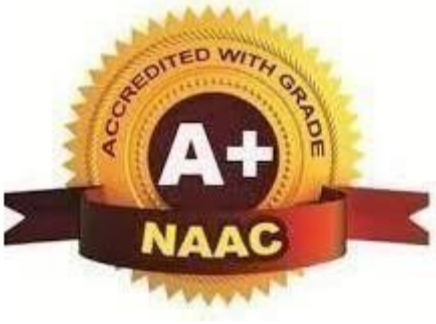
TULSIRAMJI GAIKWAD-PATIL College of Engineering & Technology

Mohgaon, Wardha Road, Nagpur - 441 108

An Autonomous Institute



Department
of
Biotechnology Engineering

B.Tech. Biotechnology Engineering

Teaching Scheme

7th and 8th Semester

Considering

National Education Policy 2020

From

AcademicYear2026-27

Vision of Institute

To emerge as a learning Center of Excellence in the National Ethos indomains of Science, Technology and Management.

Mission of Institute

1. Tostriveforrearingstandardandstatureofthestudentsbypracticinghigh standards of professional ethics, transparency and accountability.
2. To provide facilities and services to meet the challenges of Industry and Society.
3. To facilitate socially responsive research, innovation and entrepreneurship.
4. Toascertainholisticdevelopmentofthestudentsandstaffmembersbyinculcating knowledge and profession as work practices.

Vision of the Department

"To produce competent Entrepreneurs, Researchers and industry ready Professionals in Biotechnology through quality education."

Mission of the Department

- To impart quality technical education and unique interdisciplinary research by merging science and technology
- To make students aware about techniques of modern biotechnology and industrial advancements
- To Inculcate Social and Ethical values in the students and empower them through imparting of knowledge and skills in biotechnology

Program Education Objectives(PEO)

PEO1: Develop Biotechnology graduates as human resource with technical competencies and strong foundation of science and engineering.

PEO2: Acquire fundamental knowledge of mathematics, Biosciences and engineering to analyze, design and implement solutions to the Biotechnological problems.

PEO3: Understand emerging concepts and trends in Biotechnology and allied fields

PEO4: Apply various tools to develop innovative systems for the bioprocesses

Program Outcomes(PO)

PO1: Engineering Knowledge: Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to develop to the solution of complex engineering problems.

PO2: Problem Analysis: Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4)

PO3: Design/Development of Solutions: Design creative solutions for complex engineering problems and design/develop systems/ components/ processes to meet identified needs with considerationforthepublichealthandsafety,whole-lifecost,netzerocarbon,culture,society and environment as required. (WK5)

PO4: Conduct Investigations of Complex Problems: Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modelling, analysis & interpretation of data to provide valid conclusions. (WK8).

PO5:Engineering Tool Usage: Create, select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems. (WK2 and WK6)

PO6: The Engineer and The World: Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture and environment. (WK1, WK5, and WK7). **PO7:Ethics:**Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9)

PO8: Individual and Collaborative Team work: Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.

PO9: Communication: Communicate effectively and inclusively within the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences

PO10: Project Management and Finance: Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.

PO11:Life-LongLearning: Recognizetheneedfor, and have the preparation and ability for

i) independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change. (WK8)

Program Specific Outcomes(PSO)

PSO1:	Ability to apply the acquired knowledge and recent techniques to come up with ideas in the domains of Bioprocess Engineering, Bioinformatics and Biopharmaceuticals
PSO2:	Ability to utilize their proficiency and skills in solving real life problems in Diagnostics Genetic Engineering and Fermentation Technology using recent technologies.
PSO3:	Analyzing the impact of Biotechnology Engineering solutions in the societal and human context to create productive human resource for the country.

TulsiramjiGaikwad-PatilCollegeofEngineering&Technology,Nagpur

(AnAutonomousInstitutionAffiliatedtoRTMNagpurUniversity,Nagpur)

SCHEMEOFINSTRUCTIONS &SYLLABI

Programme:Biotechnology Engineering

SchemeofInstructions: :FinalYearB.Tech.inBiotechnology Engineering

Semester–VII

Sr. No.	Course Category	Course Code	CourseTitle	T/P	Contact Hours			Credits	ExamScheme			ESE Duration (Hours)	Total Marks
					L	P	Hrs.		CT/IA	CA	ESE		
1	**PCC**	BBT34701	Fermentation Technology	T	4	-	4	4	30	10	60	3	100
2	**PCC**	BBT34702	Bioprocess Equipment Design	T	4	-	4	3	30	10	60	3	100
3	**PCC**	BBT34710	Bioprocess Equipment Design Lab	P	-	2	2	1		25	25	2	50
4	**PEC**	BBT34704-06	Professional Elective- IV	T	4	-	4	4	30	10	60	3	100
4	**PEC**	BBT34707-09	Professional Elective- V	T	4	-	4	4	30	10	60	3	100
5	**Project**	BBT34703	Project (Major Project)	P	-	8	6	3	-	50	50	2	100
6	**MDM**	BBA4705	Entrepreneurship in Biotechnology	T	3	-	3	3	30	10	60	3	100
7	**MDM**	BCS4704	Data Structures with Simulations Lab	P	-	2	2	1	-	25	25	2	50
8	**PCC**	BBT34711	Sustainable Development Goals	T			2	2	14	6	30	2	50
			Total	**-**	**20**	**10**	**30**	**25**	**164**	**156**	**430**	**23**	**750**

