

M.Sc., BIOMEDICAL SCIENCE

5 Year Integrated Programme

REGULATIONS & CURRICULUM STRUCTURE (2022-2023)



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BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI – 620 024
M.Sc., BIOMEDICAL SCIENCE (5 YEAR INTEGRATED) PROGRAMME

PREAMBLE OF THE COURSE STRUCTURE

(M.Sc. Biomedical Science - Integrated Programme)

PROGRAMME: M.Sc. Biomedical Science (5 year Integrated) is an autonomous programme through Choice Based Credit System [CBCS] offered by the Department of Biomedical Science, Bharathidasan University, Tiruchirappalli. It will be an intensive full time 5 years course, which will include classroom lectures, seminars, guest lectures, laboratory practical, self study and projects. Equip young students with in-depth education, highly skilled and strategies to change the future of modern medicine. Our Ultimate aim is to promote, develop and deliver excellence in all aspects of biomedical science. In this Programme, the candidates will have proper guidance and support to set quality standards for the health care profession through training, education, assessments, examinations and continuous professional development.

DURATION OF THE PROGRAMME: The period of certified study for the M.Sc, Biomedical Science (5 year Integrated Programme) shall be a full time course and its duration shall extend over a period of five academic years consisting 10 semesters pattern, with examinations at the end of each semester. Each year shall consist of two semesters' viz. Odd and Even semesters. Odd semester shall be from July to November and even semester shall be from December to April. There shall be not less than 90 working days which shall comprise 450 teaching clock hours for each semester.

ELIGIBILITY FOR ADMISSION: A candidate who has passed in Higher Secondary School Examination (10+2 Pattern) conducted by State Governments / CBSE or an equivalent examination of other Board accepted by the Syndicate of this University, as equivalent thereto are eligible for admission. This program will be offered to students who have completed their 12 years of schooling and studied Biology, Physics and Chemistry through both their 10th and 12th standards. Students who have also had Mathematics besides Biology would be considered too. Candidate must have minimum pass grade or equivalent and as per Government norms.

Students for this program would be selected based on the aggregated average of the performance of the candidate in their Higher Secondary School Examination and also through the entrance test / interview conducted by the department for this purpose, if necessary. On the basis of the performance in the marks secured in +2, and the entrance test, the candidates will be short-listed for admission. The performance in the entrance test / +2 marks, evidence of age, educational qualification, community, extra-curricular activities, etc., will be verified during the admission time. The Tamil Nadu Government norms will be applied in the selection of candidates. The list of candidates who are selected will be displayed in the notice board of the departments and University website. Official letter of intimation will also be sent to the selected candidates.

EXAMINATIONS: There shall be examination at the end of each semester: for odd semesters in the month of October / November and for even semester in the month of April/May. In case of X semester, the examination will be in the form of seminar and / or viva-voce based on their four-six months dissertation work.

CREDITS: Credit is a system of quantifying the outcomes of learning or means of expressing equivalence of learning. It is way of comparing learning achieved using different parameters such as student work load, learning out comes and contact hours. At the global level there are two method of assigning credits “Credits” may be calculated my means of ‘learning outcomes’ or ‘contact hours’. Total Credits for M.Sc., 5 year integrated program is minimum 230 credit requirement.

EXIT OPTION: It is proposed that students of 5-year Integrated Biomedical Science Programme have the option of exit at the end of the third-year with a B.Sc. degree in Biomedical Science, by fulfilling minimum 140 credit requirements specified in the M.Sc. Biomedical Science course structure. A duly constituted departmental committee will review the student’s request for lateral exit and the Committee’s recommendations will be forwarded to the Head of the Institution for the final approval.

ELECTIVE COURSE AND EXTRA DISCIPLINARY COURSES (ECs & EDCs): Normally for science students the Major Elective Courses (EC) shall be chosen within those offered by the Science groups. The Extra Disciplinary course (EDC) are open to all students irrespective of Science or Arts or Commerce Programs.

