



(An Autonomous Institution - AFFILIATED TO ANNA UNIVERSITY, CHENNAI)

S.P.G.Chidambara Nadar - C.Nagammal Campus

S.P.G.C.Nagar, K.Vellakulam - 625 701, (Near Virudhunagar), Madurai District.

DEPARTMENT OF BIOTECHNOLOGY

MINUTES OF THE 2nd ONLINE MEETING

BOARD OF STUDIES OF BIOTECHNOLOGY

DATE: 11th, May, 2021, Tuesday

Time: 10.00 AM – 2.30 PM

PLATFORM: GOOGLE MEET

Meeting Link: meet.google.com/itn-qoxh-atw

IN ATTENDANCE:

S. No	Name of the Expert	Designation	Capacity
1	Dr. Sukumaran Prabhu	Professor, Department of Biotechnology, Sri Venkateswara College of Engineering, Pennalur, Sriperumnudur tk – 602117	Anna University Nominee
2	Dr. A.Santhiagu	Professor, School of Biotechnology, NIT Calicut, Kerala-673601.	Academic Council Nominee
3	Dr. N.Ayyadurai	Senior Scientist, Biochemistry & Biotechnology, CSIR-Central Leather Research Institute, Adyar, Chennai – 600 020.	
4	Dr. K. Rajeshwari	Founder and Managing Director, Bioklone Biotech Private Limited , Plot No.14 and 15, Golden Jubilee Biotech Park, Siruseri, Navalur, Chennai – 603 103, Tamil Nadu.	Industrialist
5	Ms.S.Sivagamasunthari	Associate Scientist, Biocon Park , SEZ, BommasandraJigani Link Rd, Phase-IV, Bommasandra Industrial Area, Bengaluru, Karnataka 560099.	Alumni

S. No	Name of the Faculty	Designation
1	Dr. M. Vasanthi	Chairperson / HoD-BT
2	Dr. Anant Achary	Principal and Senior Professor / BT
3	Dr. R. Shyam Kumar	PG Programme Coordinator
4	Dr. S. Mariaamalraj	UG Programme Coordinator
5	Dr. K. Geetha	Research Programme Coordinator
6	Dr. I. Ganesh Moorthy	Associate Professor / BT
7	Dr.S.Karthikumar	Assistant Professor / BT
8	Mr. S. Manibalan	Assistant Professor / BT
9	Er.M. Soundaryalakshmi	Assistant Professor / BT
10	Dr.V. C. Padmanaban	Assistant Professor / BT
11	Dr. A. Ronaldo Anuf	Assistant Professor / BT
12	Er. R. Amuthalakshmi	Assistant Professor / BT
13	Dr.D.Pradiba	Assistant Professor / BT

THE MINUTES:

The meeting was called for considering the Undergraduate curriculum and syllabi, PG amendments in open electives and approval of the three member committee for online course (UG/PG), value added courses and Industry Internship.

DISCUSSIONS:

1. Dr. M. Vasanthi, the Chairperson, welcomed the gathering and introduced the process of syllabus framing in detail to the Board of studies members.
2. Dr. S. Mariaamalraj, the UG programme coordinator, presented the proposed UG syllabus to the BoS members.
3. Dr. Sukumaran Prabhu, the Anna University nominee, suggested to cross check that the course objectives and Course Outcomes are aligned across all the courses.
4. The Anna University nominee, suggested inclusion of tutorial hour in “Cell Biology” course to enable teaching the students the basic concepts through animations and videos. Dr. A. Santhiagu, Academic Council nominee, clarified that if related video contents and animations could be shared during the regular hours, then there will not be a need for the tutorial hours. The point was accepted by all the members.
5. All the BoS expert committee members gave their approval for the syllabus of Microbiology without any modifications.
6. In the Stoichiometry course, the Academic Council nominee Dr. A. Santhiagu suggested that “application of sterilization and fermentation” can be included in the unit “Energy balance”. He also suggested that “applications of stoichiometry in biochemical reactions” can be included. Further, he recommended to shuffle the basics of chemical reaction

contents to an appropriate place. The suggestions were well taken and modifications were included in the syllabus by Dr. I. Ganesh Moorthy, the subject expert.

