



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



DEPARTMENT OF BIOTECHNOLOGY

Date: 11.06.2022.

Minutes of Board of Studies Meeting




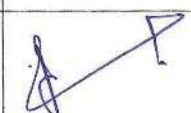

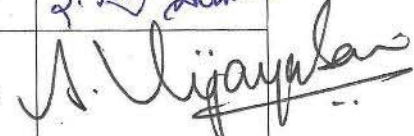

Board of Studies (BoS) meeting of B.Tech., Bioinformatics programme was conducted on 11.06.2022 in blended mode from 09.00 am onward in VSF 05, 2nd floor, U Block VFSTR and also with the following Zoom link: <https://us06web.zoom.us/j/83552270616>.

Agenda of the BoS Meeting:

1. To Discuss and finalize the curriculum structure and detailed syllabus of B.Tech., Bioinformatics Programme for the regulation 2022.
2. To approve the R22 curriculum and syllabus of B.Tech., Bioinformatics Programme and recommend to the Academic council.
3. Any other points with the permission of Chairperson.

The following members were present either thorough offline or online.

S.No	Name	Members	Signature
1.	Prof. T.C. Venkateswarulu, HoD Department of Biotechnology, VFSTR	Chairperson	
2.	Prof. Mukesh Doble, Emeritus Professor, Department of Biotechnology, IIT Madras	External member (Academic)	
3.	Prof. Pritish Kumar Varadwaj, Department of Applied Science, IIIT Allahabad	External member (Academic)	Attended online
4.	Dr. Girinath G. Pillai, Sr. Scientific Officer, NYRO Research India Pvt. Ltd.	External member (Industry)	Attended online
5.	Prof. S. Krupanidhi, Dean – Natural Sciences and Applied Technologies, VFSTR	Internal member	
6.	Prof. P. B. Kavi Kishor, Research Advisor, Department of Biotechnology, VFSTR	Internal member	
7.	Prof. D. Vijaya Ramu, Dean – Promotions, Collaborations and Faculty Affairs &	Internal member	

	Department of Biotechnology, VFSTR		
8.	Prof. S. Asha Department of Biotechnology, VFSTR	Internal member	
9.	Prof. D. John Babu Department of Biotechnology, VFSTR	Internal member	
10.	Dr. K. Abraham Peele, Associate Professor, Department of Biotechnology, VFSTR	Internal member	
11.	Dr. A. Ranganadha Reddy, Associate Professor, Department of Biotechnology, VFSTR	Internal member	
12.	Dr. S. Anil Kumar, Assistant Professor, Department of Biotechnology, VFSTR	Internal member	
13.	Dr. Vijaya Sai Ayyagari, Assistant Professor, Department of Biotechnology, VFSTR	Internal member	
14.	Dr. Sachidananda Singh, Associate Professor, Department of Biotechnology, VFSTR	Member secretary	

Chairperson Dr. T.C. Venkateswarulu, Professor and Head, Department of Biotechnology, VFSTR opened the meeting by welcoming and introducing the external members, invitees to the internal members. Chairperson presented about the *NEP 2020 Compliant Regulation - R22* which emphasis on creating *learning centric* (continuous learning and continuous assessment model), offering B.Tech., B.Tech. with Honours/ Research Honours/ Minor/ Add-on Diploma, Dual degree (B.Tech. + M.Tech./MBA), providing multiple entry and multiple exits.

The following points were discussed in the BoS meeting:


1. Regulation R22.
2. Curriculum structure with credits, credits distribution.
3. Two Modules instead of 5 units.
4. Assessment methods (Formative & Summative; 60:40).
5. Grading Schemes (O, S, A, B, C, D).
6. Pool of Department electives.
7. Open elective courses floated.
8. Minor / Honor courses.

