SAPTHAGIRI COLLEGE OF ENGINEERING, BANGALORE – 57
(Affiliated to VTU, Belagavi, and Recognized by AICTE, New Delhi)
14/5, Chikkasandra, Hesaraghatta Main Road, Bengaluru-560057
DEPARTMENT OF BIOTECHNOLOGY

1.3.2 Number of courses that include experiential learning through project work/field work/internship during the year 2020 -21

Sl.No.	Program name	Program code	Name of the Course that include experiential learning through project work/field work/internship	Course code	Details of Experiential Learning through Projects/ Internship
FINAL YEAR					
1.	BIOTECHNOLOGY	BT	Fermentation Technology	17BT71	Extraction of Micro Crystalline Cellulose for the Production of Paper from Pomegranate peel
2.	BIOTECHNOLOGY	BT	Genomics and Proteomics	17BT72	Screening of Potential Plant compounds for lead molecules and their docking studies against G12R KRas 4b Protein
3.	BIOTECHNOLOGY	BT	Plant Biotechnology	17BT73	Identification of Drug Resistance mutation in Lung Cancer sample using next generation sequencing
4.	BIOTECHNOLOGY	BT	Fermentation Technology	17BTL76	Phytochemical analysis of *Asparagus racemosu*
5.	BIOTECHNOLOGY	BT	Plant Biotechnology Lab	17BTL77	Enumerate the degradation mechanism of an un-noticed macro pollutant in our daily life
6.	BIOTECHNOLOGY	BT	Project Phase 1	17BTP78	Evaluation of *Madhuca logifolia* for antioxidant and antidiabetic activity and its complications in experimental cell lines
7.	BIOTECHNOLOGY	BT	Clinical & Pharmaceutical Biotechnology	17BT81	Isolation And Characterization of thrombolytic agent from plant source
8.	BIOTECHNOLOGY	BT	Environmental Biotechnology	17BT833	Production of biopolymer using starch from organic source
9.	BIOTECHNOLOGY	BT	Internship/ Professional Practice	17BT84	Degradation of organic pollutants using the properties of nanotechnology and photocatalytic properties

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10.	BIOTECHNOLOGY	BT	Project Work-II	17BTP85	Isolation of Potential phytochemical from *Cassia tora* and *madhuca longifolia* for antiglycation activity
11.	BIOTECHNOLOGY	BT	Seminar on current trends in Engineering and Technology	17BTS86	
THIRD YEAR					
12.	BIOTECHNOLOGY	BT	Chemical Reaction Engineering	18BT52	Identification and isolation of Microorganisms involved in the spoilage of banana fruit
13.	BIOTECHNOLOGY	BT	Enzyme Technology & Biotransformation	18BT53	A novel separation method for isolating dissolved and suspended solids in dairy waste
14.	BIOTECHNOLOGY	BT	Genomics & Proteomics	18BT54	Extraction of biosurfactant
15.	BIOTECHNOLOGY	BT	Bioanalytical Techniques	18BT55	Co Composting of coir pith with organic manure
16.	BIOTECHNOLOGY	BT	Genetic Engineering &Applications	18BT56	Pharmacological Activites of *Garcinia cambogia*
17.	BIOTECHNOLOGY	BT	Biokinetics & Enzyme Technology Laboratory	18BTL57	A pilot study on enrichment of seed coating using waste fruit peel for seed growth
18.	BIOTECHNOLOGY	BT	Genetic Engineering and Cell Culture Laboratory	18BTL58	Indian medicinal plant database
19.	BIOTECHNOLOGY	BT	Process Control & Automation Chemical	18BT61	Knowledge discovery of plants secondary metabolites
20.	BIOTECHNOLOGY	BT	Bioinformatics	18BT63	Drug likeness of plant secondary metabolites using Molsoft
21.	BIOTECHNOLOGY	BT	Bioinformatics Laboratory	18BTL67	Nanotechnology/Nanomedicine in the treatment of neurological disorders
22.	BIOTECHNOLOGY	BT	Mini-project	18BTMP68	Iot Based Automated Hydroponic Systems