GRADING: Once the marks of the CIA and end-semester examinations for each of the courses are available, they will be added. The marks, thus obtained will then be graded as per the scheme provided in Table 3. From the second semester onwards the total performance within a semester and continuous performance starting from the first semester are indicated respectively by Grade Point Average (GPA) and Cumulative Grade Point Average (CGPA). These two are calculated by the following formulae (Equation-1):

$$GPA = \frac{\sum_{i=1}^n C_i G_i}{\sum_{i=1}^n C_i}$$

Equation-1

Where ‘Ci’ is the Credit earned for the Course I in any semester; ‘Gi’ is the Grade Point obtained by the student for the Course I and ‘n’ is the number of Courses passed in that semester.

CGPA = Cumulative Grade Point Average (Average Grade Points of all the Courses passed starting from the first semester to the current semester.)

ATTENDANCE: As prescribed by the University from time to time. As of now, each student should earn a minimum of 80% of attendance to appear for the University Examinations.

EVALUATION SYSTEMS: Evaluation of each theory and project course shall comprise of Continuous Internal Assessment (CIA) for 25 marks and 75 marks for End Semester Examinations (ESE). For Practical examination: Evaluation of each practical course shall comprise of Continuous Internal Assessment (CIA) for 40 marks and 60 marks for End Semester (practical) examinations (ESE).

QUESTION PAPER PATTERN:

UNIVERSITY SEMESTER EXAMINATION (THEORY):

Part-A	Answer all questions	15X1= 15 Marks
Part-B	Answer any 5 questions out of 6 questions	5X3 = 15 Marks
Part-C	Answer any 5 questions out of 6 questions	5X5 = 25 Marks
Part-D	Answer any 2 questions out of 4 questions	2X10= <u>20 Marks</u>
	Total	<u>75 Marks</u>

- a. **CIA marks:** The CIA marks are awarded by based on student's academic performance in each paper. The pattern may followed as given below

Unit test	10
Seminar	05
Assignment	05
University Model Exam	<u> </u> 05
	<u>25</u>
	(OR)

The concerned course teacher has the liberty to design the pattern. The CIA will be conducted by the Dept. of Biomedical Science, Bharathidasan University

- b. **ESE:** There will be two methods of evaluation:

a). The External examination will be conducted by the University at the end of each semesters in subjects mentioned.

b). Project and self study review evaluation will consist of Presentation of their research findings and should defend their dissertation work which will be conducted by the University in the Department of Biomedical Science, Bharathidasan university.

UNIVERSITY SEMESTER EXAMINATION (PRACTICAL):

The examiners will be appointed by HOD on the basis of the recommendations of the board of studies. The maximum marks for each practical examination will be 100 marks.

MAXIMUM MARKS:

Maximum marks will be 100 for each theory paper and practical. The maximum marks for M.Sc., project/dissertation work shall be 100.

PASSING MINIMUM:

Theory : A student is declared to have passed in each theory course if he/she secures not less than 40% marks (30 marks out of 75) in University Examination and 40% marks (10 marks out of 25) in CIA and not less than 50% marks in aggregate taking CIS and University Exam marks together.

Practical : A student is declared to have passed in each theory course if he/she secures not less than 40% marks (24 marks out of 60) in University Examination and 40% marks (16 marks out of 40) in CIA and not less than 50% marks in aggregate taking CIS and University Exam marks together.

For Arrear Candidates: A candidate who does not pass the subject(s) may be permitted to reappear in such subject(s) in the subsequent examination to be held in October/November or April/May. However, candidates who have arrear in practical/lab shall be permitted to take their arrear practical/lab examinations only along with regular practical examination(s) in the respective semesters.

NUMBER OF WORKING DAYS PER SEMESTER

No. of working days - 90
Last working day & exam schedule will be planned suitably.

COMMUTATION OF MARKS INTO GRADES AND NORMALIZATION- AS PER THE UNIVERSITY PATTERN:

The marks to grade conversion are as follows: **TABLE-1**

Marks Range	Corresponding Grade	Grade points
90 and above	O	10
80 and above but below 90	A ⁺	9
70 and above but below 80	A	8
60 and above but below 70	B ⁺	7
50 and above but below 60	B	6
Below 50	RA	NA
Absent / withdrawn	AAA	NA
Redo (For want of Attendance)	Z	NA

- The various grades shall be as follows: O, A+, A, B+, B & RA (Reappearance; option only for core, for electives, the candidate may either reappear or choose alternative elective papers).
- The student who fails in one or more theory papers will be permitted to reappear for the same again in the subsequent semesters.
- Those who fail in the lab course will be permitted to reappear for the same along with the next following regular batch of students, in the concerned semester.
- A candidate who fails in the project / related field training examinations will have to redo the same in a subsequent semester and appear for the examination at the end for the semester.

