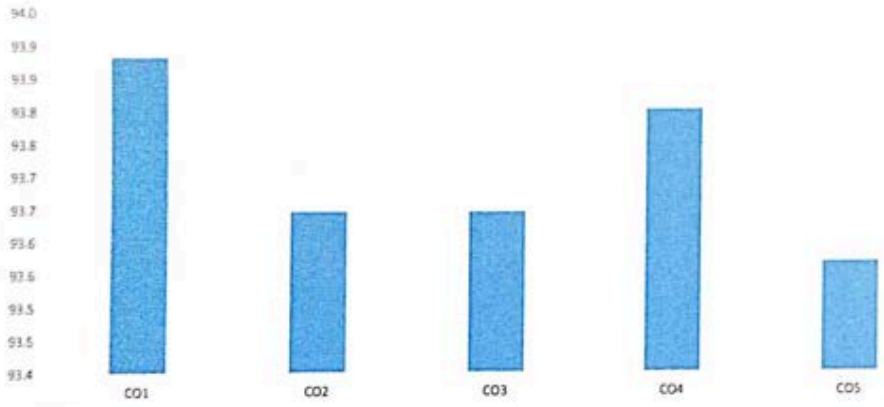
CO	INT. EXAM+	END SEM	TOTAL	%
CO1	4.800	75	79.80	93.88
CO2	4.600	75	79.60	93.65
CO3	4.600	75	79.60	93.65
CO4	4.733	75	79.73	93.80
CO5	4.533	75	79.53	93.57

COURSE ATTAINMENT FOR M.Sc., BIOTCHNOLOGY

SUBJECT NAME: PLANT BIOTECHNOLOGY
SUBJECT CODE: P16BT31
NO. OF STUDENTS: 15

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	93.9
CO2	93.6
CO3	93.6
CO4	93.8
CO5	93.6

PERCENTAGE OF ATTAINMENT



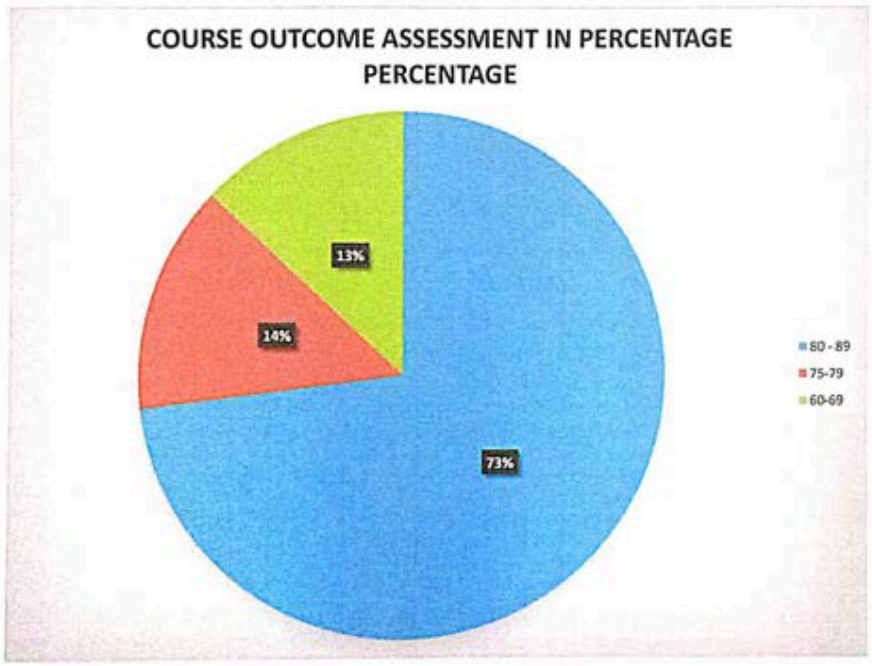
COURSE ATTAINMENT FOR M.Sc., BIOTCHNOLOGY

SUBJECT NAME: PLANT BIOTECHNOLOGY
SUBJECT CODE: P16BT31
NO. OF STUDENTS: 15

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO.OF STUDENTS	STATUS
90-100	0	OUTSTANDING
80-89	11	EXCELLENT
75-79	2	DISTINCTION
70-74	0	VERY GOOD
60-69	2	GOOD
50-59	0	AVERAGE
0-49	0	REAPPEAR

COURSE ATTAINMENT FOR M.Sc., BIOTCHNOLOGY

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO. OF STUDENTS	STATUS
90 -100	0	OUTSTANDING
80 - 89	11	EXCELLENT
75-79	2	DISTINCTION
70-74	0	VERY GOOD
60-69	2	GOOD
50-59	0	AVERAGE
BELOW 50	0	RA
COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
80 - 89	73	DISTINCTION
75-79	14	VERY GOOD
60-69	13	GOOD



PRINCIPAL
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BHARATH COLLEGE OF SCIENCE AND MANAGEMENT
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THANJAVUR-5
PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME M.Sc BIOTECHNOLOGY

PO1	To know a thorough knowledge about structure and function of cells, cellular signaling, protein trafficking, bio molecules and cellular development.
PO2	To collect, deals with various types of classification of microbes and also throws light on multifarious habitats of microbes and provides information about all the microbial cellular functions and various metabolic pathways in microbes.
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PO5	Student will get an idea about the basic understanding about Bioinformatics, tools, sequences, algorithms and the analysis of phylogenetic tree and will give an idea about the basic principles and techniques involved in plant cell culture and to understand the concepts of transformation and achievements of biotechnology in Plant systems.To understand the chemical nature and associated microbes of food and to understand the principles of food processing, preservation and manufacture.

COURSE :LAB IN BIOPROCESS TECHNOLOGY AND FOOD TECHNOLOGY
SUB.CODE:P16BT43P
COURSE OUTCOME

CO1	Isolation of industrially important microorganisms. Selective isolation of actinomycetes – study their growth characteristics. Isolation and enumeration of lactic acid bacteria. Ethanol production by yeast.
CO2	Wine production by yeast – setting up a lab experiment. Estimation of alcohol content by colorimetric method and GLC. Enzyme production – amylase production.. Production of organic acids – citric acid production by solid state fermentation.
CO3	Antibiotic production by different strains of microbes (Theory). Test for sensitivity of microorganisms. Down stream processes of enzymes – dialysis. Ion exchange chromatography – drying – cellulose column chromatography
CO4	Immobilization of yeast cell by alginate beads. Bioassay techniques for antibiotics. Large scale production of organic acids, large scale production of solvents using fermentor (Demo).
CO5	Visit to Distillery unit; alcohol production and pharmacological industries. Pasteur Institute (Field visit). Isolation & identification microbes from spoiled food. Production of yogurt, butter.

PO→ CO↓	PO1	PO2	PO3	PO4	P05
CO1	5	5	5	5	5
CO2	5	5	4	5	4
CO3	5	5	5	5	5
CO4	5	4	5	4	5
CO5	5	5	5	4	4
Avera	5	4.8	4.8	4.6	4.6

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COURSE :LAB IN PLANT AND ANIMAL BIOTECHNOLOGY COURSE CODE:P16BT33P
COURSE OUTCOME

CO1	Introduction to the laboratory and general Safety Practices for plant cell, Plant growth and development. Laboratory Report Guidelines (Theory & Demo). Aseptic culture techniques for establishment and maintenance of cultures (Hands on).Tissue culture media preparation: Preparation of stock solutions of Murashige Skoog basal medium and plant growth regulator stocks (Hands on). Mechanical isolation of protoplast. Enzymatic isolation of protoplast and culture (Hands on). Isolation of plant genomic DNA by modified CTAB method (Hands on).
CO2	The cell cycle, plant vascular system & Photoperiodism. Transformation of leaf discs with Agrobacterium (Hands on). Expression of foreign genes into plant cells: use of Agrobacterium tumefaciens (Theory). Morphogenesis in tobacco leaf tissue (Hands on). Regeneration abilities of the Shoot Apical Meristem (SAM). Preparation of chloroplast from pea (Hands on). Effect of different light wavelengths on germinating corn embryos (Hands on)
CO3	Measurement of photosynthesis (Hands on). Stomata conductance & transpiration (Hands on) Separation of thylakoid and stromal proteins by SDS-Gel electrophoresis. Isolation of DNA & RNA from light and dark –grown seedlings.
CO4	Isolation of DNA from Animal liver. Isolation of DNA from human cheek cells. Isolation of DNA from blood
CO5	Quantification of DNA by spectrophotometeric method. Size analysis of DNA by Agarose gell electrophoresis. Isolation & identification of stem cells

PO→ CO↓	PO1	PO2	PO3	PO4	P05
CO1	5	5	5	5	5
CO2	5	5	4	5	4
CO3	5	5	5	5	5
CO4	5	4	5	4	5
CO5	5	5	5	4	4
Average	5	4.8	4.8	4.6	4.6

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ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

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PO5	Student will get an idea about the basic understanding about Bioinformatics, tools, sequences, algorithms and the analysis of phylogenic tree.

COURSE :LAB IN CELL BIOLOGY,MICROBIOLOGY,BIOCHEMISTRY AND MOLECULAR BIOLOGY COURSE CODE:P16BT15P

COURSE OUTCOME

CO1	Prokaryotic & eukaryotic cell - structure observation. Cell count - prokaryotic & eukaryotic.Types of cells - parenchyma, collenchyma, sclerenchyma, columnar epithelium,squamous epithelium. Leishman staining
CO2	Total (WBC, RBC) & differential count of human blood cells.Separation of Peripheral Blood Mononuclear Cells from blood.Osmosis and Tonicity.Cell Division - Cytological preparations of tissues (onion) for mitosis..Cell Division - Cytological preparations of tissues (Tradescantia) for meiosis.Cell Division - Binary fission of yeast . Polytene and diplotene chromosomes.Temporary and permanent slide preparation.Sub-cellular fractionation.
CO3	Microscopy - Observation of different microbes.Sterilization techniques – physical, chemical, filtration and irradiation techniques. Preparation of media - simple media and complex media. Isolation of microorganisms from air, soil & water - spread plate, pour plate, streak plate technique. Staining methods – simple, differential, acid - fast & negative Identification - Macroscopic, microscopic, biochemical, serological & generic level. Bacterial growth curve - colony counting, cell counting, spectrophotometric method. Preservation & maintenance. Antibiotic sensitivity test –
CO4	Preparation of solutions – Molar, Normal, Percentage, Stock, Working etc. Preparation of buffers – PBS, Tris and Acetate buffer.Identification of sugars - reducing & non-reducing sugars.Estimation of mono saccharine (glucose) by Nelson, Somogi method & polysaccharide (starch) by iodine method. Estimation of amino acid by Ninhydrin method. Estimation of protein by Lowry's method and Barford Method Estimation of nucleic acids by absorbance at 260 nm and hyperchromic effect.Enzyme assay: Estimation of salivary amylase from saliva & phosphatase from potato.
CO5	Isolation and purification of genomic DNA from prokaryotes. Isolation and purification of genomic DNA from eukaryotes. Isolation and purification of plasmid DNAObservation of DNA - Agarose gel electrophoresis.Quantification of nucleic acids – DNA & RNA – Chemical and UV method. Separation of protein by SDS PAGE Protein staining techniques. Amido black, coomosic brilliant blue & $AgNO_3$. Transfer of protein - Western blot. Observation of transferred protein – staining (Indian ink), immunoblot.Bacterial mutagenesis – physical & chemical. Preparation of E. coli competent cells.Transformation of bacteria – $CaCl_2$ method.Bacterial conjugation.Transduction

PO →	PO1	PO2	PO3	PO4	PO5
CO1	3	2	1	1	1
CO2	1	1	2	2	1
CO3	2	2	3	2	3
CO4	3	1	2	1	3
CO5	3	2	2	3	2
AVERAGE	**2.4**	**1.6**	**2**	**1.8**	**2**

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THANJAVUR-5
PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME M.Sc BIOTECHNOLOGY

PO1	To know a thorough knowledge about structure and function of cells, cellular signaling, protein trafficking, bio molecules and cellular development.
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PO5	Student will get an idea about the basic understanding about Bioinformatics, tools, sequences, algorithms and the analysis of phylogenetic tree.

COURSE :LAB IN rDNA TECHNOLOGY & IMMUNOLOGY COURSE CODE:P16BT23P

COURSE OUTCOME

CO1	Isolation of plasmids – small & large scale. Size analysis of plasmids by agarose gel electrophoresis. Restriction digestion, ligation. Preparation of competent E.coli cells & transformation of E.coli with recombinantDNA. Selection methods (Blue white selection, insertional inactivation). Primer design and PCR amplification of β(beta)- galactosidase. Cloning of PCR product into pBR322. Introduction of cloned genes and analysis by SDS – PAGE.
CO2	Southern blotting. RFLP Analysis of 18s rRNA of the genome. Genetic diversity of Pseudomonas by RAPD. Reporter gene assay (GUS/ β(beta)- galactosidase). Northen blotting.
CO3	Basics - Bleeding, separation of serum, plasma. (Hands on). Precipitation techniques – Agar gel diffusion, counter immuno-eletrophoresis, single radial immuno-diffusion, rocket immuno-electrophoresis (Hands on). Agglutination techniques Blood grouping and Rh factor; Latex agglutination – RF, ASLO, HBsAg and CRP (Hands on); Heme agglutination - RPHA / IHA (Hands on) Labeled Assays Enzyme Linked Immunosorbent Assay (ELISA) (Hands on) Immunoflouresence (IF) (Hands on). Immunohistochemistry (IH) (Demonstration). Immunoperoxidase (PAP) staining. Radioimmunoassays (RIA) (Theory).
CO4	Preparation of tissue culture media. Separation of Human PBMC & analysis. Types of culture. Maintenance of culture
CO5	Breeding and maintenance of experimental animals. Surgical and experimental techniques – thymectomy, spleenectomy and harvesting of lymphnodes. Isolation and enumeration of immune reactive cells. Immunization techniques and use of adjuvants. Choice of animals, form and dose of antigen, route of immunization, immunization

PO→ CO↓	PO1	PO2	PO3	PO4	P05
CO1	3	3	4	4	4
CO2	4	4	4	4	4
CO3	4	3	4	3	4
CO4	3	4	4	3	4
CO5	4	4	4	4	4
Average	3.6	3.6	4	3.6	4

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ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME B.Sc:BIOTECHNOLOGY

PO1	TheCell biology is the study of the structure and function of prokaryotic and eukaryotic cells. Functions of cell, its organelles, synthesis and function of macromolecules ,carbohydrate, protein, lipid, DNA & RNA and microscopic techniques to understand the cell structure. Basic of microbiology dealing types of microbes analyse medical microbiology.
PO2	This course is designed to given an understanding about the basics of molecular biology – classical genetics & molecular aspects.Isolation, preservation and improvement of strains.Food Microbiology-Medical Microbiology,Agricultural Microbiology.
PO3	This courser is planned to basic knowledge on r DNA Technology,Blotting techniques ,pharmaceutical products, Gene therapy.structure functions of biomolecules.Amino Acids and Proteins.Anatomy of the immune system.vaccinology-Clinical immunology.Classification of lipids.macro and micro minerals , Anatomy of the Immune System.Vaccinology,Clinical Immunology, Instruments in centrifugation, chromatography, electrophoresis, spectroscopy and crystallography.
PO4	This course is planned to give basic knowledge about plant tissue culture, transgenesis, genetic modifications in agriculture,Plant Genetic Engineering,Genetic modification in food industry,Production of organic food.This course is planned to impart knowledge on fundamentals of animal cell culture, GMOs, gene therapy & transgenic animals.Biostatistics - Concepts of statistics.This course is planned to give basic knowledge about plant tissue culture, transgenesis, genetic modifications in agriculture,Plant Genetic Engineering,Genetic modification in food industry,Production of organic food.This course is planned to impart knowledge on fundamentals of animal cell culture, GMOs, gene therapy & transgenic animals.Biostatistics - Concepts of statistics.
PO5	This course is designed to give an idea about the avenues of exploiting microbes and to study the downstream processes for product recovery in fermentation.Microbes in food processing and production,Fermented foods and beverages.

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PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME

PO1	TheCell biology is the study of the structure and function of prokaryotic and eukaryotic cells. In this course the students will learn different areas of cellular biology including the structure and functions of cell, its organelles, synthesis and function of macromolecules such as carbohydrate, protein, lipid, DNA & RNA; membrane structure and function; bioenergetics; cellular communication; and microscopic techniques to understand the cell structure. course about the basic of microbiology dealing types of microbes analyse medical microbiology.
PO2	This course is designed to given an understanding about the basics of molecular biology – classical genetics & molecular aspects.Isolation, preservation and improvement of strains.Food Microbiology-Medical Microbiology,Agricultural Microbiology.
PO3	This courser is planned to give basic knowledge on r DNA Technology,Blotting techques ,pharmaceutical products, Gene therapy.structure functions of biomolecules.Amino Acids and Proteins.Classification of lipids.Fundemental concepts and Anatomy of the immune system.vaccinology-Clinical immunology.Classification of lipids.macro and micro minerals - source and functions.Fundamental Concepts and Anatomy of the Immune System.Vaccinology,Clinical Immunology.to specialize in instruments in centrifugation, chromatography, electrophoresis, spectroscopy and crystallography.
PO4	This course is planned to give basic knowledge about plant tissue culture, transgenesis, genetic modifications in agriculture,Plant Genetic Engineering,Genetic modification in food industry,Production of organic food.This course is planned to impart knowledge on fundamentals of animal cell culture, GMOs, gene therapy & transgenic animals.Biostatistics - Concepts of statistics.
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COURSE :IMMUNOLOGY SUB CODE:16SCCBT4

COURSE OUTCOME

CO1	Terminology – Antigen, immunogen, hapten, allergen, tolarogen, super antigens, antibody, immunoglobulin, antigenigity, immunogenicity. Self & nonself, innate & acquired immunity.
CO2	Natural built in barriers – skin, semen, salivn, tears, enzymes. Mediators of immune system - lymphokines, cytokines, interferon,
CO3	Major Histocompatibility Complex - MHC genes, MHC ,T cell development, maturation,B cell development, maturation,B cell receptor and determinants. B cell subsets. Immunoglobulins.
CO4	Active, passive and combined immunization recombinant DNA, protein based, plant-based, peptide, anti idiotypic and conjugate vaccines – production & applications. Role and properties of adjuvants & ISCOMS.
CO5	Immunity to infection. - Bacteria, viral, fungal and parasitic,Hypersensitivity – Type I, II, III and IV. Autoimmunity transplantation immunology.

PO → CO↓	PO1	PO2	PO3	PO4	PO5
CO1	2	3	2	2	1
CO2	2	3	3	2	2
CO3	2	3	1	3	1
CO4	3	3	2	2	2
CO5	3	3	3	3	2
AVERAGE	**2.4**	**3**	**2.2**	**2.4**	**1.6**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	CB20S077570	AAKASH S	3	5	5	5	5	23	92
2	CB20S077571	AJAY D	5	5	5	5	3	23	92
3	CB20S077572	ARUN PRASATH M	4	4	4	5	5	22	88
4	CB20S077573	ASWINI R	4	4	5	5	5	23	92
5	CB20S077574	BAKAVATH B	5	5	4	4	4	22	88
6	CB20S077576	DANUSH VARTHAN V	5	5	5	5	4	24	96
7	CB20S077577	GNANAVEL S	4	4	4	5	5	22	88
8	CB20S077578	GOHILAVANI R	5	5	5	5	4	24	96
9	CB20S077579	HARITHA K	5	5	5	5	4	24	96
10	CB20S077580	JAYAPRIYA J	4	5	5	5	5	24	96

11	CB20S077581	MOHAMED IRFAN J	5	5	5	5	5	25	100
12	CB20S077582	MOHAMED THARIK M	4	4	4	5	5	22	88
13	CB20S077583	MOUNIKA R	4	5	5	5	5	24	96
14	CB20S077584	PALANIVEL V	3	3	4	5	5	20	80
15	CB20S077585	POOMINATHAN M	3	5	5	3	5	21	84
16	CB20S077586	RASIKA LK	5	4	5	5	5	24	96
17	CB20S077587	RISWAN A	4	5	4	5	4	22	88
18	CB20S077588	ROBINSON A	4	4	5	5	4	22	88
19	CB20S077589	SANTHANA SELVA A	4	5	5	5	5	24	96
20	CB20S077590	SATHISH M	4	3	4	5	5	21	84
21	CB20S077591	SNEKA N	4	4	4	5	5	22	88
22	CB20S077592	SRIMAR R	3	3	5	5	5	21	84
23	CB20S077593	SUJITH KUMAR S	3	4	5	4	5	21	84
24	CB20S077594	SYED SALMAN SN	3	4	5	5	5	23	92
25	CB20S077595	VINODHINI M	5	5	4	5	5	24	96
AVERAGE			4.08	4.4	4.64	4.84	4.68		

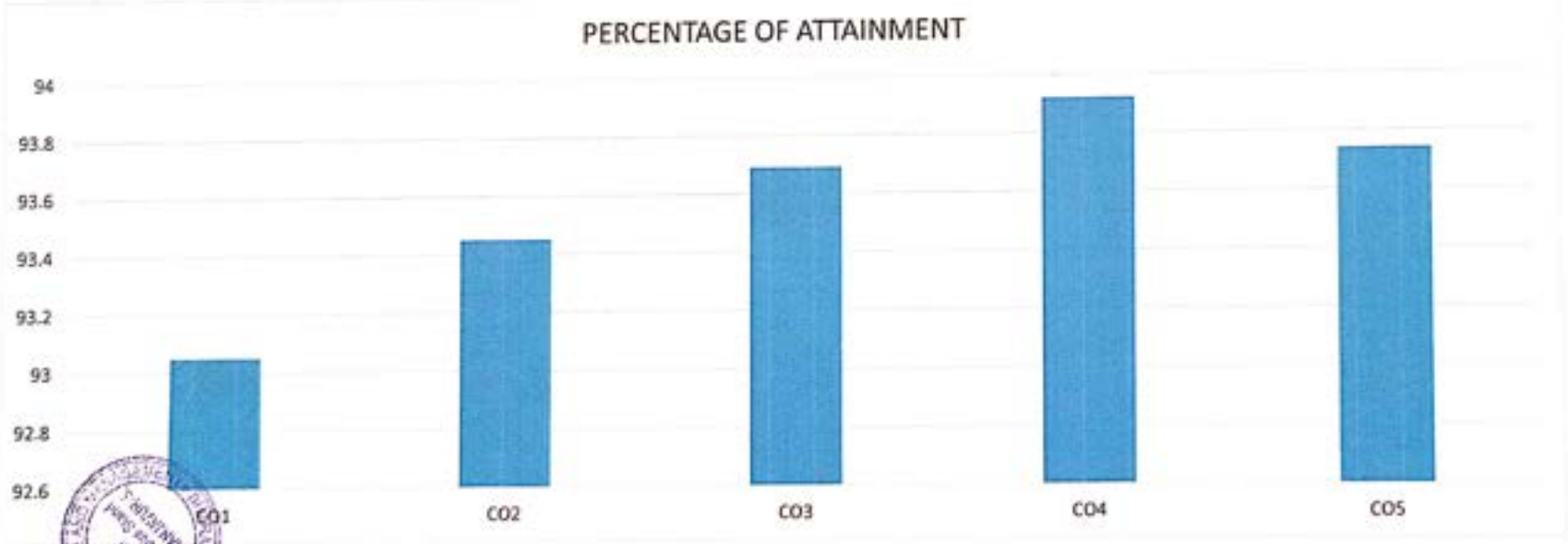
EXPECTED ATTAIMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	4.08	75	79.08	93.03529
CO2	4.44	75	79.44	93.45882
CO3	4.64	75	79.64	93.69412
CO4	4.84	75	79.84	93.92941
CO5	4.68	75	79.68	93.74118

COURSE ATTAINMENT FOR B.SC., BIOTECHNOLOGY

SUBJECT NAME : IMMUNOLOGY
SUBJECT CODE 16SCCBT4
NO.OF STUDENTS 25

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	93.05
CO2	93.45
CO3	93.69
CO4	93.92
CO5	93.74

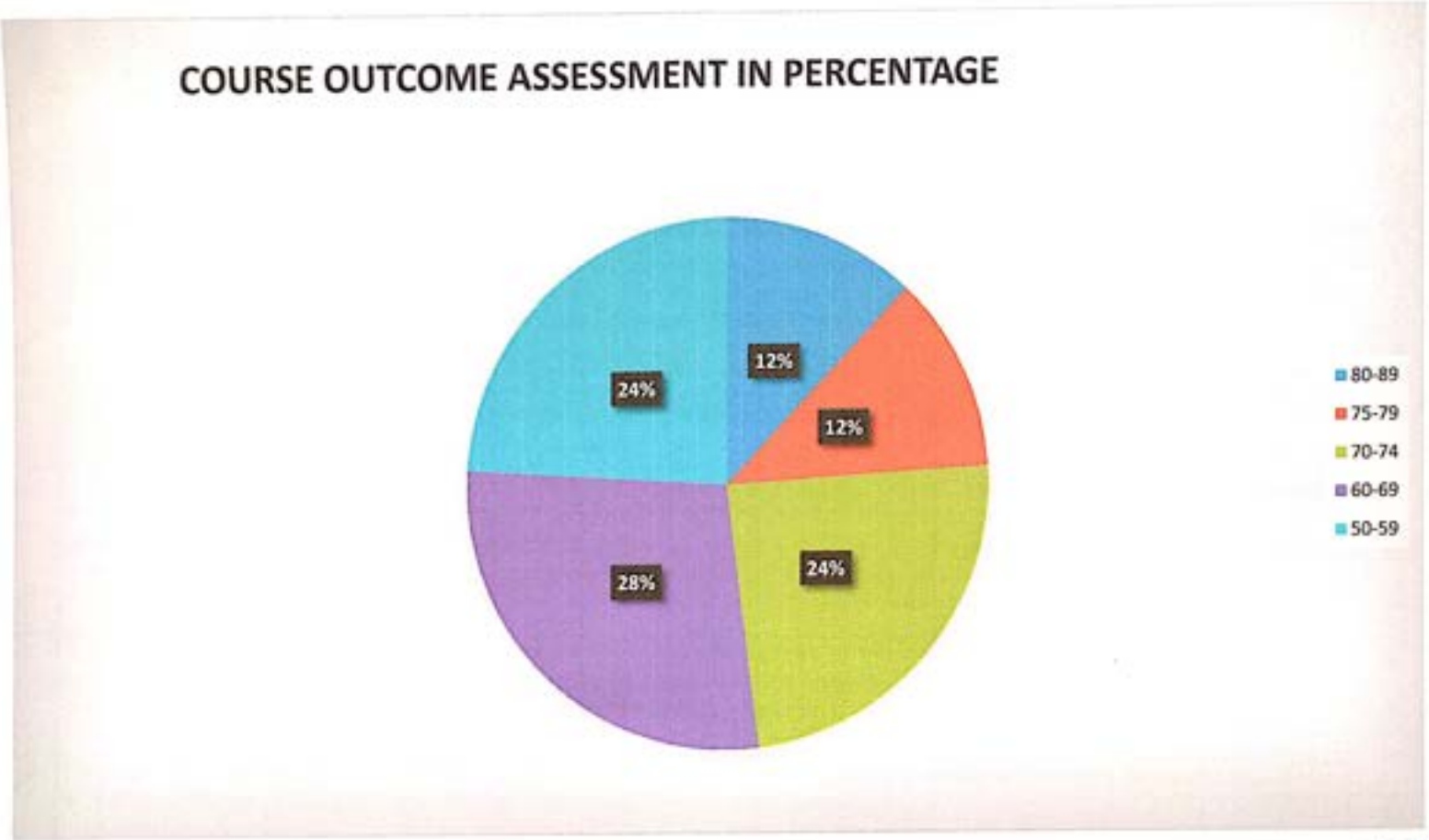


COURSE ATTAINMENT FOR B.Sc., BIOTCHNOLOGY

SUBJECT NAME:IMMUNOLOGY
SUBJECT CODE: 16SCCBT4
NO. OF STUDENTS: 25

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO. OF STUDENTS	STATUS
90 -100	0	OUTSTANDING
80 - 89	3	EXCELLENT
75-79	3	DISTINCTION
70-74	6	VERY GOOD
60-69	7	GOOD
50-59	6	AVERAGE
BELOW 50	0	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
80-89	12.00%	EXCELLENT
75-79	12.00%	DISTINCTION
70-74	24.00%	VERY GOOD
60-69	28.00%	GOOD
50-59	24.00%	AVERAGE



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(UGC Recognized 2(f) & 12(B) Institution)
THANJAVUR-5
PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

B.Sc., BIOTECHNOLOGY PROGRAM OUTCOME

PO1	TheCell biology is the study of the structure and function of prokaryotic and eukaryotic cells. In this course the students will learn different areas of cellular biology including the structure and functions of cell, its organelles, synthesis and function of macromolecules such as carbohydrate, protein, lipid, DNA & RNA; membrane structure and function; bioenergetics; cellular communication; and microscopic techniques to understand the cell structure. course about the basic of microbiology dealing types of microbes analyse medical microbiology.
PO2	This course is designed to given an understanding about the basics of molecular biology – classical genetics & molecular aspects.Isolation, preservation and improvement of strains.Food Microbiology-Medical Microbiology,Agricultural Microbiology.
PO3	This courser is planned to give basic knowledge on r DNA Technology,Blotting techques ,pharmaceutical products, Gene therapy.structure functions of biomolecules.Amino Acids and Proteins.Classification of lipids.Fundemental concepts and Anatomy of the immune system.vaccinology-Clinical immunology.Classification of lipids.macro and micro minerals - source and functions.Fundamental Concepts and Anatomy of the Immune System.Vaccinology,Clinical Immunology.to specialize in instruments in centrifugation, chromatography, electrophoresis, spectroscopy and crystallography.
PO4	This course is planned to give basic knowledge about plant tissue culture, transgenesis, genetic modifications in agriculture,Plant Genetic Engineering,Genetic modification in food industry,Production of organic food.This course is planned to impart knowledge on fundamentals of animal cell culture, GMOs, gene therapy & transgenic animals.Biostatistics - Concepts of statistics.
PO5	This course is designed to give an idea about the avenues of exploiting microbes and to study the downstream processes for product recovery in fermentation.Microbes in food processing and production,Fermented foods and beverages.

COURSE :BIOMOLECULES SUB CODE:16SACBT1

COURSE OUTCOME

CO1	Isomerism, anomeric form and mutarotation. classification of monosaccharides - Structure, occurrence, chemistry and functions of glucose, galactose, ribose and fructose
CO2	Classification of amino acids,Proteins,Behaviour of proteins in solutions, salting in and salting out of proteins. Denaturation and renaturation of proteins.
CO3	Definition, basic ideas about the biochemical functions of lipids. Classification of lipids with examples, classification of fatty acids, physical and chemical properties of fatty acids - saponification number, acid number and iodine number.
CO4	DNA: Watson and Crick model and forms of DNA. Properties ofDNA. RNA- Structure and types of RNA: t-RNA, r-RNA and m-RNA.
CO5	Vitamins - Source, structure, biological role, daily requirement and deficiency manifestation of vitamin A, B, C, D, E and K.

PO → CO↓	PO1	PO2	PO3	PO4	PO5
CO1	3	2	2	2	1
CO2	3	2	3	2	2
CO3	3	2	1	3	1
CO4	3	3	2	2	2
CO5	3	3	3	3	2
AVERAGE	**3**	**2.4**	**2.2**	**2.4**	**1.6**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	CB20S077570	AAKASH S	5	4	5	5	4	23	92
2	CB20S077571	AJAY D	5	5	5	5	3	23	92
3	CB20S077572	ARUN PRASATH M	3	5	5	5	4	22	88
4	CB20S077573	ASWINI R	5	5	5	5	3	22	88
5	CB20S077574	BAKAVATH B	3	4	5	5	5	22	88
6	CB20S077576	DANUSH VARTHAN V	5	5	5	5	2	22	88
7	CB20S077577	GNANAVEL S	5	5	5	4	3	22	88
8	CB20S077578	GOHILAVANI R	5	5	5	4	4	23	92
9	CB20S077579	HARITHA K	5	4	4	5	5	23	92
10	CB20S077580	JAYAPRIYA J	4	5	5	4	5	23	92

11	CB20S077581	MOHAMED IRFAN J	5	5	5	5	4	24	96
12	CB20S077582	MOHAMED THARIK M	5	4	4	5	5	23	92
13	CB20S077583	MOUNIKA R	5	5	5	5	4	24	96
14	CB20S077584	PALANIVEL V	3	3	4	5	5	20	80
15	CB20S077585	POOMINATHAN M	5	5	5	2	5	22	88
16	CB20S077586	RASIKA LK	5	5	5	4	5	24	96
17	CB20S077587	RISWAN A	3	5	5	5	5	23	92
18	CB20S077588	ROBINSON A	5	5	5	3	5	23	92
19	CB20S077589	SANTHANA SELVA A	5	5	4	4	5	23	92
20	CB20S077590	SATHISH M	5	5	4	5	3	22	88
21	CB20S0775901	SNEKA N	5	5	5	4	4	23	92
22	CB20S0775912	SRIMAR R	4	4	4	5	5	22	88
23	CB20S077593	SUJITH KUMAR S	4	4	5	4	5	22	88
24	CB20S077594	SYED SALMAN SN	5	5	5	4	3	22	88
25	CB20S077595	VINODHINI M	4	4	5	5	5	23	92
AVERAGE			**4.52**	**4.64**	**4.76**	**4.48**	**4.24**		

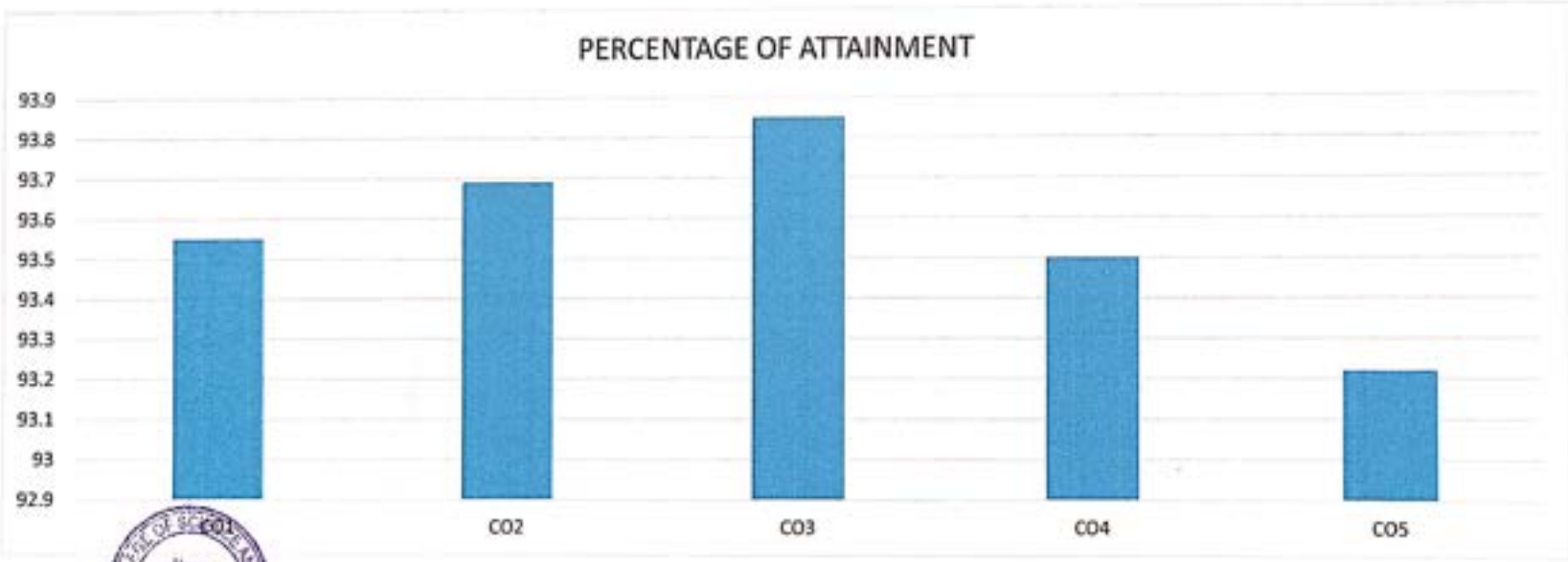
EXPECTED ATTAIMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	4.52	75	79.52	93.55294
CO2	4.64	75	79.64	93.69412
CO3	4.76	75	79.76	93.83529
CO4	4.48	75	79.48	93.50588
CO5	4.24	75	79.24	93.22353

COURSE ATTAINMENT FOR B.SC., BIOTECHNOLOGY

SUBJECT NAME : BIOMOLEUCULES
SUBJECT CODE : 16SACBT1
NO.OF STUDENTS 25

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	93.55
CO2	93.69
CO3	93.85
CO4	93.5
CO5	93.22

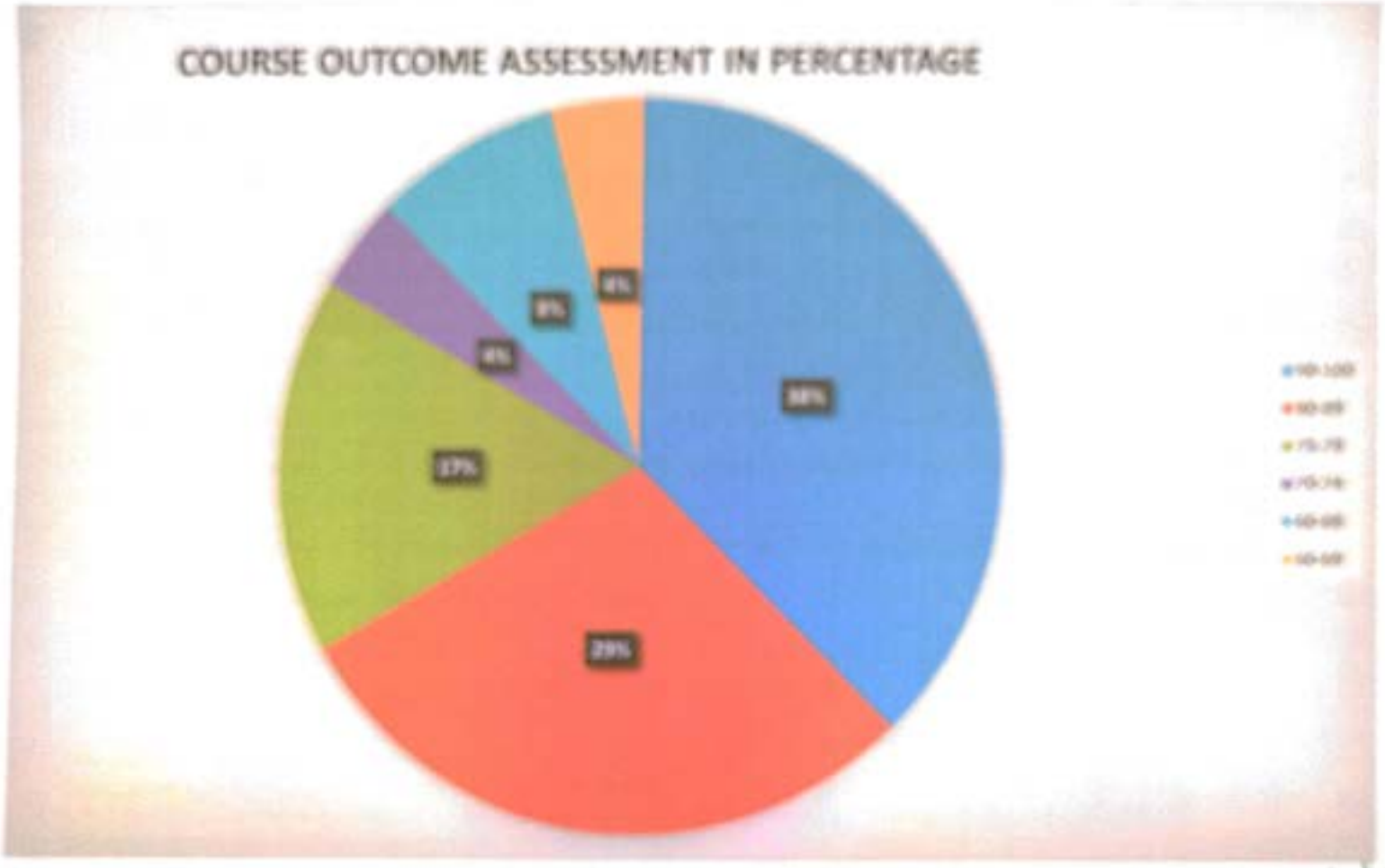


COURSE ATTAINMENT FOR B.Sc., BIOTCHNOLOGY

SUBJECT NAME:BIOMOLEUCULES
SUBJECT CODE: 16SACBT1
NO. OF STUDENTS: 25

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO. OF STUDENTS	STATUS
90 -100	9	OUTSTANDING
80 - 89	7	EXCELLENT
75-79	4	DISTINCTION
70-74	1	VERY GOOD
60-69	2	GOOD
50-59	1	AVERAGE
BELOW 50	0	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
90-100	36.00%	OUTSTANDING
80-89	28.00%	EXCELLENT
75-79	16.00%	DISTINCTION
70-74	4.00%	VERY GOOD
60-69	8.00%	GOOD
60-69	4.00%	AVERAGE



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THANJAVUR-5
PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME

PO1	TheCell biology is the study of the structure and function of prokaryotic and eukaryotic cells. In this course the students will learn different areas of cellular biology including the structure and functions of cell, its organelles, synthesis and function of macromolecules such as carbohydrate, protein, lipid, DNA & RNA; membrane structure and function; bioenergetics; cellular communication; and microscopic techniques to understand the cell structure. course about the basic of microbiology dealing types of microbes analyse medical microbiology.
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PO3	This courser is planned to give basic knowledge on r DNA Technology,Blotting techques ,pharmaceutical products, Gene therapy.structure functions of biomolecules.Amino Acids and Proteins.Classification of lipids.Fundemental concepts and Anatomy of the immune system.vaccinology-Clinical immunology.Classification of lipids.macro and micro minerals - source and functions.Fundamental Concepts and Anatomy of the Immune System.Vaccinology,Clinical Immunology.to specialize in instruments in centrifugation, chromatography, electrophoresis, spectroscopy and crystallography.
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PO5	This course is designed to give an idea about the avenues of exploiting microbes and to study the downstream processes for product recovery in fermentation.Microbes in food processing and production,Fermented foods and beverages.

