



VIGNAN'S
Foundation for Science, Technology & Research
UNIVERSITY
(Estd u/s 3 of UGC Act of 1956)

DEPARTMENT OF BIOTECHNOLOGY

Action Taken Report on B. Tech Biotechnology Program R 13 Feedback

Implemented in R16 introduced in the AY 2016 - 17

Action taken based on the suggestions from Students:

1. The Course Contents of Biotechnology Curriculum are in tune with the Program Outcomes
2. The Biotechnology Course Contents are designed to enrich laboratory Skills and Core competencies.
3. The Courses placed in the Biotechnology curriculum serve the needs of both advanced and slow learners.
4. Contact Hour Distribution among the various Course Components (LTP) is Satisfiable.
5. The Electives offered will enrich the passion to learn new technologies in emerging areas.
6. The Curriculum provides an opportunity towards Self learning to realize the expectations.
7. The Composition of Basic Sciences, Engineering, Humanities and Management Courses in the curriculum is a right mix and satisfiable.
8. No. of Laboratory sessions Integrated with Theory Courses in Biotechnology have been sufficient to improve the technical skills.
9. Integration of Minor Project with Theory Courses offered in Biotechnology have enhanced the technical competency and leadership skills in the management of biotech related firms.

Analysis of Overall Feedback given by the Students on R 13

Parameters	Strongly Agree	Agree	Moderate	Disagree	Strongly Disagree	Avg. Rating	Grade
Q1	79	15.3	4.8	0.4	0.1	4.715	Excellent
Q2	85.2	9.9	3.9	0	0.6	4.779	Excellent
Q3	13	78	7.9	0.7	0	4.021	Excellent
Q4	71.5	18.4	9.4	0.2	0	4.597	Excellent
Q5	16.4	76.7	5	1.3	0.2	4.066	Excellent
Q6	7.8	78.7	11.8	1.2	0.1	3.917	Very Good
Q7	73	20.4	5.9	0.4	0	4.651	Excellent
Q8	71.5	22.1	5.8	0	0.2	4.635	Excellent
Q9	73.3	20.4	5.3	0.6	0	4.652	Excellent

Itemized responses given to the Suggestions of Students

Suggestion: Add more courses on Plant Biotechnology to get more understanding on extracting medicinal components from plants.

Action Taken: A stream of professional core electives under the name of "Plant biotechnology" comprising the courses namely Plant Metabolism, Agricultural Biotechnology, Plant tissue Culture and Transgenic Plants were introduced in R16 curriculum.

Suggestion: Introduce more elective courses in one specific area of students' interest.

Action Taken: In order to facilitate students to focus more on their interest are professional core electives were offered under different streams as Plant Biotechnology, Animal Biotechnology and Fermentation Technology.

Suggestion: Connection between theory courses and laboratory is required for better understanding of the concept.

Action Taken: Theory courses were integrated with Laboratories for better understanding of the concept.

Suggestion: Inclusion of small projects related to core courses will be useful for understanding the core concepts.

Action Taken: Minor projects were introduced in majority of core courses for better understanding of the contents and also to make the student's industry ready.

Suggestion: Courses on manufacturing of Bioproducts need to introduced.

Action Taken: To generate interest among students on Biotechnology in the first year itself, a course named 'Bioproducts and Bio-entrepreneurship' was introduced which comprises of real time Bioproducts, in addition to that a course named 'Fermentation Products' was introduced in the stream of Fermentation Technology under professional core electives.

Suggestion: Include hands on training on fermenter for better understanding of Bioprocess parameters control.

Action Taken: To train students on operation of fermenter for controlling the process parameters, practical sessions were added to Bioprocess Engineering Laboratory.

Suggestion: The concept of Ramachandran plot in the course Bioinformatics has to be included as it is very important tool in docking studies.

Action Taken: As Ramachandran plot is very much essential in homology modeling and docking studies the concept of Ramachandran plot was included in the course Bioinformatics in Unit V.

Suggestion: The concept of Microbial Growth Kinetics is present in two courses i.e., Biochemical Reaction Engineering and Bioprocess Engineering.