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23.	BIOTECHNOLOGY	BT			Coagulation of diary waste
SECOND YEAR					
24.	BIOTECHNOLOGY	BT	Microbiology	18BT32	Isolation and Characterization of Pseudomonas species from soil and its application in minimum inhibition of heavy metal Lead
25.	BIOTECHNOLOGY	BT	Unit Operations	18BT33	Extraction and Estimation of Lycopene from different sources.
26.	BIOTECHNOLOGY	BT	Introduction to Biomolecules	18BT34	To study the impact of Biochemical parameters on enzyme activity
27.	BIOTECHNOLOGY	BT	Microbiology Laboratory	18BTL37	Estimation of reducing sugar from fruit extract
28.	BIOTECHNOLOGY	BT	Unit Operations Laboratory	18BTL38	Study of antimicrobial properties of plant extract from *Madhuca longifolia* and *Garcinia cambogia*
29.	BIOTECHNOLOGY	BT	Stoichiometry	18BT41	Extraction and Characterization of starch from *Solanum Tuberosum* and *Zea mays*
30.	BIOTECHNOLOGY	BT	Molecular Biology	18BT42	Automatic hand sanitizer based on ultrasonic sensor
31.	BIOTECHNOLOGY	BT	Immunotechnology	18BT43	Extraction of Polyphenolic Components from Rosella
32.	BIOTECHNOLOGY	BT	Cell Culture Techniques	18BT44	Isolation Identification and Characterization of Phosphate Solubilizing bacteria from soil
33.	BIOTECHNOLOGY	BT	Clinical Biochemistry	18BT46	Pharmacological review on *Justica wyaadensis*
34.	BIOTECHNOLOGY	BT	Biochemistry Laboratory	18BTL47	Isolation of genomic DNA from different plant sources
35.	BIOTECHNOLOGY	BT	Immunotechnology Laboratory	18BTL48	Preparation of Bioplastics using Agar and Glycerol

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VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI
CHOICE PASED CREDIT SYSTEM (CBCS)
SCHEME OF TEACHING AND EXAMINATION 2017-2018

B.E-BIOTECHNOLOGY

VII SEMESTER

Sl. No.	Course Code	Title	Teaching Department	Teaching Hours /Week		Examination				Credits
				Theory	Practical/ Drawing	Duration in hours	SEE Marks	CIE Marks	Total Marks	
1	17BT71	Fermentation Technology	BT/CHE	04		03	60	40	100	4
2	17BT72	Genomics & Proteomics	BT	04		03	60	40	100	4
3	17BT73	Plant Biotechnology	BT	04		03	60	40	100	4
4	17BT74X	Professional Elective-3	BT/CHE	03		03	60	40	100	3
5	17BT75X	Professional Elective-4	BT/CHE	03		03	60	40	100	3
6	17BTL76	Fermentation Technology Laboratory	BT/CHE	01-Hour Instruction 02-Hour Practical		03	60	40	100	2
7	17BTL77	Plant Biotechnology Laboratory	BT	01-Hour Instruction 02-Hour Practical		03	60	40	100	2
8	17BTP78	Project Work Phase–I + Project work Seminar	BT		03	--	--	100	100	2
TOTAL				**Theory:18 hours Practical and Project: 09 hours**		**21**	**420**	**380**	**800**	**24**

Professional Elective-3		**Professional Elective-4**	
17BT741	Health Informatics	17BT751	Dairy Biotechnology
17BT742	Bioreactor Design Concepts	17BT752	Forensic Science
17BT743	Lab to Industrial Scaling	17BT753	Molecular Diagnostics
17BT744	Food Biotechnology	17BT754	Big Data Management

1. **Project Phase – I and Project Seminar:** Comprises of Literature Survey, Problem identification, Objectives and Methodology. CIE marks shall be based on the report covering Literature Survey, Problem identification, Objectives and Methodology and Seminar presentation skill.