COURSE : APPLIED MICROBOLOGY SUB CODE:16SACMB2

COURSE OUTCOME

CO1	Isolation, preservation and improvement of strains. Handling and development of inoculum for various fermentation process.
CO2	Microbial Energetic-Energy from inorganic compounds.Energy from hydrocarbons
CO3	Food Microbiology,Food poisoning – Food borne diseases.culture, microscopy and sampling methods.
CO4	Medical Microbiology,Infectious Diseases – viral, bacterial, fungal & protozoan.pathogenicity and laboratory diagnosis of Gram positive organisms
CO5	Environmental and Agricultural Microbiology.Waste management - waste water treatment, organic compost, biogas production,

PO → CO↓	PO1	PO2	PO3	PO4	PO5
CO1	2	3	2	2	1
CO2	2	3	3	2	2
CO3	2	3	1	3	1
CO4	3	3	2	2	2
CO5	3	3	3	3	2
AVERAGE	**2.4**	**3**	**2.2**	**2.4**	**1.6**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	CB20S077570	AAKASH S	4	4	5	5	5	23	88
2	CB20S077571	AJAY D	3	4	5	5	5	22	88
3	CB20S077572	ARUN PRASATH M	4	4	5	5	5	23	92
4	CB20S077573	ASWINI R	4	5	5	5	5	24	96
5	CB20S077574	BAKAVATH B	4	3	5	5	5	22	88
6	CB20S077575	BHAVADHARANI B	4	5	5	5	5	24	88
7	CB20S077576	DANUSH VARTHAN V	4	4	5	5	5	23	92
8	CB20S077577	GNANAVEL S	4	4	5	5	5	23	96
	CB20S077578	GOHILAVANI R	4	4	5	5	5	23	88
	CB20S077579	HARITHA K	4	3	5	5	5	22	96

11	CB20S077580	JAYAPRIYA J	4	4	5	5	5	23	92
12	CB20S077581	MOHAMED IRFAN J	4	5	5	5	5	24	92
13	CB20S077582	MOHAMED THARIK M	4	4	5	5	5	23	92
14	CB20S077583	MOUNIKA R	4	5	5	5	5	24	88
15	CB20S077584	PALANIVEL V	4	4	5	5	5	23	92
16	CB20S077585	POOMINATHAN M	4	3	5	5	5	22	96
17	CB20S077586	RASIKA LK	4	5	5	5	5	24	92
18	CB20S077587	RISWAN A	5	5	5	5	4	24	96
19	CB20S077588	ROBINSON A	4	4	5	5	5	23	92
20	CB20S077589	SANTHANA SELVA A	4	5	5	5	5	24	88
21	CB20S077590	SATHISH M	4	4	5	5	5	23	96
22	CB20S077591	SNEKA N	5	4	5	5	4	23	96
23	CB20S077592	SRIMAR R	4	3	5	5	5	22	92
24	CB20S077593	SUJITH KUMAR S	4	4	5	5	5	23	96
25	CB20S077594	SYED SALMAN SN	3	5	5	5	5	23	92
26	CB20S077595	VINODHINI M	5	5	5	5	4	24	92
AVERAGE			**4.038**	**4.115**	**5**	**5**	**4.88**		

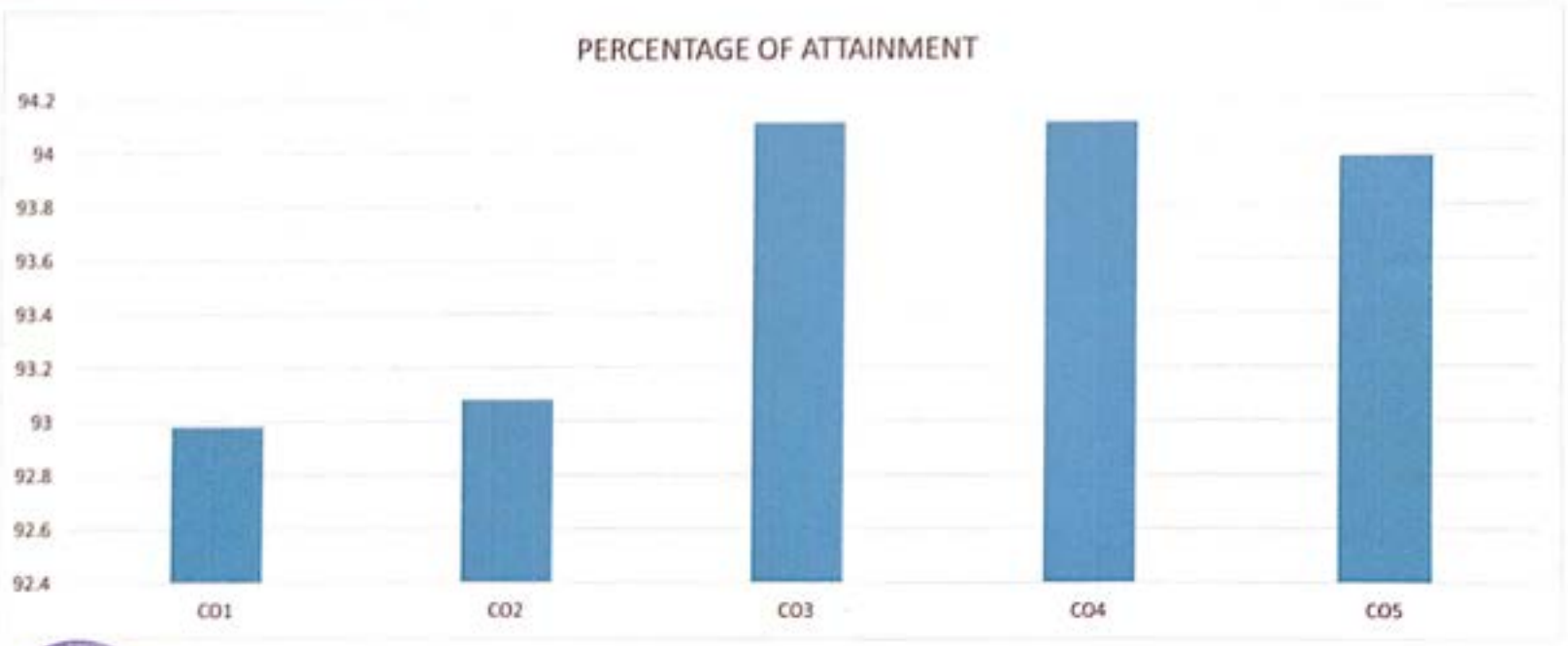
EXPECTED ATTAIMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+	END SEM	TOTAL	%
CO1	4.04	75	79.04	92.99
CO2	4.12	75	79.12	93.08
CO3	5	75	80	94.12
CO4	5	75	80	94.12
CO5	4.885	75	79.885	93.98

COURSE ATTAINMENT FOR B.SC., BIOTECHNOLOGY

SUBJECT NAME :APPLIED MICROBIOLOGY
SUBJECT CODE :16SACMB2
NO.OF STUDENTS 26

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	92.98
CO2	93.08
CO3	94.11
CO4	94.11
CO5	93.98

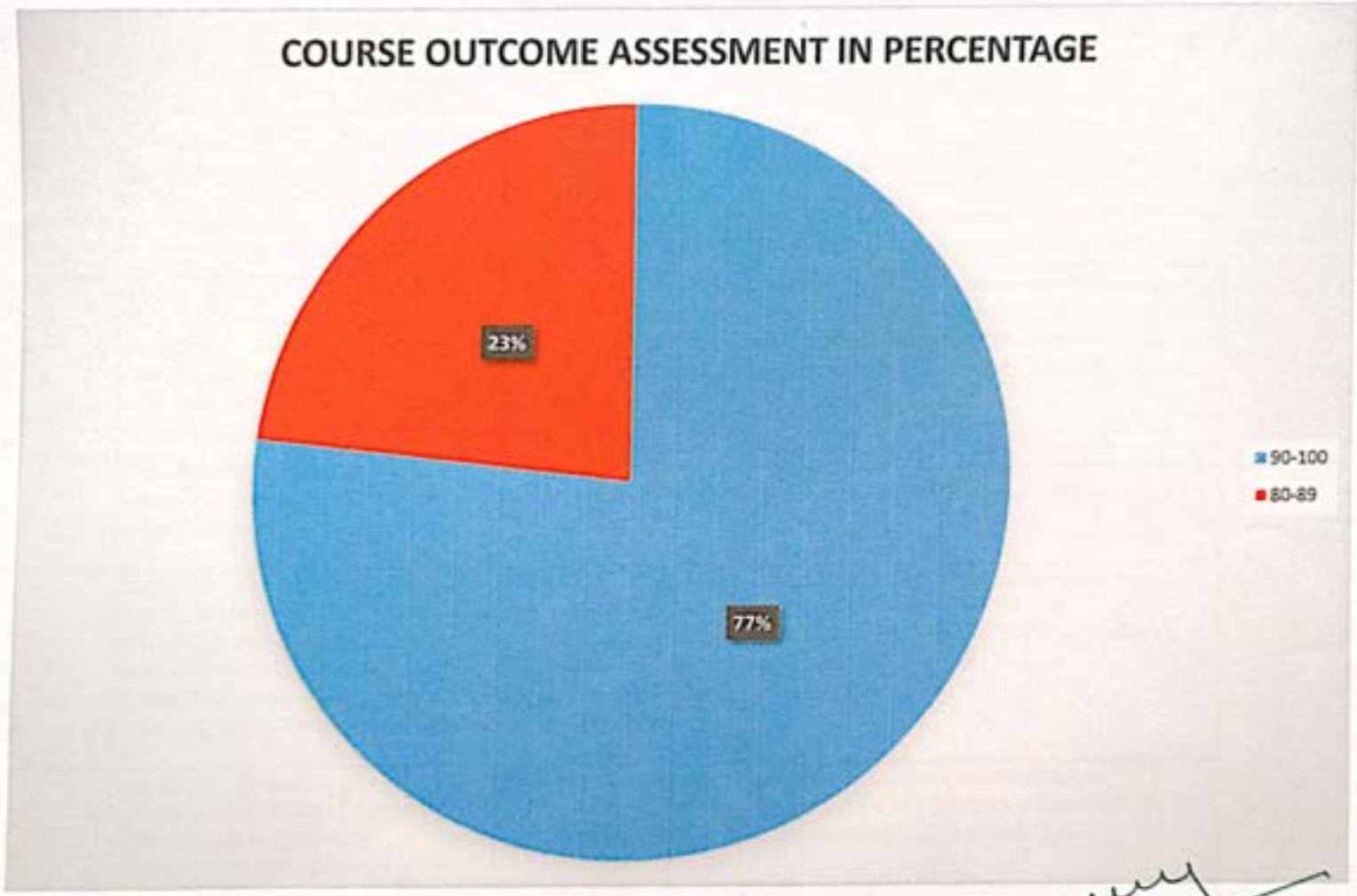


COURSE ATTAINMENT FOR B.Sc., BIOTCHNOLOGY

SUBJECT NAME: APPLIED MICROBIOLOGY
SUBJECT CODE: 16SACMB2
NO. OF STUDENTS: 26

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	**NO. OF STUDENTS**	**STATUS**
90 -100	20	OUTSTANDING
80 - 89	6	EXCELLENT
75-79	0	DISTINCTION
70-74	0	VERY GOOD
60-69	0	GOOD
50-59	0	AVERAGE
BELOW 50	0	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	**PERCENTAGE**	**STATUS**
90-100	76.92%	OUTSTANDING
80-89	23.07%	EXCELLENT



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PO5	This course is designed to give an idea about the avenues of exploiting microbes and to study the downstream processes for product recovery in fermentation.Microbes in food processing and production,Fermented foods and beverages.

COURSE : r DNA TECHNOLOGY SUB CODE:16SCCBT3

COURSE OUTCOME

CO1	Isolation of genes. Enzymes of rDNA technology exonuclease, DNA modifying enzymes - Polymerase, Transferase, Kinase and Ligase
CO2	Plasmids, Phage vectors, Cosmids, Phagemids, Virus vectors, Shuttle vectors and expression vectors
CO3	Cloning vectors for E. coli., Cloning vectors for Eukaryotes. Methods of transformation.
CO4	DNA amplification using polymerase chain reaction (PCR): key concepts, Analysis of amplified products.
CO5	Analysis of recombinant DNA - Selection methods – antibiotics, expression basis, GUS expression. Sequencing

PO → CO↓	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	3	2	2	2	1
CO2	3	2	3	2	2
CO3	3	2	1	3	1
CO4	3	3	2	2	2
CO5	3	3	3	3	2
AVERAGE	**3**	**2.4**	**2.2**	**2.4**	**1.6**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	CB20S077570	AAKASH S	4	5	4	5	5	23	92
2	CB20S077571	AJAY D	5	5	4	5	4	23	92
3	CB20S077572	ARUN PRASATH M	3	5	5	5	4	22	88
4	CB20S077573	ASWINI R	2	5	5	5	5	22	88
5	CB20S077574	BAKAVATH B	4	4	5	5	4	22	88
6	CB20S077576	DANUSH VARTHAN V	5	5	4	3	5	22	88
7	CB20S077577	GNANAVEL S	4	4	4	5	5	22	88
8	CB20S077578	GOHILAVANI R	5	5	5	3	5	23	92
9	CB20S077579	HARITHA K	5	5	5	5	3	23	92
10	CB20S077580	JAYAPRIYA J	5	5	5	3	5	23	92

11	CB20S077581	MOHAMED IRFAN J	5	5	5	5	4	24	96
12	CB20S077582	MOHAMED THARIK M	4	4	5	5	5	23	92
13	CB20S077583	MOUNIKA R	5	4	5	5	5	24	96
14	CB20S077584	PALANIVEL V	3	3	4	5	5	20	80
15	CB20S077585	POOMINATHAN M	4	4	4	5	5	22	88
16	CB20S077586	RASIKA LK	5	5	5	5	4	24	96
17	CB20S077587	RISWAN A	4	4	5	5	5	23	92
18	CB20S077588	ROBINSON A	4	5	4	5	5	23	92
19	CB20S077589	SANTHANA SELVA A	4	4	5	5	5	23	92
20	CB20S077590	SATHISH M	2	5	5	5	5	22	88
21	CB20S077591	SNEKA N	4	5	5	5	4	23	92
22	CB20S077592	SRIMAR R	4	4	4	5	5	22	88
23	CB20S077593	SUJITH KUMAR S	2	5	5	5	5	22	88
24	CB20S077594	SYED SALMAN SN	3	5	4	5	5	22	88
25	CB20S077595	VINODHINI M	5	5	5	5	3	23	92
AVERAGE			3.926	4.519	4.519	4.664	4.56		

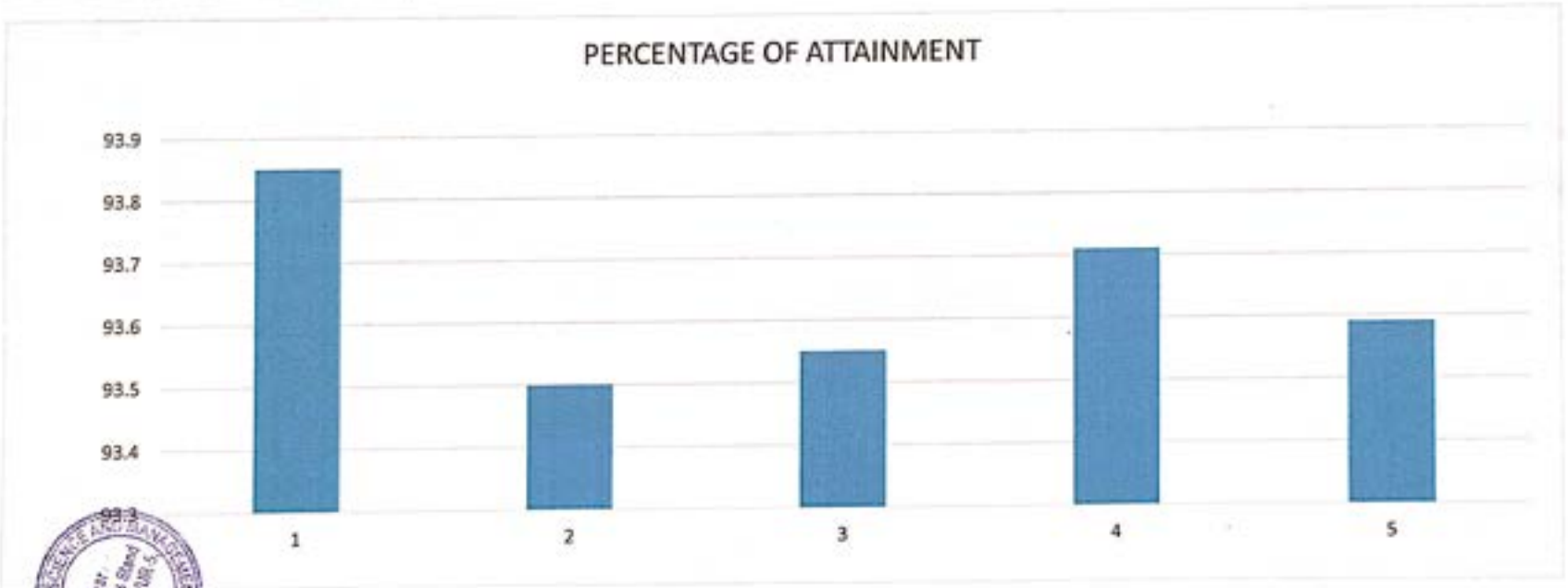
EXPECTED ATTAIMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	3.93	75	78.93	92.86
CO2	4.52	75	79.52	93.55
CO3	4.52	75	79.52	93.55
CO4	4.66	75	79.66	93.72
CO5	4.556	75	79.556	93.60

COURSE ATTAINMENT FOR B.SC., BIOTECHNOLOGY

SUBJECT NAME :r DNA TECHNOLOGY
SUBJECT CODE :16SCCBT3
NO.OF STUDENTS 25

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	93.85
CO2	93.5
CO3	93.55
CO4	93.71
CO5	93.59

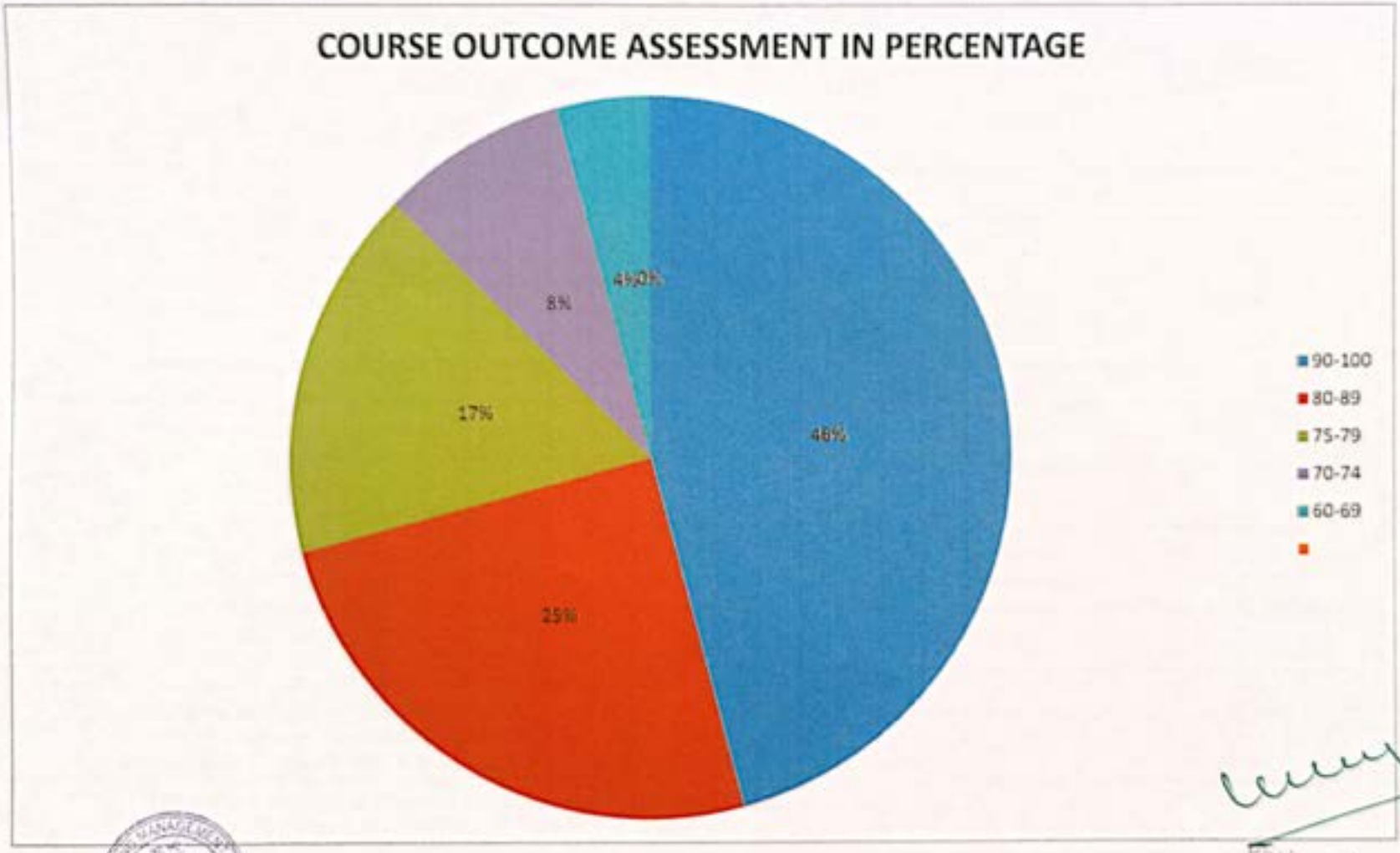


COURSE ATTAINMENT FOR B.Sc., BIOTCHNOLOGY

SUBJECT NAME: r DNA TECHNOLOGY
SUBJECT CODE: 16SCCBT3
NO. OF STUDENTS: 25

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO. OF STUDENTS	STATUS
90 -100	11	OUTSTANDING
80 - 89	6	EXCELLENT
75-79	4	DISTINCTION
70-74	2	VERY GOOD
60-69	1	GOOD
50-59	0	AVERAGE
BELOW 50	0	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
90-100	44.00%	OUTSTANDING
80-89	24.00%	EXCELLENT
75-79	16.00%	DISTINCTION
70-74	8.00%	VERY GOOD
60-69	4.00%	GOOD



Bharath College of Science and Management
Bharath Avenue (Near New Bus Stand)
THANJAVUR - 613 005.

UG - 20.

BHARATH COLLEGE OF SCIENCE AND MANAGEMENT
(UGC Recognized 2(f) & 12(B) Institution)
THANJAVUR-5
PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

B.Sc., BIOTECHNOLOGY PROGRAM OUTCOME

PO1	TheCell biology is the study of the structure and function of prokaryotic and eukaryotic cells. In this course the students will learn different areas of cellular biology including the structure and functions of cell, its organelles, synthesis and function of macromolecules such as carbohydrate, protein, lipid, DNA & RNA; membrane structure and function; bioenergetics; cellular communication; and microscopic techniques to understand the cell structure. course about the basic of microbiology dealing types of microbes analyse medical microbiology.
PO2	This course is designed to given an understanding about the basics of molecular biology – classical genetics & molecular aspects.Isolation, preservation and improvement of strains.Food Microbiology-Medical Microbiology,Agricultural Microbiology.
PO3	This courser is planned to give basic knowledge on r DNA Technology,Blotting techques ,pharmaceutical products, Gene therapy.structure functions of biomolecules.Amino Acids and Proteins.Classification of lipids.Fundemental concepts and Anatomy of the immune system.vaccinology-Clinical immunology.Classification of lipids.macro and micro minerals - source and functions.Fundamental Concepts and Anatomy of the Immune System.Vaccinology,Clinical Immunology.to specialize in instruments in centrifugation, chromatography, electrophoresis, spectroscopy and crystallography.
PO4	This course is planned to give basic knowledge about plant tissue culture, transgenesis, genetic modifications in agriculture,Plant Genetic Engineering,Genetic modification in food industry,Production of organic food.This course is planned to impart knowledge on fundamentals of animal cell culture, GMOs, gene therapy & transgenic animals.Biostatistics - Concepts of statistics.
PO5	This course is designed to give an idea about the avenues of exploiting microbes and to study the downstream processes for product recovery in fermentation.Microbes in food processing and production,Fermented foods and beverages.

COURSE :BASIC MICROBOLOGY SUB CODE:16SACMB1

COURSE OUTCOME

CO1	Establishment of fields of medical microbiology.Immunology and environmental microbiology.
CO2	Whittaker's five kingdom.Diversity of Microbial world.
CO3	History of phycology.ultra structure, pigments, flagella.cycle of Chlamydomonas and Spirogyra.
CO4	Historical developments in the field of Mycology .Fungal cell ultra-structure.Sexual and asexual reproduction.
CO5	Protozoa, Viruses, Viroids and Prions.TMV, poliovirus.

PO → CO↓	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	3	2	2	2	1
CO2	3	2	3	2	2
CO3	3	2	1	3	1
CO4	3	3	2	2	2
CO5	3	3	3	3	2
AVERAGE	**3**	**2.4**	**2.2**	**2.4**	**1.6**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	CB20S077570	AAKASH S	3	5	4	5	5	22	88
2	CB20S077571	AJAY D	3	4	5	5	5	22	88
3	CB20S077572	ARUN PRASATH M	3	3	5	5	5	21	84
4	CB20S077573	ASWINI R	3	5	5	5	5	22	88
5	CB20S077574	BAKAVATH B	5	3	5	5	5	22	88
6	CB20S077575	BHAVADHARANI B	3	4	5	5	5	22	88
7	CB20S077576	DANUSH VARTHAN V	3	5	5	5	5	23	92
8	CB20S077577	GNANAVEL S	3	5	5	4	5	22	88
9	CB20S077578	GOHILAVANI R	3	5	5	5	5	23	92
10	CB20S077579	HARITHA K	4	5	4	5	5	23	92

11	CB20S077580	JAYAPRIYA J	4	4	5	5	5	23	92
12	CB20S077581	MOHAMED IRFAN J	3	4	5	5	5	22	88
13	CB20S077582	MOHAMED THARIK M	4	5	3	5	5	22	88
14	CB20S077583	MOUNIKA R	4	4	5	5	5	23	92
15	CB20S077584	PALANIVEL V	3	4	5	5	5	22	88
16	CB20S077585	POOMINATHAN M	4	3	5	5	5	22	88
17	CB20S077586	RASIKA LK	4	4	5	5	5	23	92
18	CB20S077587	RISWAN A	3	5	5	5	5	22	88
19	CB20S077588	ROBINSON A	4	4	5	5	5	23	92
20	CB20S077589	SANTHANA SELVA A	4	5	5	5	4	23	92
21	CB20S077590	SATHISH M	3	5	5	5	5	23	92
22	CB20S0775901	SNEKA N	3	4	5	5	5	22	88
23	CB20S0775912	SRIMAR R	4	3	5	5	5	22	88
24	CB20S077593	SUJITH KUMAR S	3	4	5	5	5	22	88
25	CB20S077594	SYED SALMAN SN	4	3	5	5	5	22	88
26	CB20S077595	VINODHINI M	4	4	5	5	5	23	92
AVERAGE			3.5	4.192	4.846	4.962	4.962		

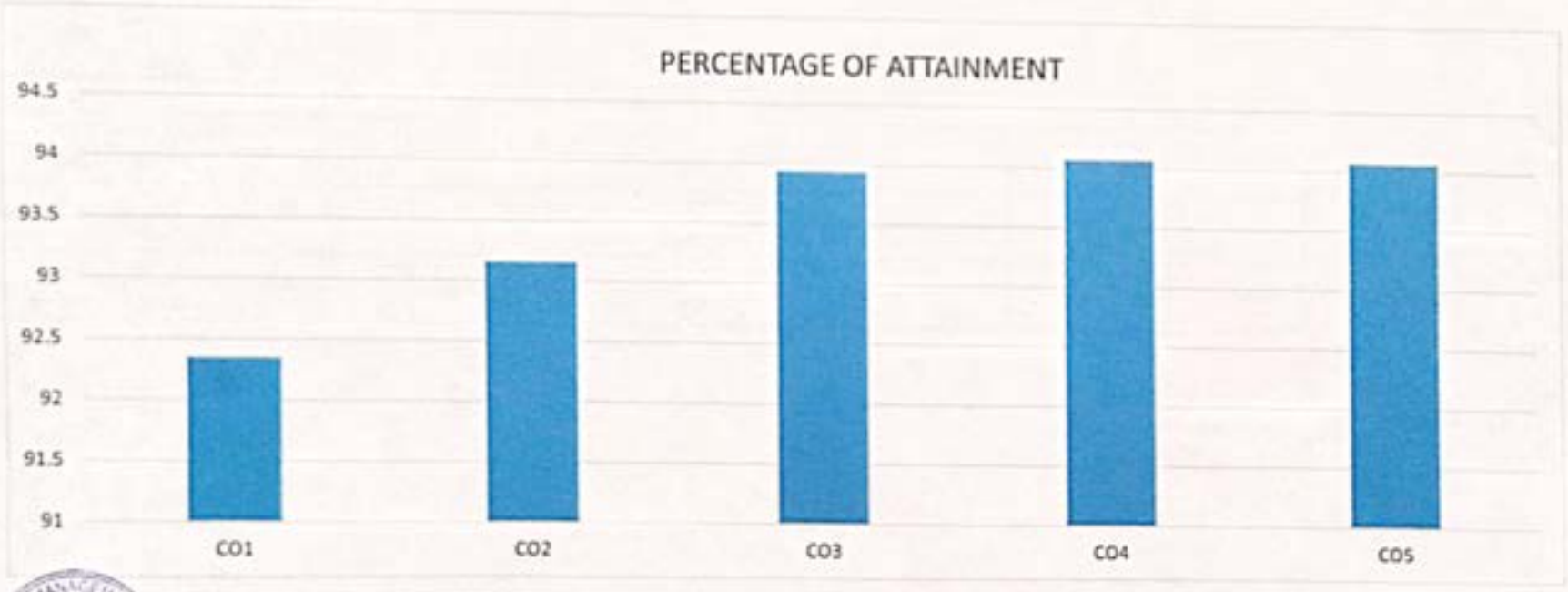
EXPECTED ATTAIMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+	END SEM	TOTAL	%
CO1	3.5	75	78.5	92.35294
CO2	4.19	75	79.19	93.16471
CO3	4.85	75	79.85	93.94118
CO4	4.96	75	79.96	94.07059
CO5	4.962	75	79.962	94.07294

COURSE ATTAINMENT FOR B.SC., BIOTECHNOLOGY

SUBJECT NAME : BASIC MICROBIOLOGY
SUBJECT CODE : 116SACMB1
NO.OF STUDENTS 26

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	92.35
CO2	93.16
CO3	93.94
CO4	94.07
CO5	94.07



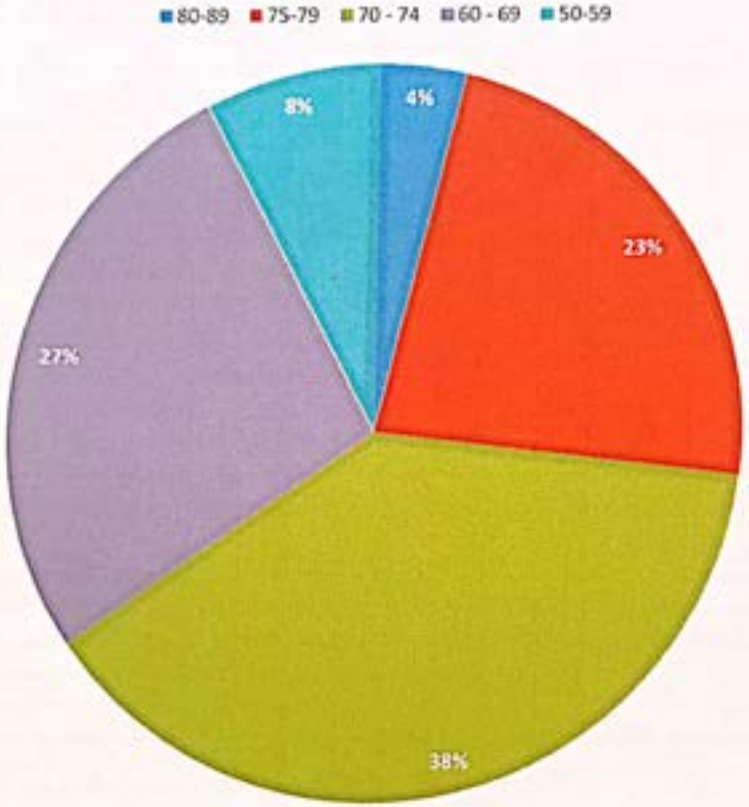
COURSE ATTAINMENT FOR B.Sc., BIOTCHNOLOGY

SUBJECT NAME: BASIC MICROBIOLOGY
SUBJECT CODE: 16SACMB1
NO. OF STUDENTS: 26

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO. OF STUDENTS	STATUS
90 -100	0	OUTSTANDING
80 - 89	1	EXCELLENT
75-79	6	DISTINCTION
70-74	10	VERY GOOD
60-69	7	GOOD
50-59	2	AVERAGE
BELOW 50	0	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
80-89	3.84%	EXCELLENT
75-79	23.07%	DISTINCTION
70 - 74	38.46%	VERY GOOD
60 - 69	26.92%	GOOD
50-59	7.69%	AVERAGE

COURSE OUTCOME ASSESSMENT IN PERCENTAGE



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ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

B.Sc., BIOTECHNOLOGY PROGRAM OUTCOME

PO1	TheCell biology is the study of the structure and function of prokaryotic and eukaryotic cells. In this course the students will learn different areas of cellular biology including the structure and functions of cell, its organelles, synthesis and function of macromolecules such as carbohydrate, protein, lipid, DNA & RNA; membrane structure and function; bioenergetics; cellular communication; and microscopic techniques to understand the cell structure. course about the basic of microbiology dealing types of microbes analyse medical microbiology.
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PO5	This course is designed to give an idea about the avenues of exploiting microbes and to study the downstream processes for product recovery in fermentation.Microbes in food processing and production,Fermented foods and beverages.

