MINUTES OF THE SEVENTH MEETING OF THE BOARD OF STUDIES IN BIOCHEMISTRY HELD ONLINE ON 06th JANUARY, 2022

Vide Notice sent via email dated December 27th, 2021 the seventh meeting of the BoS was conducted on the 6th of January 2021. Due to existing circumstances surrounding COVID19, the meeting was conducted online via Google Meet.

The meeting started at 10:00 a.m. and was concluded at 11:45 a.m. Since the number of members represented the Quorum, the BoS began its proceedings.

Minutes are presented in the format.

Members present:

1. Dr. Aduja Naik -Chairperson
2. Dr. Meenal Kowshik -VC Nominee
3. Dr. Sandeep Garg -AC Nominee
4. Dr. Lyned Lasrado -AC Nominee
5. Ms. Sarah T. Mesquita -Member Secretary
6. Dr. Supriya N. Prabhu Khorjuvenkar -Member
7. Ms. Lisha Da Costa -Member
8. Dr. Nidhi Bhatiwada -Industry Representative

Members absent:

1. Elissa Fernandes -Alumni Student Representative

Proceedings

The Chairperson Dr. Aduja Naik welcomed the members of the Board of Studies (BoS), introduced the new members, and along with the agenda for the meeting, also explained the functions of the Board of Studies. The Board then proceeded to transact the following business:

Agenda Items:

1. Introduction and approval of syllabus for Generic Elective Course (GEC for F.Y. B.Sc.) and Skill Enhancement Course (SEC for S.Y. B.Sc.)
2. Any other business (A.O.B.)

PART A: RESOLUTIONS

i. A discussion was held on the syllabi of the proposed Generic Elective Course for First-Year students. The BoS then discussed and subsequently approved the syllabus and the redrafted syllabus is presented in Annexure-I.

ii. The BoS also approved the syllabus for the proposed Skill Enhancement Course for the Second-Year students; which is presented in Annexure-II

MINUTES OF THE MEETING OF THE BOARD OF STUDIES IN BIOCHEMISTRY HELD ON 6TH JANUARY 2022 AT 10.00 A.M.

PART B: Resolutions/Recommendations of BoS that require consideration/approval of Academic Council:

Introduction of Generic Elective Course (G.E.C.) and Skill Enhancement Course (S.E.C.) that were proposed by the Department and are presented in Annexure - I and II. Seeking approval for floating these courses from the even semester of the academic year 2021-22 onwards.

The minutes of the meeting along with the approved course outcomes, course syllabi will be circulated to all the BoS members by e-mail prior to placing them before the Academic Council.

The Chairperson thanked the members of the Board of Studies in Biochemistry for their valuable contributions and suggestions.

The following members of the Board of Studies were present in person for the meeting:

1. Dr. Aduja Naik (Chairman)
2. Ms. Sarah T. Mesquita (Member Secretary)
3. Dr. Supriya Prabhu Khorjuvekar (Member)
4. Ms. Lisha Da Costa (Member)

The following members of the Board of Studies attended the meeting online via video conferencing - https://meet.google.com/mek-tnwx-ovd

1. Prof. Meenal Kowshik (VC nominee)
2. Prof. Sandeep Garg (AC Nominee)
3. Dr. Lyned Lasrado (AC Nominee)
4. Dr. Nidhi Bhatiwada (Industry Representative)

Members absent with prior intimation:

1. Ms. Elissa Fernandes (Industry Representative)

The meeting ended at 11:45 am on the 06th of January 2022.

Date: 12th January 2022

Dr. Aduja Naik
Chairperson
BoS (Biochemistry)

Ms. Sarah Mesquita
Member Secretary
BoS (Biochemistry)

PART C: The remarks of the Dean of the Faculty:-

a. The minutes are in order
b. The minutes may be placed before the Academic Council with remarks if any.
c. Important points of the minutes which need clear policy decision of the Academic Council to be recorded.

Date: 12th January 2022

Ananya Das
Signature of the Dean:

(Faculty of Science)

B.SC. DEGREE COURSE IN BIOCHEMISTRY - COURSE STRUCTURE

(To be applicable from the academic year 2022-23)

SEMESTER	CORE		ELECTIVE			
I	**BCH-I.C-1** Molecules of Life	**BCH-I.C-2** Cell Biology	--------	--------	--------	--------
II	**BCH-II.C-3** Protein Chemistry	**BCH-II.C-4** Biophysics	--------	--------	--------	--------
III	**BCH-III.C-5A** Metabolism of Biomolecules		**BCH.E-1** Tools & Techniques in Biochemistry	**BCH.E-17** Enzymology	**BCH.E-18** Fundamentals of Microbiology	**BCH.E-4** Plant Biochemistry
IV	**BCH-IV.C-6A** Immunology		**BCH.E-5** Human Physiology	**BCH.E-6** Nutritional Biochemistry	**BCH.E-19** Endocrinology	**BCH.E-8** Advanced Cell Biology
V	**BCH-V.C-7** Molecular Biology		**BCH.E-9** Concepts of Genetics	**BCH.E-10** Regulation of Gene Expression	**BCH.E-20** Industrial Microbiology	**BCH.E-12** Bioinformatics
VI	**BCH-VI.C-8A** Clinical Biochemistry		**BCH.E-21** Introduction to Pharmacology	**BCH.E-22** Food Biochemistry	**BCH.E-11** Genetic Engineering and Biotechnology	**BCH.E-23** Environmental Chemistry

Generic Elective Course: Biochemical Correlation of Diseases

Skill Enhancement Course: Nutraceutical Product Development

*The Generic Elective course and Skill Enhancement course will be floated from Even semester of academic year 2021-22 onwards.