7. In Thermodynamics for Biotechnologist course, the Anna University nominee recommended to include “applications of thermodynamic concepts in biochemical reactions” throughout the syllabus. He also suggested to include case studies related to thermodynamic concepts in biotechnology in all the Units. Dr. Anant Achary, Principal and Senior Professor, also opined that the suggestions given by the Anna University nominee are very vital and need to be included in the syllabus. The suggestions were well taken and included in the syllabus.
8. The Anna University nominee recommended to specify the cell type to be studied under “Differential Fractionation” experiment in Cell Biology laboratory. The suggestions were included in the revised syllabus.
9. Dr.K.Rajeshwari, the Industry representative, suggested inclusion of bacterial system identification in “Microscopic identification of Yeast/Molds” experiment in Microbiology laboratory course. Dr. R. Shyam Kumar, PG programme coordinator, explained that since other experiments in this course will be carried out using bacteria, observation of pre-mounted yeast and molds cells alone will be demonstrated in the experiment “Microscopic identification of Yeast/Molds”.
10. In Analytical Methods of Instrumentation course, the Anna University nominee, suggested to revise the title of UNIT-I as “Introduction to Electromagnetic radiation”. He also recommended to include advanced chromatographic techniques in UNIT-IV. The suggestions were well taken and implemented.
11. In Basic Industrial Biotechnology course, the Academic Council nominee, Dr. A. Santhiagu and Dr. K. Rajeshwari the Industry representative, suggested to bring the topic “Insulin” first in the list of recombinant products in UNIT-V. Also, the Anna University nominee as well as Industry representative, pointed out the incompleteness of the term “Future aspects” in UNIT-V and both of them suggested to include “Vaccines” as sub-topic of the Future aspects. All the suggestions are included in the revised syllabus.
12. In Enzyme Technology and Biotransformation course, the Anna University nominee, suggested to include the topic “Effect of salt and ionic concentration on enzyme activity” in addition to “effect of pH and Temperature” in UNIT-II. Dr. Anant Achary opined the same. The suggestions were accepted and included in the syllabus.
13. In Molecular Biology course, the Anna University nominee suggested to reorganize UNIT-I (Introduction to Nucleic acid) by shifting the topic “Organization of chromosome” to the first for better flow of content. The suggestions were well taken and included in the modified syllabus.
14. All the BoS members accepted the syllabus of “Fluid Mechanics and Heat Transfer Operation” without any modification.

15. In Chemical Engineering Laboratory for Biotechnologist course, Dr. A. Santhiagu, Academic Council nominee, suggested to mention the experiment name as “Adsorption isotherms” instead of “Adsorption”.
16. In Instrumentation and methods of analysis lab, the Anna University nominee, suggested to use “biological solutions” instead of “inorganic chemicals” in the experiments. The suggestions were included in the revised syllabus.
17. In Bioprocess Principles course, Industry representative, suggested to change the topic “Phases of Microbial growth” to “Phases of Bacterial growth” in Unit I for better clarity and specificity. The point was well taken and modification has been made in the syllabus.
18. In Genetic Engineering course, the Anna University nominee, sought clarification in Units I and III regarding inclusion of topics like star activity and basics of sequencing techniques. Dr K.Geetha, Subject expert, clarified that star activity was mentioned with respect to restriction enzymes and the two basic methods of sequencing were already included in the syllabus. Industry representative enquired if Unit II will be covering both prokaryotic and eukaryotic host cells under the topic “introduction of rDNA into host cells”. It was clarified that both prokaryotic and eukaryotic systems will be covered.
19. All the committee members approved the syllabus of Mass transfer Operation (BT1503) unanimously.
20. All the committee members approved the syllabus of Bioprocess Laboratory I (BT1511) unanimously.
21. In Molecular Biology and Genetic Engineering Laboratory course, the Anna University nominee suggested to shift Agarose Gel electrophoresis experiment after DNA isolation. Dr K.Geetha, Subject expert, informed him that the students will find it easy to analyze the isolated DNA sample in agarose gel after DNA isolation experiment if they already know the technique. Hence it would be much convenient to keep Agarose gel electrophoresis as first experiment. He also enquired about the need for Western blotting experiment which was clarified by pointing out that the students will be analyzing the expressed protein after IPTG induction studies. BoS Industry representative suggested to shift Experiments 4, 5, 6 & 7 after Experiments 8 and 9 for better flow of the content. It was put forth that the current order of experiments better justifies the steps involved in rDNA technology. Anna University nominee suggested to change the title of Experiment 4 to “Restriction **enzymes** digestion of DNA” as more than one enzyme will be used for digestion. The necessary modification have been included in the syllabus.
22. The Anna University nominee suggested to cross verify the syllabus of the course “Bioinformatics” with that of “Genomics and Proteomics” for any overlaps. He suggested to include MATLAB in Bioinformatics lab syllabus. The suggestions were included in the syllabus.
23. The Syllabus of Bioprocess Engineering was accepted without any modifications by the experts.