COURSE : CELL BIOLOGY SUB CODE :16SCCBT1

COURSE OUTCOME

CO1	Fundamentals of cell structure.Prokaryotic and eukaryotic cells.Cell division:
CO2	Cellular membranes and matrices.Dynamic nature of membranes;cytoskeleton – structure and function.
CO3	Cellular organelles in metabolism.Morphology and functions of peroxisomes and glyoxisomes;
CO4	Cellular organelles in energy metabolism,Mitochondria,Chloroplast – structure and function.structure of nucleic acids.
CO5	Methods in cell biology.Microscopy,Use of radioisotopes;

PO → CO↓	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	3	2	2	2	1
CO2	3	2	3	2	2
CO3	3	2	1	3	1
CO4	3	3	2	2	2
CO5	3	3	3	3	2
AVERAGE	**3**	**2.4**	**2.2**	**2.4**	**1.6**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	CB20S077570	AAKASH S	2	5	4	5	5	21	84
2	CB20S077571	AJAY D	3	5	4	5	4	21	84
3	CB20S077572	ARUN PRASATH M	3	5	5	5	4	22	88
4	CB20S077573	ASWINI R	2	5	5	5	5	22	88
5	CB20S077574	BAKAVATH B	3	4	5	5	4	21	84
6	CB20S077575	BHAVADHARANI B	5	5	5	4	3	22	88
7	CB20S077576	DANUSH VARTHAN V	5	5	5	3	5	23	92
8	CB20S077577	GNANAVEL S	4	4	4	3	3	22	88
9	CB20S077578	GOHILAVANI R	5	5	5	3	5	23	92
10	CB20S077579	HARITHA K	5	5	5	4	3	22	88
11	CB20S077580	JAYAPRIYA J	5	5	5	3	4	22	88

12	CB20S077581	MOHAMED IRFAN J	4	3	5	5	4	21	84
13	CB20S077582	MOHAMED THARIK M	4	4	5	4	5	22	88
14	CB20S077583	MOUNIKA R	3	4	5	5	5	22	88
15	CB20S077584	PALANIVEL V	3	4	4	5	5	21	84
16	CB20S077585	POOMINATHAN M	5	4	4	4	4	21	84
17	CB20S077586	RASIKA LK	5	5	5	4	4	23	92
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19	CB20S077588	ROBINSON A	3	5	4	5	5	22	88
20	CB20S077589	SANTHANA SELVA A	4	4	4	5	5	22	88
21	CB20S077590	SATHISH M	5	5	5	5	2	22	88
22	CB20S0775901	SNEKA N	5	5	4	4	4	22	88
23	CB20S0775912	SRIMAR R	3	4	4	5	5	21	84
24	CB20S077593	SUJITH KUMAR S	3	5	5	5	3	21	84
25	CB20S077594	SYED SALMAN SN	3	5	5	3	5	21	84
26	CB20S077595	VINODHINI M	5	5	5	4	3	22	88
AVERAGE			3.786	4.5	4.536	4.278	4.154		

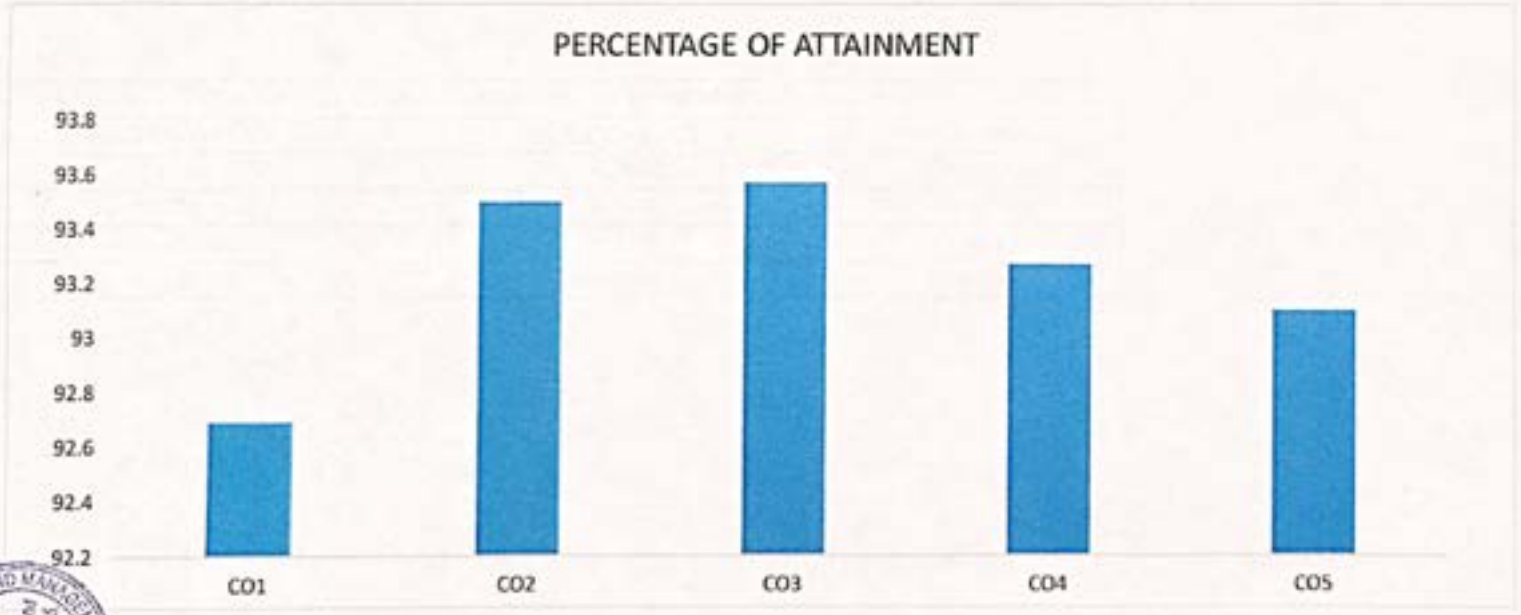
EXPECTED ATTAIMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	3.79	75	78.79	92.69
CO2	4.5	75	79.5	93.53
CO3	4.54	75	79.54	93.58
CO4	4.28	75	79.28	93.27
CO5	4.143	75	79.143	93.11

COURSE ATTAINMENT FOR B.SC., BIOTECHNOLOGY

SUBJECT NAME :CELL BIOLOGY
SUBJECT CODE :16SCCBT1
NO.OF STUDENTS 26

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	92.69
CO2	93.5
CO3	93.57
CO4	93.27
CO5	93.1

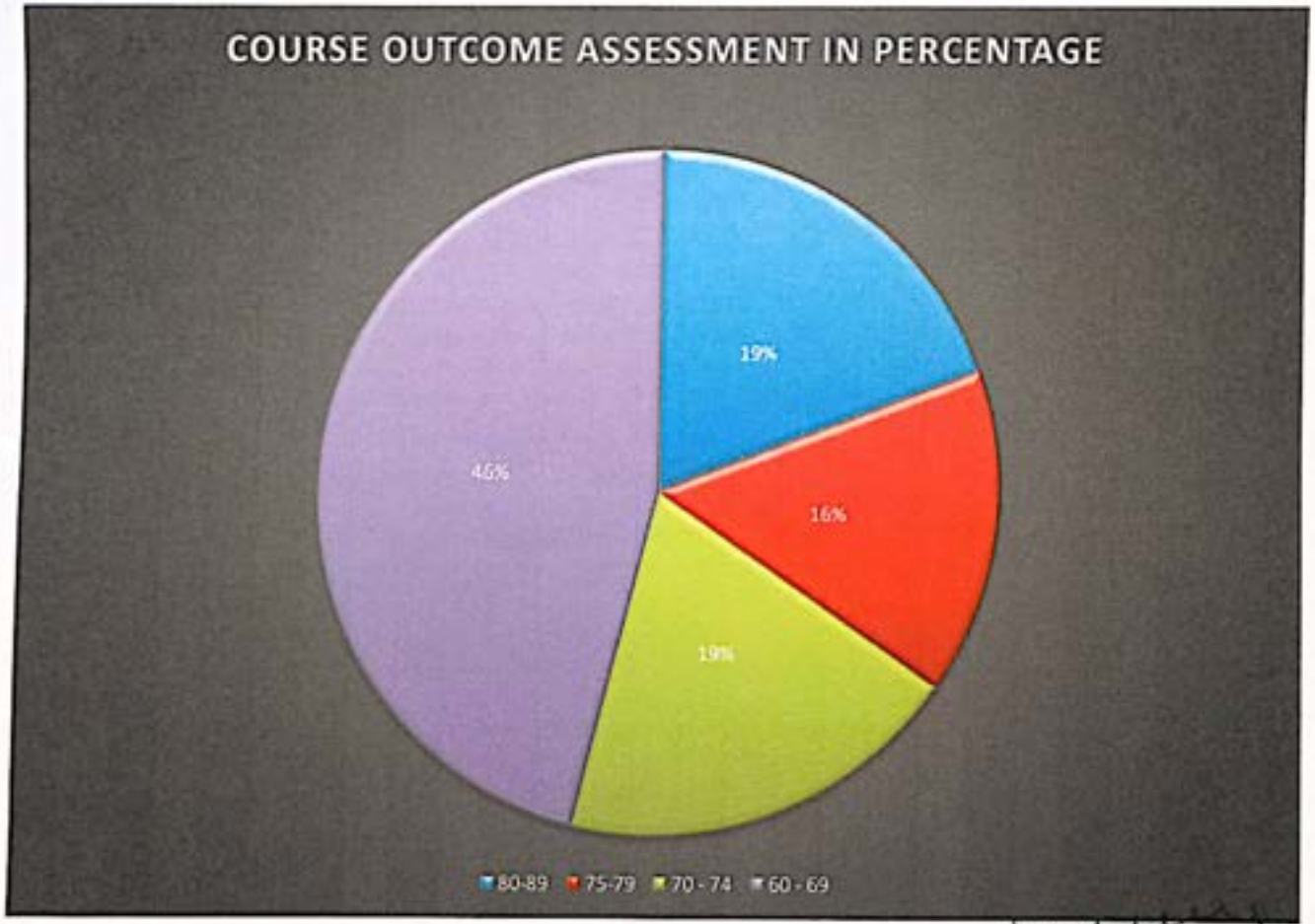


COURSE ATTAINMENT FOR B.Sc., BIOTCHNOLOGY

SUBJECT NAME: CELL BIOLOGY
SUBJECT CODE: 16SCCBT1
NO. OF STUDENTS: 26

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO. OF STUDENTS	STATUS
90 -100	0	OUTSTANDING
80 - 89	5	EXCELLENT
75-79	4	DISTINCTION
70-74	5	VERY GOOD
60-69	12	GOOD
50-59	0	AVERAGE
BELOW 50	0	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
80-89	19.23%	EXCELLENT
75-79	15.38%	DISTINCTION
70 - 74	19.23%	VERY GOOD
60 - 69	46.15%	GOOD



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ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME

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COURSE : MOLECULAR BIOLOGY SUB CODE :16SCCBT2

COURSE OUTCOME

CO1	Nucleus & Chromosomes,3 dimensional organization of cytoskeleton,chromatin,allele, loci, gene. Nuclear division.
CO2	Organization of Chromosomes,chromosomal abnormalities and qualitative inheritance.Somatic cell genetics.
CO3	Central dogma of Molecular Biology,Transcription – Prokaryotic & Eukaryotic Transcription.Translation - Factors involved in translation.
CO4	Prokaryotic and Eukaryotic DNA replication.Mechanism of DNA replication.Enzymes & proteins involved in DNA replication.
CO5	Regulation of gene expression.gene loss, gene amplification, gene rearrangement.

PO → CO↓	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	2	3	2	2	1
CO2	2	3	3	2	2
CO3	2	3	1	3	1
CO4	3	3	2	2	2
CO5	3	3	3	3	2
AVERAGE	**2.4**	**3**	**2.2**	**2.4**	**1.6**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	CB20S077570	AAKASH S	4	3	5	5	5	22	88
2	CB20S077571	AJAY D	4	4	5	5	5	23	92
3	CB20S077572	ARUN PRASATH M	4	4	5	5	5	23	92
4	CB20S077573	ASWINI R	3	5	5	5	5	23	92
5	CB20S077574	BAKAVATH B	4	5	5	5	5	24	96
6	CB20S077575	BHAVADHARANI B	5	5	5	4	5	24	96
7	CB20S077576	DANUSH VARTHAN V	5	4	5	5	5	24	96
8	CB20S077577	GNANAVEL S	4	5	5	5	4	23	92
9	CB20S077578	GOHILAVANI R	4	5	5	5	5	24	96
10	CB20S077579	HARITHA K	3	4	5	5	5	22	88

11	CB20S077580	JAYAPRIYA J	4	4	5	5	5	23	92
12	CB20S077581	MOHAMED IRFAN J	4	5	5	5	5	24	96
13	CB20S077582	MOHAMED THARIK M	4	3	5	5	5	22	88
14	CB20S077583	MOUNIKA R	4	5	5	5	5	24	96
15	CB20S077584	PALANIVEL V	4	3	5	5	5	22	88
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17	CB20S077586	RASIKA LK	4	3	5	5	5	22	88
18	CB20S077587	RISWAN A	4	5	5	5	5	24	96
19	CB20S077588	ROBINSON A	4	4	5	5	5	23	92
20	CB20S077589	SANTHANA SELVA A	5	4	5	5	5	24	96
21	CB20S077590	SATHISH M	4	4	5	5	5	23	92
22	CB20S0775901	SNEKA N	4	4	5	5	5	23	92
23	CB20S0775912	SRIMAR R	4	4	4	5	5	22	88
24	CB20S077593	SUJITH KUMAR S	3	4	3	5	5	20	80
25	CB20S077594	SYED SALMAN SN	4	3	5	5	5	22	88
26	CB20S077595	VINODHINI M	3	4	5	5	5	22	88
AVERAGE			3.923	4.115	4.885	4.962	4.962		

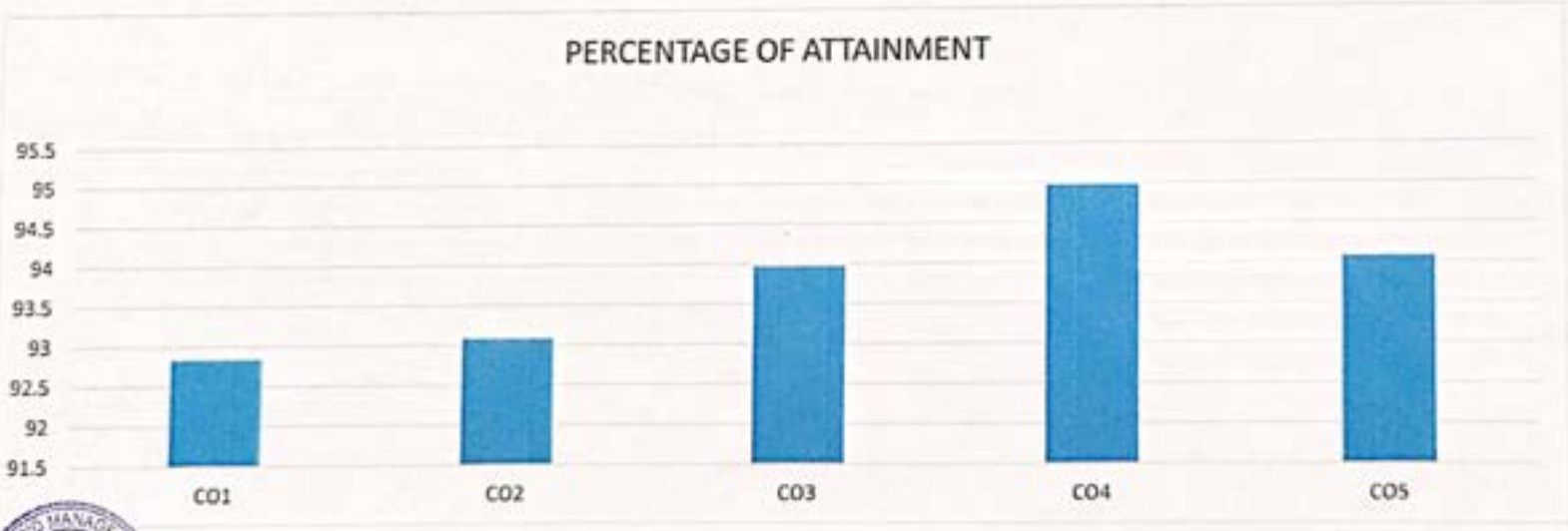
EXPECTED ATTAIMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	3.92	75	78.92	92.84706
CO2	4.12	75	79.12	93.08235
CO3	4.88	75	79.88	93.97647
CO4	4.96	75	79.96	94.07059
CO5	4.962	75	79.962	94.07294

COURSE ATTAINMENT FOR B.SC., BIOTECHNOLOGY

SUBJECT NAME MOLECULAR BIOLOGY
SUBJECT CODE 16SCCBT2
NO.OF STUDENTS 26

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	92.84
CO2	93.08
CO3	93.97
CO4	94.97
CO5	94.07

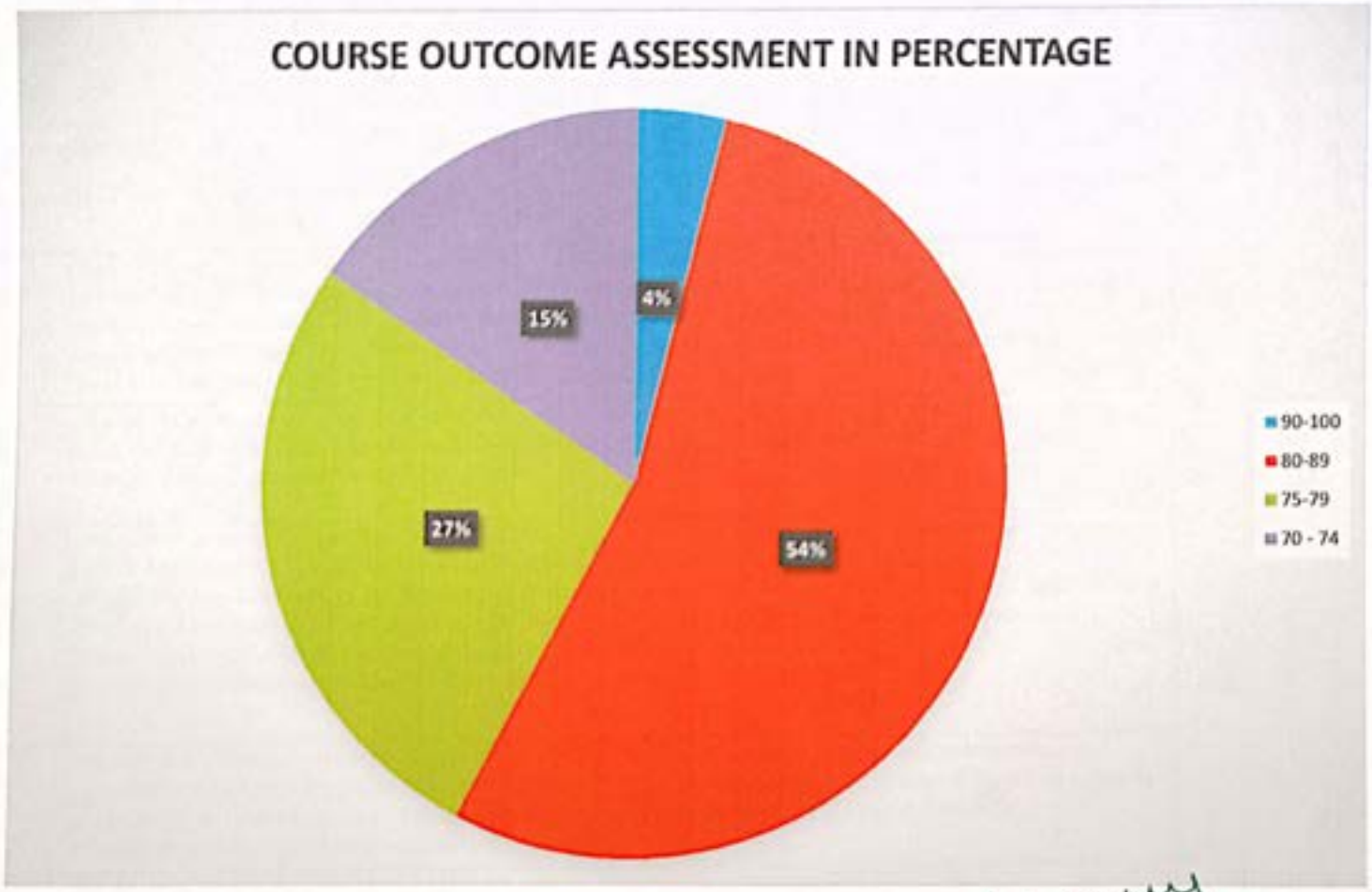


COURSE ATTAINMENT FOR B.Sc., BIOTCHNOLOGY

SUBJECT NAME: MOLECULAR BIOLOGY
SUBJECT CODE: 16SCCBT2
NO. OF STUDENTS: 26

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO. OF STUDENTS	STATUS
90 -100	1	OUTSTANDING
80 - 89	14	EXCELLENT
75-79	7	DISTINCTION
70-74	4	VERY GOOD
60-69	0	GOOD
50-59	0	AVERAGE
BELOW 50	0	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
90-100	3.84%	OUTSTANDING
80-89	53.84%	EXCELLENT
75-79	26.92%	DISTINCTION
70 - 74	15.38%	VERY GOOD



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PROGRAM OUTCOME

PO1	TheCell biology is the study of the structure and function of prokaryotic and eukaryotic cells. In this course the students will learn different areas of cellular biology including the structure and functions of cell, its organelles, synthesis and function of macromolecules such as carbohydrate, protein, lipid, DNA & RNA; membrane structure and function; bioenergetics; cellular communication; and microscopic techniques to understand the cell structure. course about the basic of microbiology dealing types of microbes analyse medical microbiology.
PO2	This course is designed to given an understanding about the basics of molecular biology – classical genetics & molecular aspects.Isolation, preservation and improvement of strains.Food Microbiology-Medical Microbiology,Agricultural Microbiology.
PO3	This courser is planned to give basic knowledge on r DNA Technology,Blotting techques ,pharmaceutical products, Gene therapy.structure functions of biomolecules.Amino Acids and Proteins.Classification of lipids.Fundemental concepts and Anatomy of the immune system.vaccinology-Clinical immunology.Classification of lipids.macro and micro minerals - source and functions.Fundamental Concepts and Anatomy of the Immune System.Vaccinology,Clinical Immunology.to specialize in instruments in centrifugation, chromatography, electrophoresis, spectroscopy and crystallography.
PO4	This course is planned to give basic knowledge about plant tissue culture, transgenesis, genetic modifications in agriculture,Plant Genetic Engineering,Genetic modification in food industry,Production of organic food.This course is planned to impart knowledge on fundamentals of animal cell culture, GMOs, gene therapy & transgenic animals.Biostatistics - Concepts of statistics.
PO5	This course is designed to give an idea about the avenues of exploiting microbes and to study the downstream processes for product recovery in fermentation.Microbes in food processing and production,Fermented foods and beverages.

COURSE : APPLIED BIOCHEMISTRY SUB CODE:16SACBT2

COURSE OUTCOME

CO1	Basic principles of sedimentation. Types of centrifuges - Preparative, analytical, high speed, low speed, ultracentrifuge, differential and density gradient. Determination of molecular weight
CO2	Chromatography, Adsorption Chromatography, Paper Chromatography, TLC, HPTLC, Ion Exchange Chromatography, Gel permeation Chromatography, Affinity Chromatography, GC, GLC and HPLC,
CO3	Factors affecting electrophoretic migration, Technique and uses of agarose gel electrophoresis, PAGE, SDS-PAGE, Two-dimensional electrophoresis and Isoelectricfocussing.
CO4	Beer-Lambert law and its limitations. Light absorption and transmission. Extinction coefficient.Flame Photometry. Atomic absorption spectrophotometry, Principle and application of NMR and ESR techniques
CO5	Principle, instrumentation and applications of X-Ray Crystallography – X-ray diffraction, Bragg equation, Reciprocal lattice, Miller indices & Unit cell, Concept of different crystal structure, determination of crystal structure .

PO → CO↓	PO1	PO2	PO3	PO4	PO5
CO1	2	3	2	2	1
CO2	2	3	3	2	2
CO3	2	3	1	3	1
CO4	3	3	2	2	2
CO5	3	3	3	3	2
AVERAGE	**2.4**	**3**	**2.2**	**2.4**	**1.6**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	CB20S077570	AAKASH S	4	4	4	5	5	22	88
2	CB20S077571	AJAY D	5	4	5	4	4	22	88
3	CB20S077572	ARUN PRASATH M	4	4	5	5	4	22	88
4	CB20S077573	ASWINI R	4	5	5	5	5	24	96
5	CB20S077574	BAKAVATH B	4	5	5	5	3	22	88
6	CB20S077576	DANUSH VARTHAN V	5	5	4	5	5	24	96
7	CB20S077577	GNANAVEL S	5	5	5	3	4	22	88
8	CB20S077578	GOHILAVANI R	5	5	5	5	4	24	96
9	CB20S077579	HARITHA K	4	5	5	5	5	24	96
10	CB20S077580	JAYAPRIYA J	5	5	5	5	5	25	100

11	CB20S077581	MOHAMED IRFAN J	5	5	5	5	5	25	100
12	CB20S077582	MOHAMED THARIK M	4	4	5	5	4	22	88
13	CB20S077583	MOUNIKA R	4	4	5	5	5	23	92
14	CB20S077584	PALANIVEL V	4	4	4	4	4	20	80
15	CB20S077585	POOMINATHAN M	3	3	4	5	5	20	80
16	CB20S077586	RASIKA LK	5	5	5	5	5	25	100
17	CB20S077587	RISWAN A	4	4	5	5	5	23	92
18	CB20S077588	ROBINSON A	5	4	4	5	5	23	92
19	CB20S077589	SANTHANA SELVA A	5	5	5	4	5	24	96
20	CB20S077590	SATHISH M	4	4	4	5	5	22	88
21	CB20S077591	SNEKA N	4	5	5	4	5	23	92
22	CB20S077592	SRIMAR R	3	3	4	5	5	20	80
23	CB20S077593	SUJITH KUMAR S	4	3	4	5	5	21	84
24	CB20S077594	SYED SALMAN SN	4	5	4	5	4	22	88
25	CB20S077595	VINODHINI M	4	5	5	5	5	24	96
AVERAGE			4.28	4.4	4.64	4.76	4.64		

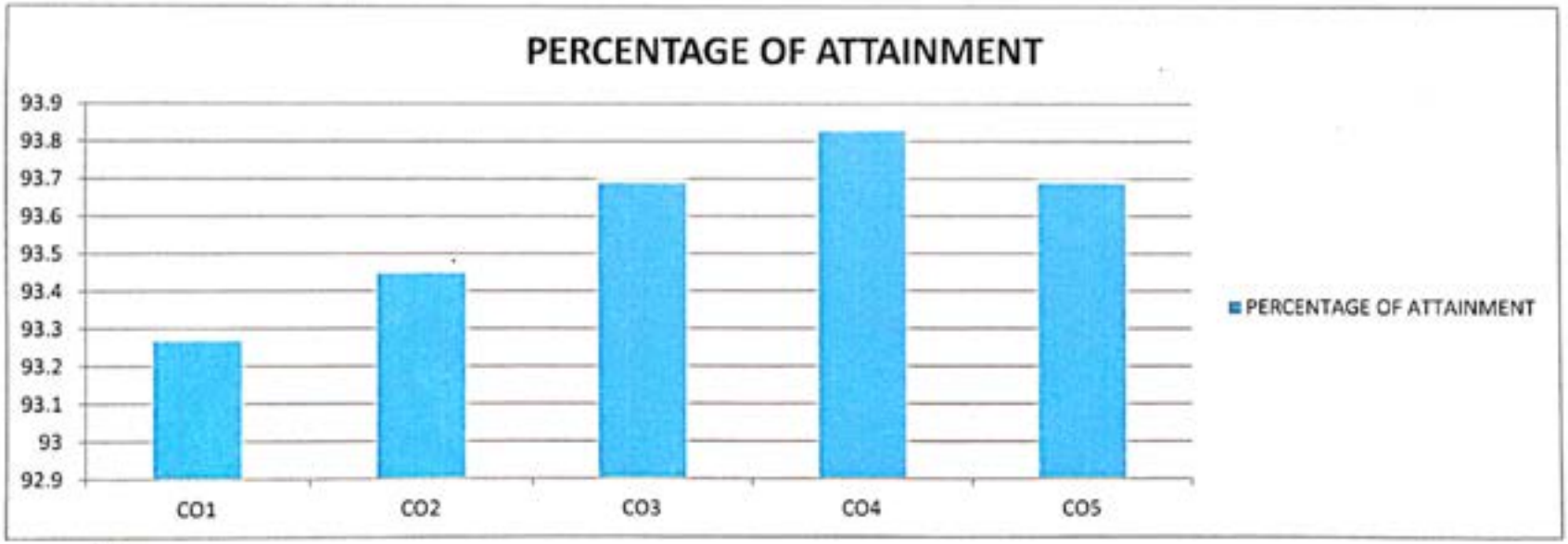
EXPECTED ATTAIMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	4.28	75	79.28	93.27
CO2	4.44	75	79.44	93.46
CO3	4.64	75	79.64	93.69
CO4	4.76	75	79.76	93.84
CO5	4.64	75	79.64	93.69

COURSE ATTAINMENT FOR B.SC., BIOTECHNOLOGY

SUBJECT NAME : APPLIED BIOCHEMISTRY
SUBJECT CODE : 16SACBT2
NO.OF STUDENTS 25

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	93.27
CO2	93.45
CO3	93.69
CO4	93.83
CO5	93.69

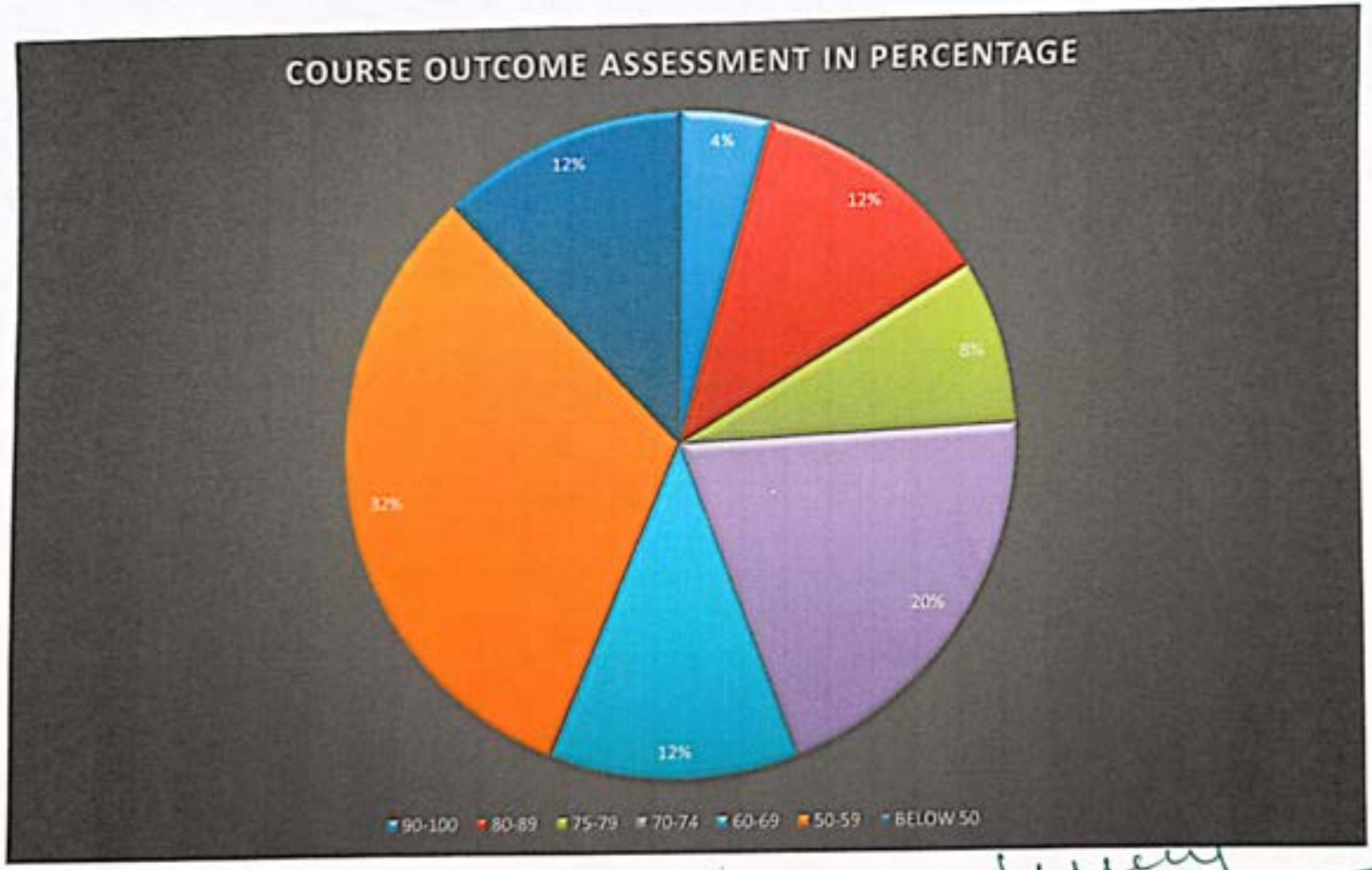


COURSE ATTAINMENT FOR B.Sc., BIOTCHNOLOGY

SUBJECT NAME:APPLIED BIOCHEMISTRY
SUBJECT CODE: 16SACBT2
NO. OF STUDENTS: 25

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO. OF STUDENTS	STATUS
90 -100	1	OUTSTANDING
80 - 89	3	EXCELLENT
75-79	2	DISTINCTION
70-74	5	VERY GOOD
60-69	3	GOOD
50-59	8	AVERAGE
BELOW 50	3	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
90-100	4.38%	OUTSTANDING
80-89	12.00%	EXCELLENT
75-79	8.00%	DISTINCTION
70-74	20.00%	VERY GOOD
60-69	12.00%	GOOD
50-59	32.00%	AVERAGE
BELOW 50	12.00%	RA



PRINCIPAL
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BHARATH COLLEGE OF SCIENCE AND MANAGEMENT
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THANJAVUR-5
PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME

PO1	TheCell biology is the study of the structure and function of prokaryotic and eukaryotic cells. In this course the students will learn different areas of cellular biology including the structure and functions of cell, its organelles, synthesis and function of macromolecules such as carbohydrate, protein, lipid, DNA & RNA; membrane structure and function; bioenergetics; cellular communication; and microscopic techniques to understand the cell structure. course about the basic of microbiology dealing types of microbes analyse medical microbiology.
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PO4	This course is designed to give basic concepts of immunology.Fundemental concepts and Anatomy of the immune system.vaccinology-Clinical immunology.
PO5	To learn about fundamentals of animal cell culture,GMOs,Gene therapy and transgenic animals.

COURSE :r DNA TECHNOLOGY COURSE CODE:16SCCBT3P

CO1	Isolation of genomic DNA from plant, animal cells & from bacteria
CO2	Isolation of plasmid DNA – small & large scale
CO3	Restriction digestion – single & double digestion, Ligation.
CO4	Selection & screening of rDNA products – Antibiotic resistance, Blue white colony.
CO5	PCR amplification, Southern blot and northern blot.

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PO →	PO1	PO2	PO3	PO4	PO5
CO1	2	1	1	1	1
CO2	2	2	2	3	1
CO3	1	1	3	2	3
CO4	2	3	2	2	2
CO5	3	2	2	1	2
AVERAGE	**2**	**1.8**	**2**	**1.8**	**1.8**

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PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME B.Sc BIOTECHNOLOGY

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PO5	To learn about fundamentals of animal cell culture,GMOs,Gene therapy and transgenic animals.

COURSE : CELL BIOLOGY COURSE CODE: 16SCCBT1P

CO1	Structure observation of Prokaryotic cells Structure observation of Eukaryotic cell
CO2	Motility of an organism
CO3	Cell Staining – Cytochemical methods.
CO4	Structure of purine and pyrimidine base, Watson and Crick model and forms of DNA.
CO5	Cell division – Binary fission of yeast

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PO →	PO1	PO2	PO3	PO4	PO5
CO1	3	2	2	2	1
CO2	3	2	3	2	2
CO3	3	2	1	3	1
CO4	3	3	2	2	2
CO5	3	3	3	3	2
AVERAGE	**3**	**2.4**	**2.2**	**2.4**	**1.6**

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PO4	This course is designed to give basic concepts of immunology.Fundemental concepts and Anatomy of the immune system.vaccinology-
PO5	To learn about fundamentals of animal cell culture,GMOs,Gene therapy and transgenic animals.

COURSE : MICROBIOLOGY COURSE CODE: 16SACMB1P
COURSE OUTCOME

CO1	Preparation of Microbiological media
CO2	Isolation of microorganisms from various samples
CO3	Biochemical identification of bacteria.
CO4	Staining of fungl
CO5	Identification of algae, fungi, lichens & yeast

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PO →	PO1	PO2	PO3	PO4	PO5
CO1	1	1	1	2	1
CO2	2	2	3	2	1
CO3	3	1	1	2	1
CO4	2	3	2	2	3
CO5	2	3	2	3	2
AVERAGE	**2**	**2**	**1.8**	**2.2**	**1.6**

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COURSE : LAB IN MICROBIALBIOTECHNOLOGY COURSE CODE:16SCCBT6P
COURSE OUTCOME

CO1	Isolation of industrially important microorganisms.
CO2	Enzyme production – amylase production.
CO3	Antibiotic production by different strains of microbes
CO4	Isolation & identification microbes from spoiled food
CO5	Immobilization of yeast cell by alginate beads

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PO →	PO1	PO2	PO3	PO4	PO5
CO1	1	2	1	1	1
CO2	1	1	2	1	1
CO3	2	1	1	2	1
CO4	1	1	2	1	1
CO5	1	2	1	3	1
AVERAGE	**1.2**	**1.4**	**1.4**	**1.6**	**1**

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PO5	To learn about fundamentals of animal cell culture,GMOs,Gene therapy and transgenic animals.

COURSE : PLANT AND ANIMAL BIOTECHNOLOGY COURSE CODE:16SCCBT5P
COURSE OUTCOME

CO1	Isolation of plant genomic DNA
CO2	Preparation of chloroplast from pea
CO3	Isolation of DNA from Animal liver, Isolation of DNA from human cheek cells
CO4	Quantification of DNA by spectrophotometeric method
CO5	Types of Animal cell culture – Primary, secondary & established

PO →	PO1	PO2	PO3	PO4	PO5
CO1	3	2	1	1	1
CO2	1	1	2	2	1
CO3	2	2	3	2	3
CO4	3	1	2	1	3
CO5	3	2	2	3	2
AVERAGE	**2.4**	**1.6**	**2**	**1.8**	**2**

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PO5	To learn about fundamentals of animal cell culture,GMOs,Gene therapy and transgenic animals.

COURSE : IMMUNOLOGY COURSE CODE:16SCCBT4P
COURSE OUTCOME

CO1	Separation of serum & plasma
CO2	Agglutination - Blood grouping, Latex agglutination, WIDAL
CO3	Breeding & maintenance of laboratory animals. Immunization
CO4	Raising antibody – polyclonal & monoclonal
CO5	Breeding of experimental animals.

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PO →	PO1	PO2	PO3	PO4	PO5
CO1	2	1	1	1	1
CO2	2	1	1	1	2
CO3	2	1	3	2	3
CO4	2	1	2	2	1
CO5	3	1	1	3	2
AVERAGE	**2.2**	**1**	**1.6**	**1.8**	**1.8**

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ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

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PO5	To learn about fundamentals of animal cell culture,GMOs,Gene therapy and transgenic animals.

COURSE : BIOCHEMISTRY COURSE CODE:16SACBT1P
COURSE OUTCOME

CO1	Isolation of Mitochondria from rat liver.
CO2	Separation of amino acids/sugars/nucleic acids/pigments using paper and thin layer chromatography.
CO3	SDS-PAGE analysis of proteins
CO4	Separation of Blood, plasma and serum
CO5	Extraction of Proteins from biological materials, Protein separation methods : Precipitation, chromatographic, electrophoretic techniques.

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PO →	PO1	PO2	PO3	PO4	PO5
CO1	2	1	1	1	1
CO2	2	2	2	3	1
CO3	1	1	3	2	3
CO4	2	3	2	2	2
CO5	3	2	2	1	2
AVERAGE	**2**	**1.8**	**2**	**1.8**	**1.8**

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PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME B.SC BIOTECHNOLOGY

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PO5	To learn about fundamentals of animal cell culture,GMOs,Gene therapy and transgenic animals.