PRACTICAL /SUMMER TRAINING: Student may undergo practical/summer training during the months of May and June. The student should submit a report signed by the supervisor from the industry/Institution involved in Biomedical Sciences, in which he/she has undertaken the training. The summer training shall not be compulsory.

GUIDELINES FOR FINAL SEMESTER PROJECT/DISSERTATION: Each M.Sc., student will have to undertake a project work under the guidance of his/her supervisor for a period of 4-6 months as per course curriculum. The students will have the option of undertaking the project work in the Department Laboratory itself or in other Institutions based on permission of HOD. The Department faculty members act as an Internal Supervisor for the student who are doing dissertation in other institutes. Also, those students are advised to submit their Joining report duly signed by their external guide from the host institute at earliest (within 2 weeks) possible to their internal guide

OBJECTIVE OF DISSERTATION: To impart the theoretical knowledge through research methods may help those to formulate a rigorous research problem related to basic medical science on the basis of their observation from their experiments. This will help to do an independent study and encourage them to answer a scientific question

SUBMISSION OF DISSERTATION: The student will be allowed to submit his/her thesis once the supervisor (Internal/External) is satisfied with the progress and completion of the research work. The project work should be an original research.

ORAL DEFENSE OF THE DISSERTATION/THESIS: The student will have to defend his/her research work in front of a panel consisting internal examiner and an external examiner appointed by the HOD with the concern of Board of Study Members

FINAL CONFERMENT OF THE DEGREE: A candidate shall be declared eligible for conferment of the degree only after he/ she has passed all the courses prescribed therefore, including practical/ labs and project/ dissertations.

RANKING: A candidate who passes all courses in the prescribed period of duration of the course in the first appearance in all the papers and also scores the highest total marks, is alone eligible for ranking.

- Reappeared candidates will not be considered for ranking.
- Only one rank will be considered for each core Department.
- Student's strength of the course will be indicated in the Rank Certificate.

REVISION OF REGULATION AND CURRICULUM: The Department Board of Studies (BOS) may, from time to time, revise, amend or change the Regulations and the curriculum, if found necessary. However, the Department follows other general guidelines of the University, which are not laid down in this regulation

AMENDMENT OF RULES: The Department committee may be empowered to change/modify the regulations relating to M.Sc (Biomedical Science) program as and when required.

OTHER REGULATIONS:

1. The Department committee may be empowered to implement the orders of University.
2. The common regulations of the University shall also be applicable to this program.
3. The dress should be clean Trousers and Collared Shirt for Boys; Salwar or Churidhar with Kameez for Girls and student maintain decorum.
4. All students are requested to hold their university identity card while entering into the department
5. Wearing Lab coat and laboratory shoes (Exception wherever applicable, E.g. Animal tissue culture facility) are mandatory for all students during the practical hours. The details regarding the lab coat patterns can be obtained from department office.
6. Students are advised to contact their respective academic councilors /coordinator for any queries and further assistance.
7. All students are requested to keep their department premises very neat and clean
8. The department library facility is available for students convince. All students are advised to utilize library facility and strictly follow the library regulation and rules.
9. All students are advised to make entry in log book, while using the instruments in the lab.
10. Using mobile phones inside the class rooms/Laboratory are strictly prohibited
11. The students are requested to provide their Parents/Guardians contact address with telephone numbers to their respective academic councilors. The change of address and contact numbers need to be informed immediately. The same way parents are requested to contact the academic councilors contact details on each year to know the wards overall performance in the Department
12. The Department has constituted anti ragging / sexual harassment committee. The committee members contact details and numbers are available in the Department notice board.

