Sapthagiri College of Engineering

(Affiliated to Visvesvaraya Technological University, Belagavi & Approved by AICTE, New Delhi)
(ISO: 9001-2015 and ISO: 14001-2015 certified, NAAC accredited with A Grade)

#14/5, Chikkasandra, Hesaraghatta Main Road, Bengaluru – 560057
Phone: 080-28372800/1/2 www.sapthagiri.edu.in   Fax: 080-28372797

AY 2023-24

Department of Biotechnology

1.3.1 Institution integrates cross-cutting issues relevant to Gender, Environment and Sustainability, Human Values and Professional Ethics into the Curriculum

PROGRAM EDUCATIONAL OBJECTIVES (PEO)

The program educational objectives of Bachelor of Engineering in Biotechnology at Sapthagiri College of Engineering are broadly defined on following four counts.

PEO 1: Students will be in lucrative professionals in different sectors of Biotechnology fields with high proficiency in multidisciplinary tasks.

PEO 2: Operate technically at competent level in concocting problems of biotechnology and utilize the knowledge to develop Biological processes and Bio-techniques.

PEO 3: Students will endure higher education with harmonious combination of the skills of engineering, management & life science

PEO 4: Students will inculcate Socio-ethical values, exhibit professionalism, team spirit for lifelong learning and well-being of society and mankind.

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![Sapthagiri College of Engineering logo] **SAPTHAGIRI** College of Engineering Creating Tomorrow

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PROGRAM SPECIFIC OUTCOMES (PSO)

At the end of the B.E Biotechnology engineering program, the students are expected to have developed the following program specific outcomes.

PSO 1: Acquire exhaustive knowledge of theoretical and practical aspects in biotechnology

PSO 2: Apply the accomplished skills and modern tools to obtain sustainable solutions to complex problems.

PSO 3: Decipher the interdisciplinary skills of biotechnology to address the different ethical, legal and social issues in Biotechnology.

PROGRAM OUTCOMES (POs)

Program outcomes are narrower statements that describe what students are expected to know and be able to do by the time of graduation. These relate to the skills, knowledge and behavior. Graduation of **Bachelor of Biotechnology** program at Sapthagiri College of Engineering will attain the following program outcomes **in the field of Biotechnology.**

PO 1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO 2. Problem analysis: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO 3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

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PO 4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO 5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO 6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO 7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO 8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO 9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO 10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO 11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO 12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

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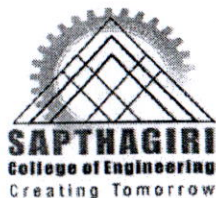
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Courses that integrates with Gender, Environment and Sustainability, Human Values and Professional Ethics into the Curriculum.

Sl.No.	Subject Name /Code	Beyond Syllabus	Innovative teaching methods / ICT Tools Used	Deployment Strategy and Tool	Cross-cutting issues integrated	PO	PSO
1.	BBT301 Cell Biology and Genetics	----------	Google classroom & Google meet	Chalk and Talk method	-----------------	PO1, 2,3,4,5,6	PSO1,2
2.	BBT302 Unit Operations + Lab	Conduction of new experiments which are beyond the syllabus	Google classroom & Google meet	Chalk and Talk method / PPT, Projectwork, Internship	----------	PO1,2,3,4 ,9,10,11,12	PSO1,2 / PSO 1,2
3.	BBT303 Biochemistry +Lab	Conduction of new experiments which are beyond the syllabus	Google classroom & Google meet	Chalk and Talk method / PPT	---------- ----------	PO1,2,3, 9,10,11	
4.	BBT304 Microbiology	----------	Google classroom & Google meet	Chalk and Talk method,PPT		PO1,2,5,12	PSO1
5.	BBTL305 Microbiology Lab	Conduction of new experiments which are beyond the syllabus	Google classroom & Google meet	Chalk and Talk method,PPT	----------	PO1,2,3,4, 9,11	PSO1,2