COURSE : MOLECULAR BIOLOGY COURSE CODE:16SCCBT2P

CO1	Isolation and purification of genomic DNA from prokaryotes
CO2	Isolation and purification of plasmid DNA.
CO3	Transformation of bacteria – CaCl2 method
CO4	Observation of DNA
CO5	Staining of proteins

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PO →	PO1	PO2	PO3	PO4	PO5
CO1	1	1	1	2	1
CO2	2	2	3	3	3
CO3	3	1	3	2	1
CO4	2	2	2	2	3
CO5	3	2	2	3	2
AVERAGE	**2.2**	**1.6**	**2.2**	**2.4**	**2**

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PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME

PO1	To know a thorough knowledge about structure and function of cells, cellular signaling, protein trafficking, bio molecules and cellular development.
PO2	To collect, deals with various types of classification of microbes and also throws light on multifarious habitats of microbes and provides information about all the microbial cellular functions and various metabolic pathways in microbes.
PO3	To study the structure, properties and metabolism of different biomolecules and to know the interrelationships between different metabolisms.To understand the basic concepts of immune system, elucidate the immune response of humans to foreign substances and to study the modern techniques of immunology that help determine human protection.
PO4	To study the various principles underlying genetic engineering that forms the basis of rDNA technology and to study the methodologies, and in brief the applications and related issues of rDNA technology and understanding about the basics of Animal cell culture, transgenic animals, pest & animal management, Molecular markers and regulations about the use of Biotechnology.To study the downstream processes for product recovery in fermentation
PO5	student will get an idea about the basic understanding about Bioinformatics, tools, sequences, algorithms and the analysis of phylogenetic tree and will give an idea about the basic principles and techniques involved in plant cell culture and to understand the concepts of transformation and achievements of biotechnology in Plant systems.to understand the chemical nature and associated microbes of food and to understand the principles of food processing, preservation and manufacture.

COURSE : CELLBIOLOGY SUB CODE :P16BT11

COURSE OUTCOME

CO1	Cell structure -Introduction to cell,Plasma Membrane:Cell Wall:
CO2	Cell Organelles-Endoplasmic Reticulum,Ribosomes,Mitochondria,Mitochondria,Lysosome,peroxisome :strucutre and function
CO3	Nuclear Material:Cytoskeleton:Microtubules, microfilaments & associated proteins – actin, myosin and intermediate filaments. 3 dimensional organization of cytoskeleton.,nucleus
CO4	Organization of Chromosomes, Cell Division & Cell Cycle,Cell Growth Control:
CO5	Microbial Cell Biology,Structural organization of prokaryotic cell. Cell appendages – cilia, pili, fimbriae & flagella.

PO → CO↓	PO1	PO2	PO3	PO4	PO5
CO1	2	3	2	2	1
CO2	2	3	3	2	2
CO3	2	3	1	3	1
CO4	3	3	2	2	2
CO5	3	3	3	3	2
AVERAGE	**2.4**	**3**	**2.2**	**2.4**	**1.6**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	P20443402	ANTONY. A	4	4	5	5	5	23	88
2	P20443403	ARAVIND KUMAR. S	4	3	5	5	5	22	88
3	P20443404	DEVENDRAN. S	3	4	5	5	5	22	88
4	P20443405	MADHAN BABU	3	5	5	5	5	23	92
5	P20443406	KARTHICK. S	4	5	5	5	5	24	96
6	P20443407	MADHAN KUMAR. S	4	5	5	4	5	23	92
7	P20443408	MOHAMMED ISLAM. B	4	4	5	5	5	23	92
8	P20443409	NANDHINI. M	5	5	5	5	4	24	96
9	P20443410	PRIYA DHARSHINI. R	4	4	5	5	5	23	92
10	P20443411	PURUSHOTHAMAN. R	3	5	5	5	5	23	92
11	P20443412	RAJESH. V	4	4	5	5	5	23	92
12	P20443413	RAMANIKANTH. A	4	4	5	5	5	23	92
13	P20443414	RAMESH KUMAR. M	4	4	5	5	5	23	92
14	P20443415	SUVETHA. M	3	5	5	5	5	23	92
15	P20443416	VIGNESH. M	4	4	5	5	5	23	92
16	P20443417	VIJAY RAJ. L	3	5	5	5	5	23	92
17	P20443418	YOGA PRIYA. G	5	4	5	5	5	24	96
AVERAGE			3.823529	4.352941	5	4.941176471	4.941		

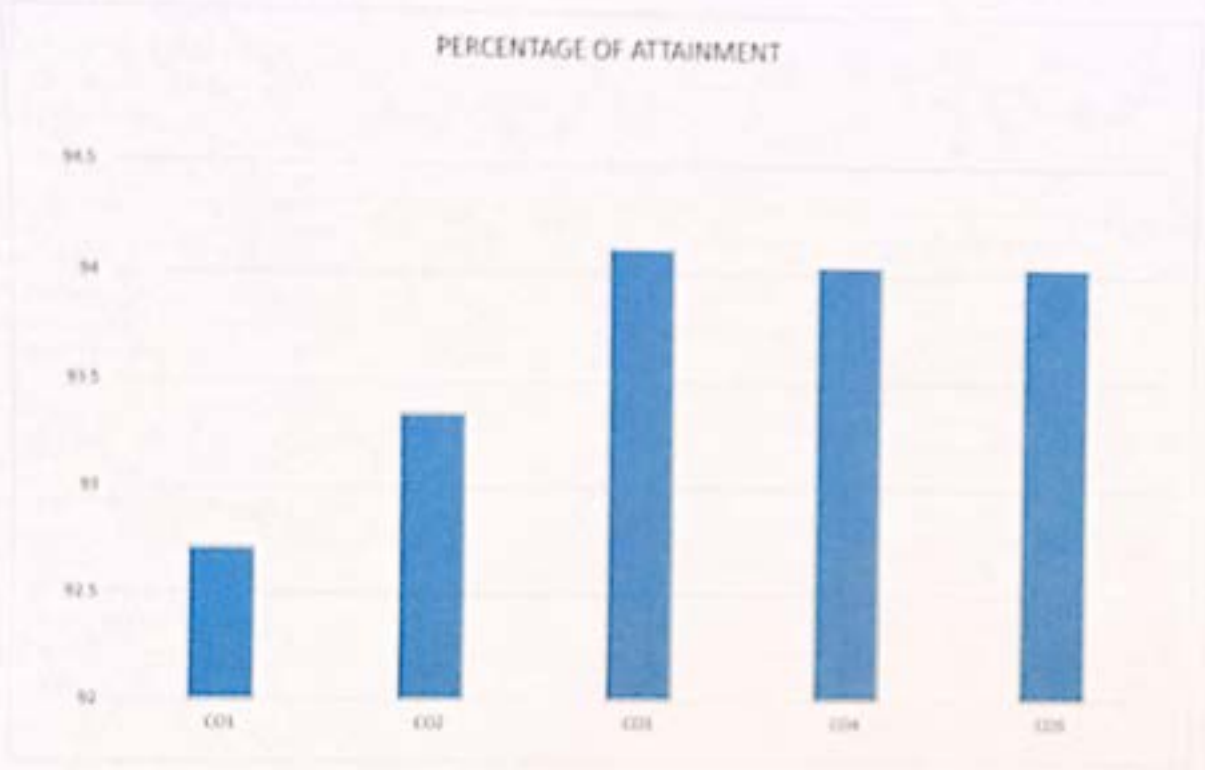
EXPECTED ATTAIMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	3.82	75	78.82	92.72941
CO2	4.35	75	79.35	93.35294
CO3	5	75	80	94.11765
CO4	4.94	75	79.94	94.04706
CO5	4.94	75	79.94	94.04706

COURSE ATTAINMENT FOR M.SC., BIOTECHNOLOGY

SUBJECT NAME :CELL BIOLOGY
SUBJECT CODE :P16BT11
NO.OF STUDENTS 17

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	92.72
CO2	93.35
CO3	94.118
CO4	94.04
CO5	94.04

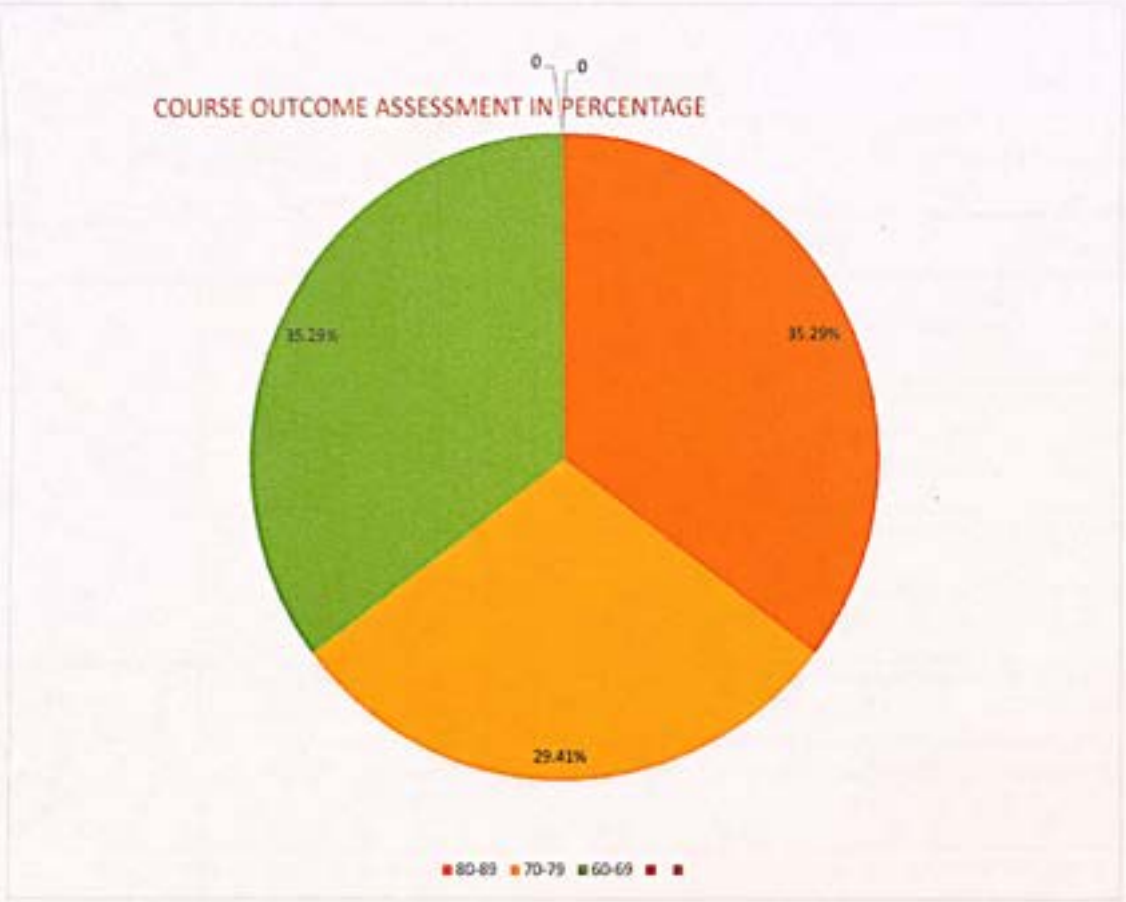


COURSE ATTAINMENT FOR M.Sc., BIOTCHNOLOGY

SUBJECT NAME:CELLBIOLOGY
SUBJECT CODE: P16BT11
NO. OF STUDENTS: 17

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO. OF STUDENTS	STATUS
90 -100	0	OUTSTANDING
80 - 89	6	EXCELLENT
70-79	5	DISTINCTION
60-69	6	GOOD
50-59	0	AVERAGE
BELOW 50	0	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
80-89	35.29%	EXCELLENT
70-79	29.41%	DISTINCTION
60-69	35.29%	GOOD



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THANJAVUR-5
PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME

PO1	To know a thorough knowledge about structure and function of cells, cellular signaling, protein trafficking, bio molecules and cellular development.
PO2	To collect, deals with various types of classification of microbes and also throws light on multifarious habitats of microbes and provides information about all the microbial cellular functions and various metabolic pathways in microbes.
PO3	To study the structure, properties and metabolism of different biomolecules and to know the interrelationships between different metabolisms.To understand the basic concepts of immune system, elucidate the immune response of humans to foreign substances and to study the modern techniques of immunology that help determine human protection.
PO4	To study the various principles underlying genetic engineering that forms the basis of rDNA technology and to study the methodologies, and in brief the applications and related issues of rDNA technology and understanding about the basics of Animal cell culture, transgenic animals, pest & animal management, Molecular markers and regulations about the use of Biotechnology.To study the downstream processes for product recovery in fermentation
PO5	student will get an idea about the basic understanding about Bioinformatics, tools, sequences, algorithms and the analysis of phylogenetic tree and will give an idea about the basic principles and techniques involved in plant cell culture and to understand the concepts of transformation and achievements of biotechnology in Plant systems.to understand the chemical nature and associated microbes of food and to understand the principles of food processing, preservation and manufacture.

COURSE : MICROBIOLOGY SUB CODE :P16BT12

COURSE OUTCOME

CO1	Discovery of microbial world, the experiment of Pasteur, the era of discovery of antibiotics and anaerobic life. Types and classification of microbes. Isolation, identification, characteristics and ultra structure of microbes – Viruses, Bacteria, Fungi and Algae. Various associations of microbes.
CO2	Origin and evolution of microorganisms. Concepts of species and hierarchical taxa. Bergy's system of classification – Viruses, Bacteria, Fungi. Biological nomenclature - Measurement of species richness and evenness. Simpson's diversity index – Multivariate analysis.Microbial Nutrition and Growth,Molecular Systematics.
CO3	Microbial MetabolismInfluence of environment on microbial physiology. Physical factors – radiations, temperature, pH and pressure. Chemical factors – nutrients, water, C, H, O, N, P, S. Growth factors - amino acids, purines, pyrimidines, nucleosides, nucleotides, vitamins, lipids, inorganic nutrients.
CO4	Methods in Microbiology Isolation of microbes from various sources - serial dilution, pure culture and culture preservation techniques. Microbial culture collection centers. Staining techniques – Simple & differential - Gram, endospore, negative, flagellar staining
CO5	Microbial GeneticsGenetic system of bacteria – transformation, transduction, recombination. Extra cellular genetic material - plasmids and transposons. Genetic systems of viruses – Phage I, RNA viruses and retroviruses.

PO → CO↓	PO1	PO2	PO3	PO4	PO5
CO1	2	3	2	2	1
CO2	2	3	3	2	2
CO3	2	3	1	3	1
CO4	3	3	2	2	2
CO5	3	3	3	3	2
AVERAGE	**2.4**	**3**	**2.2**	**2.4**	**1.6**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	P20443402	ANTONY. A	4	4	5	5	5	23	88
2	P20443403	ARAVIND KUMAR. S	4	4	5	5	5	23	92
3	P20443404	DEVENDRAN. S	3	5	5	5	5	23	92
4	P20443405	MADHAN BABU	3	4	5	5	5	22	88
5	P20443406	KARTHICK. S	4	4	5	5	5	23	92
6	P20443407	MADHAN KUMAR. S	4	5	5	5	5	24	96
7	P20443408	MOHAMMED ISLAM. B	4	5	5	5	5	24	96
8	P20443409	NANDHINI. M	4	5	5	5	4	23	92
9	P20443410	PRIYA DHARSHINI. R	4	5	5	5	5	24	96
10	P20443411	PURUSHOTHAMAN. R	4	5	5	5	5	24	96
11	P20443412	RAJESH. V	4	5	5	5	5	24	96
12	P20443413	RAMANIKANTH. A	4	5	5	5	5	24	96
13	P20443414	RAMESH KUMAR. M	4	5	5	5	5	24	96
14	P20443415	SUVETHA. M	4	5	5	5	5	24	96
15	P20443416	VIGNESH. M	4	5	5	5	5	24	96
16	P20443417	VIJAY RAJ. L	3	5	5	5	5	23	92
17	P20443418	YOGA PRIYA. G	4	4	5	5	5	23	92
AVERAGE			3.824	4.706	5	5	4.94118		

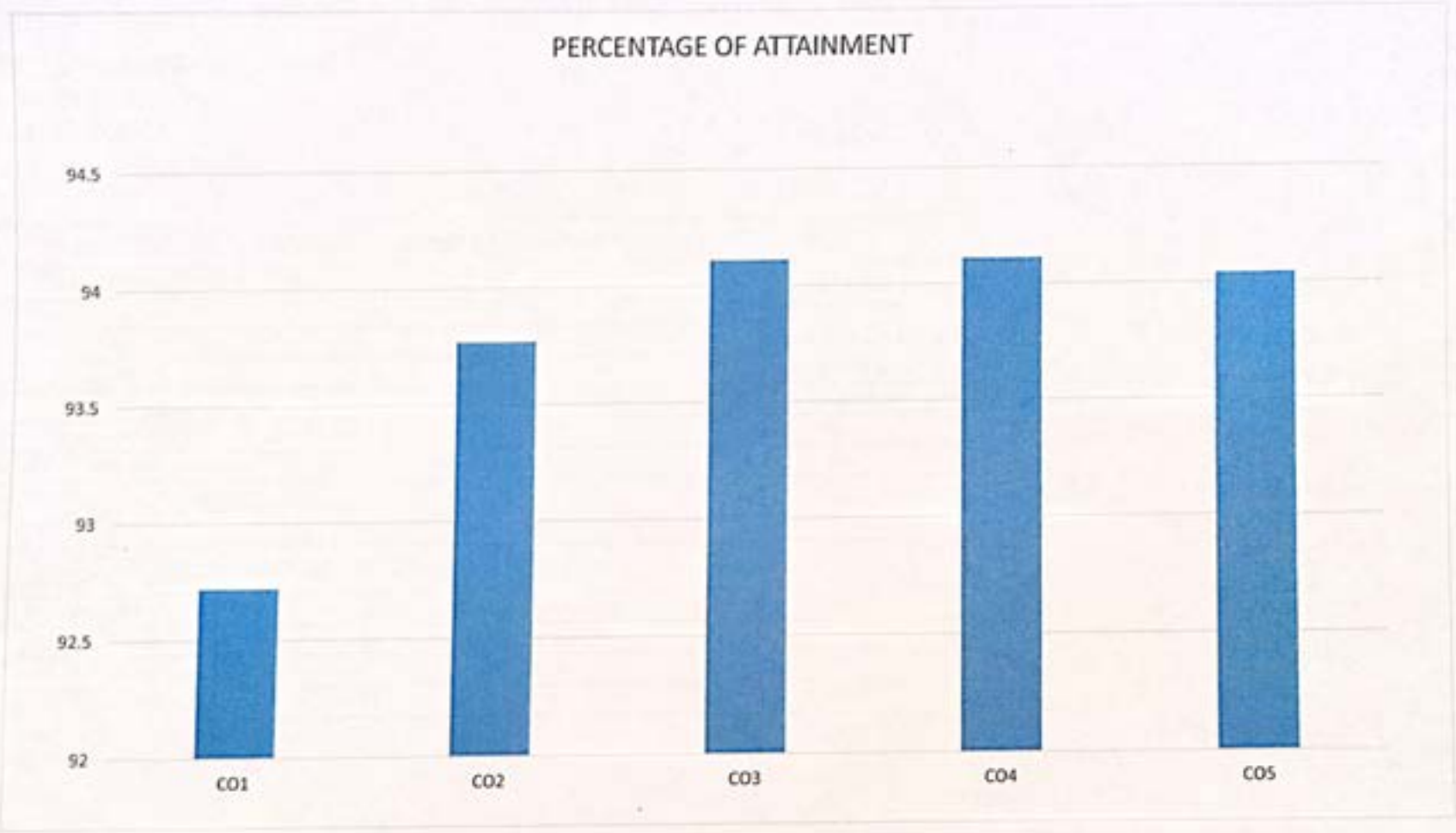
EXPECTED ATTAIMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	3.82	75	78.82	92.72941
CO2	4.71	75	79.71	93.77647
CO3	5	75	80	94.11765
CO4	5	75	80	94.11765
CO5	4.94	75	79.94	94.04706

COURSE ATTAINMENT FOR M.SC., BIOTECHNOLOGY

SUBJECT NAME :MICROBIOLOGY
SUBJECT CODE :P16BT12
NO.OF STUDENTS:17

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	92.72
CO2	93.77
CO3	94.11
CO4	94.11
CO5	94.04

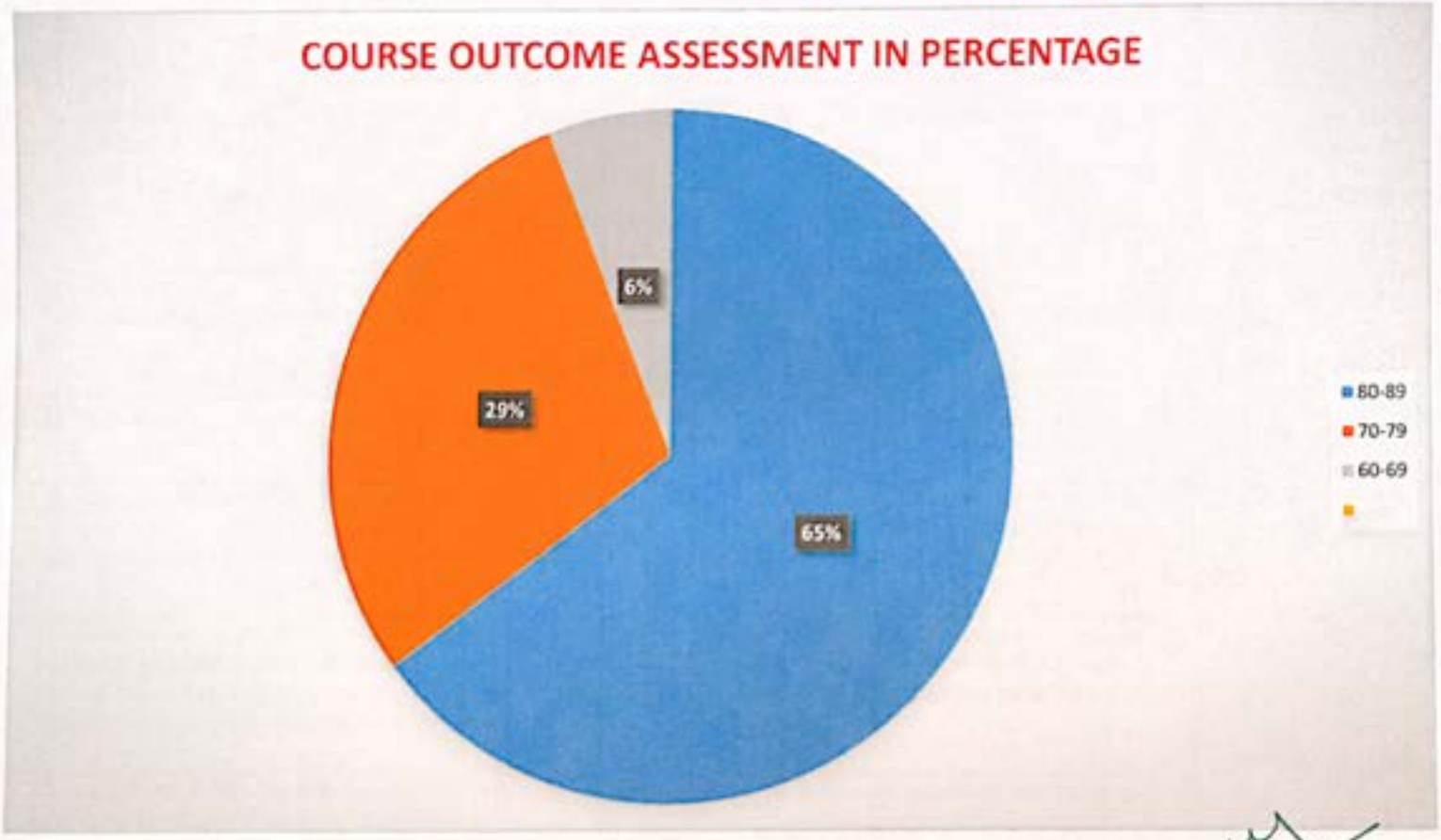


COURSE ATTAINMENT FOR M.Sc., BIOTCHNOLOGY

SUBJECT NAME:MICROBIOLOGY
SUBJECT CODE: P16BT12
NO. OF STUDENTS: 17

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO. OF STUDENTS	STATUS
90 -100	0	OUTSTANDING
80 - 89	11	EXCELLENT
70-79	5	DISTINCTION
60-69	1	GOOD
50-59	0	AVERAGE
BELOW 50	0	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
80-89	64.70%	EXCELLENT
70-79	29.41%	DISTINCTION
60-69	5.88%	GOOD



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THANJAVUR-5
PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME

PO1	To know a thorough knowledge about structure and function of cells, cellular signaling, protein trafficking, bio molecules and cellular development.
PO2	To collect, deals with various types of classification of microbes and also throws light on multifarious habitats of microbes and provides information about all the microbial cellular functions and various metabolic pathways in microbes.
PO3	To study the structure, properties and metabolism of different biomolecules and to know the interrelationships between different metabolisms.To understand the basic concepts of immune system, elucidate the immune response of humans to foreign substances and to study the modern techniques of immunology that help determine human protection.
PO4	To study the various principles underlying genetic engineering that forms the basis of rDNA technology and to study the methodologies, and in brief the applications and related issues of rDNAtechnology and understanding about the basics of Animal cell culture, transgenic animals, pest & animal management, Molecular markers and regulations about the use of Biotechnology.To study the downstream processes for product recovery in fermentation
PO5	student will get an idea about the basic understanding about Bioinformatics, tools, sequences, algorithms and the analysis of phylogenetic tree and will give an idea about the basic principles and techniques involved in plant cell culture and to understand the concepts of transformation and achievements of biotechnology in Plant systems.to understand the chemical nature and associated microbes of food and to understand the principles of food processing, preservation and manufacture.

COURSE :MOLECULAR BIOLOGY SUB CODE :P16BT14
COURSE OUTCOME

CO1	Nucleic Acid, Bases, Nucleoside, Nucleotide Types: DNA Replication:
CO2	Central Dogma - Transcription & Translation..
CO3	Mutation. Types - Molecular nature of mutation, mutagen and origin ofspontaneous mutations. Gene transfer mechanisms - transformation, transduction, conjugation, transfection and their applications,Regulation in eukaryotes
CO4	Extra-chromosomal hereditary materials & transposablegenetic elements
CO5	Genetic analysis of microbes

PO → CO↓	PO1	PO2	PO3	PO4	PO5
CO1	2	3	2	2	1
CO2	2	3	3	2	2
CO3	2	3	1	3	1
CO4	3	3	2	2	2
CO5	3	3	3	3	2
AVERAGE	**2.4**	**3**	**2.2**	**2.4**	**1.6**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	P20443402	ANTONY. A	4	4	5	5	5	23	88
2	P20443403	ARAVIND KUMAR. S	4	4	4	5	5	22	88
3	P20443404	DEVENDRAN. S	3	5	5	5	5	23	88
4	P20443405	MADHAN BABU	3	5	5	5	5	22	22
5	P20443406	KARTHICK. S	4	4	5	5	5	23	92
6	P20443407	MADHAN KUMAR. S	4	4	4	5	5	22	88
7	P20443408	MOHAMMED ISLAM. B	4	4	5	5	5	23	92
8	P20443409	NANDHINI. M	4	5	5	5	4	24	96
9	P20443410	PRIYA DHARSHINI. R	4	4	5	5	5	23	92
10	P20443411	PURUSHOTHAMAN. R	4	4	5	5	5	23	92
11	P20443412	RAJESH. V	4	4	5	5	5	23	92
12	P20443413	RAMANIKANTH. A	4	5	5	5	5	24	96
13	P20443414	RAMESH KUMAR. M	4	4	5	5	5	23	92
14	P20443415	SUVETHA. M	4	5	4	5	5	23	92
15	P20443416	VIGNESH. M	4	5	5	4	5	23	92
16	P20443417	VIJAY RAJ. L	3	5	5	5	5	23	92
17	P20443418	YOGA PRIYA. G	4	5	5	5	5	24	96
AVERAGE			3.8235	4.47059	4.82353	4.9412	4.941		

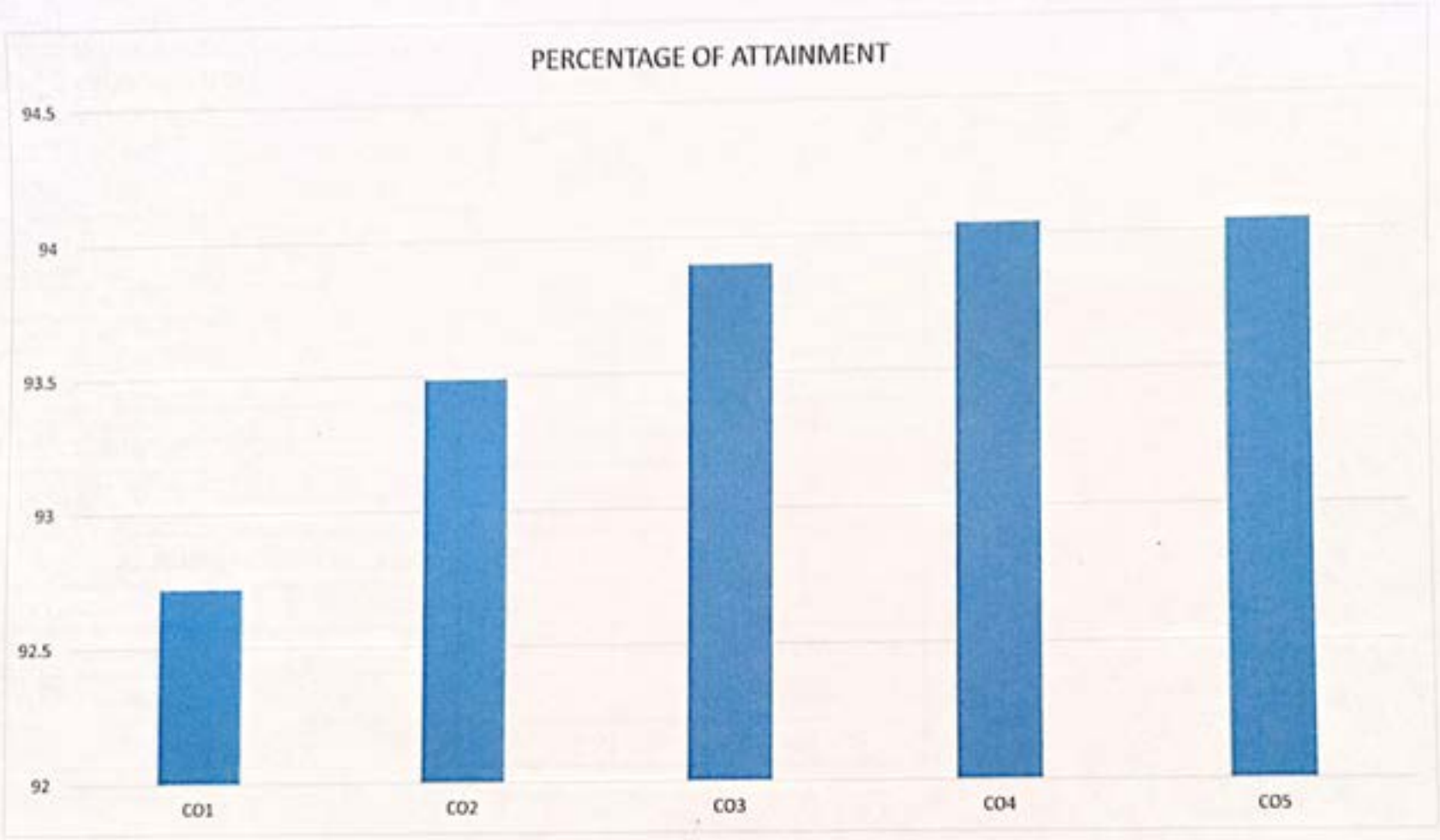
EXPECTED ATTAIMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	3.82	75	78.82	92.729412
CO2	4.47	75	79.47	93.494118
CO3	4.82	75	79.82	93.905882
CO4	4.94	75	79.94	94.047059
CO5	4.94	75	79.94	94.047059

COURSE ATTAINMENT FOR M.SC., BIOTECHNOLOGY

SUBJECT NAME :MOLECULARBIOLOGY
SUBJECT CODE :P16BT14
NO.OF STUDENTS:17

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	92.72
CO2	93.49
CO3	93.9
CO4	94.04
CO5	94.04

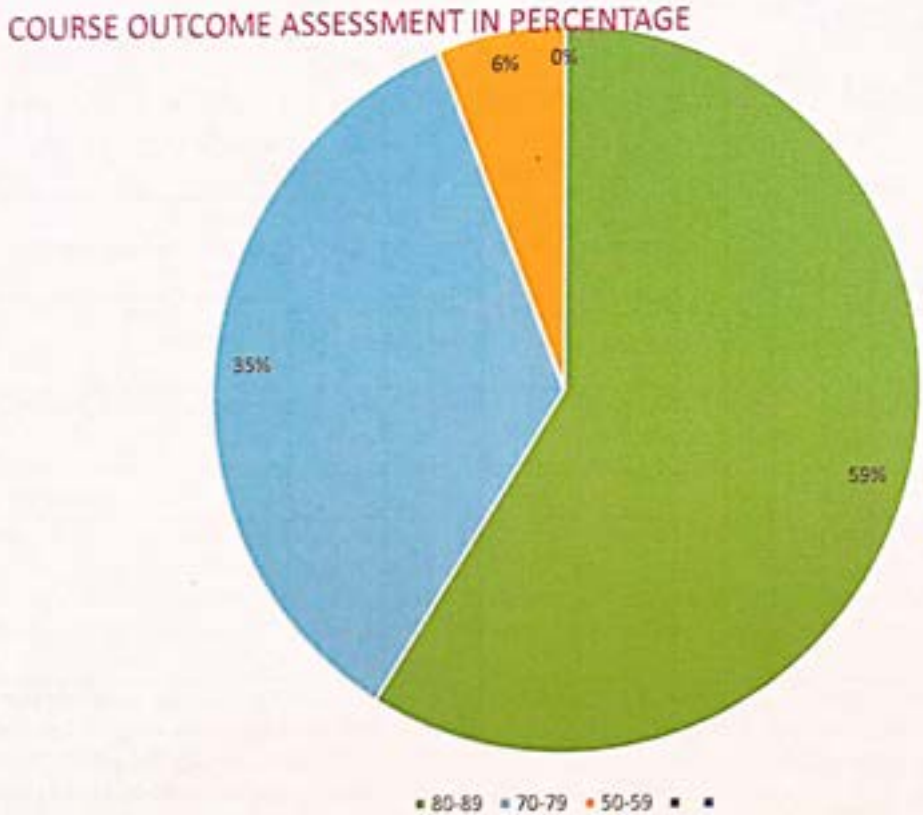


COURSE ATTAINMENT FOR M.Sc., BIOTCHNOLOGY

SUBJECT NAME:MOLECULAR BIOLOGY
SUBJECT CODE: P16BT14
NO. OF STUDENTS: 17

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO. OF STUDENTS	STATUS
90 -100	0	OUTSTANDING
80 - 89	10	EXCELLENT
70-79	6	DISTINCTION
60-69	0	GOOD
50-59	1	AVERAGE
BELOW 50	0	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
80-89	58.82%	EXCELLENT
70-79	35.25%	DISTINCTION
50-59	5.88%	AVERAGE



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ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME

PO1	To know a thorough knowledge about structure and function of cells, cellular signaling, protein trafficking, bio molecules and cellular development.
PO2	To collect, deals with various types of classification of microbes and also throws light on multifarious habitats of microbes and provides information about all the microbial cellular functions and various metabolic pathways in microbes.
PO3	To study the structure, properties and metabolism of different biomolecules and to know the interrelationships between different metabolisms.To understand the basic concepts of immune system, elucidate the immune response of humans to foreign substances and to study the modern techniques of immunology that help determine human protection.
PO4	To study the various principles underlying genetic engineering that forms the basis of rDNA technology and to study the methodologies, and in brief the applications and related issues of rDNA technology and understanding about the basics of Animal cell culture, transgenic animals, pest & animal management, Molecular markers and regulations about the use of Biotechnology.To study the downstream processes for product recovery in fermentation
PO5	student will get an idea about the basic understanding about Bioinformatics, tools, sequences, algorithms and the analysis of phylogenetic tree and will give an idea about the basic principles and techniques involved in plant cell culture and to understand the concepts of transformation and achievements of biotechnology in Plant systems.to understand the chemical nature and associated microbes of food and to understand the principles of food processing, preservation and manufacture.

COURSE :BIOCHEMISTRY SUB CODE :P16BT13
COURSE OUTCOME

CO1	Chemical basis of life and composition of living matter. Biomolecules - chemical composition and bonding. Properties of water, acids, gases and buffer. pH, ionization and hydrophobicity
CO2	Amino acids - Structure and functional group, properties. Biosynthesis, types, properties and metabolism of amino acids. Proteins - Peptides and covalent structure of proteins.Enzyme-Nomenclature, classification, properties, structure and functional relationship. Enzyme catalysis and general principles of catalysis.
CO3	Carbohydrates - Structure and classification. Sugars - mono, di, and polysaccharides, chemical composition and bonding.Glycolysis, Kreb's cycle, Gluconeogenesis and HMP pathway.Lipids - Structure, classification and properties. Lipid metabolism. Oxidation - Fatty acids and cholesterol. Biosynthesis of lipids.
CO4	Nucleic acids - Structure, diversity and function. Sequencing of nucleic acids. Brief overview of central dogma.Vitamins - Classification and derivatives. Secondary metabolites from plants.
CO5	Bioenergetics - basic principles, equilibrium and concept of free energy, redox potential and their applications. Coupled processes - process of photosynthesis.