Course Category	BSC/ESC (Basic Science Course/Engineering Science Course.)	PCC (ProgrammeCore courses)	PEC (Programme Electivecourses)	OEC (Open Elective Course)	Multi-disciplinary courses	VSEC (SkillCourse)	VEC(Value Education Courses)	Humanities Social Science &Management		Experiential Learning Courses	CC(Liberal Learning Courses)	VAC (Valueadded Course)
								AEC(Ability EnhancementCourse)	IKS (Indian Knowledge System)			
Credits	-	10	8	-	4	-	-	-		4	-	-
Cumulative Sum	16/13	49	20	8	14	8	2	10		7	4	2

PROGRESSIVETOTALCREDITS:126+25=151

Chairperson	Vice-Principal / Director Academics	Director Administration	Principal	June,2026	1.00	Applicablefor AY 2026-27
				Dateof Release	Version	

Director Academics
Tulsiramji Gaikwad-Patil College Of Engineering And Technology, Nagpur

Dr. Premanand Naktode
Principal
TGPCET, Nagpur

Tulsiramji Gaikwad-Patil College of Engineering & Technology,Nagpur

(An Autonomous Institution Affiliated to RTM Nagpur University, Nagpur)

SCHEMEOFINSTRUCTIONS &SYLLABI

Programme: Biotechnology Engineering

Scheme of Instructions: Final Year B.Tech. in Biotechnology Engineering

Semester–VIII

Sr. No.	Course Category	Course Code	Course Title	T/P	Contact Hours			Credits	Exam Scheme			ESE Duration (Hours)	Total Marks
					L	P	Hrs.		CT/IA	CA	ESE		
1	**PCC**	BBT44801	Research Methodology(Online)	T	4	-	4	4	-	25	75	3	100
3	**Project**	BEC44802	Internship/Capstone Project	P	-	24	24	12	-	150	150	3	300
			Total	**-**	**8**	**24**	**32**	**16**	**-**	**200**	**300**	**9**	**500**

Course Category	BSC/ESC (Basic Science Course/Engineering Science Course.)	PCC (ProgrammeCore courses)	PEC (Programme Electivecourses)	OEC (Open Elective Course)	Multi-disciplinary courses	VSEC (SkillCourse)	VEC (Value Education Courses)	Humanities Social Science&Management		Experiential Learning Courses	CC(Liberal Learning Courses)	VAC (Valueadded Course)
								AEC(Ability EnhancementCourse)	IKS(Indian Knowledge System)			
Credits		4	-	-	-	-	-	-		12	-	-
Cumulative Sum	16/13	53	20	8	14	8	2	10		19	4	2

PROGRESSIVETOTALCREDITS:151+16=167

Chairperson	Vice-Principal / Director Academics	Director Administration	Principal	June,2026	1.00	Applicablefor AY 2026-27
				Dateof Release	Version	

Director Academics
Tulsiramji Gaikwad-Patil College Of Engineering And Technology, Nagpur

Dr. Premanand Naktode
Principal
TGPCET, Nagpur

TulsiramjiGaikwad-PatilCollegeofEngineering&Technology,Nagpur

(AnAutonomousInstitutionAffiliatedtoRTMNagpurUniversity,Nagpur)

SCHEMEOFINSTRUCTIONS &SYLLABI

Program: Biotechnology Engineering

List of Electives offered by

Biotechnology Engineering

Sem	Course Code	PE	Bucket 1: Production
5	BBT33507	I	Biopharmaceutical Technology
6	BBT33605	II	Enzyme Technology
6	BBT33608	III	Biosimilars Technology
7	BBT4703	IV	Nanotechnology
7	BBT4706	V	Good Manufacturing and Laboratory Practices
Sem	**Course Code**	**PE**	**Bucket 2: Lab and Analytical**
5	BBT33508	I	Introduction to Bioinformatics
6	BBT33606	II	Precision Medicine Technology
6	BBT33609	III	Stem cell Technology
7	BBT4704	IV	Tissue Engineering and organ Printing
7	BBT4707	V	Biosensors
Sem	**Course Code**	**PE**	**Bucket 3: Environmental Biotechnology**
5	BBT33509	I	Bioremediation and Biodegradation
6	BBT33607	II	Biofertilizer and Biopesticide technology
6	BBT33610	III	Bioenergy and Biofules
7	BBT4705	IV	Industrial Microbiology and its Application
7	BBT4708	V	Pollution control and Remediation

List of Open Electives offered by Biotechnology Engineering

CourseCode	Subject
BBT32309(OE-I)	Food and Nutrition
BBT32408(OE-II)	Waste Management
BBT35310 (OE-III)	Bioterrorism and National Security

Chairperson	Vice-Principal / Director Academics	Director Administration	Principal	June,2026	1.00	Applicablefor AY 2026-27
				Dateof Release	Version	

Director Academics
Tulsiramji Gaikwad-Patil College Of Engineering And Technology, Nagpur

Dr. Premanand Naktode
Principal
TGPCET, Nagpur