PROGRAMME OUTCOMES

Programme Outcomes (PO)	Short Title of the POs	Description of the Programme Outcomes Graduates will be able to:
PO-1	Problem Analysis and Solutions	Think critically, identify, analyze problems/ situations and further attempt to design/ develop solutions that meet the specified goals.
PO-2	Use of Technology	Apply appropriate IT tools efficiently in their daily activities of communication and academics.
PO-3	Environment and Sustainability	Analyze and attempt solutions to environmental issues and commit themselves to sustainable development in the local/ national and global context.
PO-4	Ethics	Recognize and understand professional ethics /human values and be responsible for the same.
PO-5	Individual and Team work	Function effectively at various levels, capacities and situations.
PO-6	Communication	Communicate proficiently (oral and written) as a responsible member of society.
PO-7	Research Aptitude	Understand general research methods and be able to analyse, interpret and derive rational conclusions.
PO-8	Life Skills	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of domain specific change.

PROGRAMME SPECIFIC OUTCOMES (PSO)

After successful completion of a Bachelor's degree in Biochemistry, the students will:

PSO-1	Fundamental Knowledge of Biochemistry	Possess a fundamental knowledge of the different aspects of Biochemistry, with the means and ability to specialize in a specific field.
PSO-2	Development of practical skills	Be equipped with practical skills and the ability to apply their theoretical concepts to design, perform experiments, analyze and interpret data and thus develop proficiency in laboratory management.
PSO-3	Critical thinking and analytical skills	Be able to demonstrate proficiency in quantitative reasoning (critical thinking) and analytical skills.
PSO-4	Analysis and Problem Solving	Be able to use these skills to analyze and solve industry related problems, thus preparing them for a successful career in industry and research institutes.
PSO-5	Understanding the need for sustainable solutions	Be able to understand the impact of Biochemistry in the development of sustainable solutions for the environment and societal context.
PSO-6	Developing an inclination towards research	Develop an inclination towards research through the compulsory internship in industry/research/academic institutes which promote and inculcate professional ethics and code of practice among students, enabling them to work in a team with a multidisciplinary approach.

Annexure-I

Syllabus for Generic Elective Course

GEC: BIOCHEMICAL CORRELATION OF DISEASES	
COURSE CODE:	**GEC**
MARKS:	**100**
CREDITS:	**4**
CONTACT HOURS:	**Theory**: 60 Hours
COURSE OUTCOMES:	On the successful completion of the course, the students will be able to: **CLO1:** Understand the mechanism of metabolic disorders at molecular level. **CLO2**: Identify management methods of lifestyle disorders. **CLO3**: Comprehend the concepts of pathogenesis of the diseases. **CLO4:** Conceptualize the principle and use of vaccines.

BIOCHEMICAL CORRELATION OF DISEASES **Total hours: 60**

MODULE	TOPICS	CONTACT HOURS	TOTAL CONTACT HOURS
MODULE 1: **Congenital and Nutritional diseases**	**1.1: Inborn errors of metabolism** Alkaptonuria, Phenylketonuria, Glycogen and Lipid storage diseases, Clotting disorders **1.2: Nutritional deficiency-based diseases** Kwashiorkar, Marasmus, Beri-beri, Scurvy, Pellagra, Anaemia, Night blindness, Rickets, Osteomalacia, Osteoporosis, Wilson's disease	**07** **08**	**15**
MODULE 2: **Lifestyle and hormonal disorders**	**2.1: Life style diseases** Obesity, Cardiovascular diseases, Atherosclerosis, Diabetes mellitus-II. Inflammatory Bowel Disease (IBD). **2.2: Hormonal Imbalances** Outline of hormone action and imbalances leading to disease - precocious puberty, hyper and hypopituitarism. Hyper and hypothyroidism. PCOS	**07** **08**	**15**
MODULE 3: Autoimmune diseases and protein misfolding	**3.1: Autoimmune diseases** Concepts in immune recognition - self and non-self-discrimination, organ specific autoimmune diseases – Hashimoto's thyroiditis, Grave's disease, Myasthenia Gravis; Systemic diseases - SLE, rheumatoid arthritis; Diabetes Mellitus-I. **3.2: Diseases caused due to misfolded proteins** Alzheimer's, Huntington's disease, Transmissible Spongiform Encephalopathy (Kuru, CJD, Mad Cow Disease), Sickle cell anaemia, Thalessemia.	**09** **06**	**15**