PO → CO↓	PO1	PO2	PO3	PO4	PO5
CO1	2	3	2	2	1
CO2	2	3	3	2	2
CO3	2	3	1	3	1
CO4	3	3	2	2	2
CO5	3	3	3	3	2
AVERAGE	**2.4**	**3**	**2.2**	**2.4**	**1.6**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	P20443402	ANTONY. A	4	4	5	5	5	22	88
2	P20443403	ARAVIND KUMAR. S	4	4	5	5	5	23	92
3	P20443404	DEVENDRAN. S	4	5	5	5	5	24	96
4	P20443405	MADHAN BABU	4	4	5	5	5	23	92
5	P20443406	KARTHICK. S	3	4	5	5	5	22	88
6	P20443407	MADHAN KUMAR. S	4	5	5	5	5	24	96
7	P20443408	MOHAMMED ISLAM. B	4	4	5	5	5	23	92
8	P20443409	NANDHINI. M	4	4	5	5	4	23	92
9	P20443410	PRIYA DHARSHINI. R	4	4	5	5	5	23	92
10	P20443411	PURUSHOTHAMAN. R	4	5	5	4	5	23	92
11	P20443412	RAJESH. V	4	4	5	5	5	23	92
12	P20443413	RAMANIKANTH. A	4	5	4	5	5	23	92
13	P20443414	RAMESH KUMAR. M	4	5	5	5	4	23	92
14	P20443415	SUVETHA. M	4	4	5	5	5	23	92
15	P20443416	VIGNESH. M	4	4	5	5	5	23	92
16	P20443417	VIJAY RAJ. L	3	4	5	5	5	23	92
17	P20443418	YOGA PRIYA. G	3	4	5	5	5	23	92
AVERAGE			3.8235	4.2941176	4.9411765	4.941	4.882		

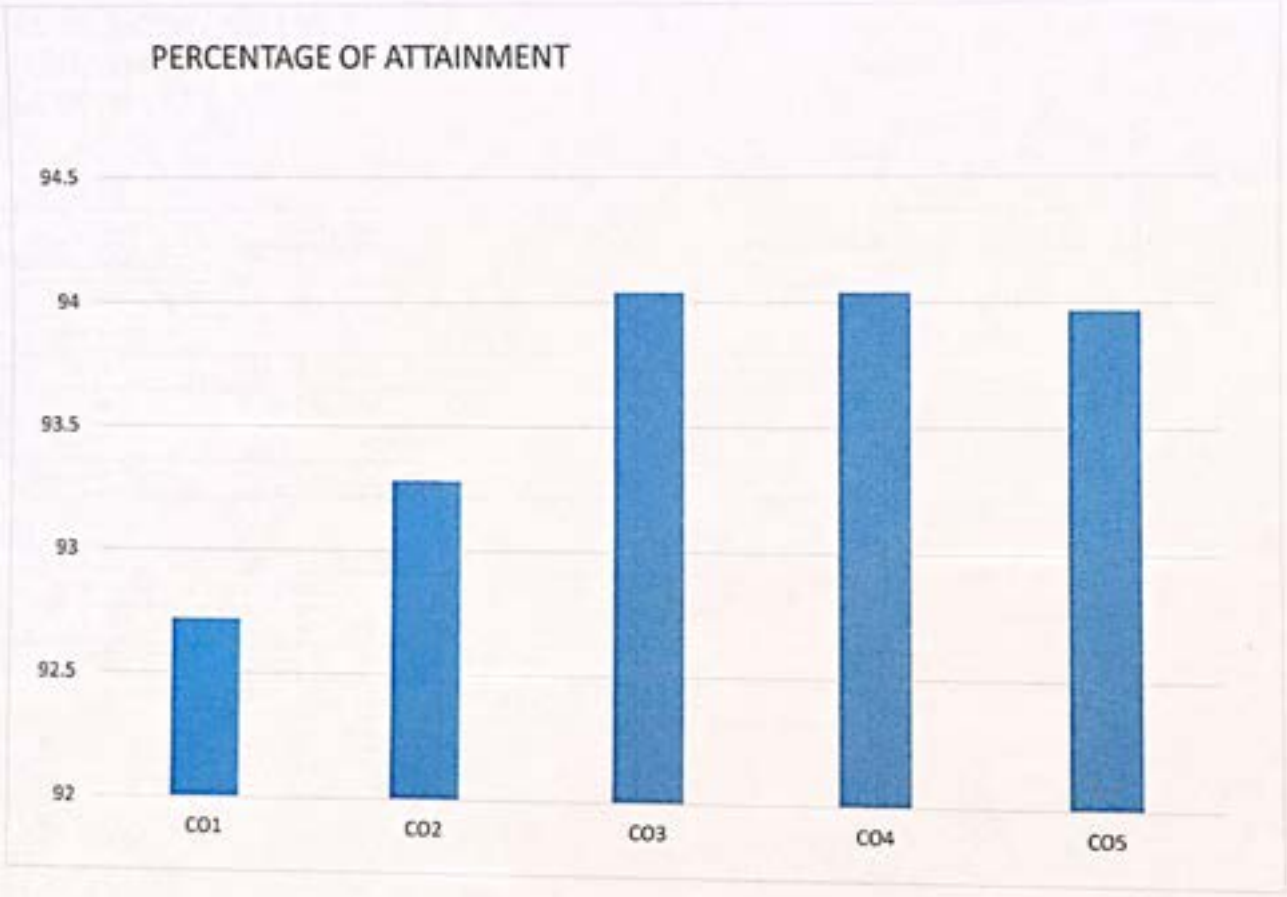
EXPECTED ATTAIMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	3.82	75	78.82	92.729412
CO2	4.29	75	79.29	93.282353
CO3	4.94	75	79.94	94.047059
CO4	4.94	75	79.94	94.047059
CO5	4.88	75	79.88	93.976471

COURSE ATTAINMENT FOR M.SC., BIOTECHNOLOGY

SUBJECT NAME :BIOCHEMISTRY
SUBJECT CODE :P16BT13
NO.OF STUDENTS:17

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	92.72
CO2	93.28
CO3	94.04
CO4	94.04
CO5	93.97

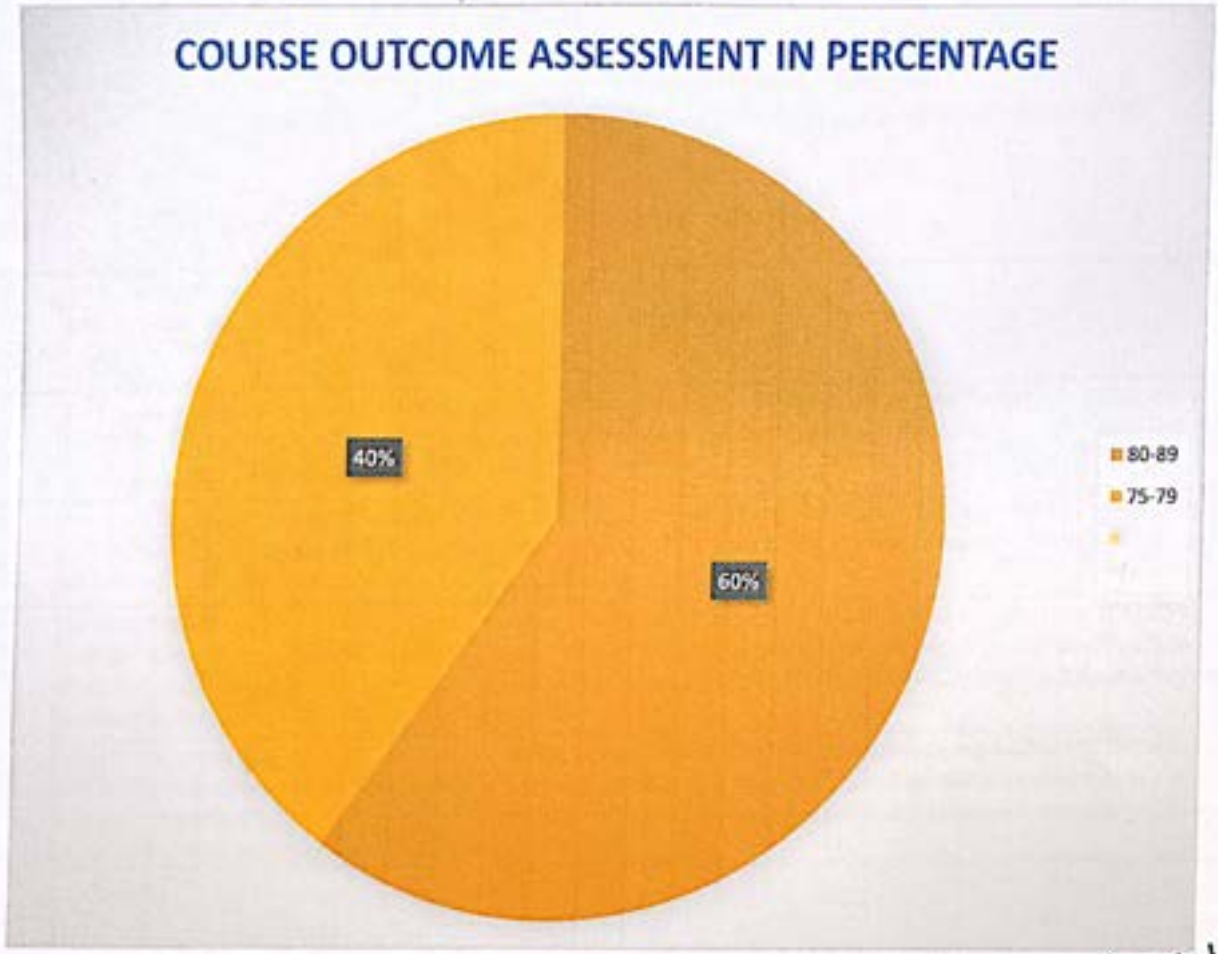


COURSE ATTAINMENT FOR M,.Sc., BIOTCHNOLOGY

SUBJECT NAME:BIOCHEMISTRY
SUBJECT CODE: P16BT13
NO. OF STUDENTS: 17

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO. OF STUDENTS	STATUS
90 -100	0	OUTSTANDING
80 - 89	8	EXCELLENT
70-79	9	VERY GOOD
60-69	0	GOOD
50-59	0	AVERAGE
BELOW 50	0	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
80-89	12.00%	EXCELLENT
75-79	8.00%	DISTINCTION



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ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME

PO1	To know a thorough knowledge about structure and function of cells, cellular signaling, protein trafficking, bio molecules and cellular development.
PO2	To collect, deals with various types of classification of microbes and also throws light on multifarious habitats of microbes and provides information about all the microbial cellular functions and various metabolic pathways in microbes.
PO3	To study the structure, properties and metabolism of different biomolecules and to know the interrelationships between different metabolisms.To understand the basic concepts of immune system, elucidate the immune response of humans to foreign substances and to study the modern techniques of immunology that help determine human protection.
PO4	To study the various principles underlying genetic engineering that forms the basis of rDNA technology and to study the methodologies, and in brief the applications and related issues of rDNAtechnology and understanding about the basics of Animal cell culture, transgenic animals, pest & animal management, Molecular markers and regulations about the use of Biotechnology.To study the downstream processes for product recovery in fermentation
PO5	student will get an idea about the basic understanding about Bioinformatics, tools, sequences, algorithms and the analysis of phylogenetic tree and will give an idea about the basic principles and techniques involved in plant cell culture and to understand the concepts of transformation and achievements of biotechnology in Plant systems.to understand the chemical nature and associated microbes of food and to understand the principles of food processing, preservation and manufacture.

COURSE :BIOSTATISTICS,BIOETHICS AND IPR SUB CODE :P16BTE3

COURSE OUTCOME

CO1	Introduction to Biostatistics – sample, population and statistical inference.statistical treatment to proportion data.
CO2	Bioethics-Ethics and the law issues - genetic engineering, stem cells, cloning, medical techniques, transhumanism and bioweapons.
CO3	Basics of patents, types of patents. Global scenario of patents and Indian position, patenting of biological materials.
CO4	Patent Filling and Infringement.Patent infringement - meaning, scope, litigation,
CO5	Biological safetycabinets, primary containment for biohazards, biosafety levels.

PO → CO↓	PO1	PO2	PO3	PO4	PO5
CO1	2	3	2	2	1
CO2	2	3	3	2	2
CO3	2	3	1	3	1
CO4	3	3	2	2	2
CO5	3	3	3	3	2
AVERAGE	**2.4**	**3**	**2.2**	**2.4**	**1.6**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	P20443402	ANTONY. A	4	4	5	5	5	23	88
2	P20443403	ARAVIND KUMAR. S	4	5	5	4	5	23	88
3	P20443404	DEVENDRAN. S	3	5	4	5	5	22	88
4	P20443405	MADHAN BABU	4	5	5	5	5	24	23
5	P20443406	KARTHICK. S	4	4	5	5	5	23	92
6	P20443407	MADHAN KUMAR. S	4	4	5	5	5	23	92
7	P20443408	MOHAMMED ISLAM. B	5	5	5	5	5	25	100
8	P20443409	NANDHINI. M	5	5	5	5	4	25	100
9	P20443410	PRIYA DHARSHINI. R	5	3	5	4	5	20	80
10	P20443411	PURUSHOTHAMAN. R	4	5	5	5	5	24	96
11	P20443412	RAJESH. V	3	5	5	5	5	22	88
12	P20443413	RAMANIKANTH. A	4	5	4	5	5	23	92
13	P20443414	RAMESH KUMAR. M	4	4	5	5	5	23	92
14	P20443415	SUVETHA. M	2	5	3	5	5	20	80
15	P20443416	VIGNESH. M	4	5	5	5	5	24	96
16	P20443417	VIJAY RAJ. L	3	5	5	5	5	23	92
17	P20443418	YOGA PRIYA. G	5	5	5	4	5	24	96
AVERAGE			3.9411765	4.6470588	4.7647059	4.8235294	4.9411765		

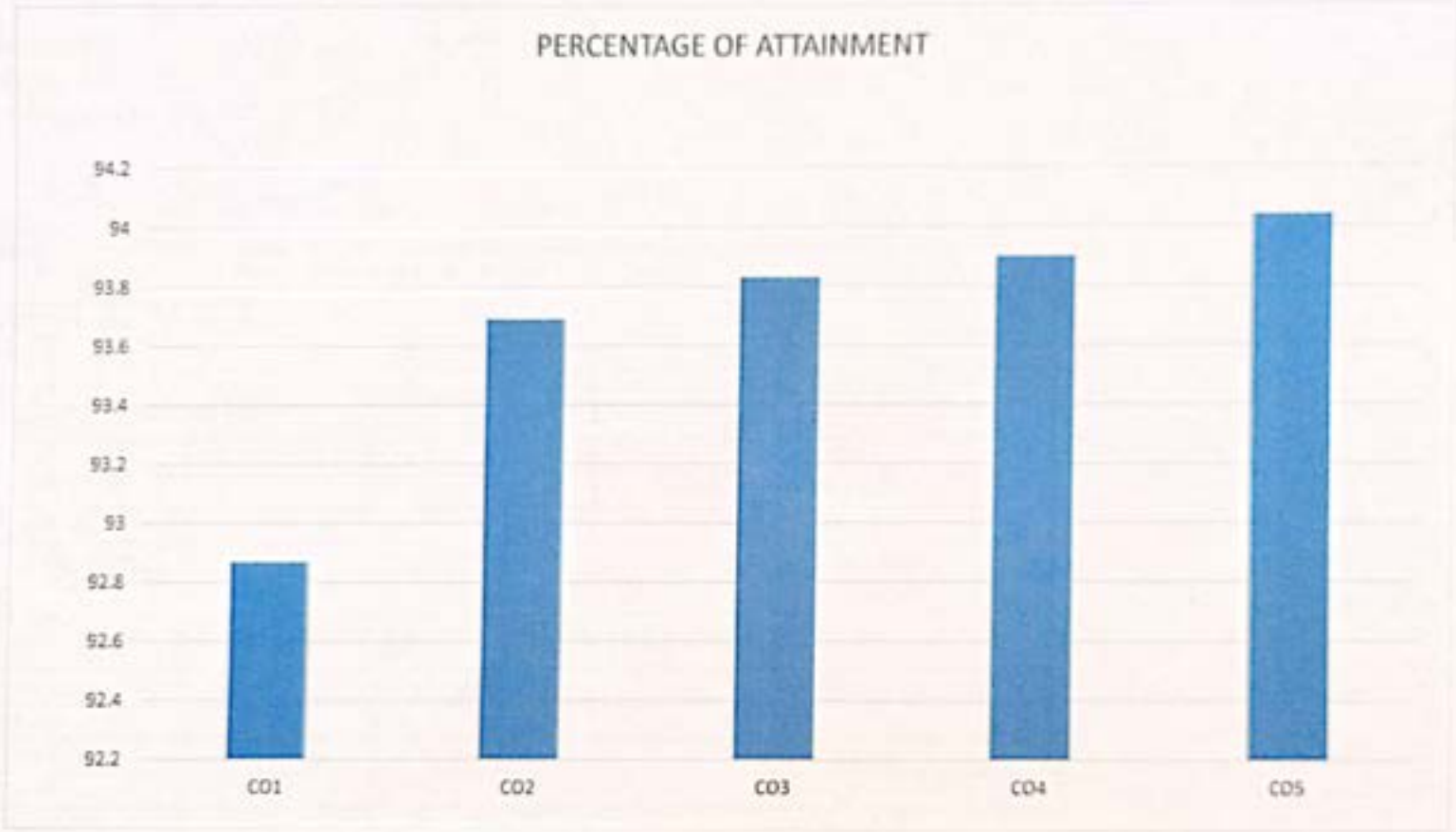
EXPECTED ATTAIMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	3.94	75	78.94	92.870588
CO2	4.64	75	79.64	93.694118
CO3	4.76	75	79.76	93.835294
CO4	4.82	75	79.82	93.905882
CO5	4.94	75	79.94	94.047059

COURSE ATTAINMENT FOR M.SC., BIOTECHNOLOGY

SUBJECT NAME :BIO STATISTICS ,BIOETHICS AND IPR
SUBJECT CODE :P16BTE3
NO.OF STUDENTS:17

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	92.87
CO2	93.69
CO3	93.83
CO4	93.9
CO5	94.04

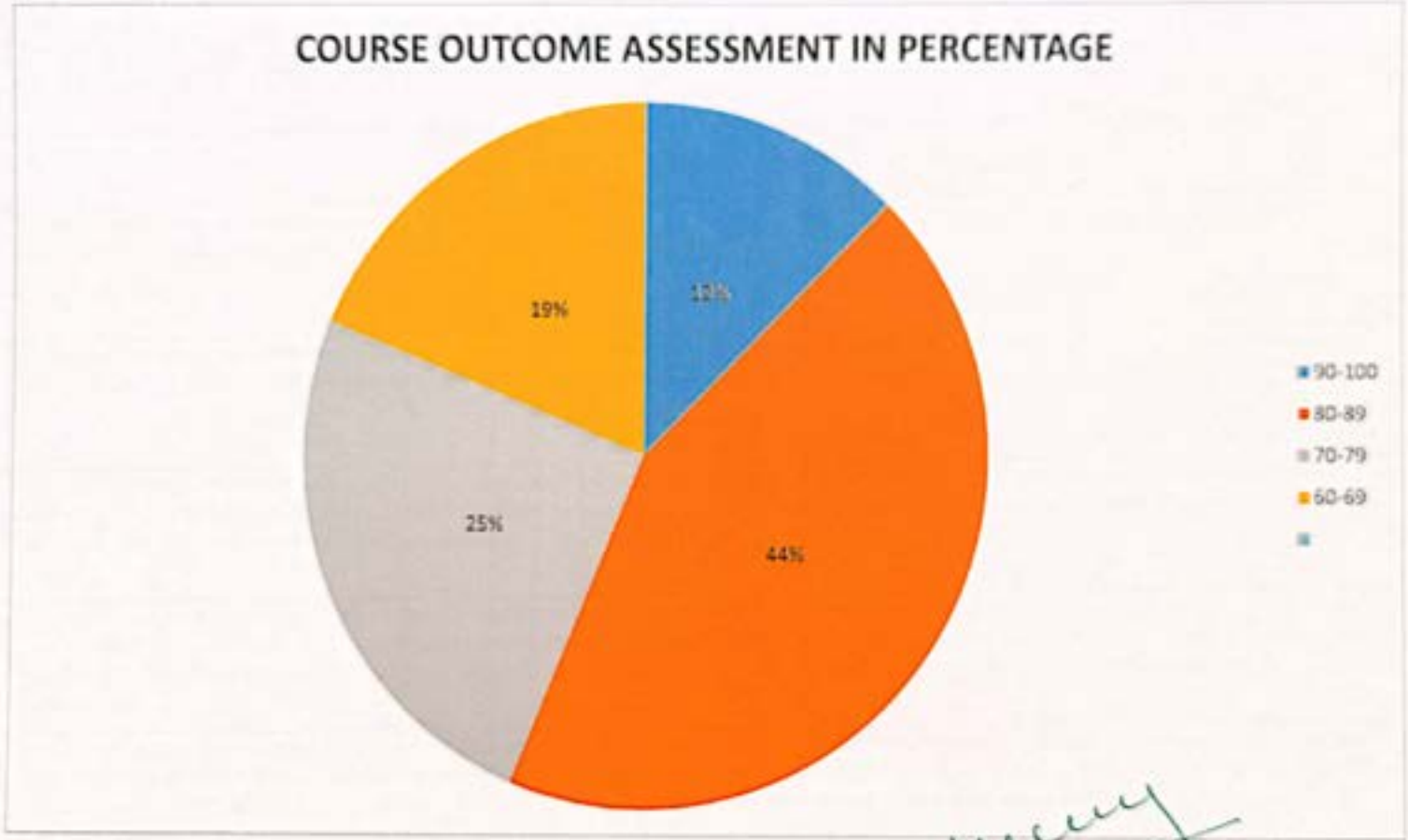


COURSE ATTAINMENT FOR M.Sc., BIOTCHNOLOGY

SUBJECT NAME:BIOSTATISTICS,BIOETHICS AND IPR
SUBJECT CODE: P16BTE3
NO. OF STUDENTS: 17

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO. OF STUDENTS	STATUS
90 -100	2	OUTSTANDING
80 - 89	7	EXCELLENT
70-79	4	DISTINCTION
60-69	3	GOOD
50-59	0	AVERAGE
BELOW 50	0	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
90-100	11.76%	OUTSTANDING
80-89	41.17%	EXCELLENT
70-79	23.52%	DISTINCTION
60-69	17.64%	AVERAGE



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THANJAVUR-5
PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME

PO1	To know a thorough knowledge about structure and function of cells, cellular signaling, protein trafficking, bio molecules and cellular development.
PO2	To collect, deals with various types of classification of microbes and also throws light on multifarious habitats of microbes and provides information about all the microbial cellular functions and various metabolic pathways in microbes.
PO3	To study the structure, properties and metabolism of different biomolecules and to know the interrelationships between different metabolisms.To understand the basic concepts of immune system, elucidate the immune response of humans to foreign substances and to study the modern techniques of immunology that help determine human protection.
PO4	To study the various principles underlying genetic engineering that forms the basis of rDNA technology and to study the methodologies, and in brief the applications and related issues of rDNAtechnology and understanding about the basics of Animal cell culture, transgenic animals, pest & animal management, Molecular markers and regulations about the use of Biotechnology.To study the downstream processes for product recovery in fermentation
PO5	student will get an idea about the basic understanding about Bioinformatics, tools, sequences, algorithms and the analysis of phylogenetic tree and will give an idea about the basic principles and techniques involved in plant cell culture and to understand the concepts of transformation and achievements of biotechnology in Plant systems.to understand the chemical nature and associated microbes of food and to understand the principles of food processing, preservation and manufacture.

COURSE :PLANT BIOTECHNOLOGY SUB CODE :P16BT31

COURSE OUTCOME

CO1	Basics of Plant Tissue culture-Plant tissue culture techniques. In-vitro pollination and fertilization. Embryo culture and its applications.
CO2	Protoplast – Culture & Genetic Manipulation
CO3	Plant Transgenesis - Agrobacterium mediated gene transfer, Agrobacterium based vectors (Tiplasmids and Ri plasmids), viral vectors and their applications.
CO4	Transgenic plants -Genetically modified foods - application, future applications, ecological impact of transgenic plants.
CO5	Plant Molecular Biology Techniques-. DNA finger printing in plants. Marker assisted selection (MAS) for crop improvement.

PO →	PO1	PO2	PO3	PO4	PO5
CO1	2	3	2	2	1
CO2	2	3	3	2	2
CO3	2	3	1	3	1
CO4	3	3	2	2	2
CO5	3	3	3	3	2
AVERAGE	**2.4**	**3**	**2.2**	**2.4**	**1.6**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	P20443402	ANTONY. A	4	5	5	5	5	24	88
2	P20443403	ARAVIND KUMAR. S	4	5	5	5	5	24	88
3	P20443404	DEVENDRAN. S	3	4	4	5	5	21	88
4	P20443405	MADHAN BABU	3	5	5	5	5	23	24
5	P20443406	KARTHICK. S	4	4	5	5	5	23	92
6	P20443407	MADHAN KUMAR. S	4	4	5	5	5	23	92
7	P20443408	MOHAMMED ISLAM. B	4	5	5	5	5	25	100
8	P20443409	NANDHINI. M	5	5	5	5	5	25	100
9	P20443410	PRIYA DHARSHINI. R	4	4	4	5	5	22	88
10	P20443411	PURUSHOTHAMAN. R	4	5	5	5	5	24	96
11	P20443412	RAJESH. V	4	4	4	5	5	22	88
12	P20443413	RAMANIKANTH. A	4	5	5	5	5	24	96
13	P20443414	RAMESH KUMAR. M	2	3	5	5	5	20	80
14	P20443415	SUVETHA. M	4	5	5	5	5	24	96
15	P20443416	VIGNESH. M	5	5	5	5	5	25	100
16	P20443417	VIJAY RAJ. L	3	4	5	5	5	22	88
17	P20443418	YOGA PRIYA. G	5	5	5	5	5	25	100
AVERAGE			3.8823529	4.5294118	4.8235294	5	5		

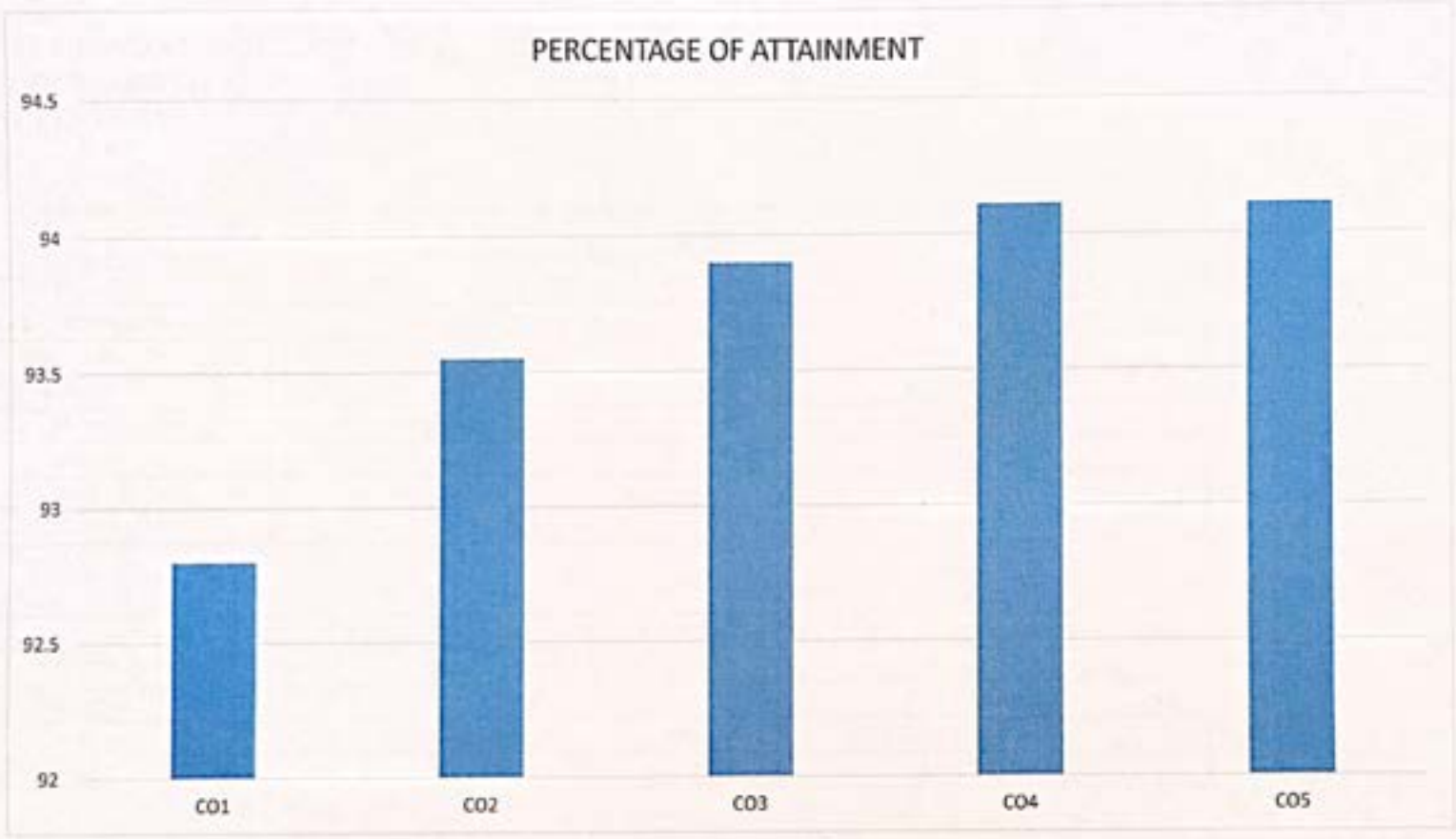
EXPECTED ATTAIMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	3.88	75	78.88	92.8
CO2	4.52	75	79.52	93.552941
CO3	4.82	75	79.82	93.905882
CO4	5	75	80	94.117647
CO5	5	75	80	94.117647

COURSE ATTAINMENT FOR M.SC., BIOTECHNOLOGY

SUBJECT NAME :PLANT BIOTECHNOLOGY
SUBJECT CODE :P16BT31
NO.OF STUDENTS:17

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	92.8
CO2	93.55
CO3	93.9
CO4	94.11
CO5	94.11



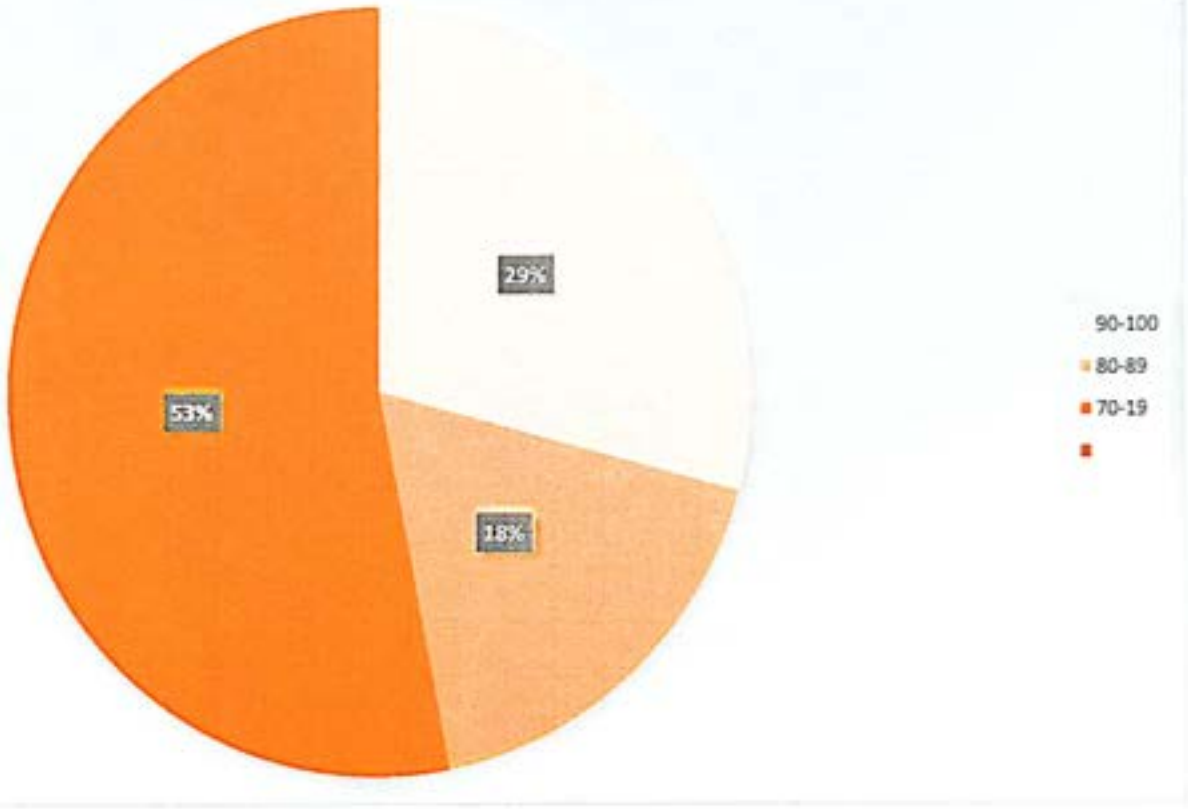
COURSE ATTAINMENT FOR M.Sc., BIOTCHNOLOGY

SUBJECT NAME:PLANT BIOTECHNOLOGY
SUBJECT CODE: P16BT31
NO. OF STUDENTS: 17

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO. OF STUDENTS	STATUS
90 -100	5	OUTSTANDING
80 - 89	3	EXCELLENT
70-79	9	DISTINCTION
60-69	0	GOOD
50-59	0	AVERAGE
BELOW 50	0	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
90-100	29.11%	EXCELLENT
80-89	17.64%	DISTINCTION
70-19	52.94%	AVERAGE

COURSE OUTCOME ASSESSMENT IN PERCENTAGE



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PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME

PO1	To know a thorough knowledge about structure and function of cells, cellular signaling, protein trafficking, bio molecules and cellular development.
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COURSE :ANIMAL BIOTECHNOLOGY SUB CODE :P16BT32

COURSE OUTCOME

CO1	Animal Cell, Tissue and Organ Culture-Transformation of animal cells – Cloning vectors – Restriction Endonucleases, expression vectors – RTPCR - animal viral vectors and yeast vectors.
CO2	Transgenic Animals-Development and uses - mice, cattle, goat, fish and sheep and transgenic pets. Tendered meat production.
CO3	Pest and Animal Management-Biotechnological approach to the production of live feed.
CO4	Molecular Markers-Use of nucleic acid probes and antibodies in clinical diagnosis and tissue typing.
CO5	Regulating the use of Biotechnology-Regulating DNA technology – DNA barcoding. Regulating food and food ingredients. Human gene therapy.

PO →	PO1	PO2	PO3	PO4	PO5
CO1	2	3	2	2	1
CO2	2	3	3	2	2
CO3	2	3	1	3	1
CO4	3	3	2	2	2
CO5	3	3	3	3	2
AVERAGE	**2.4**	**3**	**2.2**	**2.4**	**1.6**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	P20443402	ANTONY. A	4	5	5	5	5	24	88
2	P20443403	ARAVIND KUMAR. S	4	5	5	5	5	24	88
3	P20443404	DEVENDRAN. S	3	5	5	5	5	23	88
4	P20443405	MADHAN BABU	4	5	5	5	5	24	88
5	P20443406	KARTHICK. S	4	4	5	5	5	23	92
6	P20443407	MADHAN KUMAR. S	4	4	5	5	5	23	92
7	P20443408	MOHAMMED ISLAM. B	5	5	5	5	5	25	100
8	P20443409	NANDHINI. M	5	5	5	5	4	25	100
9	P20443410	PRIYA DHARSHINI. R	2	3	5	4	5	20	80
10	P20443411	PURUSHOTHAMAN. R	4	5	5	5	5	24	96
11	P20443412	RAJESH. V	3	3	5	5	5	21	84
12	P20443413	RAMANIKANTH. A	4	5	5	5	5	24	96
13	P20443414	RAMESH KUMAR. M	4	4	5	5	5	23	92
14	P20443415	SUVETHA. M	2	5	3	5	5	20	80
15	P20443416	VIGNESH. M	4	5	5	5	5	24	96
16	P20443417	VIJAY RAJ. L	3	5	5	5	5	23	92
17	P20443418	YOGA PRIYA. G	5	5	5	5	5	25	100
AVERAGE			3.7647059	4.5882353	4.8823529	4.9411765	4.9411765		

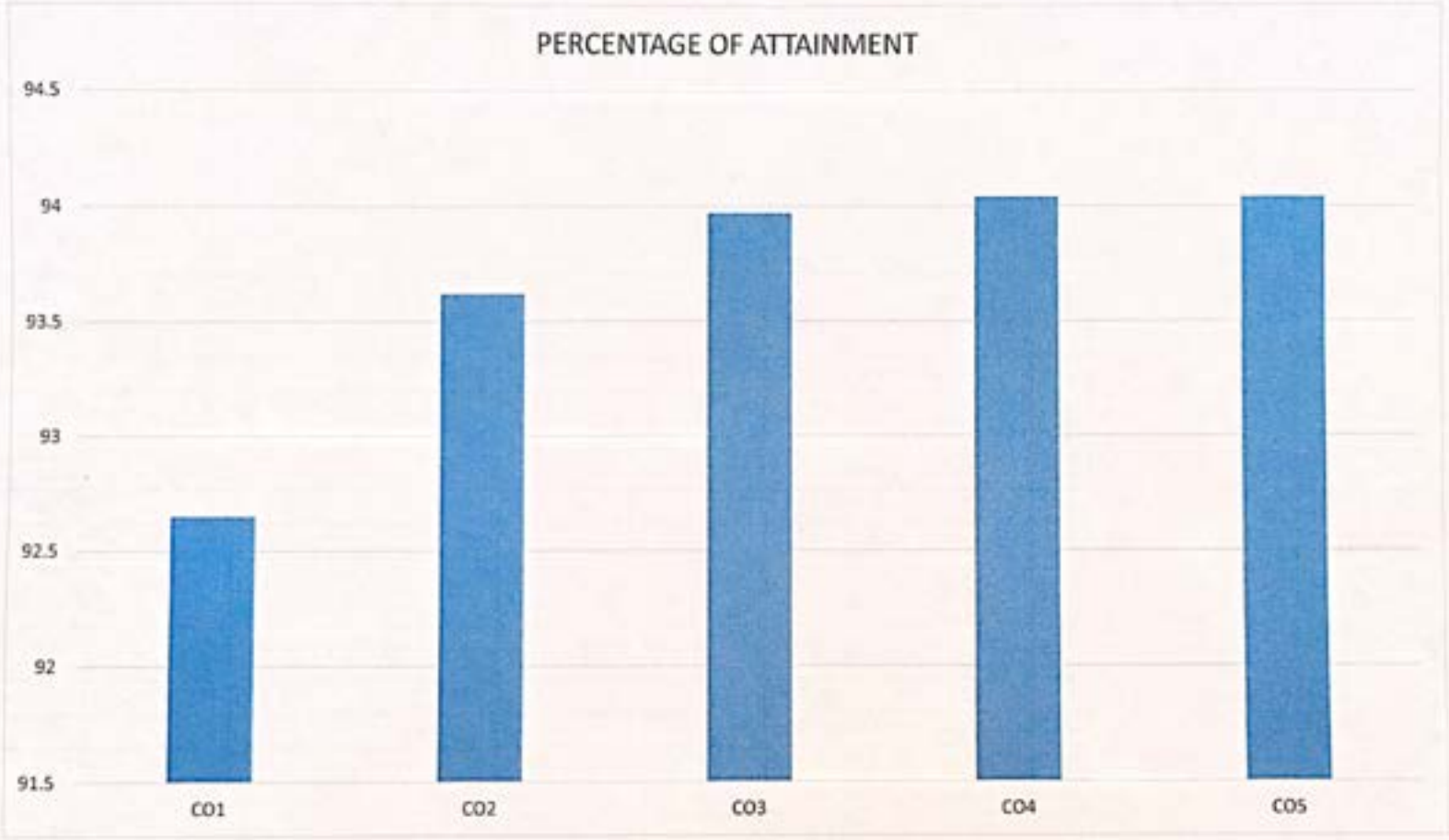
EXPECTED ATTAIMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	3.76	75	78.76	92.658824
CO2	4.58	75	79.58	93.623529
CO3	4.88	75	79.88	93.976471
CO4	4.94	75	79.94	94.047059
CO5	4.94	75	79.94	94.047059

COURSE ATTAINMENT FOR M.SC., BIOTECHNOLOGY

SUBJECT NAME :ANIMAL BIOTECHNOLOGY
SUBJECT CODE :P16BT32
NO.OF STUDENTS:17

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	92.65
CO2	93.62
CO3	93.97
CO4	94.04
CO5	94.04

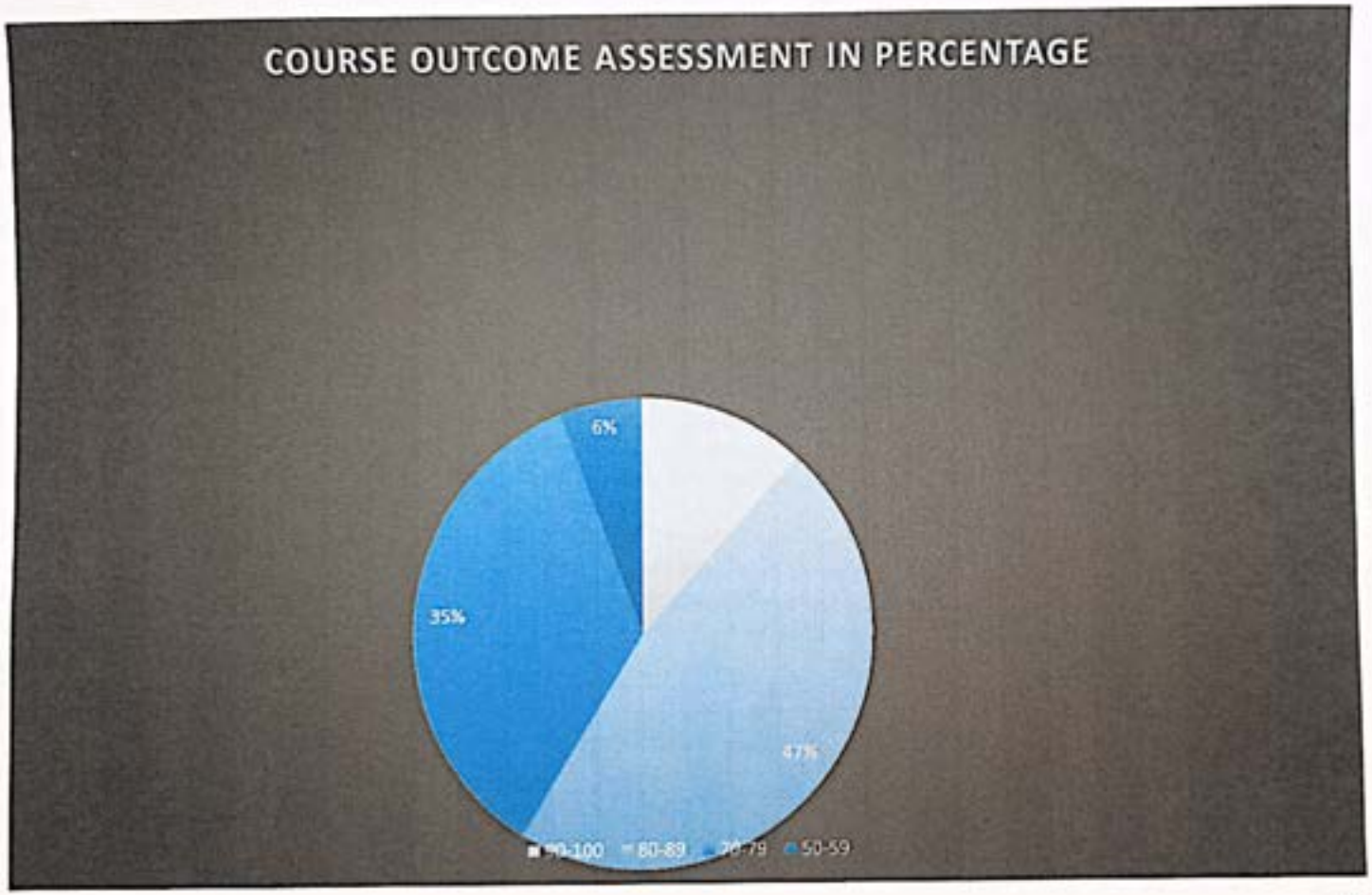


COURSE ATTAINMENT FOR M.Sc., BIOTCHNOLOGY

SUBJECT NAME:ANIMAL BIOTECHNOLOGY
SUBJECT CODE: P16BT32
NO. OF STUDENTS: 17

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO. OF STUDENTS	STATUS
90 -100	2	OUTSTANDING
80 - 89	8	EXCELLENT
70-79	6	DISTINCTION
60-69	0	GOOD
50-59	1	AVERAGE
BELOW 50	0	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
90-100	11.76%	OUTSTANDING
80-89	47.05%	EXCELLENT
70-79	35.29%	DISTINCTION
50-59	5.88%	AVERAGE



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PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME M.Sc BIOTECHNOLOGY

PO1	To know a thorough knowledge about structure and function of cells, cellular signaling, protein trafficking, bio molecules and cellular development.
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PO5	Student will get an idea about the basic understanding about Bioinformatics, tools, sequences, algorithms and the analysis of phylogenic tree.