24. The Anna University nominee enquired whether exam fee for the NPTEL courses (under online courses category) will be paid by college for the students. The Chairperson stated that the students will be paying their exam fee for NPTEL exams they undertake.
25. The Anna University nominee enquired whether students will be allowed to handle fermentor during the Bioprocess Engineering laboratory. The UG programme coordinator replied that the students are given hands on training to handle bioreactor and as per the requirement of the experiment, representative boy students stay overnight in the laboratory and carryout experiments such as batch culture.
26. All the committee members accepted the framed syllabus for “Downstream Processing” without any modification.
27. In Immunology course, the Anna University nominee enquired whether the topic “Antigen Presenting Cells” in Unit I covered only macrophages or other types of APCs also. It was clarified that both professional and non-professional APCs will be covered in the mentioned topic.
28. The industry representative suggested that the topic “therapy” in Unit IV should be clearly specified and it was clarified by Dr. K.Geetha that it was a continuation of Autoimmunity topic. The content of Unit V received appreciation from the external members.
29. In Downstream Processing (DSP) Laboratory course, the Anna University nominee enquired about the difference between “Cell disruption by homogenization” topics which was also included in Cell Biology Laboratory. It was clarified that unlike cell biology lab, in DSP lab, the optimization of process parameters for cell disruption would be experimented.
30. Dr. N. Ayyadurai, the Academic council nominee, enquired about the availability of high-pressure homogenizer in the department.
31. In Immunology Lab course, the status of institutional animal ethical committee (IAEC) renewal and procurement of animals were discussed and clarified. The Anna University nominee informed that the chairperson should possess a copy of the UGC guidelines regarding conduct of animal dissection and an Animal dissection committee should be formed in the department.
32. In Mini Project course, the Anna University nominee enquired whether the mini project will be continued as main project in their final semester. It was clarified that it could be continued as main project.
33. In Advanced Biochemistry course, the Anna University nominee, suggested to include topics related to carbohydrate metabolism in Unit III. The Chairperson and the subject expert accepted the suggestion and included Starch Biosynthesis, Glycogen synthesis and degradation in Unit III. In addition to that, based on the suggestions, the total contact hours for Unit III have been increased to 12 contact hours whereas total contact hours for Unit II have been reduced to 6.
34. **The Anna University nominee, suggested to change Chemical Reaction Engineering (CRE) course as Professional Core from Professional Electives as this course will**

provide the basics for Bioprocess Engineering. It was clarified that, CRE is not the basic requirement of Bioprocess engineering. Further it was put forth by Prof. Anant Achary that all the pre-requisites for Bioprocess engineering course have been met in semester III, IV, and V. This was justified by other internal BoS members that if CRE was the basis for Bioprocess Engineering, it should have been given in the earlier semesters by Anna University in their previous regulations which was not the case. It was brought to the notice of the experts that in Anna University new regulation R2019 also CRE has been shifted to Elective courses. Other autonomous Institutions like Bannari Amman Engineering College and MEPCO Schlenk Engineering College also the same is being followed. Prof. Anant Achary suggested that “Biochemical Engineering” course could be included in the next syllabus revision.

PPT attached for further clarification. (PPT file is attached). This has been attached to show that other autonomous institutions have chosen to bring Chemical Reaction Engineering course as a professional elective. The internal members of the BoS also expressed the difficulty in bringing this course as professional core due to overall credit restrictions. This course is hence recommended to be provided as Professional Elective paper

35. In Fundamentals of Nano Sciences course, all the experts were satisfied with the framed syllabus and appreciated inclusion of all the Nano biotechnology related topics in Unit V.
36. In Metabolic Engineering course, the Anna University Nominee advised to include tutorial hours. Dr. D. Pradiba, subject expert, explained that the content delivery incorporates tutorial type classes. Also, as this course is an elective, additional tutorial hour /credits shall disturb the balance in credits. The point was well taken.
37. In Animal Biotechnology course, the Anna university nominee suggested to swap Unit I and II. However, the industry nominee commented that the existing order maintains the flow well and the syllabus can be accepted without any change.
38. In Tissue Engineering course, the industry nominee commented that the syllabus was very elaborate and covered all the necessary aspects quite extensively. Hence it requires no change.
39. In Cancer Biology course, the industry nominee recommended to include the topic “Antibody directed enzyme prodrug therapy” in the syllabus. The suggestion was well taken and included in Unit V.
40. For Genomics and Proteomics course, the Anna University Nominee recommended to include MATLAB in the syllabus. The suggestion was accepted and included in the syllabus.
41. In Good Manufacturing and Laboratory Practice course, the industry nominee suggested to modify the course title as “Good Manufacturing Practice and Good Laboratory Practice”. She also suggested to include the Pollution control board certification procedure for laboratory accreditation. The suggestions were included in the revised syllabus.