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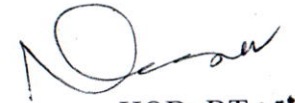
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39.	18BT81 Regulatory affairs in Biotechnology	----------	Google classroom	Chalk and Talk method	------------------------	PSO1,2
				PPT	PO 1,2,3,10,12	
40.	18BT821 Environmental biotechnology	----------	Google classroom	Chalk and Talk method	Environmental Sustainability	PO1,2,3,4,7,9,11
				PPT		PSO1,2
41.	18BT822 Industrial Microbiology	----------	Google classroom	Chalk and Talk method	Environmental Sustainability	PO1,2,3,4,7,9,11
				PPT		PSO1,2
42.	18BTP83 Project Phase 2	----------	-------	PPT	"Environmental Sustainability Human Value and Professional ethics"	PO1,2,3,4,5,6,7,8,9,10 PSO1,2,3
43.	18BTS84 Technical Seminar	----------	-------	PPT	"Environmental Sustainability Human Value and Professional ethics"	PO1,2,3,4,5,6,7,8,9,10 PSO1,2,3
44.	18BTI85 Internship	----------	--------	PPT	"Environmental Sustainability Human Value and Professional ethics"	PO1,2,3,4,5,6,7,8,9,10 PSO1,2,3

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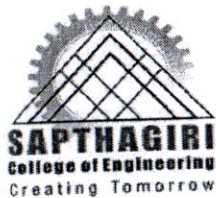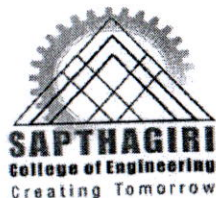(ISO: 9001-2015 and ISO: 14001-2015 certified, NAAC accredited with A Grade)

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No.	Course		Google meet	PPT,Project			
30.	INT21INT68 Innovation/Entrepreneurship /Societal Internship	---------	Google classroom & Google meet	Chalk and Talk method PPT	Human Value and Professional ethics	PO 1,2,3,8,10,11,12	PSO 1,2
31.	18BT71 Bioprocess Engineering	---------	Google classroom	Chalk and Talk method, NPTEL Videos, PPT	------------------	PO1,3,4,6, 9,10	PSO1,2
32.	18BT72 Clinical & Pharmaceutical Biotechnology	---------	Google classroom	Chalk and Talk method, NPTEL Videos, PPT	----------	PO 1,2,3,8,10,11,12	PSO1,2, PSO1,2
33.	18T732Bioreactor Design Concepts	---------	Google classroom	Chalk and Talk method You tube,PPT,Project and Intership	----------	PO 1,2,3,8,10,11,12	
34.	18BT742Agricultural Biotechnology	---------	Google classroom	Chalk and Talk method PPT	----------	PO 1,2,3,4,9,10,12	PSO1,2 PSO1,2
35.	18BT752 Forensic science	Group Discussion and case studies	Google classroom	Chalk and Talk method PPT	Human Value and Professional ethics	PO1,2,4,6,8,10	PSO1,2
36.	18BTL76Bioprocess Engineering Laboratory	Conduction of new experiments which are beyond the syllabus	Google classroom	Chalk and Talk method ,Project and Intership	--------------------	PO1,2,3,4,9,10,11,12	
37.	18BTP77 Project phase 1	----------	----------	PPT	"Environmental Sustainability Human Value and Professional ethics"	PO1,2,3,4,5,6,7,8,9,10	PSO1,2,3
38.	18BT71Internship	----------	----------	PPT	"Environmental Sustainability Human Value and Professional ethics"	PO1,2,3,4,5,6,7,8,9,10	PSO1,2,3

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No.	Course	(Beyond syllabus)	Online platform	Teaching method	Value addition	PO	PSO
			Google meet	Internship			PSO1,2
22.	21BT582 Extraction Methods and Herbal products	----------	Google classroom & Google meet	Chalk and Talk method You tube PPT	----------	PO1,2,3,4,6,9,10,11,12	
23.	HSMC21BT61 Biobusiness Management and Entrepreneurship	----------	Google classroom & Google meet	Chalk and Talk method, , PPT	Human Value and Professional ethics	PO1,2,3,4,6,8,9,10,11,12	PSO1,2,3
24.	IPCC21BT62 Bioprocess Principles, Control &Automation + Lab	- Conduction of new experiments which are beyond the syllabus	Google classroom & Google meet	Chalk and Talk method, NPTEL Videos, PPT	----------	PO1,2,3,6,8	PSO1,2
25.	PCC21BT63 Enzyme Technology	----------	Google classroom &Google meet	Chalk and Talk method,Project and Internship	----------	PO 1,2,3,4,9,10,12	PSO1,2
26.	21BT641 Human Anatomy and Physiology	Conduction of new experiments which are beyond the syllabus	Google classroom & Google meet	Chalk and Talk method, NPTEL Videos, PPT	----------	PO1,2,3,4,6,9,10,11,12	PSO1,2 PSO1,2,3
27.	21BT651 Ecology and Ecosystem	----------	Google classroom & Google meet	Chalk and Talk method PPT	Environmental Sustainability	PO1,2,3,4,6,7,9,10,11,12	PSO1,2
28.	PCC21BTL66 Enzyme Technology lab	- Conduction of new experiments which are beyond the syllabus	Google classroom & Google meet	Chalk and Talk method PPT	----------	PO1,2,3,4,5, 9,10,12	PSO 1,2
29.	MP21BTMP67 Mini project	----------	Google classroom &	Chalk and Talk method	Human Value and Professional ethics	PO 1,2,3,8,10,11,12	