COURSE :LAB IN CELL BIOLOGY,MICROBIOLOGY,BIOCHEMISTRY AND MOLECULAR BIOLOGY COURSE CODE:P16BT15P

COURSE OUTCOME

CO1	Prokaryotic & eukaryotic cell - structure observation. Cell count - prokaryotic & eukaryotic.Types of cells - parenchyma, collenchyma, sclerenchyma, columnar epithelium,squamous epithelium. Leishman staining
CO2	Total (WBC, RBC) & differential count of human blood cells.Separation of Peripheral Blood Mononuclear Cells from blood.Osmosis and Tonicity.Cell Division - Cytological preparations of tissues (onion) for mitosis..Cell Division - Cytological preparations of tissues (Tradescantia) for meiosis.Cell Division - Binary fission of yeast . Polytene and diplotene chromosomes.Temporary and permanent slide preparation.Sub-cellular fractionation.
CO3	Microscopy - Observation of different microbes.Sterilization techniques – physical, chemical, filtration and irradiation techniques. Preparation of media - simple media and complex media. Isolation of microorganisms from air, soil & water - spread plate, pour plate, streak plate technique. Staining methods – simple, differential, acid - fast & negative Identification - Macroscopic, microscopic, biochemical, serological & generic level. Bacterial growth curve - colony counting, cell counting, spectrophotometric method. Preservation & maintenance. Antibiotic sensitivity test –
CO4	Preparation of solutions – Molar, Normal, Percentage, Stock, Working etc. Preparation of buffers – PBS, Tris and Acetate buffer.Identification of sugars - reducing & non-reducing sugars.Estimation of mono saccharine (glucose) by Nelson, Somogi method & polysaccharide (starch) by iodine method. Estimation of amino acid by Ninhydrin method. Estimation of protein by Lowry's method and Barford Method Estimation of nucleic acids by absorbance at 260 nm and hyperchromic effect.Enzyme assay: Estimation of salivary amylase from saliva & phosphatase from potato.
CO5	Isolation and purification of genomic DNA from prokaryotes. Isolation and purification of genomic DNA from eukaryotes. Isolation and purification of plasmid DNAObservation of DNA - Agarose gel electrophoresis.Quantification of nucleic acids – DNA & RNA – Chemical and UV method. Separation of protein by SDS PAGE Protein staining techniques. Amido black, coomosic brilliant blue & AgNO3. Transfer of protein - Western blot. Observation of transferred protein – staining (Indian ink), immunoblot.Bacterial mutagenesis – physical & chemical. Preparation of E. coli competent cells.Transformation of bacteria – CaCl2 method.Bacterial conjugation.Transduction

PO →	PO1	PO2	PO3	PO4	PO5
CO1	3	2	1	1	1
CO2	1	1	2	2	1
CO3	2	2	3	2	3
CO4	3	1	2	1	3
CO5	3	2	2	3	2
AVERAGE	**2.4**	**1.6**	**2**	**1.8**	**2**

Near New Bus Stand THANJAVUR-6

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ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME M.Sc BIOTECHNOLOGY

PO1	To know a thorough knowledge about structure and function of cells, cellular signaling, protein trafficking, bio molecules and cellular development.
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COURSE :LAB IN CELL BIOLOGY,MICROBIOLOGY,BIOCHEMISTRY AND MOLECULAR BIOLOGY COURSE CODE:P16BT15P

COURSE OUTCOME

CO1	Prokaryotic & eukaryotic cell - structure observation. Cell count - prokaryotic & eukaryotic.Types of cells - parenchyma, collenchyma, sclerenchyma, columnar epithelium,squamous epithelium. Leishman staining
CO2	Total (WBC, RBC) & differential count of human blood cells.Separation of Peripheral Blood Mononuclear Cells from blood.Osmosis and Tonicity.Cell Division - Cytological preparations of tissues (onion) for mitosis..Cell Division - Cytological preparations of tissues (Tradescantia) for meiosis.Cell Division - Binary fission of yeast . Polytene and diplotene chromosomes.Temporary and permanent slide preparation.Sub-cellular fractionation.
CO3	Microscopy - Observation of different microbes.Sterilization techniques – physical, chemical, filtration and irradiation techniques. Preparation of media - simple media and complex media. Isolation of microorganisms from air, soil & water - spread plate, pour plate, streak plate technique. Staining methods – simple, differential, acid - fast & negative Identification - Macroscopic, microscopic, biochemical, serological & generic level. Bacterial growth curve - colony counting, cell counting, spectrophotometric method. Preservation & maintenance. Antibiotic sensitivity test –
CO4	Preparation of solutions – Molar, Normal, Percentage, Stock, Working etc. Preparation of buffers – PBS, Tris and Acetate buffer.Identification of sugars - reducing & non-reducing sugars.Estimation of mono saccharine (glucose) by Nelson, Somogi method & polysaccharide (starch) by iodine method. Estimation of amino acid by Ninhydrin method. Estimation of protein by Lowry's method and Barford Method Estimation of nucleic acids by absorbance at 260 nm and hyperchromic effect.Enzyme assay: Estimation of salivary amylase from saliva & phosphatase from potato.
CO5	Isolation and purification of genomic DNA from prokaryotes. Isolation and purification of genomic DNA from eukaryotes. Isolation and purification of plasmid DNAObservation of DNA - Agarose gel electrophoresis.Quantification of nucleic acids – DNA & RNA – Chemical and UV method. Separation of protein by SDS PAGE Protein staining techniques. Amido black, coomosic brilliant blue & AgNO3. Transfer of protein - Western blot. Observation of transferred protein – staining (Indian ink), immunoblot.Bacterial mutagenesis – physical & chemical. Preparation of E. coli competent cells.Transformation of bacteria – CaCl2 method.Bacterial conjugation.Transduction

PO →	PO1	PO2	PO3	PO4	PO5
CO1	3	2	1	1	1
CO2	1	1	2	2	1
CO3	2	2	3	2	3
CO4	3	1	2	1	3
CO5	3	2	2	3	2
AVERAGE	**2.4**	**1.6**	**2**	**1.8**	**2**

PRINCIPAL
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BHARATH COLLEGE OF SCIENCE AND MANAGEMENT
(UGC Recognized 2(f) & 12(B) Institution)
THANJAVUR-5
PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME M.Sc BIOTECHNOLOGY

PO1	To know a thorough knowledge about structure and function of cells, cellular signaling, protein trafficking, bio molecules and cellular development.
PO2	To collect, deals with various types of classification of microbes and also throws light on multifarious habitats of microbes and provides information about all the microbial cellular functions and various metabolic pathways in microbes.
PO3	To study the structure, properties and metabolism of different biomolecules and to know the interrelationships between different metabolisms.To understand the basic concepts of immune system, elucidate the immune response of humans to foreign substances and to study the modern techniques of immunology that help determine human protection.
PO4	To study the various principles underlying genetic engineering that forms the basis of rDNA technology and to study the methodologies, and in brief the applications and related issues of rDNA technology and understanding about the basics of Animal cell culture, transgenic animals, pest & animal management, Molecular markers and regulations about the use of Biotechnology.To study the downstream processes for product recovery in fermentation.
PO5	Student will get an idea about the basic understanding about Bioinformatics, tools, sequences, algorithms and the analysis of phylogenetic tree.

COURSE :LAB IN rDNA TECHNOLOGY & IMMUNOLOGY COURSE CODE:P16BT23P

COURSE OUTCOME

CO1	Isolation of plasmids – small & large scale. Size analysis of plasmids by agarose gel electrophoresis. Restriction digestion, ligation. Preparation of competent E.coli cells & transformation of E.coli with recombinantDNA. Selection methods (Blue white selection, insertional inactivation). Primer design and PCR amplification of β(beta)- galactosidase. Cloning of PCR product into pBR322. Introduction of cloned genes and analysis by SDS – PAGE.
CO2	Southern blotting. RFLP Analysis of 18s rRNA of the genome. Genetic diversity of Pseudomonas by RAPD. Reporter gene assay (GUS/ β(beta)- galactosidase). Northen blotting.
CO3	Basics - Bleeding, separation of serum, plasma. (Hands on). Precipitation techniques – Agar gel diffusion, counter immuno-eletrophoresis, single radial immuno-diffusion, rocket immuno-electrophoresis (Hands on). Agglutination techniques Blood grouping and Rh factor; Latex agglutination – RF, ASLO, HBsAg and CRP (Hands on); Heme agglutination - RPHA / IHA (Hands on) Labeled Assays Enzyme Linked Immunosorbent Assay (ELISA) (Hands on) Immunoflouresence (IF) (Hands on). Immunohistochemistry (IH) (Demonstration). Immunoperoxidase (PAP) staining. Radioimmunoassays (RIA) (Theory).
CO4	Preparation of tissue culture media. Separation of Human PBMC & analysis. Types of culture. Maintenance of culture
CO5	Breeding and maintenance of experimental animals. Surgical and experimental techniques – thymectomy, spleenectomy and harvesting of lymphnodes. Isolation and enumeration of immune reactive cells. Immunization techniques and use of adjuvants. Choice of animals, form and dose of antigen, route of immunization, immunization

PO→ CO↓	PO1	PO2	PO3	PO4	P05
CO1	3	3	4	4	4
CO2	4	4	4	4	4
CO3	4	3	4	3	4
CO4	3	4	4	3	4
CO5	4	4	4	4	4
Average	3.6	3.6	4	3.6	4

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PO→ CO↓	PO1	PO2	PO3	PO4	P05
CO1	3	3	4	4	4
CO2	4	4	4	4	4
CO3	4	3	4	3	4
CO4	3	4	4	3	4
CO5	4	4	4	4	4
Average	3.6	3.6	4	3.6	4

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ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME B.Sc.,BIOTECHNOLOGY

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PO5	This course is designed to give an idea about the avenues of exploiting microbes and to study the downstream processes for product recovery in fermentation.Microbes in food processing and production,Fermented foods and beverages.

COURSE : BASIC MICROBIOLOGY SUB CODE:16SACMB1

CO1	Establishment of fields of medical microbiology.Immunology and environmental microbiology.
CO2	Whittaker's five kingdom.Diversity of Microbial world.
CO3	History of phycology.ultra structure, pigments, flagella.cycle of Chlamydomonas and Spirogyra.
CO4	Historical developments in the field of Mycology .Fungal cell ultra-structure.Sexual and asexual reproduction.
CO5	Protozoa, Viruses, Viroids and Prions.TMV, poliovirus.

PO →	PO1	PO2	PO3	PO4	PO5
CO1	3	2	2	2	1
CO2	3	2	3	3	2
CO3	3	2	1	2	1
CO4	3	2	1	2	2
CO5	3	3	3	3	1
AVERAGE	**3**	**2.2**	**2**	**2.4**	**1.4**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

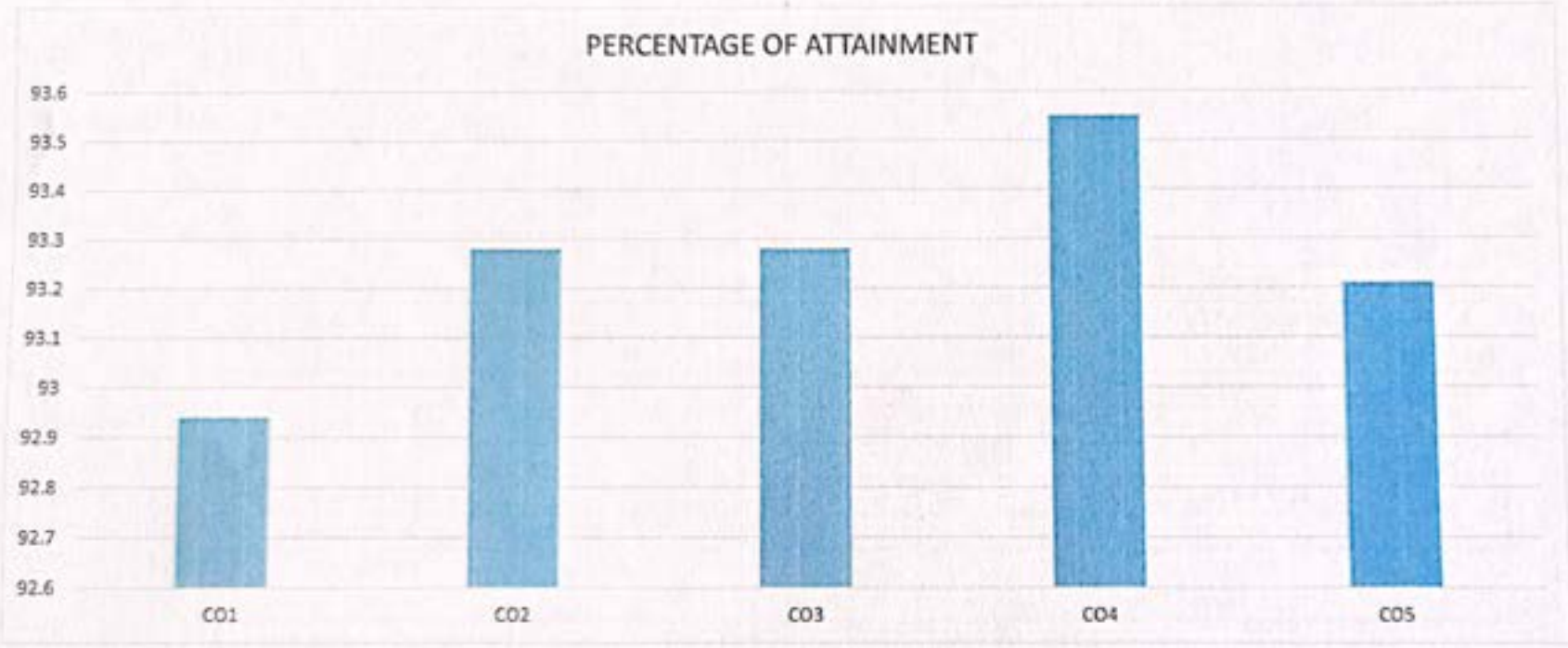
SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	CB21S078364	ABINAYA.V	4	4	4	5	5	22	88
2	CB21S078365	ARTHI.M	4	5	5	5	5	24	96
3	CB21S078366	ASHWIN.M	3	3	4	5	4	19	76
4	CB21S078367	DHANUSH.T	4	4	3	4	4	19	76
5	CB21S078368	INDRA LAKHA.K	4	4	4	5	5	22	88
6	CB21S078369	KALAINITHI.K	5	5	5	5	4	24	96
7	CB21S078370	KAVIYA.S	4	5	5	4	4	23	92
8	CB21S078371	MAHA BARATHI.M	4	4	4	5	5	23	92
9	CB21S078372	MEGNA.T	4	5	5	5	5	24	96
10	CB21S078373	NAVEENKUMAR.M	4	4	4	4	4	20	80
11	CB21S078374	PRAVEENKUMAR.S	4	4	4	4	4	20	80
12	CB21S078375	PRAVEEN KUMAR.T	4	4	4	4	4	20	80
13	CB21S078376	SANTHOSHKUMAR.S	3	4	4	4	4	19	76
14	CB21S078377	SATHISHKUMAR.S	3	4	4	4	4	19	76
15	CB21S078378	SNEKA.S	5	5	5	5	4	24	96

16	CB21S078379	SURYA.S	4	4	4	4	3	19	76
17	CB21S078380	SUVITHRA.M	5	5	5	5	4	24	96
		AVERAGE	4	4.29	4.29	4.53	4.24		

EXPECTED ATTAIMENT IN EACH CO - 85%	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	4	75	79	92.94
CO2	4.29	75	79.29	93.28
CO3	4.29	75	79.29	93.28
CO4	4.52	75	79.52	93.55
CO5	4.23	75	79.23	93.21

COURSE ATTAINMENT FOR B.SC., BIOTECHNOLOGY
SUBJECT NAME : BASIC MICROBIOLOGY
SUBJECT CODE : 16SACMB1

NO.OF STUDENTS:	17
COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	92.94
CO2	93.28
CO3	93.28
CO4	93.55
CO5	93.21



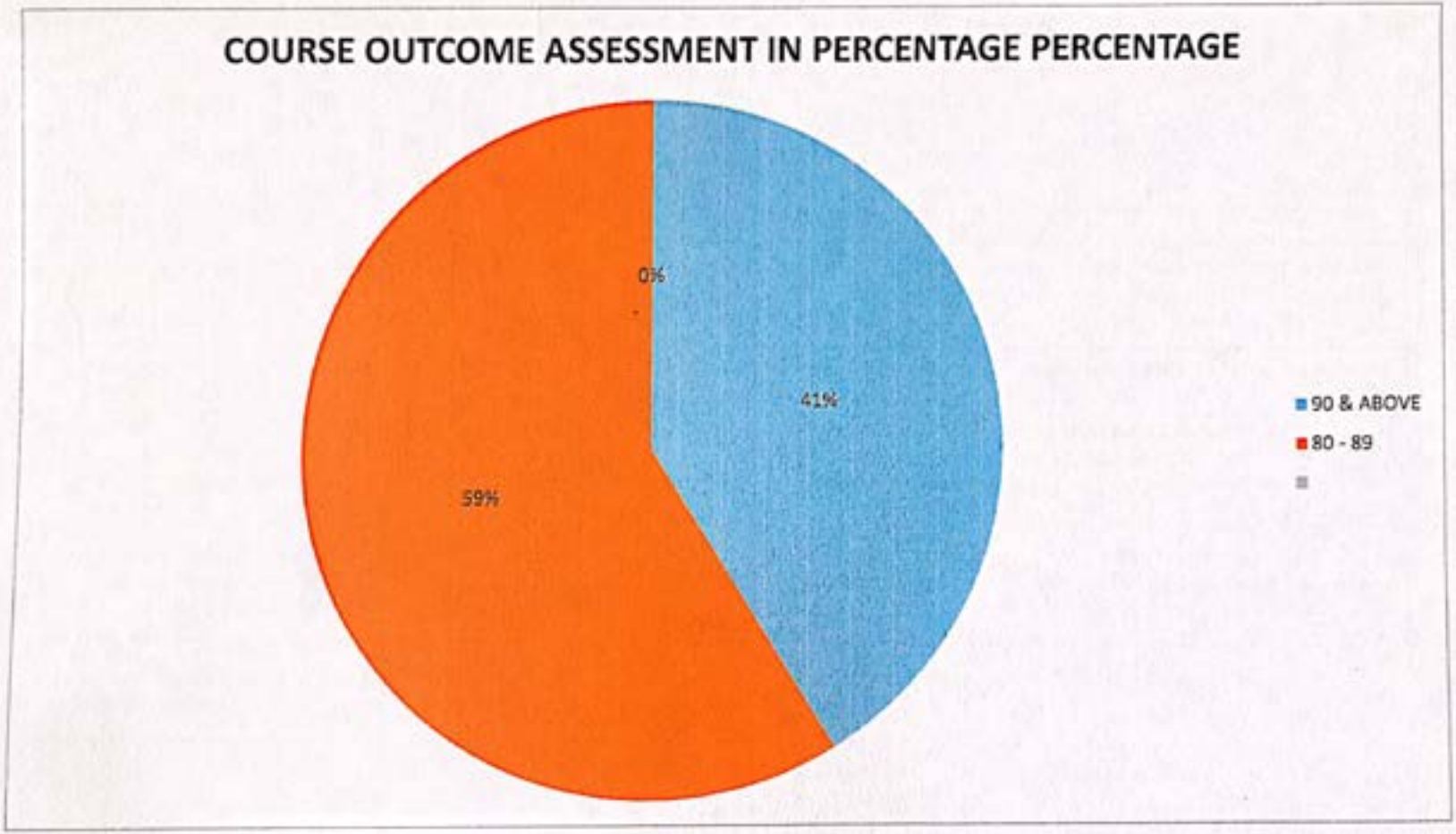
COURSE ATTAINMENT FOR B.Sc. BIOTECHNOLOGY

SUBJECT NAME: BASIC MICROBIOLOGY
SUBJECT CODE: 16SACMB1
NO. OF STUDENTS: 17

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO. OF STUDENTS	STATUS
90 & ABOVE	7	OUTSTANDING
80 - 89	10	EXCELLENT
70 - 79	0	DISTINCTION
60 - 69	0	VERY GOOD
50 - 59	0	GOOD
40 - 49	0	AVERAGE
BELOW 40	0	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
90 & ABOVE	41.17%	DISTINCTION
80 - 89	58.82%	VERY GOOD

COURSE OUTCOME ASSESSMENT IN PERCENTAGE PERCENTAGE



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PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME B.Sc.,BIOTECHNOLOGY

PO1	TheCell biology is the study of the structure and function of prokaryotic and eukaryotic cells. Functions of cell, its organelles, synthesis and function of macromolecules ,carbohydrate, protein, lipid, DNA & RNA and microscopic techniques to understand the cell structure. Basic of microbiology dealing types of microbes analyse medical microbiology.
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PO3	This courser is planned to basic knowledge on r DNA Technology,Blotting techques ,pharmaceutical products, Gene therapy.structure functions of biomolecules.Amino Acids and Proteins.Anatomy of the immune system.vaccinology-Clinical immunology.Classification of lipids.macro and micro minerals , Anatomy of the Immune System.Vaccinology,Clinical Immunology, Instruments in centrifugation, chromatography, electrophoresis, spectroscopy and crystallography.
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PO5	This course is designed to give an idea about the avenues of exploiting microbes and to study the downstream processes for product recovery in fermentation.Microbes in food processing and production,Fermented foods and beverages.

COURSE : APPLIEDMICROBIOLOGY SUB CODE:16SACMB2

CO1	Isolation, preservation and improvement of strains. Handling and development of inoculum for various fermentation process.
CO2	Microbial Energetic-Energy from inorganic compounds.Energy from hydrocarbons
CO3	Food Microbiology,Food poisoning – Food borne diseases.culture, microscopy and sampling methods.
CO4	Medical Microbiology,Infectious Diseases – viral, bacterial, fungal & protozoan.pathogenicity and laboratory diagnosis of Gram positive organisms
CO5	Environmental and Agricultural Microbiology.Waste management - waste water treatment, organic compost, biogas production.

PO → CO↓	PO1	PO2	PO3	PO4	PO5
CO1	3	2	2	2	1
CO2	3	2	3	3	2
CO3	3	2	1	2	1
CO4	3	2	1	2	2
CO5	3	3	3	3	1
AVERAGE	**3**	**2.2**	**2**	**2.4**	**1.4**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

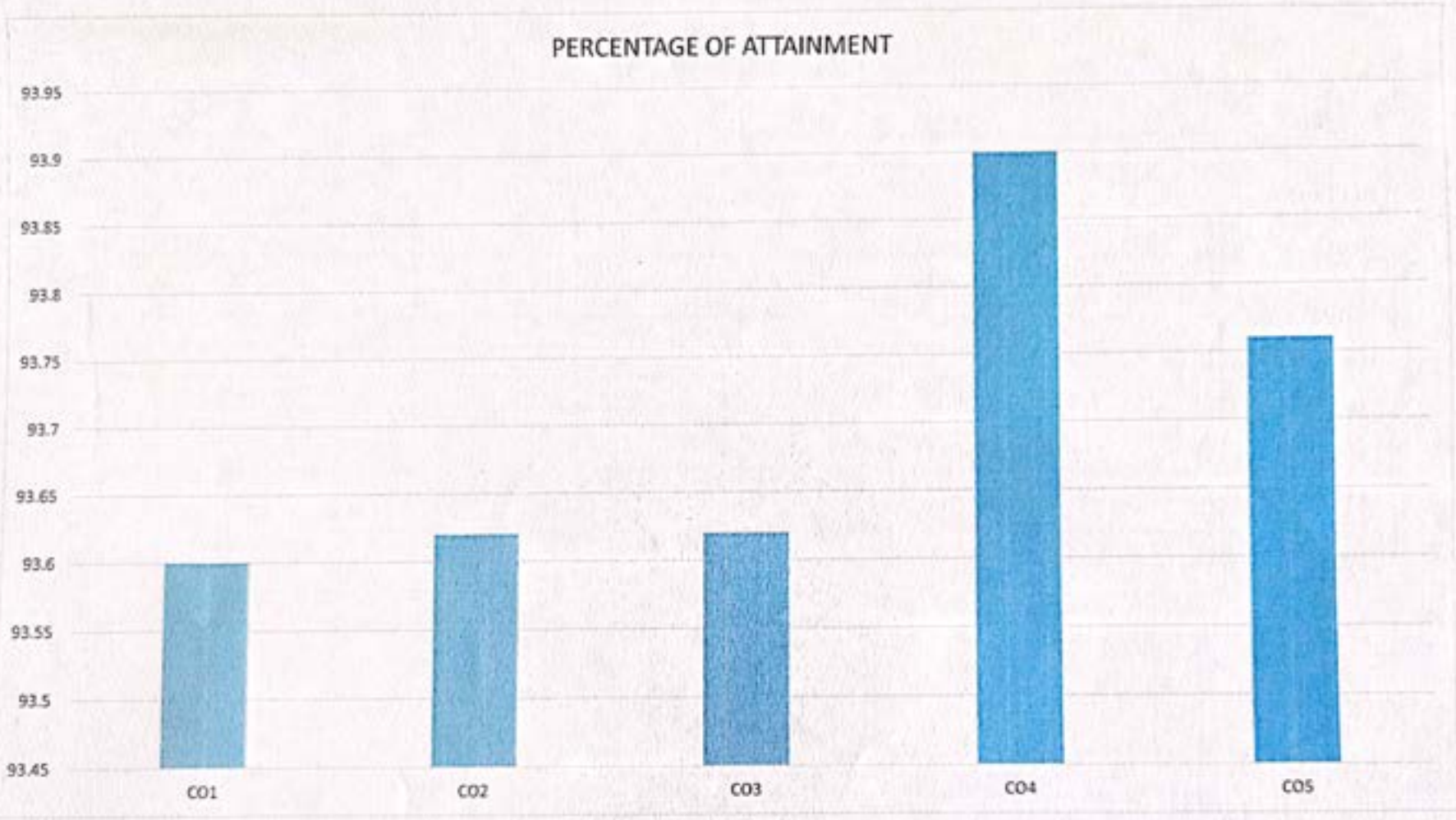
SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	CB21S078364	ABINAYA.V	4	4	4	5	5	23	92
2	CB21S078365	ARTHI.M	4	4	5	5	5	23	92
3	CB21S078367	DHANUSH.T	5	5	5	5	4	23	92
4	CB21S078368	INDRA LAKHA.K	5	5	5	5	5	24	96
5	CB21S078369	KALAINITHI.K	5	5	5	5	5	25	100
6	CB21S078370	KAVIYA.S	5	5	5	5	5	25	100
7	CB21S078371	MAHA BARATHI.M	5	5	5	5	5	25	100
8	CB21S078372	MEGNA.T	4	4	5	5	5	23	92
9	CB21S078373	NAVEENKUMAR.M	5	5	4	4	4	22	88
10	CB21S078374	PRAVEENKUMAR.S	4	4	4	5	5	22	88
11	CB21S078375	PRAVEEN KUMAR.T	4	4	4	5	5	22	88
12	CB21S078376	SANTHOSHKUMAR.S	4	4	4	5	5	22	88
13	CB21S078377	SATHISHKUMAR.S	5	5	4	4	4	22	88
14	CB21S078378	SNEKA.S	5	5	5	5	4	24	96
15	CB21S078379	SURYA.S	4	4	4	4	5	21	84

16	CB21S078380	SUVITHRA.M	5	5	5	5	5	25	100
		AVERAGE	4.56	4.56	4.56	4.81	4.75		

EXPECTED ATTAIMENT IN EACH CO - 85%	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	4.56	75	79.56	93.6
CO2	4.56	75	79.56	93.6
CO3	4.56	75	79.56	93.6
CO4	4.81	75	79.81	93.89
CO5	4.7	75	79.7	93.76

COURSE ATTAINMENT FOR B.SC., BIOTECHNOLOGY
SUBJECT NAME : APPLIED MICROBIOLOGY
SUBJECT CODE :16SACMB2
OF STUDENTS: 16

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	93.6
CO2	93.62
CO3	93.62
CO4	93.9
CO5	93.76

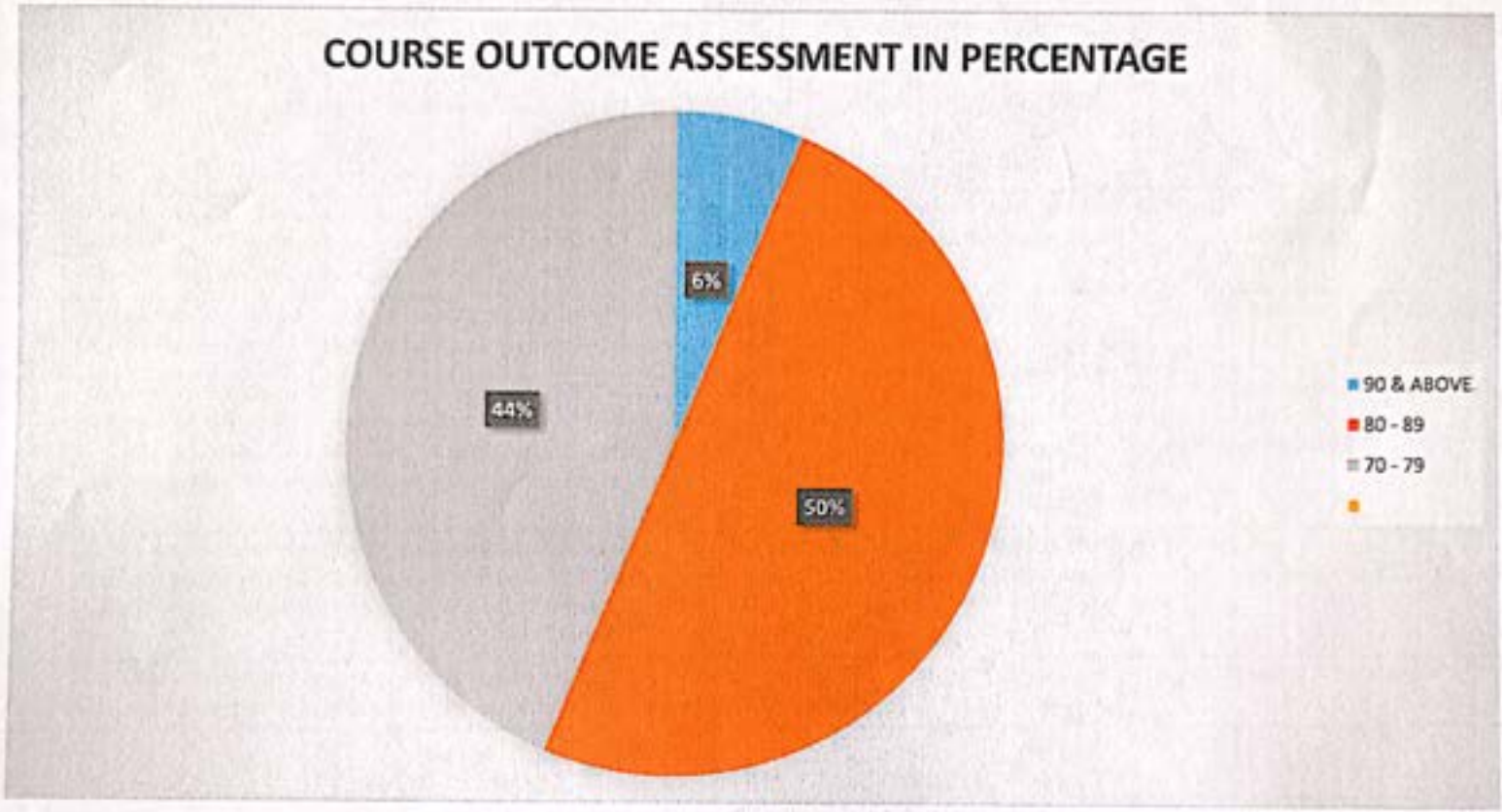


COURSE ATTAINMENT FOR B.Sc. BIOTECHNOLOGY

SUBJECT NAME: APPLIED MICROBIOLOGY
SUBJECT CODE: 16SACMB2
NO. OF STUDENTS: 16

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO. OF STUDENTS	STATUS
90 & ABOVE	1	OUTSTANDING
80 - 89	8	EXCELLENT
70 - 79	7	DISTINCTION
60 - 69	0	VERY GOOD
50 - 59	0	GOOD
40 - 49	0	AVERAGE
BELOW 40	0	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
90 & ABOVE	6.25%	OUTSTANDING
80 - 89	50.00%	EXCELLENT
70 - 79	43.75%	DISTINCTION



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COURSE : MOLECULAR BIOLOGY SUB CODE:16SCCBT2

CO1	Nucleus & Chromosomes,3 dimensional organization of cytoskeleton,chromatin,allele, loci, gene. Nuclear division.
CO2	Organization of Chromosomes,chromosomal abnormalities and qualitative inheritance.Somatic cell genetics.
CO3	Central dogma of Molecular Biology,Transcription – Prokaryotic & Eukaryotic Transcription.Translation - Factors involved in translation.
CO4	Prokaryotic and Eukaryotic DNA replication.Mechanism of DNA replication.Enzymes & proteins involved in DNA replication.
CO5	Regulation of gene expression.gene loss, gene amplification, gene rearrangement.