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI
CHOICE BASED CREDIT SYSTEM (CBCS)
SCHEME OF TEACHING AND EXAMINATION 2017-2018

B.E-BIOTECHNOLOGY

VIII SEMESTER

Sl. No.	Course Code	Title	Teaching Department	Teaching Hours /Week		Examination				Credits
				Theory	Practical/ Drawing	Duration in hours	SEE Marks	CIE Marks	Total Marks	
1	17BT81	Clinical & Pharmaceutical Biotechnology	BT	4	-	3	60	40	100	4
2	17BT82	Regulatory affairs in Biotech Industry	BT/MBA	4	-	3	60	40	100	4
3	17BT83X	Professional Elective-5	BT	3	-	3	60	40	100	3
4	17BT84	Internship/ Professional Practice	BT	Industry Oriented		3	50	50	100	2
5	17BTP85	Project Work-II	BT	-	6	3	100	100	200	6
6	17BTS86	Seminar on current trends in Engineering and Technology	BT	-	4	-	-	100	100	1
TOTAL				**Theory: 11 hours Project and Seminar: 10 hours**		**15**	**330**	**370**	**700**	**20**

Professional Elective -5	
17BT831	Protein Engineering and insilico drug design
17BT832	Metbolic Engineering
17BT833	Environmental Biotechnology

1. Internship/ Professional Practice: 4 Weeks internship to be completed between the (VI and VII semester vacation) and/or (VII and VIII semester vacation) period

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Scheme of Teaching and Examination 2018 – 19
Outcome Based Education(OBE) and Choice Based Credit System (CBCS)
(Effective from the academic year 2018 – 19)

Programme: BIOTECHNOLOGY

V SEMESTER

Sl. No	Course and Course Code		Course Title	Teaching Department	Teaching Hours /Week			Examination				Credits
					Theory Lecture	Tutorial	Practical/ Drawing	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P					
1	HSMC	18BT51	Bio-Business and Entrepreneurship	HSMC/Biotech	3	--	--	03	40	60	100	3
2	PCC	18BT52	Chemical Reaction Engineering	Chemical/Biotech	4	1	--	03	40	60	100	4
3	PCC	18BT53	Enzyme Technology & Biotransformation	Biotech	4	--	--	03	40	60	100	4
4	PCC	18BT54	Genomics & Proteomics	Biotech	3	1	--	03	40	60	100	3
5	PCC	18BT55	Bioanalytical Techniques	Biotech	3	--	--	03	40	60	100	3
6	PCC	18BT56	Genetic Engineering &Applications	Biotech	3	--	--	03	40	60	100	3
7	PCC	18BTL57	Biokinetics & Enzyme Technology Laboratory	Chemical/Biotech	--	2	2	03	40	60	100	2
8	PCC	18BTL58	Genetic Engineering and Cell Culture Laboratory	Biotech	--	2	2	03	40	60	100	2
9	HSMC	18CIV59	Environmental Studies	Civil/ Environmental [Paper setting: Civil Engineering Board]	1	--	--	02	40	60	100	1
					Examination is by objective type questions							
				TOTAL	**21**	**06**	**04**	**26**	**360**	**540**	**900**	**25**

Note: BSC: Basic Science, PCC: Professional Core, HSMC: Humanity and Social Science, NCMC: Non-credit mandatory course.

continued

AICTE Activity Points to be earned by students admitted to BE/B. Tech./B. Plan. day college programme (For more details refer to Chapter 6,AICTE Activity Point Programme, Model Internship Guidelines):

Over and above the academic grades, everyday College regular student admitted to the 4 years Degree programme and every student entering 4 years Degree programme through lateral entry, shall earn 100 and 75 Activity Points respectively for the award of degree through AICTE Activity Point Programme. Students transferred from other Universities to fifth semester are required to earn 50 Activity Points from the year of entry to VTU. The Activity Points earned shall be reflected on the student's eighth semester Grade Card.

The activities can be spread over the years, anytime during the semester weekends and holidays, as per the liking and convenience of the student from the year of entry to the programme. However, minimum hours' requirement should be fulfilled. Activity Points (non-credit) have no effect on SGPA/CGPA and shall not be considered for vertical progression.

In case students fail to earn the prescribed activity Points, Eighth semester Grade Card shall be issued only after earning the required activity Points. Students shall be admitted for the award of degree only after the release of the Eighth semester Grade Card.