Action Taken: The contents of Microbial Growth Kinetics were deleted from Biochemical Reaction Engineering course.

Suggestion: A course exclusively on applications of Biotechnology in Agriculture is required.

Action Taken: Agricultural Biotechnology course was introduced in professional electives under 'Plant Biotechnology' stream.

Suggestion: Activities related to life skills and employability have to be included in the curriculum.

Action Taken: In order to promote self-confidence and also to inculcate sportiveness among student's life skill activities were introduced in R16 curriculum.

Suggestion: For better understanding of Genomics & Proteomics, experimental knowledge essential.

Action Taken: Laboratory experiments were added to the course Genomics & Proteomics.

Suggestion: Introduction of Metabolomics is required for better understanding of Metabolic Engineering.

Action Taken: To provide a holistic purview of how metabolism is regulated and the possible ways for its engineering, the contents related to Metabolomics were included in "Metabolic Engineering".

Suggestion: The curriculum must be suitable for attempting national competitive examinations and industry needs.

Action Taken: To encourage the interest of the students towards the central services under Open elective streams, Humanities stream was introduced. Credits were allocated for Modular courses to give industry orientation to the students.

Suggestion: Encouragement towards extracurricular activities is needed.

Action Taken: Life skill activities such as short film making, Photography, Yoga, Multimedia, classical dance etc. were included in curriculum to take care of the interests of the students towards extracurricular activities.

Suggestion: Addition of industrial orientation courses are more beneficial in getting placements.

Action Taken: Credits were allocated for Modular courses to give industry orientation to the students.

Action taken based on the suggestions from Alumni:

1. The Curriculum laid a good foundation in understanding the basic engineering concepts in Biotechnology.
2. The Course Contents of Biotechnology Curriculum are in tune with the Program Outcomes.
3. The Biotechnology Curriculum encompasses all the required Job Oriented Skills.
4. Professional and Open Electives of Curriculum serve the technical advancements needed in the Biotech, Biologics and Pharma industry.
5. The Tools and Technologies learnt during laboratory sessions will enrich the quality control and quality assurance in Biotechnology industry.

Analysis of Overall Feedback given by the Alumni on R 13

Parameter	Strongly Agree	Agree	Moderate	Disagree	Strongly Disagree	Avg. Rating	Grade
Q1	50	40	0	10	0	4.3	Excellent
Q2	60	20	20	0	0	4.4	Excellent
Q3	30	20	20	10	20	3.3	Good
Q4	40	20	30	0	10	3.8	Very Good
Q5	40	30	10	0	20	3.7	Very Good
Q6	50	40	10	0	0	4.4	Excellent
Q7	90	10	0	0	0	4.9	Excellent

Itemized responses given to the suggestions of Alumni

Suggestion: Give training to students on fermenter to familiarize them with process control.

Action Taken: To train the students on operation of fermenter for controlling the process parameters, practical sessions were added to Bioprocess Engineering Laboratory.

Suggestion: Include reactor design concepts in Biochemical Reaction Engineering course.

Action Taken: By removing Microbial Growth kinetics in Biochemical Reaction Engineering course, contents related to Design of Ideal Reactors were added in R16 curriculum.

Suggestion: Introduce project-based learning to improve technical skills of the students.

Action Taken: Majority of core courses were integrated with laboratory and Minor Projects to facilitate the students better correlation between the concept learned in theory course and practical knowledge.

Suggestion: Add more courses on Plant Biotechnology and Genetic Engineering.

Action Taken: A stream of professional core electives under the name of Plant biotechnology comprising the courses Plant Metabolism, Agricultural Biotechnology, Plant tissue Culture and Transgenic Plants were introduced in R16 curriculum.

Suggestion: Department electives has to be modified by including courses of different specializations such as animal cell cultures, plant cell cultures and production technologies.

Action Taken: Professional Electives were categorized as different streams such as Plant Biotechnology, Animal Biotechnology and Fermentation Technology to cater the interests of students in different fields of Biotechnology.