42. In Bio-conjugate Technology and Applications course, Dr. N. Ayyadurai, Academic council nominee suggested to include the topic “Click Chemistry” in Unit II. He also recommended to include the application of Biomaterials (Nanomaterials) instead of synthetic polymers in Unit V. The necessary modification have been included in the syllabus.
43. In Biopharmaceutical Technology course, the Anna University nominee suggested to include Toxicity of drugs in the syllabus. Also, the industry nominee recommended to include ADA topic in the syllabus. The suggestions were accepted and included in the syllabus.
44. In Neurobiology and Cognitive Sciences course, the Anna University nominee, recommended to include Artificial Neural network (ANN) topic. The suggestions were incorporated in the syllabus.
45. The Chairperson presented the proposed list of three members committee for Online course (UG/PG), Value added course and Industrial Internship for approval of Board of studies members. The list was approved by the experts.
46. The Chairperson explained to the board of studies members that the PG students are encouraged to do industrial certification course as per the regulation. Further, chairperson informed that an extension of approval needs to be sought from Committee for the exception of the industrial certification course for the batch alone due to the pandemic situation.
47. The end semester results of II, III and IV year UG programme was presented to the BoS members by the chairperson.
48. PG programme coordinator proposed the vote of thanks.

Anna university R2019
Industrial Biotechnology

ANNA UNIVERSITY, CHENNAI
UNIVERSITY DEPARTMENTS
B. TECH. INDUSTRIAL BIOTECHNOLOGY
REGULATIONS – 2019
CHOICE BASED CREDIT SYSTEM
CURRICULUM AND SYLLABI FOR I TO VIII SEMESTERS
PROFESSIONAL ELECTIVES COURSES (PEC)

Sl. No.	CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	IB5001	Advanced Biochemistry	PEC	3	0	0	3	3
2	IB5002	Animal Biotechnology	PEC	3	0	0	3	3
3	IB5071	Bio conjugate Technology and Applications	PEC	3	0	0	3	3
4	IB5003	Bioethics	PEC	3	0	0	3	3
31	IB5022	Symbolic Mathematics	PEC	3	0	0	3	3
32	IB5023	Systems Biology	PEC	3	0	0	3	3
33	IB5024	Tissue Engineering	PEC	3	0	0	3	3
34	CH5751	Transport Phenomena	PEC	2	1	0	2	3
35	IB5073	Chemical Reaction Engineering	PEC	2	1	0	3	3
36	IB5025	Protein Structure and Function	PEC	3	0	0	3	3

CRE in professional electives



BANNARI AMMAN INSTITUTE OF TECHNOLOGY

(An Autonomous Institution Affiliated to Anna University, Chennai)
Approved by AICTE - Accredited by NBA New Delhi, NAAC with 'A' Grade and ISO 9001:2008 Certified)
SATHYAMANGALAM - 638 401 Erode District Tamil Nadu
Phone : 04295 226000 Fax : 04295 226666
Web:www.bitsathy.ac.in E-mail : stayahead@bitsathy.ac.in



III SEMESTER										
Code No.	Course	L	T	P	C	Hours/ Week	Maximum Marks			Category
							CA	ES	Total	
18BT301	ENGINEERING MATHEMATICS III	3	1	0	4	4	50	50	100	BS
18BT302	PROCESS CALCULATIONS AND UNIT OPERATIONS	3	0	2	4	5	50	50	100	ES
18BT303	INSTRUMENTATION AND ANALYTICAL TECHNIQUES	3	0	0	3	3	50	50	100	ES
18BT304	CELL BIOLOGY	3	0	0	3	3	50	50	100	PC
18BT305	BIOORGANIC CHEMISTRY	3	0	0	3	3	50	50	100	PC
18BT306	MICROBIOLOGY	3	0	0	3	3	50	50	100	PC
18BT307	MICROBIOLOGY LAB	0	0	4	2	4	100	0	100	PC
18BT308	BIOCHEMISTRY AND BIOORGANIC CHEMISTRY LAB	0	0	4	2	4	100	0	100	ES
18GE301	SOFT SKILLS - VERBAL ABILITY	0	0	2	-	2	100	0	100	EEC
Total					24					-