PO → CO↓	PO1	PO2	PO3	PO4	PO5
CO1	3	2	2	2	1
CO2	3	2	3	3	2
CO3	3	2	1	2	1
CO4	3	2	1	2	2
CO5	3	3	3	3	1
AVERAGE	**3**	**2.2**	**2**	**2.4**	**1.4**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
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3	CB21S078367	DHANUSH.T	5	5	5	5	4	24	96
4	CB21S078368	INDRA LAKHA.K	5	5	5	5	5	25	100
5	CB21S078369	KALAINITHI.K	5	5	5	5	5	25	100
6	CB21S078370	KAVIYA.S	5	5	5	5	5	25	100
7	CB21S078371	MAHA BARATHI.M	5	5	5	5	5	25	100
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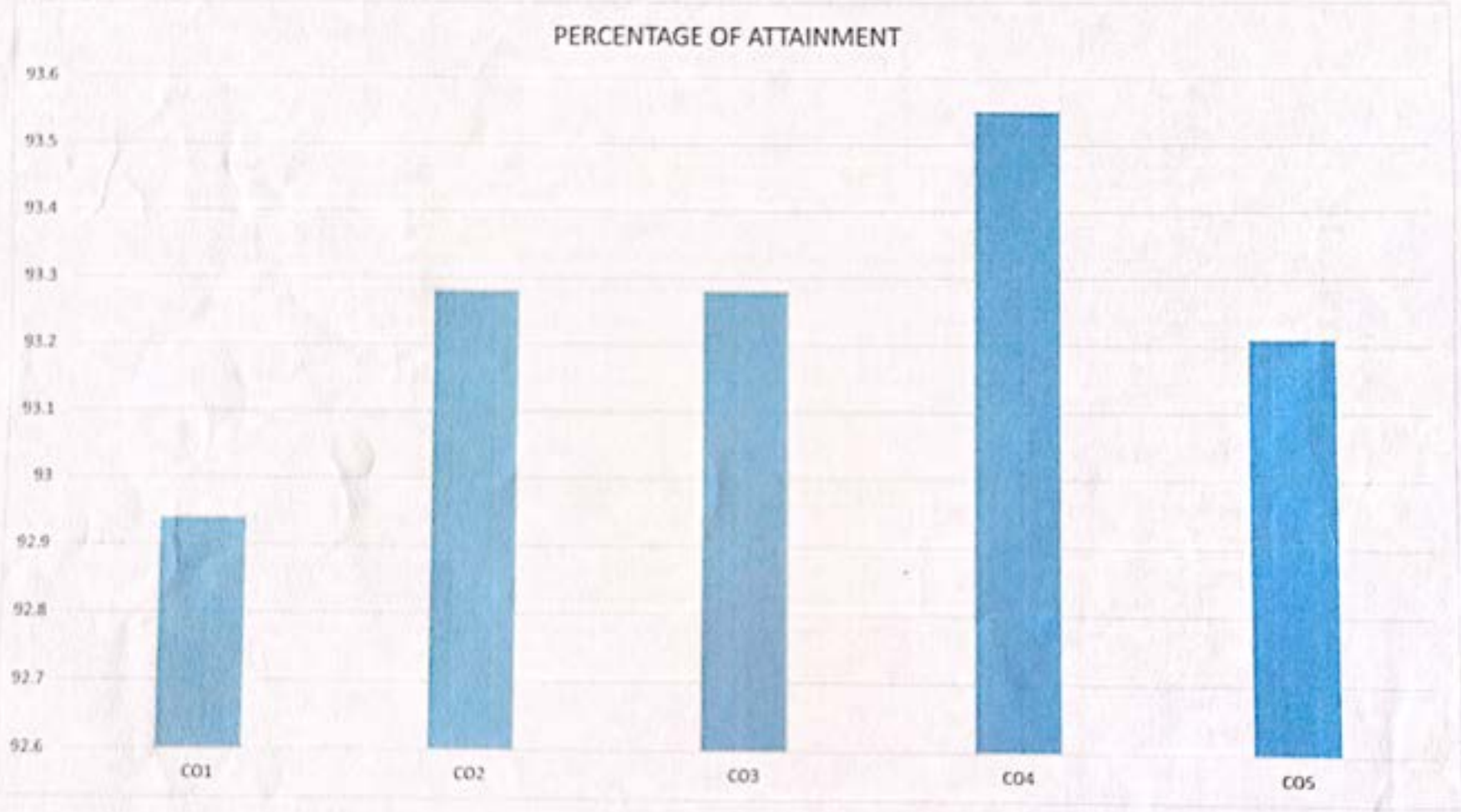
9	CB21S078373	NAVEENKUMAR.M	5	5	4	4	4	22	88
10	CB21S078374	PRAVEENKUMAR.S	4	4	4	5	5	22	88
11	CB21S078375	PRAVEEN KUMAR.T	4	4	4	5	5	22	88
12	CB21S078376	SANTHOSHKUMAR.S	4	4	4	5	5	22	88
13	CB21S078377	SATHISHKUMAR.S	5	5	4	4	4	22	88
14	CB21S078378	SNEKA.S	5	5	5	5	4	24	96
15	CB21S078379	SURYA.S	4	4	4	4	5	21	84

16	CB21S078380	SUVITHRA.M	5	5	5	5	5	25	100
		AVERAGE	4.56	4.56	4.56	4.81	4.75		

EXPECTED ATTAIMENT IN EACH CO - 85%	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	4.56	75	79.56	93.6
CO2	4.56	75	79.56	93.6
CO3	4.56	75	79.56	93.6
CO4	4.81	75	79.81	93.89
CO5	4.7	75	79.7	93.76

COURSE ATTAINMENT FOR B.SC., BIOTECHNOLOGY
SUBJECT NAME : MOLECULAR BIOLOGY
SUBJECT CODE :16SCCBT2
NO.OF STUDENTS: 16

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	93.6
CO2	93.62
CO3	93.62
CO4	93.9
CO5	93.76

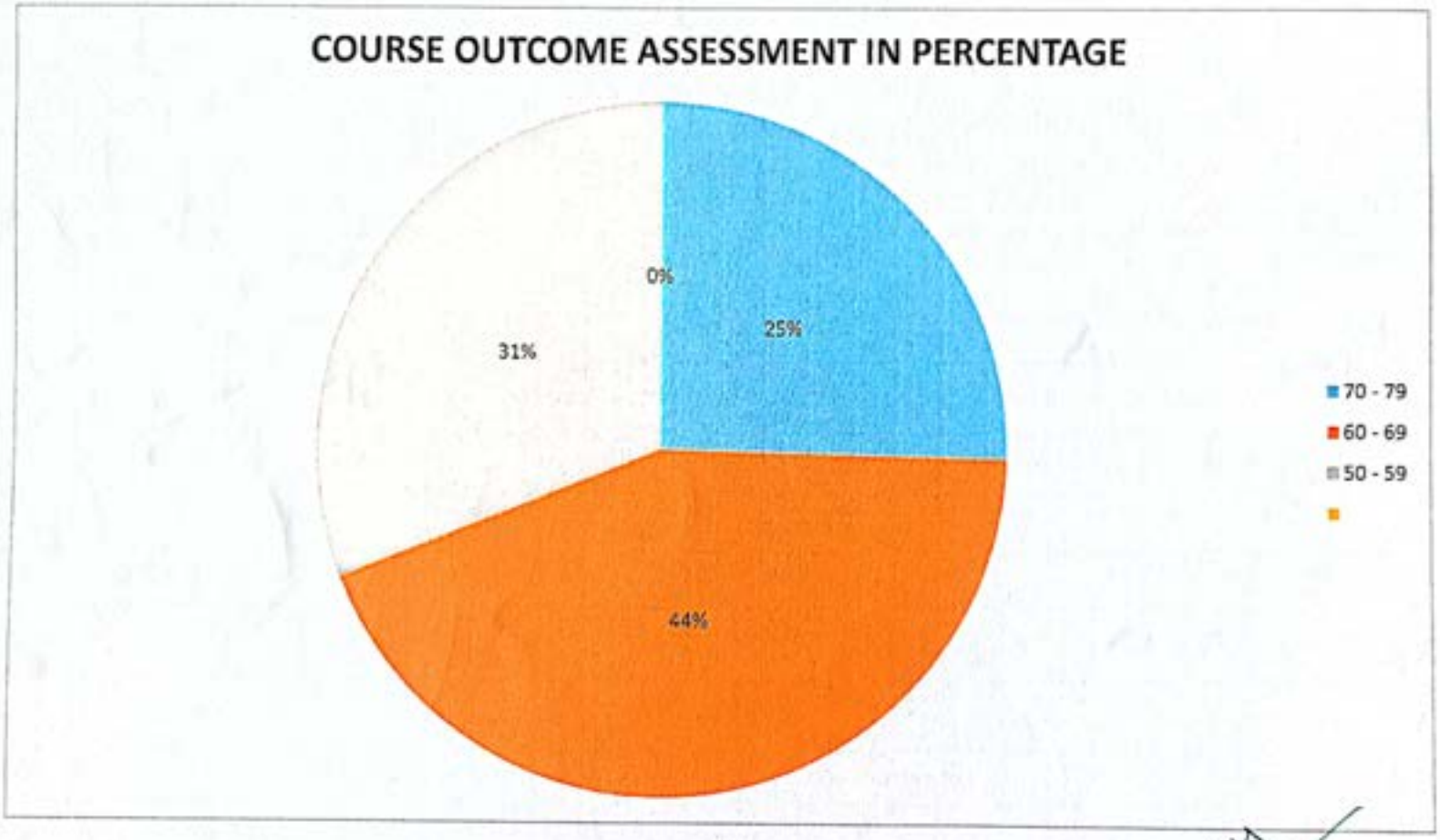


COURSE ATTAINMENT FOR B.Sc. BIOTECHNOLOGY

SUBJECT NAME: MOLECULAR BIOLOGY
SUBJECT CODE: 16SCCBT2
NO. OF STUDENTS: 16

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO. OF STUDENTS	STATUS
90 & ABOVE	0	OUTSTANDING
80 - 89	0	EXCELLENT
70 - 79	4	DISTINCTION
60 - 69	7	VERY GOOD
50 - 59	5	GOOD
40 - 49	0	AVERAGE
BELOW 40	0	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
70 - 79	25.50%	DISTINCTION
60 - 69	43.75%	VERY GOOD
50 - 59	31.25%	GOOD



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BHARATH COLLEGE OF SCIENCE AND MANAGEMENT
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THANJAVUR-5
PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME B.Sc BIOTECHNOLOGY

PO1	TheCell biology is the study of the structure and function of prokaryotic and eukaryotic cells. In this course the students will learn different areas of cellular biology including the structure and functions of cell, its organelles, synthesis and function of macromolecules such as carbohydrate, protein, lipid, DNA & RNA; membrane structure and function; bioenergetics; cellular communication; and microscopic techniques to understand the cell structure. course about the basic of microbiology dealing types of microbes analyse medical microbiology.
PO2	This course is designed to given an understanding about the basics of molecular biology – classical genetics & molecular aspects.
PO3	This courser is planned to give basic knowledge on r DNA Technology,Blotting techques ,pharmaceutical products, Gene therapy.
PO4	This course is designed to give basic concepts of immunology.Fundemental concepts and Anatomy of the immune system.vaccinology-Clinical immunology.
PO5	To learn about fundamentals of animal cell culture,GMOs,Gene therapy and transgenic animals.

COURSE : BIOCHEMISTRY COURSE CODE:16SACBT1P
COURSE OUTCOME

CO1	Isolation of Mitochondria from rat liver.
CO2	Separation of amino acids/sugars/nucleic acids/pigments using paper and thin layer chromatography.
CO3	SDS-PAGE analysis of proteins
CO4	Separation of Blood, plasma and serum
CO5	Extraction of Proteins from biological materials, Protein separation methods : Precipitation, chromatographic, electrophoretic techniques.

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PO →	PO1	PO2	PO3	PO4	PO5
CO1	2	1	1	1	1
CO2	2	2	2	3	1
CO3	1	1	3	2	3
CO4	2	3	2	2	2
CO5	3	2	2	1	2
AVERAGE	**2**	**1.8**	**2**	**1.8**	**1.8**

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PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME B.Sc BIOTECHNOLOGY

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PO5	To learn about fundamentals of animal cell culture,GMOs,Gene therapy and transgenic animals.

COURSE : CELL BIOLOGY COURSE CODE: 16SCCBT1P

CO1	Structure observation of Prokaryotic cells Structure observation of Eukaryotic cell
CO2	Motility of an organism
CO3	Cell Staining – Cytochemical methods.
CO4	Structure of purine and pyrimidine base, Watson and Crick model and forms of DNA.
CO5	Cell division – Binary fission of yeast

PO →	PO1	PO2	PO3	PO4	PO5
CO1	3	2	2	2	1
CO2	3	2	3	2	2
CO3	3	2	1	3	1
CO4	3	3	2	2	2
CO5	3	3	3	3	2
AVERAGE	**3**	**2.4**	**2.2**	**2.4**	**1.6**

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PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME B.SC BIOTECHNOLOGY

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PO5	To learn about fundamentals of animal cell culture,GMOs,Gene therapy and transgenic animals.

COURSE : MICROBIOLOGY COURSE CODE: 16SACMB1P
COURSE OUTCOME

CO1	Preparation of Microbiological media
CO2	Isolation of microorganisms from various samples
CO3	Biochemical identification of bacteria.
CO4	Staining of fungl
CO5	Identification of algae, fungi, lichens & yeast

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PO →	PO1	PO2	PO3	PO4	PO5
CO1	1	1	1	2	1
CO2	2	2	3	2	1
CO3	3	1	1	2	1
CO4	2	3	2	2	3
CO5	2	3	2	3	2
AVERAGE	**2**	**2**	**1.8**	**2.2**	**1.6**

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ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME

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COURSE :r DNA TECHNOLOGY COURSE CODE:16SCCBT3P

CO1	Isolation of genomic DNA from plant, animal cells & from bacteria
CO2	Isolation of plasmid DNA – small & large scale
CO3	Restriction digestion – single & double digestion, Ligation.
CO4	Selection & screening of rDNA products – Antibiotic resistance, Blue white colony.
CO5	PCR amplification, Southern blot and northern blot.

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PO →	PO1	PO2	PO3	PO4	PO5
CO1	2	1	1	1	1
CO2	2	2	2	3	1
CO3	1	1	3	2	3
CO4	2	3	2	2	2
CO5	3	2	2	1	2
AVERAGE	**2**	**1.8**	**2**	**1.8**	**1.8**

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ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME B.SC BIOTECHNOLOGY

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COURSE : MOLECULAR BIOLOGY COURSE CODE:16SCCBT2P

CO1	Isolation and purification of genomic DNA from prokaryotes
CO2	Isolation and purification of plasmid DNA.
CO3	Transformation of bacteria – CaCl2 method
CO4	Observation of DNA
CO5	Staining of proteins

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PO →	PO1	PO2	PO3	PO4	PO5
CO1	1	1	1	2	1
CO2	2	2	3	3	3
CO3	3	1	3	2	1
CO4	2	2	2	2	3
CO5	3	2	2	3	2
AVERAGE	**2.2**	**1.6**	**2.2**	**2.4**	**2**

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PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME

PO1	To know a thorough knowledge about structure and function of cells, cellular signaling, protein trafficking, bio molecules and cellular development.
PO2	To collect, deals with various types of classification of microbes and also throws light on multifarious habitats of microbes and provides information about all the microbial cellular functions and various metabolic pathways in microbes.
PO3	To study the structure, properties and metabolism of different biomolecules and to know the interrelationships between different metabolisms.To understand the basic concepts of immune system, elucidate the immune response of humans to foreign substances and to study the modern techniques of immunology that help determine human protection.
PO4	To study the various principles underlying genetic engineering that forms the basis of rDNA technology and to study the methodologies, and in brief the applications and related issues of rDNA technology and understanding about the basics of Animal cell culture, transgenic animals, pest & animal management, Molecular markers and regulations about the use of Biotechnology.To study the downstream processes for product recovery in fermentation
PO5	student will get an idea about the basic understanding about Bioinformatics, tools, sequences, algorithms and the analysis of phylogenetic tree and will give an idea about the basic principles and techniques involved in plant cell culture and to understand the concepts of transformation and achievements of biotechnology in Plant systems.to understand the chemical nature and associated microbes of food and to understand the principles of food processing, preservation and manufacture.

COURSE : CELLBIOLOGY SUB CODE :P16BT11

COURSE OUTCOME

CO1	Cell structure -Introduction to cell,Plasma Membrane:Cell Wall:
CO2	Cell Organelles-Endoplasmic Reticulum,Ribosomes,Mitochondria,Mitochondria,Lysosome,peroxisome :strucutre and function
CO3	Nuclear Material:Cytoskeleton:Microtubules, microfilaments & associated proteins – actin, myosin and intermediate filaments. 3 dimensional organization of cytoskeleton.,nucleus
CO4	Organization of Chromosomes, Cell Division & Cell Cycle,Cell Growth Control:
CO5	Microbial Cell Biology,Structural organization of prokaryotic cell. Cell appendages – cilia, pili, fimbriae & flagella.

PO → CO↓	PO1	PO2	PO3	PO4	PO5
CO1	2	3	2	2	1
CO2	2	3	3	2	2
CO3	2	3	1	3	1
CO4	3	3	2	2	2
CO5	3	3	3	3	2
AVERAGE	**2.4**	**3**	**2.2**	**2.4**	**1.6**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	P21442625	AHILANDESWARI R	4	4	4	5	5	22	88
2	P21442626	BHUVANESWARI S	4	5	5	5	5	24	96
3	P21442627	CHANDRU S	3	3	5	5	5	21	84
4	P21442628	HEMALATHA S	3	5	5	5	5	23	92
5	P21442629	KARHI M	4	4	5	5	5	23	92
6	P21442630	MAHESH K	4	5	5	4	5	24	96
7	P21442631	MANIKANDAN S	4	5	5	5	5	24	96
8	P21442632	NAGAPRADESH M	5	5	5	5	4	24	96
9	P21442633	PARTHIPAN S	4	4	5	4	5	22	88
10	P21442634	PRADEEPA P	3	5	5	5	5	23	92

11	P21442635	SADHASIVAM B	5	4	5	5	5	24	96
12	P21442636	SAKTHIVEL S	4	4	5	5	5	23	92
13	P21442637	SANJAI KUMAR E	4	5	5	5	5	24	96
14	P21442638	THIRUNAVUKKARASU S	3	5	4	5	5	22	88
15	P21442639	VENKADESH K	4	4	5	5	4	21	84
16	P21442640	VENGADESAN C	3	5	4	5	5	22	88
17	P21442641	YUVARAJ A	5	3	5	4	5	22	88
AVERAGE			3.882	4.412	4.824	4.824	4.882		

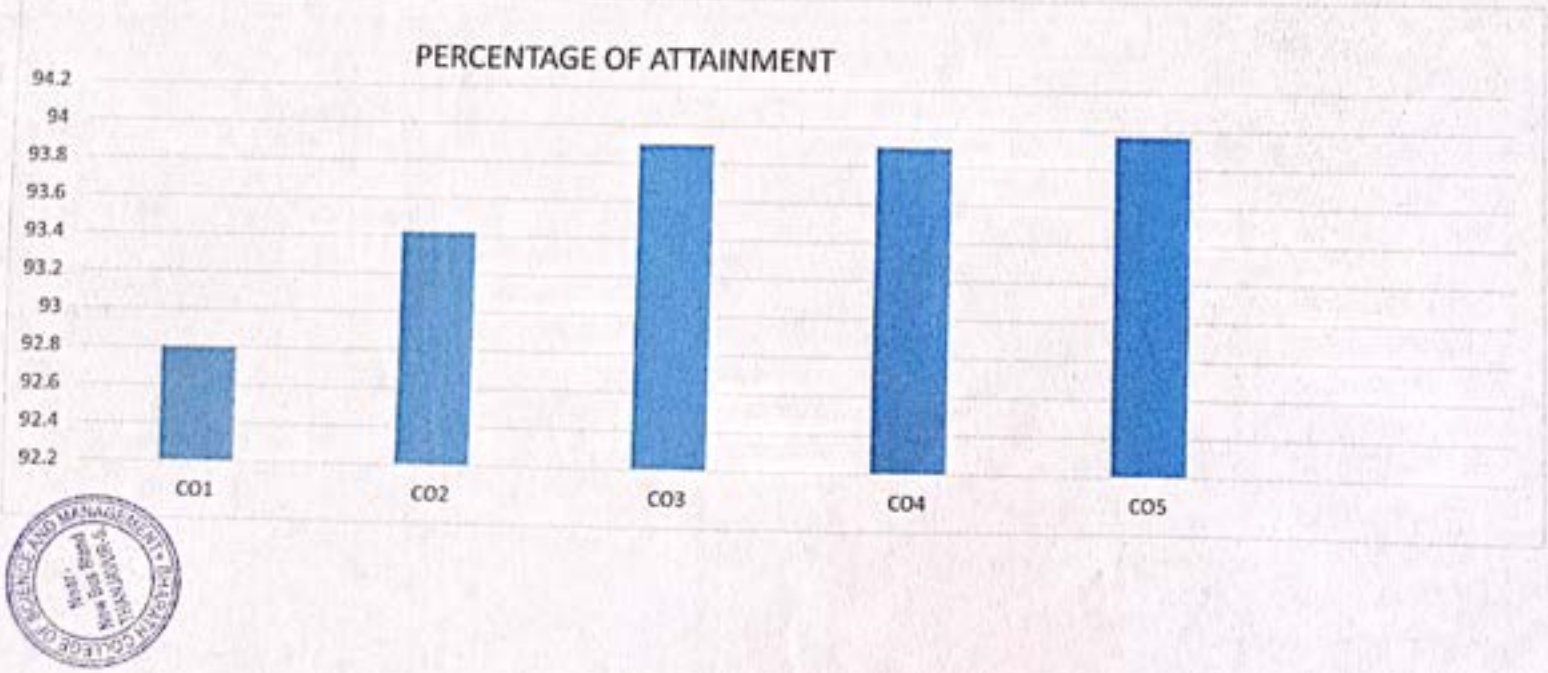
EXPECTED ATTAIMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+	END SEM	TOTAL	%
CO1	3.88	75	78.88	92.8
CO2	4.41	75	79.41	93.42353
CO3	4.82	75	79.82	93.90588
CO4	4.82	75	79.82	93.90588
CO5	4.88	75	79.88	93.97647

COURSE ATTAINMENT FOR M.SC., BIOTECHNOLOGY

SUBJECT NAME :CELL BIOLOGY
SUBJECT CODE :P16BT11
NO.OF STUDENTS:17

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	92.8
CO2	93.42
CO3	93.9
CO4	93.9
CO5	93.97

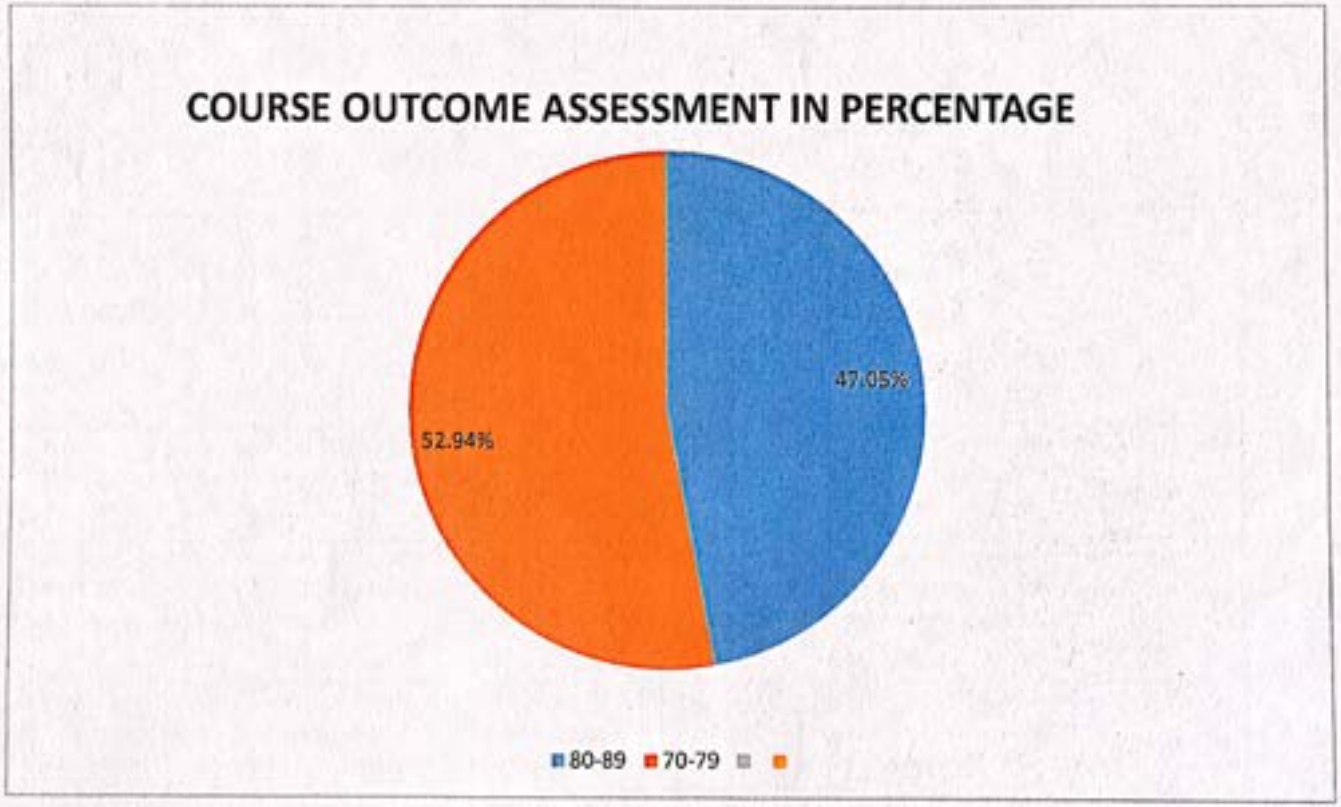


COURSE ATTAINMENT FOR M.Sc., BIOTCHNOLOGY

SUBJECT NAME:CELLBIOLOGY
SUBJECT CODE: P16BT11
NO. OF STUDENTS: 17

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO. OF STUDENTS	STATUS
90 -100	0	OUTSTANDING
80 - 89	8	EXCELLENT
70-79	9	DISTINCTION
60-69	0	GOOD
50-59	0	AVERAGE
BELOW 50	0	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
80-89	47.05%	EXCELLENT
70-79	52.94%	DISTINCTION



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PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME

PO1	To know a thorough knowledge about structure and function of cells, cellular signaling, protein trafficking, bio molecules and cellular development.
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PO5	student will get an idea about the basic understanding about Bioinformatics, tools, sequences, algorithms and the analysis of phylogenetic tree and will give an idea about the basic principles and techniques involved in plant cell culture and to understand the concepts of transformation and achievements of biotechnology in Plant systems.to understand the chemical nature and associated microbes of food and to understand the principles of food processing, preservation and manufacture.

COURSE :MOLECULAR BIOLOGY SUB CODE :P16BT14
COURSE OUTCOME

CO1	Nucleic Acid, Bases, Nucleoside, Nucleotide Types: DNA Replication:
CO2	Central Dogma - Transcription & Translation..
CO3	Mutation. Types - Molecular nature of mutation, mutagen and origin ofspontaneous mutations. Gene transfer mechanisms - transformation, transduction, conjugation, transfection and their applications,Regulation in eukaryotes
CO4	Extra-chromosomal hereditary materials & transposablegenetic elements
CO5	Genetic analysis of microbes

PO → CO↓	PO1	PO2	PO3	PO4	PO5
CO1	2	3	2	2	1
CO2	2	3	3	2	2
CO3	2	3	1	3	1
CO4	3	3	2	2	2
CO5	3	3	3	3	2
AVERAGE	**2.4**	**3**	**2.2**	**2.4**	**1.6**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	P21442625	AHILANDESWARI R	3	3	5	5	5	21	88
2	P21442626	BHUVANESWARI S	4	5	5	5	5	24	88
3	P21442627	CHANDRU S	3	4	5	4	5	21	88
4	P21442628	HEMALATHA S	3	5	5	5	3	21	24
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15	P21442639	VENKADESH K	3	5	4	4	5	21	84
16	P21442640	VENGADESAN C	3	4	5	4	5	21	84
17	P21442641	YUVARAJ A	4	4	4	4	5	21	84
AVERAGE			3.71	4.12	4.65	4.71	4.706		

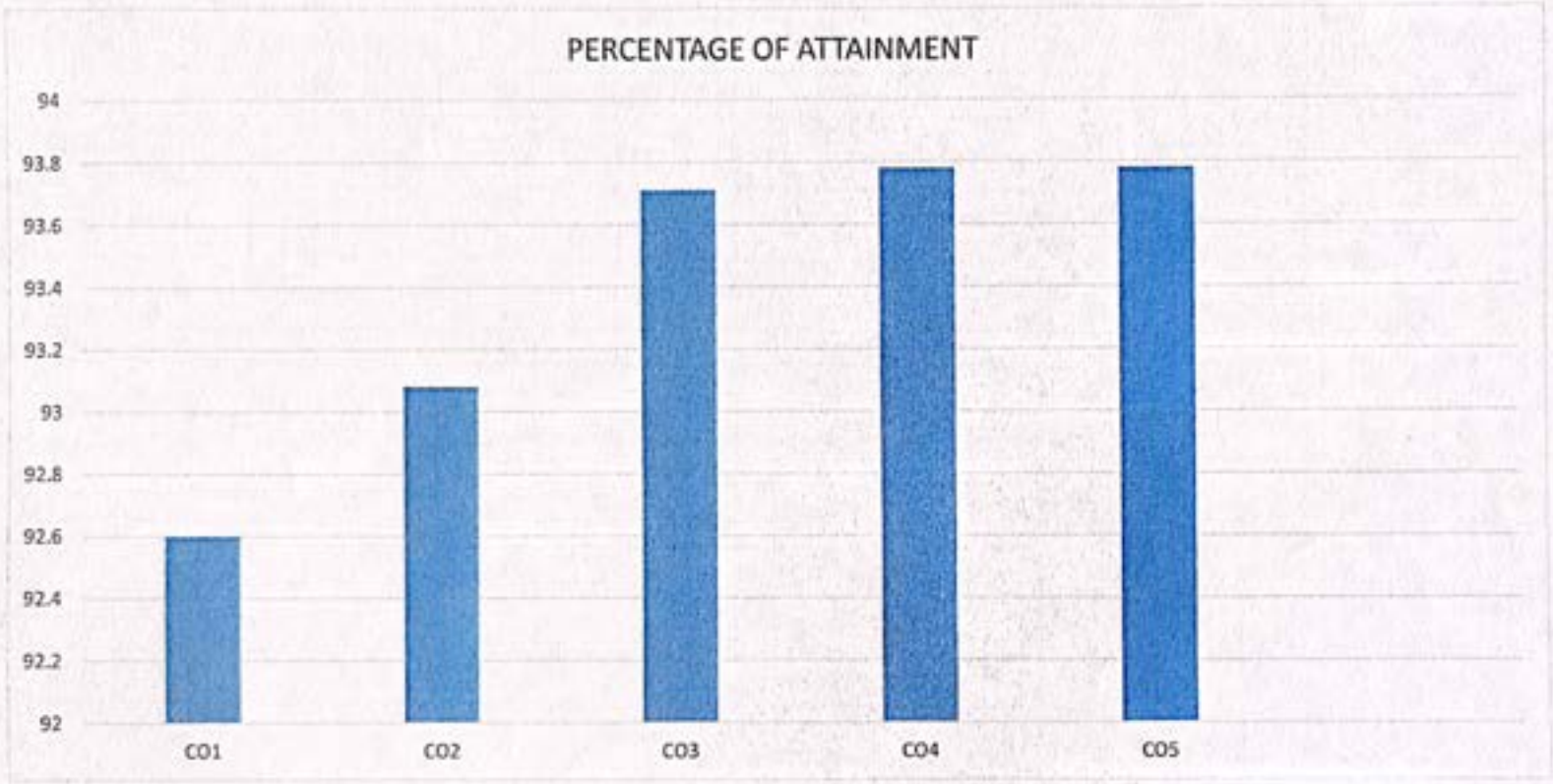
EXPECTED ATTAIMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	3.71	75	78.71	92.6
CO2	4.12	75	79.12	93.08
CO3	4.65	75	79.65	93.71
CO4	4.71	75	79.71	93.78
CO5	4.71	75	79.71	93.78

COURSE ATTAINMENT FOR M.SC., BIOTECHNOLOGY

SUBJECT NAME :MOLECULAR BIOLOGY
SUBJECT CODE :P16BT14
NO.OF STUDENTS:17

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	92.6
CO2	93.08
CO3	93.71
CO4	93.78
CO5	93.78

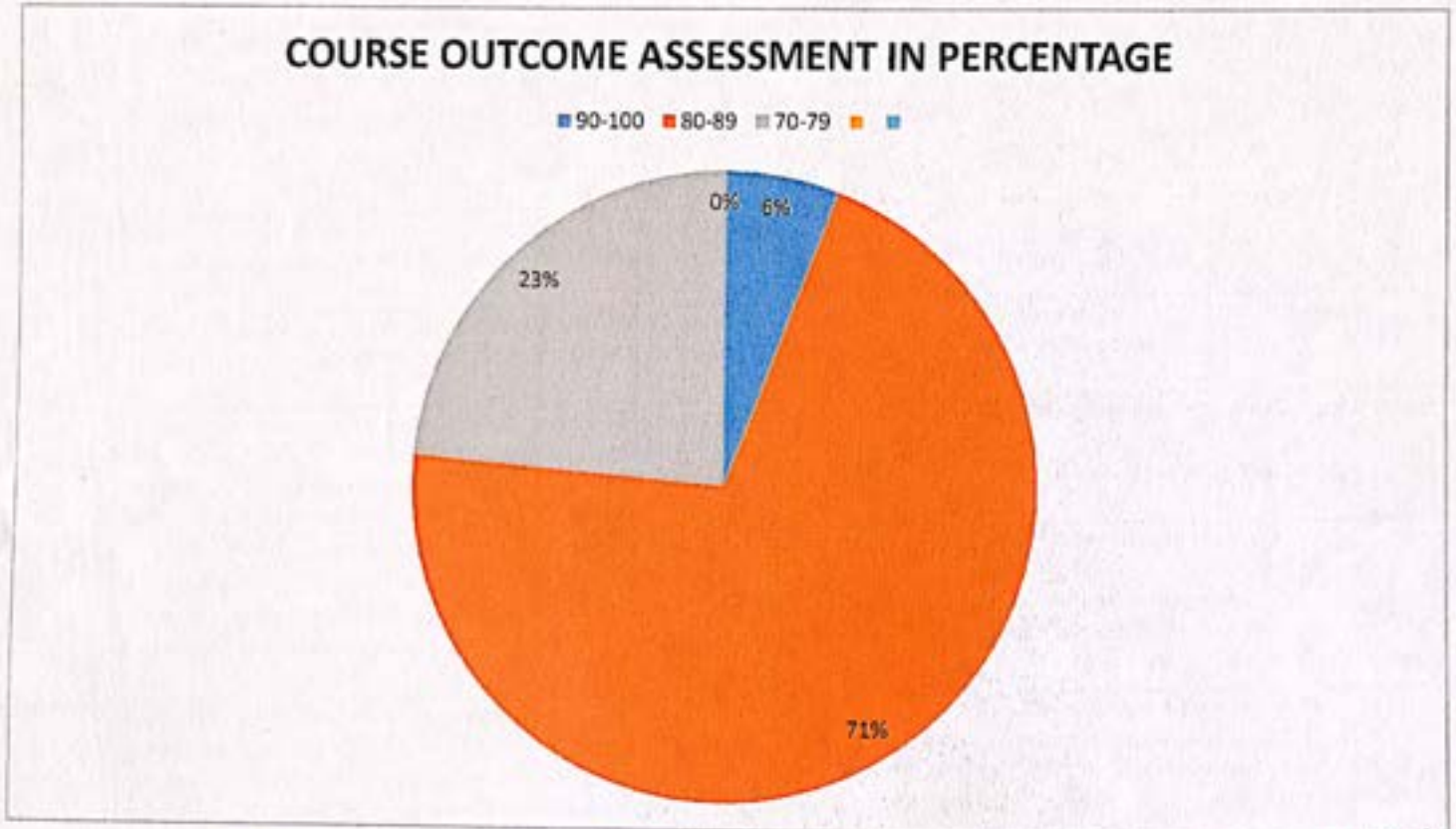


COURSE ATTAINMENT FOR M.Sc., BIOTCHNOLOGY

SUBJECT NAME:MOLECULAR BIOLOGY
SUBJECT CODE: P16BT14
NO. OF STUDENTS: 17

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO. OF STUDENTS	STATUS
90 -100	1	OUTSTANDING
80 - 89	12	EXCELLENT
70-79	4	DISTINCTION
60-69	0	GOOD
50-59	0	AVERAGE
BELOW 50	0	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
90-100	5.88%	OUTSTANDING
80-89	70.58%	EXCELLENT
70-79	23.52%	DISTINCTION



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BHARATH COLLEGE OF SCIENCE AND MANAGEMENT
(UGC Recognized 2(f) & 12(B) Institution)
THANJAVUR-5
PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME

PO1	To know a thorough knowledge about structure and function of cells, cellular signaling, protein trafficking, bio molecules and cellular development.
PO2	To collect, deals with various types of classification of microbes and also throws light on multifarious habitats of microbes and provides information about all the microbial cellular functions and various metabolic pathways in microbes.
PO3	To study the structure, properties and metabolism of different biomolecules and to know the interrelationships between different metabolisms.To understand the basic concepts of immune system, elucidate the immune response of humans to foreign substances and to study the modern techniques of immunology that help determine human protection.
PO4	To study the various principles underlying genetic engineering that forms the basis of rDNA technology and to study the methodologies, and in brief the applications and related issues of rDNA technology and understanding about the basics of Animal cell culture, transgenic animals, pest & animal management, Molecular markers and regulations about the use of Biotechnology.To study the downstream processes for product recovery in fermentation
PO5	student will get an idea about the basic understanding about Bioinformatics, tools, sequences, algorithms and the analysis of phylogenetic tree and will give an idea about the basic principles and techniques involved in plant cell culture and to understand the concepts of transformation and achievements of biotechnology in Plant systems.to understand the chemical nature and associated microbes of food and to understand the principles of food processing, preservation and manufacture.

COURSE :BIOCHEMISTRY SUB CODE :P16BT13
COURSE OUTCOME

CO1	Chemical basis of life and composition of living matter. Biomolecules - chemical composition and bonding. Properties of water, acids, gases and buffer. pH, ionization and hydrophobicity
CO2	Amino acids - Structure and functional group, properties. Biosynthesis, types, properties and metabolism of amino acids. Proteins - Peptides and covalent structure of proteins.Enzyme-Nomenclature, classification, properties, structure and functional relationship. Enzyme catalysis and general principles of catalysis.
CO3	Carbohydrates - Structure and classification. Sugars - mono, di, and polysaccharides, chemical composition and bonding.Glycolysis, Kreb's cycle, Gluconeogenesis and HMP pathway.Lipids - Structure, classification and properties. Lipid metabolism. Oxidation - Fatty acids and cholesterol. Biosynthesis of lipids.
CO4	Nucleic acids - Structure, diversity and function. Sequencing of nucleic acids. Brief overview of central dogma.Vitamins - Classification and derivatives. Secondary metabolites from plants.
CO5	Bioenergetics - basic principles, equilibrium and concept of free energy, redox potential and their applications. Coupled processes - process of photosynthesis.