Suggestion: Conduct value added courses during the semester break time to get exposure towards industry-related technologies.

Action Taken: Modular courses were given weightage in R16 curriculum to give more industrial orientation to the students.

Suggestion: Include GATE syllabus in curriculum which will be helpful to the students in cracking GATE exam.

Action Taken: GATE syllabus was considered in preparing the syllabus of R16 curriculum.

Action taken based on the suggestions from Faculty:

1. The Course Contents of Biotechnology Curriculum are in tune with the Program Outcomes.
2. The Course Contents along with the laboratory skills will enhance biomedical and Core competencies.
3. The allocation of Credits to the respective Courses is satisfiable.
4. The Contact Hour Distribution among the various Course Components (LTP) is Satisfiable
5. Electives will enable the passion to learn new technologies in emerging areas of Biotechnology.
6. The Curriculum provides an opportunity towards Self learning to realize the expectations.
7. The Composition of Basic Sciences, Engineering, Humanities and Management Courses in the curriculum is satisfiable?
8. The number of theoretical courses amalgamated with laboratory sessions is sufficient to improve the Genetic Engineering and Bioprocess technical skills of students.
9. The integration of Minor Project with Theory Courses will improve the technical competency and leadership skills among the students.

Analysis of Overall Feedback given by the Faculty on R 13

Parameter	Strongly Agree	Agree	Moderate	Disagree	Strongly Disagree	Avg. Rating	Grade
Q1	46.4	42.9	10.7	0	0	4.357	Excellent
Q2	50	39.3	7.1	3.6	0	4.357	Excellent
Q3	60.7	39.3	0	0	0	4.607	Excellent
Q4	60.7	32.1	7.1	0	0	4.532	Excellent
Q5	46.4	53.6	0	0	0	4.464	Excellent
Q6	42.9	42.9	10.7	3.6	0	4.254	Excellent
Q7	53.6	42.9	3.6	0	0	4.504	Excellent
Q8	53.6	35.7	10.7	0	0	4.429	Excellent
Q9	53.6	35.7	3.6	7.1	0	4.358	Excellent

Itemized responses given to the suggestions of Faculty

Suggestion: It is a prerequisite to include the concepts related to industrially important biological products and entrepreneurship aspects for Biotechnology students.

Action Taken: For better understanding of the commercial value of the bioproducts and entrepreneurship aspects, the course Bioproducts and Bio-entrepreneurship was introduced as a basic course in the first year of B. Tech Biotechnology programme.

Suggestion: It is advised to remove the topics five kingdom classification from 2nd unit of Microbiology and microbial growth from 3rd unit. Further, it is essential to introduce the experiments related to microscopy techniques.

Action Taken: Microscopy handling experimental techniques are incorporated in the laboratory experiments. The concept Five kingdom classification and microbial growth topics were removed.

Suggestion: It is better to include industrially important enzymes in the subject Industrial Biotechnology.

Action Taken: The concepts related to the production of industrially important bioproducts were introduced in the subject Industrial Biotechnology.

Suggestion: For Biotechnology students it is essential to understand the concepts related to fermentation process and biological products.

Action Taken: For better understanding and skills pertaining to industrial need, the course Fermentation products was introduced as an elective course in the core stream. More insights related to the topics production of enzymes, biopolymers and non-alcoholic beverages for Microbial stream were added.

Suggestion: It is better to replace the Microbial growth kinetics from unit 2 of Biochemical reaction engineering with design of ideal reactors.

Action Taken: The experiments related to the Fermentation process were incorporated in the laboratory experiments of Bioprocess Engineering subject.

Suggestion: It is also advised to remove the topics related to material balances in steady state concurrent and counter current processes topic from 4th unit of Heat and Mass transfer and VLE phase diagram, tie line and mixture rules from 5th unit.

Action Taken: The concept in microbial growth kinetics was replaced with the design of ideal reactors in the subject Biochemical reaction engineering to design various bioreactors.

Suggestion: It is useful to include the experimental laboratory section particularly hands on training related to the subject proteomics and genomics with regards to the drug development and also understanding of biological processes.