The following resolutions made after the discussion:

1. BoS Members approved the revised regulations, curriculum structure, syllabus of B.Tech., Bioinformatics programme and it follows based on the NEP 2020. Curriculum structure is provided in Appendix-I.
2. Major restructuring has taken place in the curriculum which is oriented towards continuous learning and assessment based on Module structure.
3. Major reformation has taken place in the curriculum by offering Honours/Specialization degree or Minor degree through 20 more credits with additional courses.
4. The curriculum is encompassing the courses that enable employability or entrepreneurship or skill development, provided in Appendix- II.
5. The significant changes are made in the content of all courses and hence the courses are considered as new courses provided in Appendix- III.
6. Total average percentage of syllabus revised was 74.65% compared to previous curriculum.
7. Committee recommended making the pool of electives in two parts namely Mandatory (pre requisite) and optional Electives.
8. The members also went through the syllabus and the committee recommended adding a few advanced and application-oriented tools like Rapid Miner, Knime and Circos plot generation, which are added in courses like Machine Learning for Bioinformatics and Comparative and Functional Genomics.
9. Committee recommended for shifting a course namely Algorithm in Bioinformatics from pool of electives to the core courses and the suggestion was incorporated.
10. Committee recommended adding three subjects; such as Biological Big Data Management and Analytics, Bioperl, Expression data and Image analysis in pools of electives and the recommendation was incorporated.
11. Finally, the committee appreciated the syllabus and course design and recommended to implement from 2022-23 batch onwards.

Based on the suggestions given by the members, the Chairperson of BoS told that, those fruitful suggestions would be incorporated appropriately in the curriculum and syllabi of the regulation R22 and this will be recommended to the Academic Council of VFSTR for the approval.

There being no further points for discussion, the Chairperson thanks all the external, internal, invited members and announced that the meeting was adjourned.



Member Secretary



Chairperson

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**DEPARTMENT OF BIOTECHNOLOGY****APPENDIX I****B.Tech Bioinformatics : Curriculum Structure****I Year I Semester**

Sl. No.	Course Title	L	T	P	C	Remarks	Course offered by
1	Elementary Mathematics	3	0	2	4	Basic Sciences	Department of Mathematics
2	Applied Physics	2	0	2	3	Basic Sciences	Department of Physics
3	Basics of Electrical and Electronics Engineering	2	0	2	3	Basic Engineering	Department of EEE
4	IT Workshop and Bioproducts	1	0	4	3	Basic Engineering	Departments of BT
5	Programming in C	2	0	4	4	Basic Engineering	Department of T&P
6	English Proficiency and Communication Skills	0	0	2	1	Humanities	Department of T&P
7	Physical Fitness, Sports and Games – I	0	0	3	1	Binary grade	Department of PED
8	Constitution of India	0	0	2	1	Binary grade	Department of T&P
	Total	10	0	21	20		
		31			20		

I Year II Semester

Sl. No.	Course Title	L	T	P	C	Remarks	Course offered by
1	Matrices and Differential Equations	3	0	2	4	Basic Sciences	Department of Mathematics
2	Organic Chemistry	2	0	2	3	Basic science	Department of Chemistry
3	Basic Coding Competency	0	1	3	2	Basic Engineering	Department of T&P
4	Engineering Graphics	2	0	2	3	Basic Engineering	Department of Mechanical Engineering
5	Technical English Communication	2	0	2	3	Humanities	Department of English
6	Cell and Molecular Biology	3	0	2	4	Professional core	Department of BT
7	Physical Fitness, Sports and Games – II	0	0	3	1	Binary grade	Department of PED
	Orientation Session	0	0	6	3	Binary grade	
	Total	12	1	22	23		
		35					

II Year I Semester

Sl. No.	Course Title	L	T	P	C	Remarks	Courses offered by
1	Biostatistics and Design of Experiments	3	0	2	4	Basic Sciences	Departments of Statistics and BT
2	Data Structures	2	2	2	4	Basic Engineering	Department of T&P
3	Biochemistry and Enzymology	3	0	2	4	Professional core	Department of BT
4	Microbiology and Fermentation Technology	3	0	2	4	Professional core	Department of BT
5	Algorithms in Bioinformatics	2	0	2	3	Professional core	Department of BT
6	Biological Databases	3	0	2	4	Professional core	Department of BT
7	Life Skills - I	0	0	2	1	Binary grade	Student Affairs & Physical Education
	Total	16	4	12	24		
	NCC/ NSS/ SAC/ E-cell/ Student Mentoring/ Social activities/ Publication				1	Floating credits Binary grade	
	Total	32			25		