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		syllabus					
13.	BBT456D Biopesticides and Biofertilizers		Google classroom & Google meet	Chalk and Talk method, PPT, you tube videos	----------------	PO1,2,3,4,6,9,10,11,12	PSO1,2
14.	BBT405C Bioprocess Principles and Stoichiometry	Conduction of new experiments which are beyond the syllabus	Google classroom & Google meet	Chalk and Talk method PPT	-----------	PO1,2,3,4,6,9,10,11,12	PSO1,2
15.	PCC21BT51 Biokinetics & Bioreaction engineering	----------	Google classroom & Google meet	Chalk and Talk method PPT	----------	PO1,2,3,6	PSO1,2
16.	IPCC21BT52 Immunotechnology+lab	Conduction of new experiments which are beyond the syllabus	Google classroom & Google meet	PPT	----------	PO1,2,3,4,6,9,10,11,12	PSO1,2
17.	PCC21BT53 Structural biology &Analytical techniques	----------------	Google classroom & Google meet	PPT	----------	PO1,2,3,4,8,9,11	PSO1,2
18.	PCC21BT54 Genomics, Proteomics &Bioinformatics	--------------	Google classroom & Google meet	PPT	**Human Value and Professional ethics**	PO1,2,3,4,6,8,9,10,11,12	PSO1,2
19.	PCC21BTL55 Bioinformatics lab	----------	Google classroom & Google meet	Chalk & talk, PPT, webinars,	----------	PO1,2,3,4,6,9,10,11,12	PSO1,2,3
20.	AEC21BT56 Research methodology & Intellectual property rights	----------	Google classroom & Google meet	Chalk and Talk method PPT	**Human Value and Professional ethics**	PO1,2,3,4,6,8,9,10,11,12	PSO1,2,3
21.	HSMC21CIV57 Environmental Studies	----------	Google classroom &	Chalk and Talk method,Project and	**Environmental Sustainability**	PO1,2,3,4,6,7,9,10,11,12	PSO1,2,3

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6.	BSCK307 Social Connect and Responsibility		Google classroom & Google meet	Chalk and Talk method PPT,Project and internship	**Human Value and Professional ethic**	PO1,2,3,4,6,8	PSO1,2,3
7.	BBT306B Human Anatomy and Physiology	----------	Google classroom & Google meet	Chalk and Talk method PPT	----------	PO1,2,3,9,10,11	PSO 1,2
8.	BBTL358C Analysis Of Dairy Products Lab	- Conduction of new experiments which are beyond the syllabus	Google classroom & Google meet	Chalk and Talk method PPT	-------------	PO 1,2,3,4,11,12	PSO 1,2
9.	BBT401 Molecular Biology & Genetic Engineering	Conducted Quiz Seminar	Google classroom & Google meet	Chalk and Talk method PPT,You tube videos	--------------	PO1,2,3,10,12	PSO1,2
10.	BBT402 Biostatistics and Tools + Lab	- Conduction of new experiments which are beyond the syllabus	Google classroom & Google meet	Chalk and Talk method PPT, NPTEL videos	----------	PO1,2,3,4,6,9,10,11,12	PSO1,2
11.	BBT403 Immunotechnology + Lab	Conduction of new experiments which are beyond the syllabus	Google classroom & Google meet	Chalk and Talk method PPT	----------	PO1,2,3,4,6,9,10,11,12	PSO1,2
12.	BBTL404 Molecular Biology & Genetic Engineering Lab	Conduction of new experiments which are beyond the	Google classroom & Google meet	Chalk and Talk method PPT	-------------	PO1,2,3,4,6,9,10,11,12	PSO 1,2