Action Taken: The topics material balances in steady state concurrent and counter current processes are being covered in the fifth unit and the VLE phase diagram, tie line and mixture rules have less significance in biological systems. So, it is removed from the Heat and mass transfer subject.

Suggestion: It is better to have the courses like Tissue engineering to acquaint with the current aspects related to the field of Biotechnology and regenerative medicine.

Action Taken: The new laboratory course was introduced in the subject proteomics and genomics to get hands on training in the emerging field.

Suggestion: It is useful to include the concepts of transgenic plants for stress tolerance in agriculture field.

Action Taken: Tissue engineering and regenerative medicine was introduced as an elective course for better understanding of the concepts in Transplantation and regenerative medicine.

Suggestion: It is better to include the topic related to Ramachandran plot in Bioinformatics subject which is essential in the determination of secondary structure of proteins, understanding of homology modelling and drug docking studies.

Action Taken: The subject Transgenic Plants was introduced to acquaint the knowledge related to stress tolerance and also biofactories for commercial products.

Suggestion: For Biotechnology students, it is more appropriate to give skill oriented experimental approaches related to the concepts of Fermentation process in Bioprocess Engineering subject.

Action Taken: Ramachandran plot was added in the subject Bioinformatics.

Suggestion: It is advised to incorporate Skill based practices which are required for industry demands.

Action Taken: For industrial needs, the modular courses were introduced in the programme to acquaint the skills required for industries.

Suggestion: It is advisable to include more professional electives to get expertise in the particular field.

Action Taken: The core streams are introduced to strengthen their knowledge and also to get expertise in particular field.

Action Taken report

Based on the suggestions and feedback received from the Faculty the following actions were taken and incorporated in the R16 regulation

Action taken based on the suggestions from Employers:

1. The Course Contents of Biotechnology Curriculum are in tune with the Program Outcomes.
2. The relevance of the Course Contents is applicable with the Biotech, Biologics and Pharma Industry.
3. The Professional Electives and Open Electives offered to students are in-line with the technology advancements in the biotech related firms.
4. Applicability of the tools and technologies described in the curriculum will be enough to practice in Industry.
5. Laboratory skills and theoretical concepts acquired by the students through the course contents will enable them to be placed in MNC.

Analysis of Overall Feedback given by the Employers on R 13

Parameter	Strongly Agree	Agree	Moderate	Disagree	Strongly Disagree	Avg. Rating	Grade
Q1	0	100	0	0	0	4	Excellent
Q2	33.3	25	41.7	0	0	3.916	Very Good
Q3	0	75	25	0	0	3.75	Very Good
Q4	0	91.7	8.3	0	0	3.917	Very Good
Q5	41.7	50	8.3	0	0	4.334	Excellent

Itemized responses given to the suggestions of Employers

Suggestion: It is beneficial for students to add course related to Microbial products and Bio-entrepreneurship at early stages of program to create awareness on various bioproducts and their marketing & also to explore entrepreneurship in the field of bioproducts.

Action Taken: Included the courses “Bioproducts and Bio-entrepreneurship” in the first year, second semester and “Bioethics and Intellectual property rights” in third year, second semester to familiar with wide range of bioproducts and provide essence of Bio-entrepreneurship and their marketing strategies.

Suggestion: More courses associated with Plant, Animal and Microbial technologies need to be introduced as these courses are grabbing highest percentage of job market in biotechnology industries.

Action Taken: Three departmental elective streams pertaining to Plant Biotechnology, Animal Biotechnology and Fermentation Technology were introduced to make students industry ready.

Suggestion: Better to include modular courses by industry personnel to reduce gap between industry and academic institution and to obtain solutions for local problems.

Action Taken: Modular courses exclusively on “TILLING method for crop improvement” and “Snake biology and Anti-Venom production” were offered by industry experts to solve local problems.

Suggestion: It is essential to add basics principles of reactor design which are helpful for design of various bioreactors.

Action Taken: In Biochemical reaction engineering course, design principles of reactors concepts were added to understand design of various bioreactors by revising twenty percent of syllabus.