PO → CO↓	PO1	PO2	PO3	PO4	PO5
CO1	2	3	2	2	1
CO2	2	3	3	2	2
CO3	2	3	1	3	1
CO4	3	3	2	2	2
CO5	3	3	3	3	2
AVERAGE	**2.4**	**3**	**2.2**	**2.4**	**1.6**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	P21442625	AHILANDESWARI R	4	4	5	4	5	21	88
2	P21442626	BHUVANESWARI S	4	4	5	4	5	22	88
3	P21442627	CHANDRU S	3	3	5	5	5	21	84
4	P21442628	HEMALATHA S	4	4	5	4	5	22	88
5	P21442629	KARHI M	3	4	5	5	4	21	84
6	P21442630	MAHESH K	4	4	5	5	5	23	92
7	P21442631	MANIKANDAN S	4	4	5	5	5	23	92
8	P21442632	NAGAPRADESH M	4	4	5	4	4	22	88
9	P21442633	PARTHIPAN S	4	4	5	3	5	21	84
10	P21442634	PRADEEPA P	4	5	3	4	5	21	84
11	P21442635	SADHASIVAM B	4	4	5	4	5	22	88
12	P21442636	SAKTHIVEL S	4	5	4	5	4	22	88
13	P21442637	SANJAI KUMAR E	4	5	5	5	4	23	92
14	P21442638	THIRUNAVUKKARASU S	4	4	5	5	5	23	92
15	P21442639	VENKADESH K	4	4	5	5	5	23	92
16	P21442640	VENGADESAN C	4	4	4	4	4	20	80
17	P21442641	YUVARAJ A	3	4	5	5	5	22	88
AVERAGE			3.824	4.12	4.76	4.471	4.71		

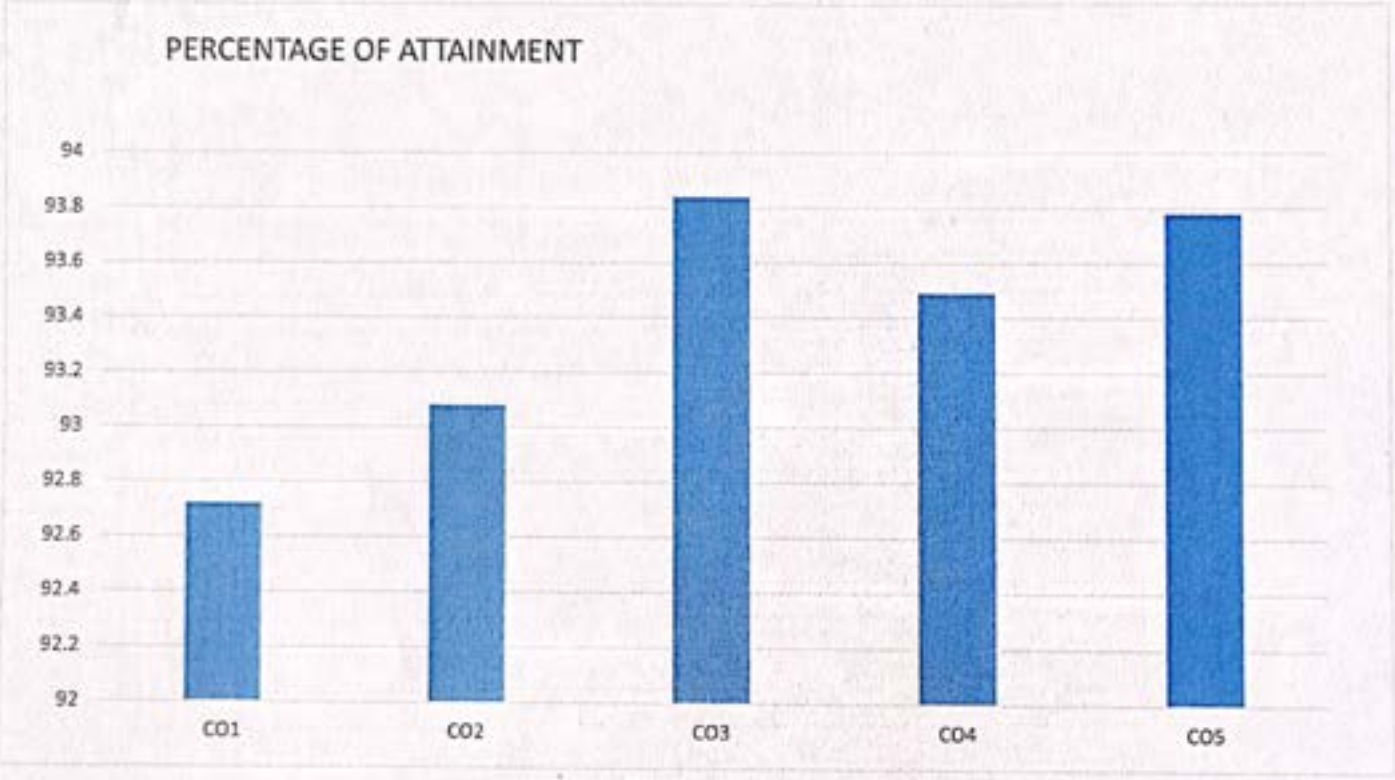
EXPECTED ATTAIMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	3.82	75	78.82	92.73
CO2	4.12	75	79.12	93.08
CO3	4.76	75	79.76	93.84
CO4	4.47	75	79.47	93.49
CO5	4.71	75	79.71	93.78

COURSE ATTAINMENT FOR M.SC., BIOTECHNOLOGY

SUBJECT NAME :BIOCHEMISTRY
SUBJECT CODE :P16BT13
NO.OF STUDENTS:17

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	92.72
CO2	93.08
CO3	93.84
CO4	93.49
CO5	93.78

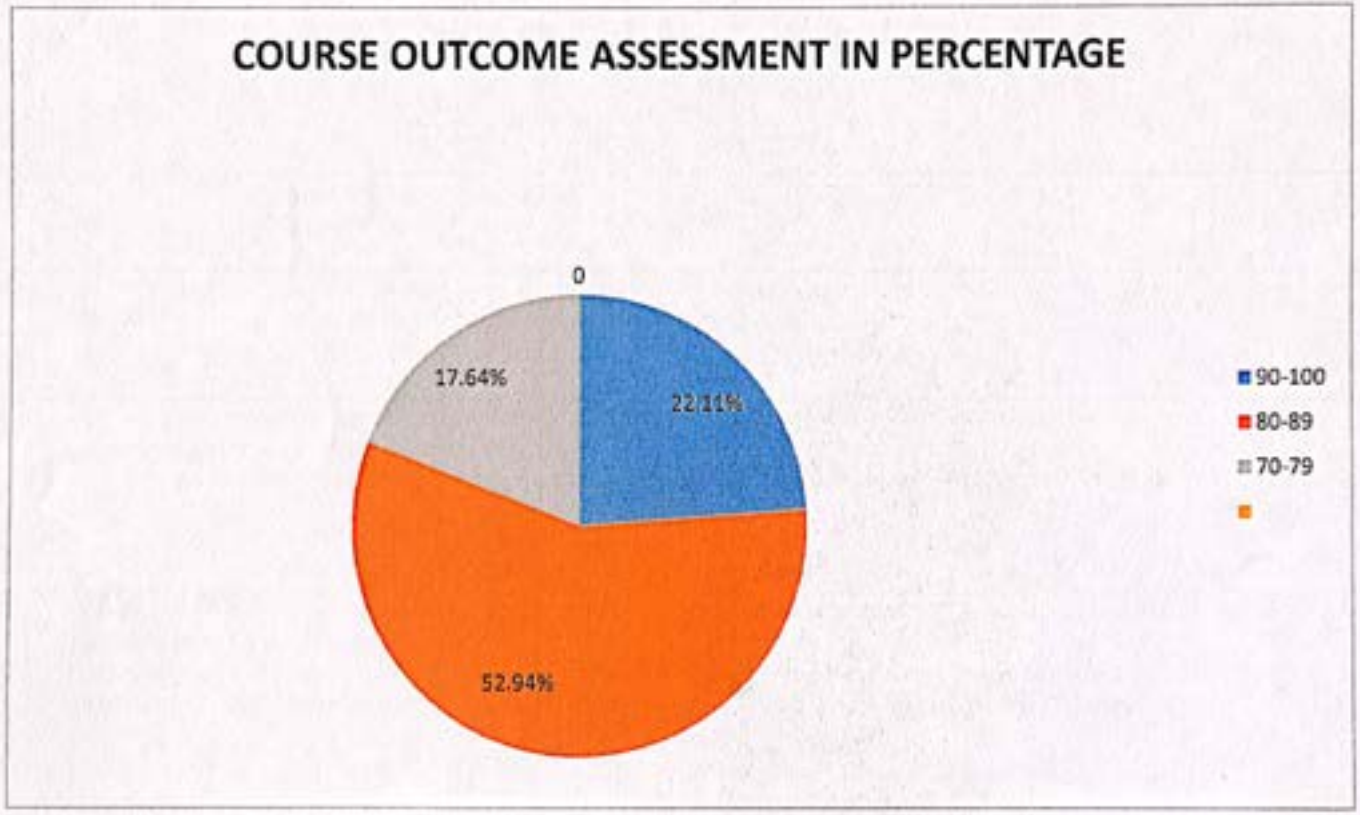


COURSE ATTAINMENT FOR M,.Sc., BIOTCHNOLOGY

SUBJECT NAME:BIOCHEMISTRY
SUBJECT CODE: P16BT13
NO. OF STUDENTS: 17

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO. OF STUDENTS	STATUS
90 -100	5	OUTSTANDING
80 - 89	9	EXCELLENT
70-79	3	DISTINCTION
60-69	0	GOOD
50-59	0	AVERAGE
BELOW 50	0	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
90-100	22.11%	OUTSTANDING
80-89	52.94%	EXCELLENT
70-79	17.64%	DISTINCTION



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ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

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COURSE : MICROBIOLOGY SUB CODE :P16BT12

COURSE OUTCOME

CO1	Discovery of microbial world, the experiment of Pasteur, the era of discovery of antibiotics and anaerobic life. Types and classification of microbes. Isolation, identification, characteristics and ultra structure of microbes – Viruses, Bacteria, Fungi and Algae. Various associations of microbes.
CO2	Origin and evolution of microorganisms. Concepts of species and hierarchical taxa. Bergy's system of classification – Viruses, Bacteria, Fungi. Biological nomenclature - Measurement of species richness and evenness. Simpson's diversity index – Multivariate analysis.Microbial Nutrition and Growth,Molecular Systematics.
CO3	Microbial MetabolismInfluence of environment on microbial physiology. Physical factors – radiations, temperature, pH and pressure. Chemical factors – nutrients, water, C, H, O, N, P, S. Growth factors - amino acids, purines, pyrimidines, nucleosides, nucleotides, vitamins, lipids, inorganic nutrients.
CO4	Methods in Microbiology Isolation of microbes from various sources - serial dilution, pure culture and culture preservation techniques. Microbial culture collection centers. Staining techniques – Simple & differential - Gram, endospore, negative, flagellar staining
CO5	Microbial GeneticsGenetic system of bacteria – transformation, transduction, recombination. Extra cellular genetic material - plasmids and transposons. Genetic systems of viruses – Phage I, RNA viruses and retroviruses.

PO → CO↓	PO1	PO2	PO3	PO4	PO5
CO1	2	3	2	2	1
CO2	2	3	3	2	2
CO3	2	3	1	3	1
CO4	3	3	2	2	2
CO5	3	3	3	3	2
AVERAGE	**2.4**	**3**	**2.2**	**2.4**	**1.6**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	**3**	**1**	**1**
CO2	**3**	**1**	**1**
CO3	**3**	**1**	**1**
CO4	**3**	**1**	**1**
CO5	**3**	**1**	**1**
TOTAL	**15**	**5**	**5**

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	P21442625	AHILANDESWARI R	3	3	5	5	5	21	88
2	P21442626	BHUVANESWARI S	4	5	5	5	5	24	96
3	P21442627	CHANDRU S	3	3	5	5	5	21	84
4	P21442628	HEMALATHA S	3	4	5	5	5	22	88
5	P21442629	KARHI M	4	4	5	5	5	23	92
6	P21442630	MAHESH K	4	5	5	5	5	24	96
7	P21442631	MANIKANDAN S	4	5	5	4	5	23	92
8	P21442632	NAGAPRADESH M	4	5	5	5	5	24	96
9	P21442633	PARTHIPAN S	4	5	4	5	5	23	92
10	P21442634	PRADEEPA P	4	5	4	5	5	23	92
11	P21442635	SADHASIVAM B	4	5	5	4	5	23	92
12	P21442636	SAKTHIVEL S	4	5	4	5	5	23	92
13	P21442637	SANJAI KUMAR E	4	5	5	5	5	24	96
14	P21442638	THIRUNAVUKKARASU S	4	5	3	5	5	22	88
15	P21442639	VENKADESH K	5	3	5	3	5	21	84
16	P21442640	VENGADESAN C	3	5	5	3	5	21	84
17	P21442641	YUVARAJ A	4	4	4	5	4	21	84
AVERAGE			3.823529	4.470588	4.6470588	4.6470588	4.941		

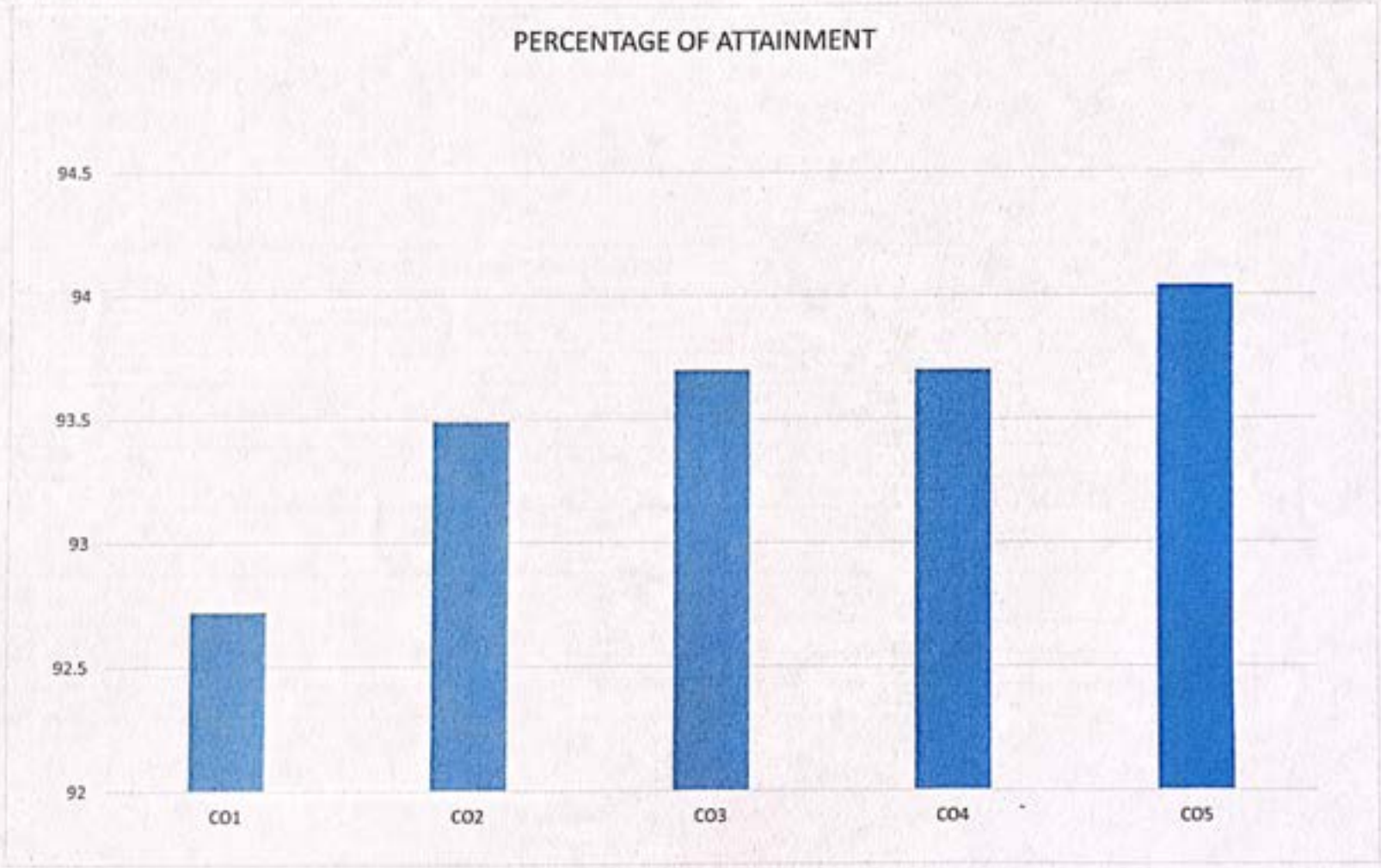
EXPECTED ATTAIMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	3.82	75	78.82	92.73
CO2	4.47	75	79.47	93.49
CO3	4.65	75	79.65	93.71
CO4	4.65	75	79.65	93.71
CO5	4.94	75	79.94	94.05

COURSE ATTAINMENT FOR M.SC., BIOTECHNOLOGY

SUBJECT NAME :MICROBIOLOGY
SUBJECT CODE :P16BT12
NO.OF STUDENTS:17

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	92.72
CO2	93.49
CO3	93.7
CO4	93.7
CO5	94.04

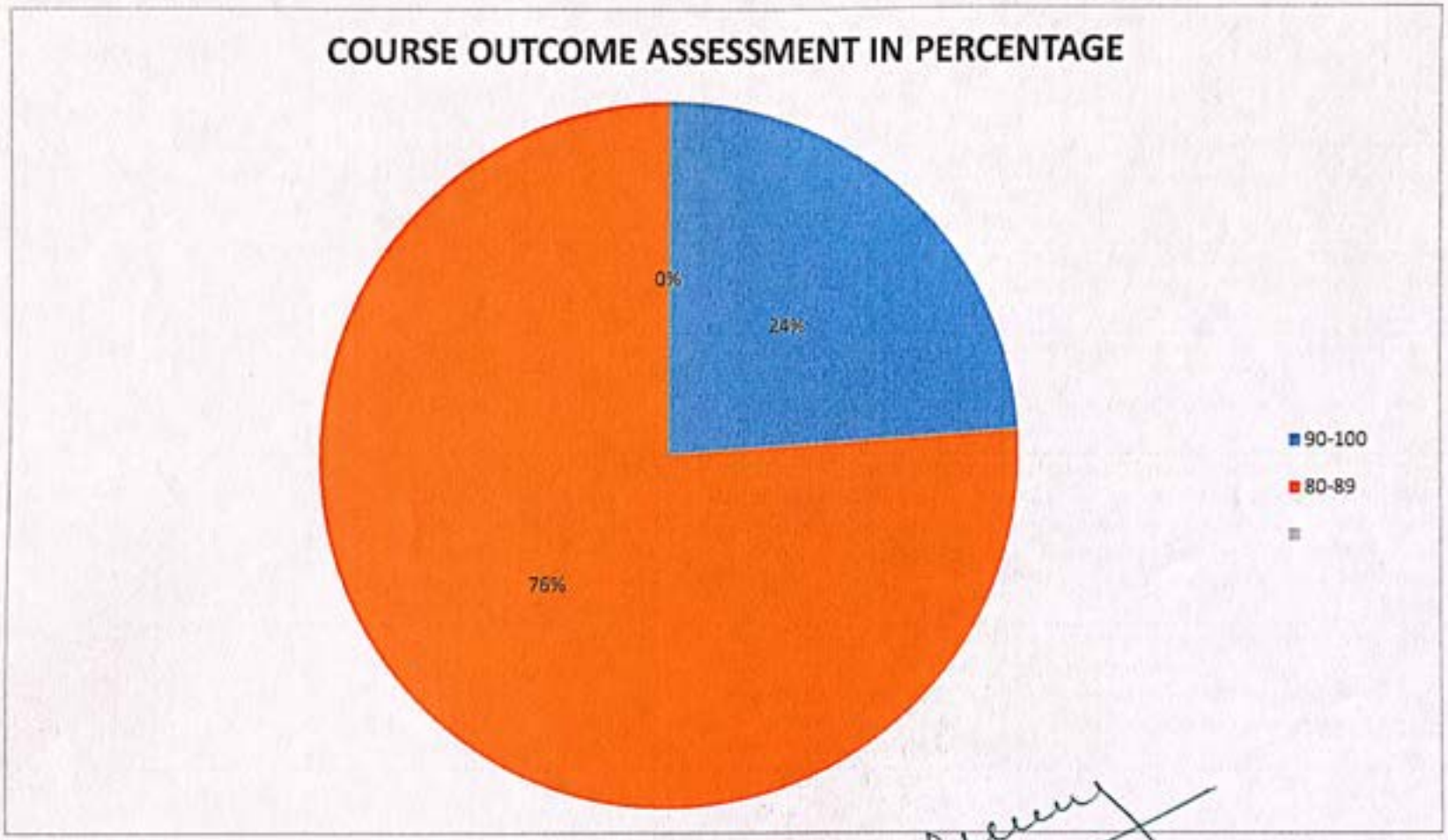


COURSE ATTAINMENT FOR M.Sc., BIOTCHNOLOGY

SUBJECT NAME:MICROBIOLOGY
SUBJECT CODE: P16BT12
NO. OF STUDENTS: 17

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO. OF STUDENTS	STATUS
90 -100	5	OUTSTANDING
80 - 89	12	EXCELLENT
70-79	0	DISTINCTION
60-69	0	GOOD
50-59	0	AVERAGE
BELOW 50	0	RA

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
90-100	22.11%	EXCELLENT
80-89	70.58%	DISTINCTION



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PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME M.Sc : BIOTECHNOLOGY

PO1	To know a thorough knowledge about structure and function of cells, cellular signaling, protein trafficking, bio molecules and cellular development.
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PO5	Student will get an idea about the basic understanding about Bioinformatics, tools, sequences, algorithms and the analysis of phylogenetic tree and will give an idea about the basic principles and techniques involved in plant cell culture and to understand the concepts of transformation and achievements of biotechnology in Plant systems.To understand the chemical nature and associated microbes of food and to understand the principles of food processing, preservation and manufacture.

COURSE CODE& COURSE TITLE	NAME OF THE PROGRAMME:M.Sc : BIOTECHNOLOGY	
	COURSE OUTCOME	
IMMUNOLOGY (P16BT22)	CO1	Cell structure -Prokaryotic, akaryotic and eukaryotic cell. Plasma Membrane-Cell Wall.
	CO2	Cell Organelles-Endoplasmic Reticulum-Ribosomes-Mitochondria-Chloroplast-Lysosomes-Peroxisomes.
	CO3	Nuclear Material-Cytoskeleton-Nucleus.
	CO4	Organization of Chromosomes, Cell Division & Cell Cycle-Cell Division-Cell Cycle and Cell Growth Control.
	CO5	Microbial Cell Biology-Structural organization of prokaryotic cell.

PO → CO↓	PO1	PO2	PO3	PO4	PO5
CO1	3	1	1	2	0
CO2	3	0	0	1	1
CO3	3	1	0	0	0
CO4	3	0	1	1	1
CO5	3	1	1	0	0
AVERAGE	**3**	**0.6**	**0.6**	**0.8**	**0.4**

INTERNAL EXAMINATION MARK DISTRIBUTION FOR EACH COURSE OUTCOME

CO	INTERNAL (25)		
	UNIT TEST (15)	SEMINAR (5)	ASSIGNMENT (5)
CO1	3	1	1
CO2	3	1	1
CO3	3	1	1
CO4	3	1	1
CO5	3	1	1
TOTAL	15	5	5

SNO	REG. NO	NAME	CO1	CO2	CO3	CO4	CO5	TOTAL	% TO TOTAL INTERNAL MARK
1	P21442625	AHILANDESWARI R	5	4	5	5	4	23	92
2	P21442626	BHUVANESWARI S	5	5	4	5	5	24	96
3	P21442627	CHANDRU S	4	5	5	4	5	23	92
4	P21442628	HEMALATHA S	4	5	5	5	5	24	96
5	P21442629	KARTHI M	5	5	5	4	5	24	96
6	P21442630	MAKESH K	5	4	5	5	5	24	96
7	P21442631	MANIKANDAN S	5	5	5	5	5	25	100
8	P21442632	NAGAPRADHEESH M	5	5	5	5	5	25	100
9	P21442633	PARTHIBAN S	4	5	5	5	4	23	92
10	P21442634	PRADEEPA P	5	5	5	5	4	24	96
11	P21442635	\SADHASIVAM B	4	5	5	5	5	24	96
12	P21442636	SAKTHIVEL S	5	5	4	4	5	23	92
13	P21442637	SANJAI KUMAR E	5	5	5	5	4	24	96
14	P21442638	THIRUNAVUKARASU S	5	4	5	4	5	23	92
15	P21442639	VENGADESH K	5	5	4	5	4	23	92
16	P21442640	VENKATESAN K	5	4	4	5	5	23	92
17	P21442641	YUVARAJ A	5	5	5	4	5	24	96
AVERAGE			4.76	4.76	4.76	4.71	4.71		

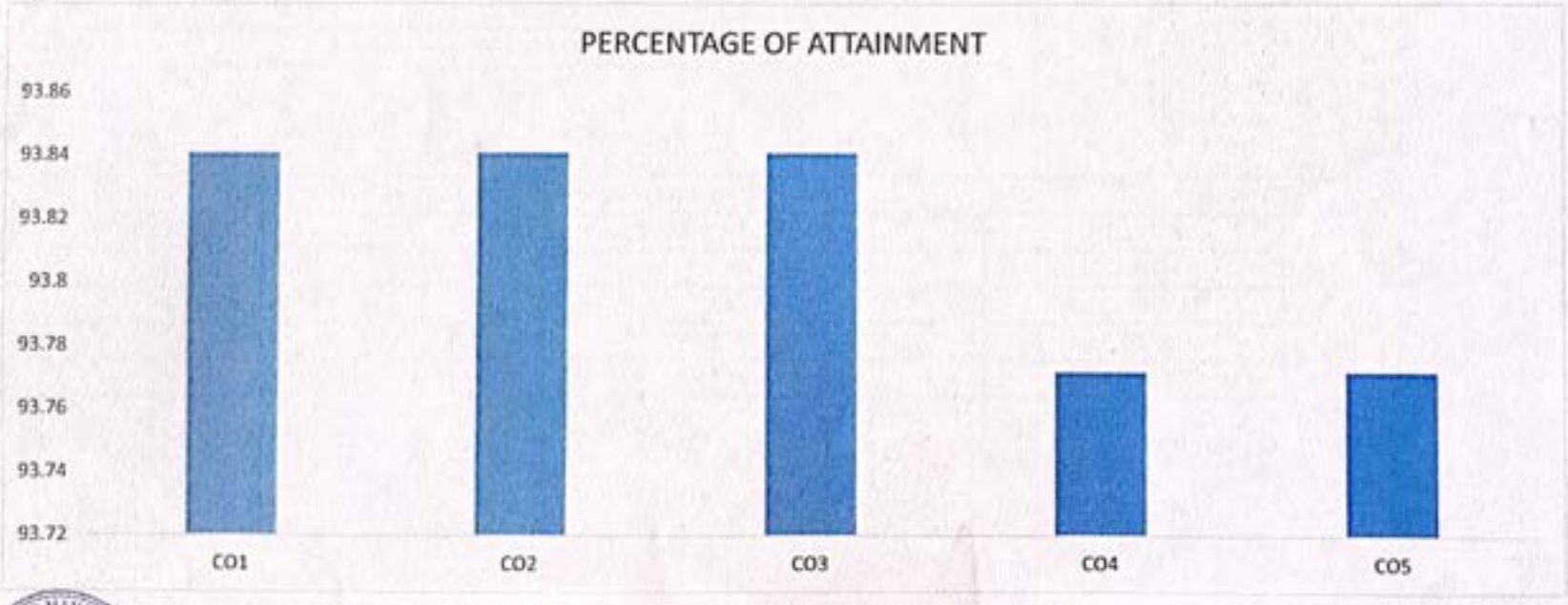
EXPECTED ATTAIMENT IN EACH CO - 85%

CO	INT. EXAM+ SEMINAR+ ASSIGNMENT	END SEM	TOTAL	%
CO1	4.76	75	79.76	93.84
CO2	4.76	75	79.76	93.84
CO3	4.76	75	79.76	93.84
CO4	4.71	75	79.71	93.77
CO5	4.71	75	79.71	93.77

COURSE ATTAINMENT FOR M.Sc., BIOTCHNOLOGY

SUBJECT NAME: IMMUNOLOGY
SUBJECT CODE: P16BT22
NO. OF STUDENTS: 17

COURSE OUTCOME	PERCENTAGE OF ATTAINMENT
CO1	93.84
CO2	93.84
CO3	93.84
CO4	93.77
CO5	93.77

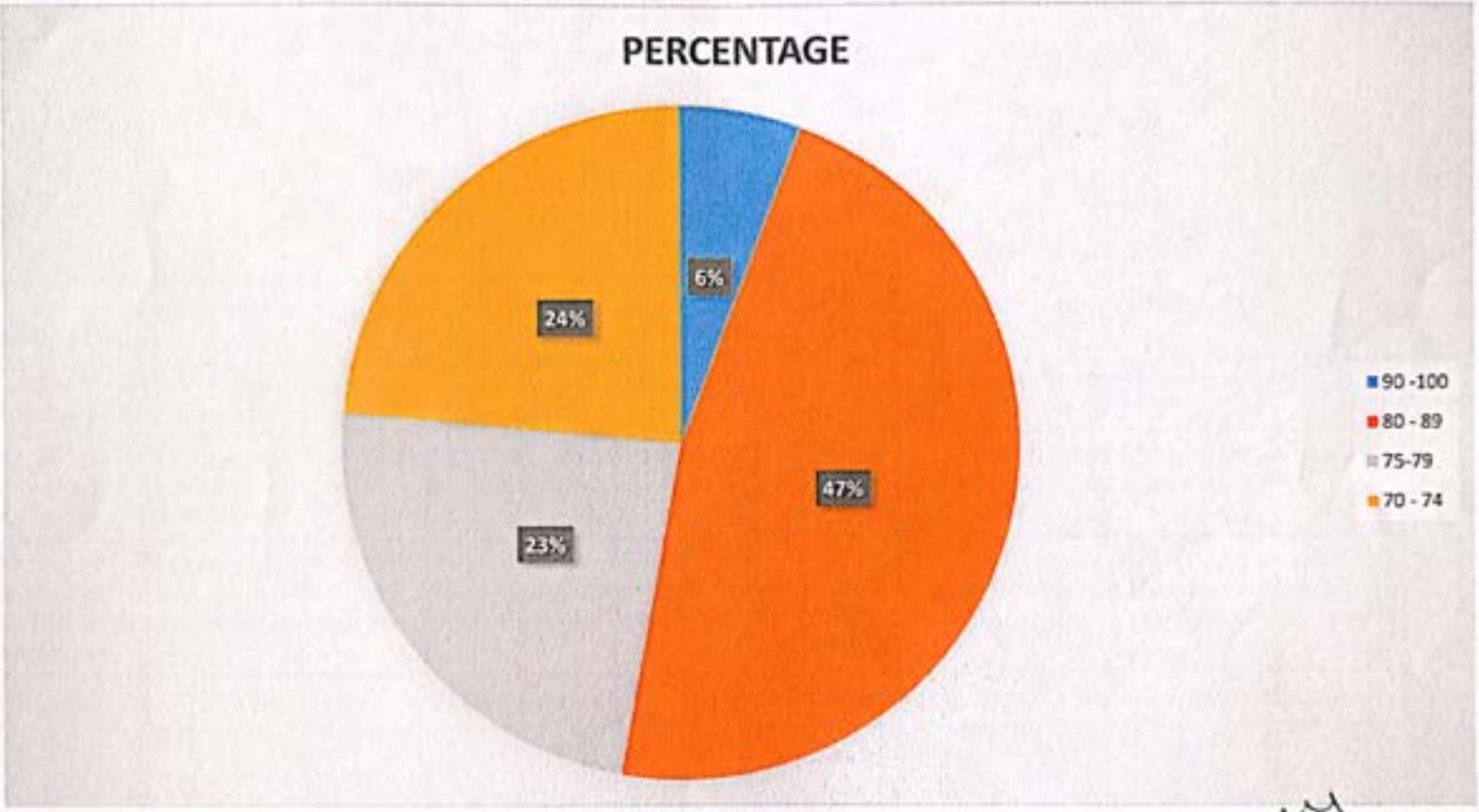


COURSE ATTAINMENT FOR M.Sc., BIOTCHNOLOGY

SUBJECT NAME: IMMUNOLOGY
SUBJECT CODE: P16BT22
NO. OF STUDENTS: 17

COURSE OUTCOME ASSESSMENT		
CATEGORY (MARKS)	NO.OF STUDENTS	STATUS
90-100	0	OUTSTANDING
80-89	1	EXCELLENT
75-79	2	DISTINCTION
70-74	1	VERY GOOD
60-69	3	GOOD
50-59	0	AVERAGE
0-49	7	REAPPEAR

COURSE OUTCOME ASSESSMENT IN PERCENTAGE		
CATEGORY (MARKS)	PERCENTAGE	STATUS
90 -100	5.80%	OUTSTANDING
80 - 89	47.00%	EXCELLENT
75-79	23.52%	DISTINCTION
70 - 74	23.52%	VERY GOOD



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PROGRAM OUTCOME M.Sc BIOTECHNOLOGY

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PO5	Student will get an idea about the basic understanding about Bioinformatics, tools, sequences, algorithms and the analysis of phylogenetic tree.

COURSE :LAB IN PLANT AND ANIMAL BIOTECHNOLOGY COURSE CODE:P16BT33P

COURSE OUTCOME

CO1	Introduction to the laboratory and general Safety Practices for plant cell, Plant growth and development. Laboratory Report Guidelines (Theory & Demo). Aseptic culture techniques for establishment and maintenance of cultures (Hands on).Tissue culture media preparation: Preparation of stock solutions of Murashige Skoog basal medium and plant growth regulator stocks (Hands on). Mechanical isolation of protoplast. Enzymatic isolation of protoplast and culture (Hands on). Isolation of plant genomic DNA by modified CTAB method (Hands on).
CO2	The cell cycle, plant vascular system & Photoperiodism. Transformation of leaf discs with Agrobacterium (Hands on). Expression of foreign genes into plant cells: use of Agrobacterium tumefaciens (Theory). Morphogenesis in tobacco leaf tissue (Hands on). Regeneration abilities of the Shoot Apical Meristem (SAM). Preparation of chloroplast from pea (Hands on). Effect of different light wavelengths on germinating corn embryos (Hands on)
CO3	Measurement of photosynthesis (Hands on). Stomata conductance & transpiration (Hands on) Separation of thylakoid and stromal proteins by SDS-Gel electrophoresis. Isolation of DNA & RNA from light and dark –grown seedlings.
CO4	Isolation of DNA from Animal liver. Isolation of DNA from human cheek cells. Isolation of DNA from blood
CO5	Quantification of DNA by spectrophotometeric method. Size analysis of DNA by Agarose gell electrophoresis. Isolation & identification of stem cells

PO→ CO↓	PO1	PO2	PO3	PO4	P05
CO1	5	5	5	5	5
CO2	5	5	4	5	4
CO3	5	5	5	5	5
CO4	5	4	5	4	5
CO5	5	5	5	4	4
Average	5	4.8	4.8	4.6	4.6

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COURSE :LAB IN PLANT AND ANIMAL BIOTECHNOLOGY COURSE CODE:P16BT33P

COURSE OUTCOME

CO1	Introduction to the laboratory and general Safety Practices for plant cell, Plant growth and development. Laboratory Report Guidelines (Theory & Demo). Aseptic culture techniques for establishment and maintenance of cultures (Hands on).Tissue culture media preparation: Preparation of stock solutions of Murashige Skoog basal medium and plant growth regulator stocks (Hands on). Mechanical isolation of protoplast. Enzymatic isolation of protoplast and culture (Hands on). Isolation of plant genomic DNA by modified CTAB method (Hands on).
CO2	The cell cycle, plant vascular system & Photoperiodism. Transformation of leaf discs with Agrobacterium (Hands on). Expression of foreign genes into plant cells: use of Agrobacterium tumefaciens (Theory). Morphogenesis in tobacco leaf tissue (Hands on). Regeneration abilities of the Shoot Apical Meristem (SAM). Preparation of chloroplast from pea (Hands on). Effect of different light wavelengths on germinating corn embryos (Hands on)
CO3	Measurement of photosynthesis (Hands on). Stomata conductance & transpiration (Hands on) Separation of thylakoid and stromal proteins by SDS-Gel electrophoresis. Isolation of DNA & RNA from light and dark –grown seedlings.
CO4	Isolation of DNA from Animal liver. Isolation of DNA from human cheek cells. Isolation of DNA from blood
CO5	Quantification of DNA by spectrophotometeric method. Size analysis of DNA by Agarose gell electrophoresis. Isolation & identification of stem cells

PO→ CO↓	PO1	PO2	PO3	PO4	P05
CO1	5	5	5	5	5
CO2	5	5	4	5	4
CO3	5	5	5	5	5
CO4	5	4	5	4	5
CO5	5	5	5	4	4
Average	5	4.8	4.8	4.6	4.6

PRINCIPAL
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THANJAVUR-5
PG DEPARTMENT OF BIOTECHNOLOGY
ATTAINMENT OF PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOME M.Sc BIOTECHNOLOGY

PO1	To know a thorough knowledge about structure and function of cells, cellular signaling, protein trafficking, bio molecules and cellular development.
PO2	To collect, deals with various types of classification of microbes and also throws light on multifarious habitats of microbes and provides information about all the microbial cellular functions and various metabolic pathways in microbes.
PO3	To study the structure, properties and metabolism of different biomolecules and to know the interrelationships between different metabolisms.To understand the basic concepts of immune system, elucidate the immune response of humans to foreign substances and to study the modern techniques of immunology that help determine human protection.
PO4	To study the various principles underlying genetic engineering that forms the basis of rDNA technology and to study the methodologies, and in brief the applications and related issues of rDNA technology and understanding about the basics of Animal cell culture, transgenic animals, pest & animal management, Molecular markers and regulations about the use of Biotechnology.To study the downstream processes for product recovery in fermentation.
PO5	Student will get an idea about the basic understanding about Bioinformatics, tools, sequences, algorithms and the analysis of phylogenetic tree and will give an idea about the basic principles and techniques involved in plant cell culture and to understand the concepts of transformation and achievements of biotechnology in Plant systems.To understand the chemical nature and associated microbes of food and to understand the principles of food processing, preservation and manufacture.

COURSE :LAB IN BIOPROCESS TECHNOLOGY AND FOOD TECHNOLOGY
SUB.CODE:P16BT43P
COURSE OUTCOME

CO1	Isolation of industrially important microorganisms. Selective isolation of actinomycetes – study their growth characteristics. Isolation and enumeration of lactic acid bacteria. Ethanol production by yeast.
CO2	Wine production by yeast – setting up a lab experiment. Estimation of alcohol content by colorimetric method and GLC. Enzyme production – amylase production.. Production of organic acids – citric acid production by solid state fermentation.
CO3	Antibiotic production by different strains of microbes (Theory). Test for sensitivity of microorganisms. Down stream processes of enzymes – dialysis. Ion exchange chromatography – drying – cellulose column chromatography
CO4	Immobilization of yeast cell by alginate beads. Bioassay techniques for antibiotics. Large scale production of organic acids, large scale production of solvents using fermentor (Demo).
CO5	Visit to Distillery unit; alcohol production and pharmacological industries. Pasteur Institute (Field visit). Isolation & identification microbes from spoiled food. Production of yogurt, butter.

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