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Programme: BIOTECHNOLOGY

VI SEMESTER

Sl. No	Course and Course Code		Course Title	Teaching Department	Teaching Hours /Week			Examination				Credits
					Theory Lecture	Tutorial	Practical/ Drawing	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P					
1	PCC	18BT61	Process Control & Automation	Chemical	4	1	--	03	40	60	100	4
2	PCC	18BT62	Bioprocess Equipment Design & CAED	Chemical	4	2	--	04	40	60	100	4
3	PCC	18BT63	Bioinformatics	Biotech	4	--	--	03	40	60	100	4
4	PEC	18BT64X	Professional Elective -1	Biotech	3	--	--	03	40	60	100	3
5	OEC	18BT65X	Open Elective -A	Biotech	3	--	--	03	40	60	100	3
6	PCC	18BTL66	Process Control & Automation Laboratory	Chemical	--	2	2	03	40	60	100	2
7	PCC	18BTL67	Bioinformatics Laboratory	Biotech	--	2	2	03	40	60	100	2
8	MP	18BTMP68	Mini-project	-	--	1	2	03	40	60	100	2
9	Internship	--	Internship		To be carried out during the vacation/s of VI and VII semesters and /or VII and VIII semesters.							
				TOTAL	**18**	**08**	**06**	**25**	**320**	**480**	**800**	**24**

Note: PCC: Professional core, PEC: Professional Elective, OE: Open Elective, MP: Mini-project.

Mini-project work:
Based on the ability/abilities of the student/s and recommendations of the mentor, a single discipline or a multidisciplinary Mini-project can be assigned to an individual student or to a group having not more than 4 students.

CIE procedure for Mini-project:

(i) Single discipline: The CIE marks shall be awarded by a committee consisting of the Head of the concerned Department and two senior faculty members of the Department, one of whom shall be the Guide.

The CIE marks awarded for the Min-project work, shall be based on the evaluation of project report, project presentation skill and question and answer session in the ratio 50:25:25.The marks awarded for the project report shall be the same for all the batch mates.

(ii) Interdisciplinary: Continuous Internal Evaluation shall be group wise at the college level with the participation of all guides of the college.

The CIE marks awarded for the Mini-project, shall be based on the evaluation of project report, project presentation skill and question and answer session in the ratio 50:25:25.The marks awarded for the project report shall be the same for all the batch mates.

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Programme: BIOTECHNOLOGY

III SEMESTER

Sl. No	Course and Course Code		Course Title	Teaching Department	Teaching Hours /Week			Examination				Credits
					Theory Lecture	Tutorial	Practical/ Drawing	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P					
1	BSC	18BT31	Biostatistics	Mathematics	3	1	--	03	40	60	100	3
2	PCC	18BT32	Microbiology	Biotech	4	0	--	03	40	60	100	4
3	PCC	18BT33	Unit Operations	Chemical/Biotech	3	1	--	03	40	60	100	3
4	PCC	18BT34	Introduction to Biomolecules	Biotech	3	1	--	03	40	60	100	3
5	PCC	18BT35	Cell Biology and Genetics	Biotech	3	0	--	03	40	60	100	3
6	PCC	18BT36	Python Programming	CSE	3	1	--	03	40	60	100	3
7	PCC	18BTL37	Microbiology Laboratory	Biotech	--	2	2	03	40	60	100	2
8	PCC	18BTL38	Unit Operations Laboratory	Chemical/Biotech	--	2	2	03	40	60	100	2
9	HSMC	18KVK39	Vyavaharika Kannada (Kannada for communication)/	HSMC	--	2	--	--	100	--	100	1
		18KAK39	Aadalitha Kannada (Kannada for Administration)									
		OR										
		18CPC39	Constitution of India, Professional Ethics and Cyber Law		1	--	--	02	40	60		
					Examination is by objective type questions							
				TOTAL	19 OR 20	08 OR 10	04	24 OR 26	420 OR 360	480 OR 540	900	24

Note: BSC: Basic Science, PCC: Professional Core, HSMC: Humanity and Social Science, NCMC: Non-credit mandatory course.