Suggestion: It is required to amalgamate theory course with laboratory to offer hands on experience.

Action Taken: Some of the core courses are a combination of theory with laboratory for better understanding and to gain hands on experience.

Suggestion: Introduce more courses highlighting health issues and curb of diseases due to the exponential growth of population.

Action Taken: Offered courses such as Genetics, Immunology and Immunoinformatics and Tissue Engineering and Regenerative Medicine to identify genes involved in disease and genetic mutations.

Suggestion: It is necessary to add the course related to Bioprocess development and optimization through statistical tools for manufacturing of various bioproducts economically.

Action Taken: Bioprocess Modeling and Simulation course was offered to control bioprocesses for manufacturing of bioproducts economically.

Suggestion: Better to add more courses related to engineering principles for commercial production of primary and secondary metabolites.

Action Taken: Courses like Process engineering principles, Heat and Mass transfer, Biochemical Reaction engineering and Downstream processing were included for industrial production of primary and secondary metabolites.

Action taken based on the suggestions from Parents:

1. The theoretical courses and practical sessions offered in our Biotechnology curriculum are satisfiable.
2. The overall assessment of technical knowledge in Biotechnology disciplines acquired by your ward who is pursuing his/her program in our institution is satisfiable.
3. The Academic and Emotional Progression of your ward are satisfying as per your expectations.
4. Competency of your ward in Biotechnology is on par with the students from other Universities/Institutes.
5. Course Contents of our Biotechnology Curriculum are in tune with the Industry demand.

Analysis of Overall Feedback given by the Parents on R 13

Parameter	Strongly Agree	Agree	Moderate	Disagree	Strongly Disagree	Avg. Rating	Grade
Q1	88.6	6.4	0	0	0	4.686	Excellent
Q2	72.1	23.6	3.6	0.7	0	4.671	Excellent
Q3	27.9	67.1	2.9	0	2.1	4.187	Excellent
Q4	84.3	9.3	4.3	0	2.1	4.737	Excellent
Q5	72.9	19.3	5.7	0.7	1.4	4.616	Excellent

Itemized responses given to the suggestions of Parents

Suggestion: Courses related to Agricultural Biotechnology, Genetical modification of plants for higher agricultural yield.

Action Taken: A stream of professional core electives under the name Plant biotechnology was introduced with the courses namely Plant Metabolism, Agricultural Biotechnology, Plant tissue Culture and Transgenic Plants to give more orientation towards the recent developments in agriculture sector.

Suggestion: Industry production related courses has to be added to the curriculum to make the students industry ready.

Action Taken: To enlighten the students in industrial production of Bioproducts professional core elective stream namely Fermentation Technology was introduced which includes the courses namely Microbial Technology, Fermentation Products, Bioprocess Modeling and Simulation.

Suggestion: Highest importance has to be given to genetic engineering concepts to produce genetically modified products.

Action Taken: A special emphasis was given on exclusively genetic engineering concepts by introducing courses namely Genetics, Genetic Engineering and Epigenetics, Transgenic Plants and Cell Culture Techniques.

Suggestion: Give priority to enhance communication skills and presentation skills to get placement in multinational companies.

Action Taken: Courses such as Technical English Communication, English Proficiency and Communication Skills and Professional Communication lab were introduced in curriculum to improve communication skills of the students.

Suggestion: Take steps to give more practical orientation to students to understand the concept clearly.

Action Taken: Majority of the courses were integrated with laboratories to give more practical orientation to students.

Suggestion: Project oriented learning will give an opportunity to students to improve technical skills.

Action Taken: Specific activities related to major theory courses were pre-defined to facilitate the students to carry out minor projects in that courses.

Suggestion: Courses must improve the chances of higher education to students.

Action Taken: The syllabus contents of all core courses were developed by considering the syllabus of all national level competitive exams.

Suggestion: In depth knowledge in core courses required to write the national level examinations.

Action Taken: The contents in GATE syllabus were included in the syllabus of core course courses to familiarize the students National level competitive examinations.


HoD, BT