II Year II Semester

Sl. No.	Course Title	L	T	P	C	Remarks	Courses offered by
1	Advanced Coding Competency	0	0	2	1	Basic Engineering	Department of T&P
2	Professional Communication Laboratory	0	0	2	1	Humanities	Department of T&P
3	Python Programming for Biotechnologists	3	0	2	4	Professional core	Department of BT
4	Structural Bioinformatics and Instrumental Techniques	2	0	2	3	Professional core	Department of BT
5	Environmental Studies	1	0	1	1	Basic Sciences	Department of Chemistry
6	Management Science	2	0	2	3	Humanities	Department of Management studies
7	Department Elective – 1	2	0	2	3	Department Elective	Department of BT
8	Open Elective – 1	2	0	2	3	Open Elective	
9	Life Skills - II	0	0	2	1	Binary grade	Student Affairs & Physical Education
	Total	12	0	17	20		
	Minor / Honours – 1	3	0	2	4		Department of BT
	Total	34			24		

III Year I Semester

Sl. No.	Course Title	L	T	P	C	Remarks	Courses offered by
1	Soft Skills Laboratory	0	0	2	1	Humanities	Department of T&P
2	Immunology and Immunoinformatics	3	0	2	4	Professional core	Department of BT
3	Molecular Modelling and Simulations	3	0	2	4	Professional core	Department of BT
4	R Programming for Biological Data Sciences	3	0	2	4	Professional core	Department of BT
5	Department Elective – 2	2	0	2	3	Department Elective	Department of BT
6	Open Elective – 2	2	0	2	3	Open Elective	
7	Industry interface course (Modular course)	1	0	0	1	Binary Grades	Department of BT
8	Inter-Departmental Project / Course	0	0	2	0	Project	Department of BT
	Total	14	0	14	20		
	NCC/ NSS/ SAC/ E-cell/ Student Mentoring/ Social activities/ Publication	0	0	0	1	Floating credits Binary grade	
	Minor / Honours – 2	3	0	2	4		
		33			25		

III Year II Semester

Sl. No.	Course Title	L	T	P	C	Remarks	Courses offered by
1	Quantitative aptitude and Logical reasoning	1	0	2	2	Humanities	Department of T&P
2	Data mining and Machine Learning for Bioinformatics	3	0	2	4	Professional core	Department of BT
3	Molecular Phylogenetics	2	0	2	3	Professional core	Department of BT
4	Department Elective – 3	2	0	2	3	Department Elective	Department of BT
5	Department Elective – 4	2	0	2	3	Department Elective	Department of BT
6	Open Elective – 3	2	0	2	3	Open Elective	
7	Inter-Departmental Project/Course	0	0	2	2	Project	Department of BT
8	Total	12	0	14	20		
	Minor / Honours – 3	3	0	2	4		
	Total	31			24		

IV Year I Semester

Sl. No.	Course Title	L	T	P	C	Remarks	Courses offered by
1	Next Generation Sequencing	3	0	2	4	Professional core	Department of BT
2	Systems Biology	3	0	2	4	Professional core	Department of BT
3	Department Elective – 5	2	0	2	3	Department Elective	Department of BT
4	Department Elective – 6	2	0	2	3	Department Elective	Department of BT
5	Department Elective – 7	2	0	2	3	Department Elective	Department of BT
6	Department Elective – 8	2	0	2	3	Department Elective	Department of BT
	Total	14	0	12	20		
	Minor / Honours – 4	3	0	2	4		
	Total	31			24		

