



Mangalore University

Department of Studies in Biochemistry, Mangalore University Jnanakaveri

Campus, Chikka Aluvara, Kodagu District, Karnataka, 571 232

PREAMBLE

Revision of syllabi for the 'two years' Master Degree (Choice Based Credit System- Semester Scheme) programme in Biochemistry.

PG BOS in Biochemistry has revised and prepared the syllabi (CBCS based) for the PG course in Biochemistry. The Choice Based Credit System (CBCS) comprises Hard Core, Soft Core courses for Biochemistry and Open Elective for students other than Biochemistry.

The credit pattern of PG programme in Biochemistry includes **Hard core, Soft core and Open elective. There are totally 14 Hard core courses (10 Hard Core theory courses, 03 Hard Core practical courses from 1–3rd semester and 01 Hard core project work in 4th semester)** with a total credits of 56, 09 Soft core courses (06 theory soft core courses, 03 soft core practicals) with a total of 28 credits and 02 Open elective courses (2nd and 3rd semester) for other disciplines with a total credits of 6. The project work is compulsory in the 4th semester for which 4 credits are allotted.

- The total credits of the PG Programme in Biochemistry (Hard core, soft core and Open elective courses) = **90**.
- The PG programme in Biochemistry also provides choices for the soft core courses in all the semesters.
- A detailed skeleton of the PG programme in Biochemistry is provided for aspiring postgraduates.

M.SC. BIOCHEMISTRY PROGRAMME

Learning objectives

1. Program outcomes

- Skilled human resource development
- Creativity/Innovative thinking, problem solving skills
- Development of leadership quality

- Employability and entrepreneurship
- Communication skills

2. Program specific outcomes

The program enables the students to

- Acquire necessary knowledge and skills to undertake a career in research either in industry or in an academic set up.
- Apply the knowledge of experimental approaches to solve problems in the field of core biochemistry.
- Integrate and apply the techniques in Analytical biochemistry, Protein chemistry, Clinical Biochemistry, Microbiology, Molecular biology and Bioinformatics.
- Acquire scientific knowledge in Cell biology, Diagnostic Biochemistry, Immunology, Enzymology and Genetic engineering.
- Obtain awareness of the biochemical basis of human diseases, non-invasive diagnostics, and drug development.

Two-year Master's Degree Programme (Four Semesters)

M Sc Biochemistry (CBCS)

S. No.	Semester	Hard core credits(HC)	Soft core credits(SC)	Open elective credits (OE)	Total credits	Practical/ Project*	Theory
1.	I	16	6	-	22	1 (HC) 1 (SC)	3(HC) +1(SC)
2.	II	16	6	3	25	2 (HC)	2(HC)+2(SC) + 1(OE)
3.	III	12	10	3	25	2(SC)	3(HC)+1(SC) +1(OE)
4.	IV	12	6	-	18	1(HC)*	2(HC)+2(SC)
	Total	56	28	6	90	04(HC) +03 (SC)=7	10(HC) + 06(SC) +02(OE)=18

M.Sc. Biochemistry CBCS Courses (All 4 Semesters)

HARDCORE COURSES

Serial No.	Paper code	Title of the paper
1.	BCH 401	Bioorganic & Biophysical Chemistry
2.	BCH 402	Chemistry of Biomolecules
3.	BCH 403	Biochemical Techniques
4.	BCP 408	Practical Bioanalytical Techniques
5.	BCH 451	Enzymology
6.	BCH 452	Clinical Biochemistry
7.	BCP 458	Practical Enzymology
8.	BCP 459	Practical Clinical Biochemistry
9.	BCH 501	Molecular Biology
10.	BCH 502	Immunobiology
11.	BCH 503	Cell Biology
12.	BCH 551	Genetic Engineering
13.	BCH 552	Metabolism of nitrogen containing compounds
14.	BCPR/D 557	Project work / Dissertation

SOFTCORE COURSES

Serial No.	Paper code	Title of the paper
1.	BCS 404	Human Physiology
2.	BCS 405	General Microbiology
3.	BCP 406	Practical Biochemical Methods
4.	BCP 407	Practical General Biochemistry
5.	BCS 453	Nutritional Biochemistry
6.	BCS 454	General Virology
7.	BCS 455	Metabolism of fuel molecules
8.	BCS 456	Bioethics & Bio-safety
9.	BCS 504	Molecular Genetics
10.	BCS 505	Food Science
11.	BCP 506	Practical Microbiology
12.	BCP 507	Practical Cell Biology
13.	BCP 509	Practical Molecular Biology & Immunology
14.	BCP 510	Practical Bioprocess Technology

15	BCS 553	Plant Biochemistry
16.	BCS 554	Microbial Biochemistry
17.	BCS 555	Bioinformatics, Biostatistics & Nano-biotechnology
18.	BCS 556	Nanotechnology

OPEN ELECTIVES COURSES

Sl No.	Paper code	Title of the paper
1.	BCE 457	Biochemistry in Day-To-Day Life
2.	BCE 508	Health and Disease

FIRST SEMESTER

Sl No.	Paper Code	Title of the paper	Instruction hours /week	Credits	Exam hours	Marks Exam + IA = Total	HC / SC
1.	BCH 401	Bioorganic & Biophysical Chemistry	4	4	3	70+30=100	HC
2.	BCH 402	Chemistry of Biomolecules	4	4	3	70+30=100	HC
3.	BCH 403	Biochemical Techniques	4	4	3	70+30=100	HC
4.	BCS 404*	Human Physiology	3	3	3	70+30=100	SC
5.	BCS 405*	General Microbiology					
6.	BCP 406**	Practical Biochemical Methods	8	3	6	70+30=100	SC
7.	BCP 407**	Practical General Biochemistry					
8.	BCP 408	Practical Bioanalytical Techniques	8	4	6	70+30=100	HC

Note: * Choice between BCS 404 and BCS 405, **BCS 406 & BCP 407. HC/SC: Hard Core/Soft Core.