CURRICULUM STRUCTURE (TABLE 2)

S.No.	Part	Type of the Course	Number of Courses	Total Credits
1	I	Languages	4	12
2	II	General English	4	12
3	III	A. Allied Courses I & II	4	20
		B. Core Courses	18	90
		C. Core Choices Courses	3	15
		D. Entrepreneurship/Industry Based Course	1	4
		E. Laboratory Courses	8	24
		F. Elective Courses	3	12
		G. Skill Based Elective Courses	2	10
		H. Non-Major Elective Courses	4	8
		I. Project	2	10
4	IV	A. Value Education	1	2
		B. Environmental Studies	1	2
		C. Soft Skills	1	2
5	V	A. Extension Activities	1	2
		B. Gender Studies	1	2
		Total	59	230



BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI 620 024
M.Sc., BIOMEDICAL SCIENCE - 5 YEAR INTEGRATED
PROGRAMME STRUCTURE UNDER C.B.C.S*.
 (Application to the candidates admitted from the year 2022 onwards)

FIRST YEAR - I SEMESTER

Part	Course Code	Name of the Course	Credits	Teaching Hours	Maximum Marks		
					CIA	ESE	Total
I	CL01 BM11TL1/ BM11FL1	Language Course – I (Tamil/Other Languages)	3	5	25	75	100
II	GEC01 BM11EL1	English Language Course – I	3	5	25	75	100
III	CC01 BM11C1	Core Course -1 : Cell Biology	5	5	25	75	100
	LC01 BM11CP1	Laboratory Course - 1: Cell Biology	3	4	40	60	100
	AICC01 BM11AC1	First Allied Course : Mathematics	5	5	25	75	100
IV	VE BM11VE	Value Education : Men and Society	2	3	25	75	100
		Seminar, Library, Leveraging E-Resources, VAC, etc.	--	3	--	--	--
		Total	21	30	165	435	600

FIRST YEAR - II SEMESTER

Part	Course Code	Name of the Course	Credits	Teaching Hours	Maximum Marks		
					CIA	ESE	Total
I	CL02 BM12TL2/ BM12TL2	Language Course – II (Tamil/Other Languages)	3	5	25	75	100
II	GEC02 BM12EL2	English Language Course – II	3	5	25	75	100
III	CC02 BM12C2	Core Course -2: Human Anatomy and Physiology	5	5	25	75	100
	AICC02 BM12AC2	First Allied Course : Chemistry	5	5	25	75	100
	LC02 BM12CP2	Laboratory Course* (Human Anatomy & Physiology)	3	4	40	60	100
IV	ES01 BM12ES	Environmental Studies	2	3	25	75	100
		Seminar, Library, Leveraging E-Resources, VAC, etc.	--	3	--	--	--
		Total	21 (42)	30	165	435	600 (1200)

SECOND YEAR - III SEMESTER

Part	Course Code	Name of the Course	Credits	Teaching Hours	Maximum Marks		
					CIA	ESE	Total
I	CL03 BM23TL3/ BM23TL3	Language Course – III (Tamil/Other Languages)	3	5	25	75	100
II	GE03 BM23EL3	English Language Course – III	3	5	25	75	100
III	CC03 BMS23C3	Core Course -3: Biochemistry	5	5	25	75	100
	LC03 BM23CP3	Laboratory Course-3: Biochemistry	3	4	40	60	100
	AIICC01 BM23AC3	Second Allied Course : Physics	5	5	25	75	100
IV	NMEC01 BM23NM1	Non-Major Elective Course [#]	2	3	25	75	100
		Seminar, Library, Leveraging E-Resources, VAC, etc.	--	3	--	--	--
		Total	21 (63)	30	165	435	600 (1800)

[#] Offered to other Department Students

SECOND YEAR - IV SEMESTER

Part	Course Code	Name of the Course	Credits	Teaching Hours	Maximum Marks		
					CIA	ESE	Total
I	CL04 BM24TL4/ BM24TL4	Language Course– I V (Tamil/Other Languages)	3	5	25	75	100
II	GEC04 BM24EL4	English Language Course – II	3	5	25	75	100
III	CC04 BMS24C4	Core Course -4: Principles of Genetics	5	5	25	75	100
	AIICC02 BM24AC4	Second Allied Course : Microbiology	5	5	25	75	100
	AIILC01 BM24AP1	Second Allied Laboratory Course - Microbiology	3	4	40	60	100
IV	NMEC02 BM24NM2	Non-Major Elective Course [#]	2	3	25	75	100
V	EA01 BM24EA	Extension Activities	2	--	100	--	100
		Seminar, Library, Leveraging E-Resources, VAC, etc.	--	3	--	--	--
		Total	23 (86)	30	265	435	700 (2500)