IV SEMESTER										
Code No.	Course	L	T	P	C	Hours/ Week	Maximum Marks			Category
							CA	ES	Total	
18BT401	BIOPROCESS ENGINEERING	3	1	0	4	4	50	50	100	PC
18BT402	FUNDAMENTALS OF TRANSPORT PROCESS	3	1	0	4	4	50	50	100	ES
18BT403	IMMUNOLOGY	3	0	2	4	5	50	50	100	PC
18BT404	MOLECULAR BIOLOGY	3	0	0	3	3	50	50	100	PC
18BT405	PHARMACOGNOSY AND PHARMACOLOGY	3	0	0	3	3	50	50	100	PC
18BT406	CHEMICAL THERMODYNAMICS	3	1	0	4	4	50	50	100	ES
18BT407	BIOPROCESS LABORATORY	0	0	4	2	4	100	0	100	PC
18BT408	MOLECULAR BIOLOGY LABORATORY	0	0	4	2	4	100	0	100	PC
18HS001	ENVIRONMENTAL SCIENCE	2	0	0	-	2	100	0	100	HSS
18GE401	SOFT SKILLS- BUSINESS ENGLISH	0	0	2	-	2	100	0	100	EEC
Total					26					-

DISCIPLINE ELECTIVES										
18BT001	CANCER BIOLOGY	3	0	0	3	3	50	50	100	PE
18BT002	CELLULAR BIOPHYSICS	3	0	0	3	3	50	50	100	PE
18BT003	METABOLIC ENGINEERING	3	0	0	3	3	50	50	100	PE
18BT004	BIOPOLYMERS	3	0	0	3	3	50	50	100	PE
18BT005	BIOSENSORS	3	0	0	3	3	50	50	100	PE
18BT006	BIOMATERIALS	3	0	0	3	3	50	50	100	PE
18BT007	STEM CELL TECHNOLOGY	3	0	0	3	3	50	50	100	PE
18BT008	GENOMICS AND PROTEOMICS	3	0	0	3	3	50	50	100	PE
18BT009	PHARMACOVIGILANCE	3	0	0	3	3	50	50	100	PE
18BT010	VACCINE TECHNOLOGY	3	0	0	3	3	50	50	100	PE
18BT011	MOLECULAR MODELLING AND DRUG DESIGN	3	0	0	3	3	50	50	100	PE
18BT012	MOLECULAR PATHOGENESIS AND DISEASE DIAGNOSIS	3	0	0	3	3	50	50	100	PE
18BT013	BIOLOGICAL SPECTROSCOPY	3	0	0	3	3	50	50	100	PE
18BT014	BIOPROCESS MODELLING AND SIMULATION	3	0	0	3	3	50	50	100	PE
18BT015	INTELLECTUAL PROPERTY RIGHTS AND TECHNOLOGY TRANSFER	3	0	0	3	3	50	50	100	PE
18BT016	BIOETHICS AND BIOSAFETY	3	0	0	3	3	50	50	100	PE
18BT017	BIOREMEDIATION	3	0	0	3	3	50	50	100	PE
18BT018	BIOMASS AND BIOENERGY	3	0	0	3	3	50	50	100	PE
18BT019	WASTE MANAGEMENT AND UTILIZATION	3	0	0	3	3	50	50	100	PE
18BT020	BIODIVERSITY AND BIOPROSPECTING	3	0	0	3	3	50	50	100	PE

OPEN ELECTIVES

18BT0YA	BIOFUELS	3	0	0	3	3	50	50	100	PE
	MICROBIAL CULTIVATION AND									

There is no Chemical Reaction Engineering course either in professional core or professional Electives in Bannari Amman Engineering College curriculum

In MEPCO Schlenk Engineering College, CRE is in professional electives

Mepco R2019

BTECH BIO TECHNOLOGY

BTECH BIO TECHNOLOGY Curriculum and Syllabus

Core Elective-1 (BBT)

S.No	Code	Name of the Course	Offered
1	19BTC01	BIOREMEDIATION TECHNOLOGY	BT
2	19BTC02	BIOPHYSICS	BT
3	19BTC03	NANO SCIENCE AND NANOTECHNOLOGY	BT

Core Elective-2 (BBT)

S.No	Code	Name of the Course	Offered
1	19BTC04	PROCESS CONTROL AND INSTRUMENTATION DYNAMICS	BT
2	19BTC05	BIOPROCESS - MODELING, DESIGN AND SIMULATION	BT
3	19BTC06	BIOLOGICAL SPECTROSCOPY	BT
4	19BTC07	CHEMICAL REACTION ENGINEERING	BT