SECOND SEMESTER

SL No.	Paper Code	Title of the paper	Instruction hours /week	Credits	Exam hours	Marks Exam + IA = Total	HC / SC
1.	BCH 451	Enzymology	4	4	3	70 + 30 = 100	HC
2.	BCH 452	Clinical Biochemistry	4	4	3	70 + 30 = 100	HC
3.	BCS 453*	Nutritional Biochemistry	3	3	3	70 + 30 = 100	SC
4.	BCS 454*	General Virology					
5.	BCS 455**	Metabolism of fuel molecules	3	3	3	70 + 30 = 100	SC
6.	BCS 456**	Bioethics & Bio-safety					
7.	BCE 457	Biochemistry in Day-To-Day Life	3	3	3	70 + 30 = 100	OE
8.	BCP 458	Practical Enzymology	8	4	6	70 + 30 = 100	HC
9.	BCP 459	Practical Clinical Biochemistry	8	4	6	70 + 30 = 100	HC

Note: * There is a choice between BCS 453 and BCS 454, **BCS 455 & BCS 456. BCE 457 is an open elective course for other disciplines. HC/SC: Hard Core/Soft Core.

THIRD SEMESTER

SL No.	Paper Code	Title of the paper	Instruction hours /week	Credits	Exam hours	Marks Exam + IA = Total	HC / SC
1.	BCH 501	Molecular Biology	4	4	3	70+30=100	HC
2.	BCH 502	Immunobiology	4	4	3	70+30=100	HC
3.	BCH 503	Cell Biology	4	4	3	70+30=100	HC
4.	BCS 504*	Molecular Genetics	3	3	3	70+30=100	SC
5.	BCS 505*	Food Science					
6.	BCP 506**	Practical Microbiology	8	3	6	70+30=100	SC
7.	BCP 507**	Practical Cell Biology					
8.	BCE 508	Health and Disease	3	3	3	70+30=100	OE
9.	BCP 509***	Practical Molecular Biology & Immunobiology	8	4	6	70+30=100	SC
10.	BCP 510***	Practical Bioprocess Technology					

Note: *There is a choice between BCS 504 and BCS 505, ^sBCS 506 & BCP 507, **BCP 509 & BCP 510. BCE 508 is an open elective course for other disciplines. HC/SC: Hard Core/Soft Core.

FOURTH SEMESTER

SL No.	Course Code	Title of the paper	Instruction hours /week	Exam hours	Credits	Marks Exam + IA = Total	HC / SC
1.	BCH 551	Genetic Engineering	4	3	4	70+30=100	HC
2.	BCH 552	Metabolism of Nitrogen Containing Compounds	4	3	4	70+30=100	HC
3.	BCS 553*	Plant Biochemistry	3	3	3	70+30=100	SC
4.	BCS 554*	Microbial Biochemistry					
5.	BCS 555**	Bioinformatics, Biostatistics & Nano-biotechnology	3	3	3	70+30=100	SC
6.	BCS 556**	Nanotechnology					
7.	BCPR/D 557***	Project Work /Dissertation	8	-	4	70+30=100	HC

Note: *There is a choice between BCS 553 & BCS 554, **BCS 555 & BCS 556. *BCPR 557 is compulsory to all the students. HC/SC: Hard Core/Soft Core.**

University theory question paper pattern

Sl. No.	Question type	Marks
1.	Answer any TEN out of 12 questions	2 x 10= 20
2.	Answer any FIVE questions out of seven	10 x 5 = 50
	Hardcore: Two questions from each Unit and the remaining questions from any of the four units for short answers	
	Softcore: Three questions from each unit and the remaining questions from any of the three units for short answers.	

University Practical question paper pattern

Sl. No.	Question type	Marks (70)
1.	Procedure writing	10
2.	Major Experiment	25
3.	Minor Experiment	15
4.	Record	10
5.	Viva-Voce	10

University Project work Evaluation pattern

Sl. No.	Details	Marks (70)
1.	Presentation	25
2.	Viva-Voce	20
3.	Report	25

Internal Assessment (Theory & Practical) Examination

Sl. No.	Description	Test	Marks
1.	At the end of 8 th week	C1	30
2.	At the end of 14 th week	C2	30
		C1+C2 / 2	Average of two

C1/ C2 Theory Marks Allotment

Sl. No.	Description	Marks
1.	Test	30
	Total	30

Allotment of C1/C2 Practical Marks

Ser. No.	Description	Marks
1.	Practical Test C1	30
2.	Practical Test C2 + Class Seminar	30

I

I SEMESTER

BCH 401: BIO-ORGANIC AND BIOPHYSICAL CHEMISTRY: HARD CORE

Lecture hours: 56

Total credits: 04

Course objectives

- To study the acid base concept in bio-organic chemistry.
- To understand the nature of reaction intermediates and the factors affecting reaction conditions.
- To know about reaction types and their kinetics, thermodynamics and effect of thermodynamic parameters on reactions with kinetic aspects.
- To discover various aspects of stereochemistry.

Unit I:

14 hrs.

Properties of water: Physical and chemical properties of water, ionization and ionic product of water, structure of liquid water and ice. Unusual properties of water. Hydrophilic, hydrophobic and amphipathic molecules in aqueous solution. Effect of solutes on colligative properties of water. Importance of water in