IV Year II Semester

Sl. No.	Course Title	L	T	P	C	Remarks	Courses offered by
1	Internship / Project Work	0	2#	22	12	Project	Department of BT
	Total				12		
2	Minor / Honours – 5 (for project)	0	2	6	4	Theory course may be also offered	Department of BT
	Total				16		

for interaction between Guide and students

List of Department Elective Courses

	Odd Semester	Even semester
Course-1	Bioperl (M)	Biological Big Data Management and Analytics
Course-2	Bioprocess Economics, Modeling and Simulations	Cheminformatics and QSAR
Course-3	Clinical Data Management	Good Laboratory Practices
Course-4	Expression Data and Image Analysis	Synthetic biology (M)
Course-5	Health Analytics	3D Bioprinting
Course-6	Neural Networks	Bioethics and Intellectual Property Rights (M)
Course-7	Probiotics and Food Microbiology	Phage Display
Course-8	Bioenergetics	Phytopharma
Course-9	Biopharmaceutical Technology	Plant Tissue Culture and Transgenics
Course-10	Genomics and Proteomics	Biosensors
Course-11	Metabolic Engineering	
Course-12	Vaccinology	
Course-13	Computer-Aided Drug Design (M)	
Course-14	Health Informatics (M)	
Course-15	Regulatory affairs and clinical trails	

List of Open Elective Courses

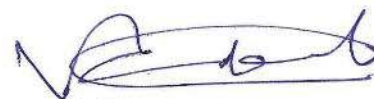
	Drug Design
Course-1	Elements of Bioinformatics
Course-2	Cheminformatics and QSAR
Course-3	Computer-Aided Drug Design
Course-4	Computational Biology
Course-5	Vaccine Design

List of Honour/Specialization Courses

	OMICS
Course-1	Pharmacogenomics
Course-2	Metabolomics
Course-3	Comparative & Functional Genomics
Course-4	Metagenomics
Course-5	Project / Open source – Swayam/NPTEL

List of Minor Courses

	FORENSIC GENOMICS
Course-1	Elements of Biotechnology and Bioinformatics
Course-2	Fundamentals of Forensic Sciences
Course-3	Next Generation Sequencing
Course-4	Forensic Genomics
Course-5	Project/AI in Genomics and Drug design



Chairperson

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DEPARTMENT OF BIOTECHNOLOGY

APPENDIX II


List of Courses that Enables Employability or Entrepreneurship or Skill Development

S. No.	Year and Semester	Course Title	Employability / Entrepreneurship / Skill development
1.	I Year I Semester	Elementary Mathematics	Skill development
2.	I Year I Semester	Applied Physics	Skill development
3.	I Year I Semester	Basics of Electrical & Electronics Engineering	Skill development
4.	I Year I Semester	IT Workshop & Bioproducts	Employability
5.	I Year I Semester	Programming in C	Employability
6.	I Year I Semester	English Proficiency & Communication Skills	Skill development
7.	I Year I Semester	Constitution of India	Employability
8.	I Year II Semester	Matrices and Differential Equations	Skill development
9.	I Year II Semester	Organic Chemistry	Skill development
10.	I Year II Semester	Engineering Graphics	Employability
11.	I Year II Semester	Basic Coding Competency	Employability
12.	I Year II Semester	Technical English Communication	Skill development
13.	I Year II Semester	Cell and Molecular Biology	Skill development
14.	II Year I Semester	Biostatistics and Design of Experiments	Skill development
15.	II Year I Semester	Microbiology & Fermentation Technology	Skill development
16.	II Year I Semester	Data Structures	Employability
17.	II Year I Semester	Biological Databases	Skill development
18.	II Year I Semester	Biochemistry and Enzymology	Skill development
19.	II Year I Semester	Algorithms in Bioinformatics	Skill development