18KVK39Vyavaharika Kannada (Kannada for communication) is for non-Kannada speaking, reading and writing students and 18KAK39 Aadalitha Kannada (Kannada for Administration) is for students who speak, read and write Kannada.

Course prescribed to lateral entry Diploma holders admitted to III semester of Engineering programs

10	NCMC	18MATDIP31	Additional Mathematics - I	Mathematics	02	01	--	03	40	60	100	0

(a)The mandatory non – credit courses Additional Mathematics I and II prescribed for III and IV semesters respectively, to the lateral entry Diploma holders admitted to III semester of BE/B. Tech. programs shall attend the classes during the respective semesters to complete all the formalities of the course and appear for the University examination. In case, any student fails to register for the said course/fails to secure the minimum 40 % of the prescribed CIE marks, he/she shall be deemed to have secured F grade. In such a case, the students have to fulfill the requirements during subsequent semester/s to appear for SEE.

(b)These Courses shall not be considered for vertical progression, but completion of the courses shall be mandatory for the award of degree.

Courses prescribed to lateral entry B.Sc. degree holders admitted to III semester of Engineering programs

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Scheme of Teaching and Examination 2018 – 19
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Programme: BIOTECHNOLOGY

IV SEMESTER

Sl. No	Course and Course Code		Course Title	Teaching Department	Teaching Hours /Week			Examination				Credits
					Theory Lecture	Tutorial	Practical/ Drawing	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P					
1	PCC	18BT41	Stoichiometry	Chemical/Biotech	3	1	--	03	40	60	100	3
2	PCC	18BT42	Molecular Biology	Biotech	4	0	--	03	40	60	100	4
3	PCC	18BT43	Immunotechnology	Biotech	3	0	--	03	40	60	100	3
4	PCC	18BT44	Cell Culture Techniques	Biotech	3	0	--	03	40	60	100	3
5	PCC	18BT45	Biochemical Thermodynamics	Chemical/Biotech	3	1	--	03	40	60	100	3
6	PCC	18BT46	Clinical Biochemistry	Biotech	3	0	--	03	40	60	100	3
7	PCC	18BTL47	Biochemistry Laboratory	Biotech	--	2	2	03	40	60	100	2
8	PCC	18BTL48	Immunotechnology Laboratory	Biotech	--	2	2	03	40	60	100	2
9	HSMC	18KVK49	Vyavaharika Kannada (Kannada for communication)/	HSMC OR	--	2	--	--	100	--	100	1
		18KAK49	Aadalitha Kannada (Kannada for Administration)									
		18CPC49	Constitution of India, Professional Ethics and Cyber Law		1	--	--	02	40	60		
					Examination is by objective type questions							
				TOTAL	19 OR 20	06 OR 08	04	24 OR 26	420 OR 360	480 OR 540	900	24

Note: BSC: Basic Science, PCC: Professional Core, HSMC: Humanity and Social Science, NCMC: Non-credit mandatory course.

18KVK49Vyavaharika Kannada (Kannada for communication) is for non-Kannada speaking, reading and writing students and 18KAK49 Aadalitha Kannada (Kannada for Administration) is for students who speak, read and write Kannada.

Course prescribed to lateral entry Diploma holders admitted to III semester of Engineering programs

10	NCMC	18MATDIP41	Additional Mathematics - II	Mathematics	02	01	--	03	40	60	100	0

(a)The mandatory non – credit courses Additional Mathematics I and II prescribed for III and IV semesters respectively, to the lateral entry Diploma holders admitted to III semester of BE/B. Tech. Programs shall attend the classes during the respective semesters to complete all the formalities of the course and appear for the University examination. In case, any student fails to register for the said course/fails to secure the minimum 40 % of the prescribed CIE marks, he/she shall be deemed to have secured F grade. In such a case, the students have to fulfill the requirements during subsequent semester/s to appear for SEE.
(b)These Courses shall not be considered for vertical progression, but completion of the courses shall be mandatory for the award of degree.

Courses prescribed to lateral entry B.Sc. degree holders admitted to IV semester of Engineering programs