MODULE 4: Infectious diseases	**4.1: Infectious diseases** Viral infection (polio, influenza/Covid-19, Jaundice); Bacterial infections (tetanus, diphtheria, cholera); Protozoan (Plasmodium and Entamoeba histolytica) and parasitic infections (helminthiasis). Vaccines against diseases. General strategies in the design and development of vaccines.	**15**	**15**

REFERENCES

Mandatory Reading

- Ananthanarayan R. and Paniker C. K. J. (2009) Textbook of Microbiology. 8th edition, University Press Publication

Supplementary Reading

- Berg, J. M., Tymoczko, J. L. and Stryer, L., Biochemistry (2012) 7th ed., W.H Freeman and Company (New York)
- Murray, R. K, Granner, D. K, Mayes, P.A. and Rodwell, V.W. (2003), Harper's Illustrated Biochemistry, McGraw-Hill Companies.
- Roitt, I. M. and Delves, P. J. (2001). Roitt's essential immunology (10th ed.). Malden, MA: Blackwell Science.
- Ellen Strauss, James Strauss. (2007) Viruses and Human disease (2nd ed.). Academic Press Publications.

Web References

- George, F. Hoffmann., Johannes, Z., William, L. Nyhan. Inherited Metabolic Disorders: A clinical approach, Springer.

- Fernandes, J., Saudubray, J.M., van Den Berghe, G. Inborn Metabolic Diseases. Springer.

Annexure-II

Syllabus for Skill Enhancement Course

SEC: NUTRACEUTICAL PRODUCT DEVELOPMENT	
COURSE CODE:	**SEC**
MARKS:	**100**
CREDITS:	**4**
CONTACT HOURS:	**Theory**: 15 Hours **Practice hours**: 45 Hours
COURSE OUTCOMES:	On the successful completion of the course, students will be able to: **CLO1:** Explain the concept of nutraceuticals and functional foods. **CLO2:** Extract and estimate bioactive compounds from plant and animal sources. **CLO3:** Discuss the trends in the nutraceutical industry and perform market research. **CLO4:** Understand the process of nutraceutical product development.

NUTRACEUTICAL PRODUCT DEVELOPMENT

MODULE	TOPICS	CONTACT HOURS	TOTAL HOURS
MODULE 1: Introduction to Nutraceuticals	**1.1: Nutraceuticals:** Definition and Classification, dietary supplements, novel foods, post-biotics, fortified foods and functional foods. **1.2: The Nutraceutical Industry:** Indian and global scenario **Activities based on module 1: Analysis of reports, market trends and projections, choosing topic for mini-project**	**03** **02** **10**	**15**
MODULE 2: Phyto-Nutraceuticals	**2.1: Plant Based Nutraceuticals** Plant secondary metabolites, Concept of cosmeceuticals and aquaceuticals. **2.2: Popular Phyto-nutraceuticals** Glucosamine from ginseng, Omega-3 fatty acids from linseed, Epigallocatechin, gallate from green tea, lycopene, polysaccharides from seaweeds. **Activities based on module 2: Extraction of phytochemicals, antioxidant assay**	**02** **02** **11**	**15**
MODULE 3: Animal Based Nutraceuticals	**3.1: Animal Based Nutraceuticals** Chitin, chitosan, glucosamine, chondroitin sulphate and other polysaccharides, protein isolates and omega-3 fatty acids of animal origin and marine sources **Activities based on module 3: Extraction of chitin and chitosan production from seafood waste and fungi**	**04** **11**	**15**
MODULE 4: Product development	**4.1: Efficacy, Safety and Toxicity of nutraceuticals, Regulatory bodies, QC, QA, FSSAI** **4.2: Mini project: Case studies on product development (paediatric/geriatric/lactose intolerant/supplements during pregnancy/protein supplements/diabetes)**	**02** **13**	**15**

REFERENCES

Mandatory Reading

- A.P. Sarkate, M.A. Patil and P.V. Agharde, (2021) Nutraceuticals and Human Health**.** Brillion Publishing. New Delhi, India.

Supplementary Reading

- Pathak Y. V. (2009) Handbook of Nutraceuticals Volume I- Ingredients, Formulations, and Applications CRC Press, Florida, USA
- Gupta, R.C. (2016) Nutraceuticals- Efficacy, safety and Toxicity. Elsevier, Massachusetts, USA.

Web References

- https://www.classcentral.com/course/swayam-functional-foods-and-nutraceuticals-14069
- New Concepts in Nutraceuticals as Alternative for Pharmaceuticals https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4336979/
- https://www.escardio.org/Journals/E-Journal-of-Cardiology-Practice/Volume-9/Nutraceuticals-what-they-are-and-how-they-work
- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4336979/

ANNEXURE A

Semester	Course Title	Existing	Changes Proposed	Specify the reason for the change
I or II	Generic Elective Course: Biochemical Correlation of Diseases	Nil	New syllabus	Introduction of GEC for F.Y. students
III or IV	Skill Enhancement Course: Nutraceutical Product Development	Nil	New syllabus	Introduction of SEC for S.Y. students