20.	II Year II Semester	Advanced Coding Competency	Employability
21.	II Year II Semester	Professional Communication	Employability
22.	II Year II Semester	Python Programming for Biological Sciences	Skill development
23.	II Year II Semester	Structural Bioinformatics and Instrumental Techniques	Skill development
24.	II Year II Semester	Environmental Studies	Skill development
25.	II Year II Semester	Management Science	Entrepreneurship
26.	III Year I Semester	Soft Skills Laboratory	Skill development
27.	III Year I Semester	R Programming for Biological Data Sciences	Skill development
28.	III Year I Semester	Immunology and Immunoinformatics	Skill development
29.	III Year I Semester	Molecular Modelling and Simulations	Skill development
30.	III Year II Semester	Quantitative aptitude & Logical reasoning	Employability
31.	III Year II Semester	Data mining & Machine Learning for Bioinformatics	Skill development
32.	III Year II Semester	Molecular Phylogenetics	Skill development
33.	IV Year I Semester	Systems Biology	Skill development
34.	IV Year I Semester	Next Generation Sequencing	Skill development
35.	Department Elective Course	Health Informatics	Employability
36.	Department Elective Course	Computer-Aided Drug Design	Employability
37.	Department Elective Course	Clinical Data Management	Employability
38.	Department Elective Course	Health Analytics	Employability
39.	Department Elective Course	Bioperl	Employability
40.	Department Elective Course	Expression Data and Image Analysis	Employability
41.	Department Elective Course	Bioenergetics	Employability
42.	Department Elective Course	Bioprocess Economics, Modeling and Simulations	Employability

43.	Department Elective Course	Probiotics and Food Microbiology	Employability
44.	Department Elective Course	Vaccinology	Employability
45.	Department Elective Course	Biopharmaceutical Technology	Employability
46.	Department Elective Course	Genomics and Proteomics	Employability
47.	Department Elective Course	Metabolic Engineering	Employability
48.	Department Elective Course	Neural Networks	Employability
49.	Department Elective Course	Regulatory affairs and clinical trails	Employability
50.	Department Elective Course	Synthetic biology	Employability
51.	Department Elective Course	Biological Big Data Management and Analytics	Employability
52.	Department Elective Course	Cheminformatics and QSAR	Employability
53.	Department Elective Course	Phage Display	Employability
54.	Department Elective Course	Plant Tissue Culture and Transgenics	Employability
55.	Department Elective Course	Phytopharma	Employability
56.	Department Elective Course	3D Bioprinting	Employability
57.	Department Elective Course	Bioethics and Intellectual Property Rights	Employability
58.	Department Elective Course	Biosensors	Employability
59.	Department Elective Course	Good Laboratory Practices	Employability
60.	Minor Course	Elements of Biotechnology and Bioinformatics	Employability
61.	Minor Course	Fundamentals of Forensic Sciences	Employability

62.	Minor Course	Next Generation Sequencing	Employability
63.	Minor Course	Forensic Genomics	Employability
64.	Minor Course	AI in Genomics and Drug design	Employability
65.	Honour course	Pharmacogenomics	Employability
66.	Honour course	Metabolomics	Employability
67.	Honour course	Comparative and Functional Genomics	Employability
68.	Honour course	Metagenomics	Employability
69.	Open elective courses	Elements of Bioinformatics	Skill development
70.	Open elective courses	Cheminformatics and QSAR	Employability
71.	Open elective courses	Computer-Aided Drug Design	Employability
72.	Open elective courses	Computational Biology	Employability
73.	Open elective courses	Vaccine Design	Employability


 Chairperson
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APPENDIX III


List of New Courses in the R22 Curriculum

S. No.	Year and Semester	Course Title	Employability / Entrepreneurship / Skill development
1.	I Year I Semester	Elementary Mathematics	Skill development
2.	I Year I Semester	Applied Physics	Skill development
3.	I Year I Semester	Basics of Electrical & Electronics Engineering	Skill development
4.	I Year I Semester	IT Workshop & Bioproducts	Employability
5.	I Year I Semester	Programming in C	Employability
6.	I Year I Semester	English Proficiency & Communication Skills	Skill development
7.	I Year I Semester	Constitution of India	Employability
8.	I Year II Semester	Matrices and Differential Equations	Skill development
9.	I Year II Semester	Organic Chemistry	Skill development
10.	I Year II Semester	Engineering Graphics	Employability
11.	I Year II Semester	Basic Coding Competency	Employability
12.	I Year II Semester	Technical English Communication	Skill development
13.	I Year II Semester	Cell and Molecular Biology	Skill development
14.	II Year I Semester	Biostatistics and Design of Experiments	Skill development
15.	II Year I Semester	Microbiology & Fermentation Technology	Skill development
16.	II Year I Semester	Data Structures	Employability
17.	II Year I Semester	Biological Databases	Skill development
18.	II Year I Semester	Biochemistry and Enzymology	Skill development

19.	II Year I Semester	Algorithms in Bioinformatics	Skill development
20.	II Year II Semester	Advanced Coding Competency	Employability
21.	II Year II Semester	Professional Communication	Employability
22.	II Year II Semester	Python Programming for Biological Sciences	Skill development
23.	II Year II Semester	Structural Bioinformatics and Instrumental Techniques	Skill development
24.	II Year II Semester	Environmental Studies	Skill development
25.	II Year II Semester	Management Science	Entrepreneurship
26.	III Year I Semester	Soft Skills Laboratory	Skill development
27.	III Year I Semester	R Programming for Biological Data Sciences	Skill development
28.	III Year I Semester	Immunology and Immunoinformatics	Skill development
29.	III Year I Semester	Molecular Modelling and Simulations	Skill development
30.	III Year II Semester	Quantitative aptitude & Logical reasoning	Employability
31.	III Year II Semester	Data mining & Machine Learning for Bioinformatics	Skill development
32.	III Year II Semester	Molecular Phylogenetics	Skill development
33.	IV Year I Semester	Systems Biology	Skill development
34.	IV Year I Semester	Next Generation Sequencing	Skill development
35.	Department Elective Course	Health Informatics	Employability
36.	Department Elective Course	Computer-Aided Drug Design	Employability
37.	Department Elective Course	Clinical Data Management	Employability
38.	Department Elective Course	Health Analytics	Employability
39.	Department Elective Course	Bioperl	Employability
40.	Department Elective Course	Expression Data and Image Analysis	Employability
41.	Department Elective Course	Bioenergetics	Employability

42.	Department Elective Course	Bioprocess Economics, Modeling and Simulations	Employability
43.	Department Elective Course	Probiotics and Food Microbiology	Employability
44.	Department Elective Course	Vaccinology	Employability
45.	Department Elective Course	Biopharmaceutical Technology	Employability
46.	Department Elective Course	Genomics and Proteomics	Employability
47.	Department Elective Course	Metabolic Engineering	Employability
48.	Department Elective Course	Neural Networks	Employability
49.	Department Elective Course	Regulatory affairs and clinical trails	Employability
50.	Department Elective Course	Synthetic biology	Employability
51.	Department Elective Course	Biological Big Data Management and Analytics	Employability
52.	Department Elective Course	Cheminformatics and QSAR	Employability
53.	Department Elective Course	Phage Display	Employability
54.	Department Elective Course	Plant Tissue Culture and Transgenics	Employability
55.	Department Elective Course	Phytopharma	Employability
56.	Department Elective Course	3D Bioprinting	Employability
57.	Department Elective Course	Bioethics and Intellectual Property Rights	Employability
58.	Department Elective Course	Biosensors	Employability
59.	Department Elective Course	Good Laboratory Practices	Employability

60.	Minor Course	Elements of Biotechnology and Bioinformatics	Employability
61.	Minor Course	Fundamentals of Forensic Sciences	Employability
62.	Minor Course	Next Generation Sequencing	Employability
63.	Minor Course	Forensic Genomics	Employability
64.	Minor Course	AI in Genomics and Drug design	Employability
65.	Honour course	Pharmacogenomics	Employability
66.	Honour course	Metabolomics	Employability
67.	Honour course	Comparative and Functional Genomics	Employability
68.	Honour course	Metagenomics	Employability
69.	Open elective courses	Elements of Bioinformatics	Skill development
70.	Open elective courses	Cheminformatics and QSAR	Employability
71.	Open elective courses	Computer-Aided Drug Design	Employability
72.	Open elective courses	Computational Biology	Employability
73.	Open elective courses	Vaccine Design	Employability


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