THIRD YEAR - V SEMESTER

Part	Course Code	Name of the Course	Credits	Teaching Hours	Maximum Marks		
					CIA	ESE	Total
III	CC05 BM35C5	Core Course - 5: Molecular Biology	5	5	25	75	100
	CC06 BM35C6	Core Course – 6: Immunology	5	5	25	75	100
	CC07 BM35C7	Core Course – 7: Pharmacology and Toxicology	5	5	25	75	100
	LC04 BM35CP4	Laboratory Course : Molecular Biology	3	4	40	60	100
	SEC01 BM35S1BT/BI	Skill Based Elective Course: (Biotechniques / Bioinformatics)	5	5	25	75	100
	CP01 BM35P1	Project	--	2	--	--	--
IV	SK01 BM35SS	Soft Skills	2	2	100	--	100
V	GS01 BM35GS	Gender Studies	2	2	100	--	100
		Seminar, Library, Leveraging E-Resources, VAC, etc.	--	--	--	--	--
		Total	27 (113)	30	340	360	700 (3200)

THIRD YEAR - VI SEMESTER

Part	Course Code	Name of the Course	Credits	Teaching Hours	Maximum Marks		
					CIA	ESE	Total
III	CC08 BM36C8	Core Course- 8: Biotechnology	5	5	25	75	100
	CC09 BM36C9	Core Course -9 : Clinical Microbiology	5	5	25	75	100
	CC10 BM36C10	Core Course- 10 : Human pathology	5	5	25	75	100
	LC05 BM36CP5	Laboratory Course : Pathology	3	4	40	60	100
	SEC02 BM36S2ML/FS	Skill Based Elective Course: (Medical Laboratory Techniques / Forensic Science)	5	5	25	75	100
	CP01 BM35P1	Project	4	6	40	60	100
		Seminar, Library, Leveraging E-Resources, VAC, etc.	--	--	--	--	--
		Total	27(140)	30	180	420	600 (3800)

FOURTH YEAR - VII SEMESTER

Course Code	Name of the Course	Credits	Teach -ing Hours	Maximum Marks		
				CIA	ESE	Total
CC11 BM47C11	Core Course -11: Clinical Biochemistry	5	6	25	75	100
CC12 BM47C12	Core Course -12: Genomics	5	6	25	75	100
CO01 BM47C13 P/C	Core Choices Course: Proteomics / Cardiovascular Biology	5	5	25	75	100
EC01 BM47E1 C/R	Elective Course : Cell Signaling / Reproductive Biology	4	5	25	75	100
LC06 BM47CP6	Laboratory Course: Clinical Biochemistry	3	5	40	60	100
	Seminar, Library, Leveraging E-Resources, VAC, etc.	--	3	--	--	--
	Total	22 (162)	30	140	360	500 (4300)

FOURTH YEAR - VIII SEMESTER

Course Code	Name of the Course	Credits	Teach -ing Hours	Maximum Marks		
				CIA	ESE	Total
CC13 BM48C14	Core Course -13: Genetic Engineering	5	5	25	75	100
CC14 BM48C15	Core Course -14: Immune and Molecular Diagnostics	5	5	25	75	100
CO02 BM48C16 N/M	Core Choices Course: Neurobiology / Molecular Medicine	5	5	25	75	100
EC02 BM48E2 S/D	Elective Course Social and Preventive Medicine / Drug Discovery and Assay Development	4	5	25	75	100
LC07 BM48CP7	Laboratory Course- Immune and Molecular Diagnostics	3	5	40	60	100
NMEC01	Non-Major Elective Course	2	3	25	75	100
	Seminar, Library, Leveraging E-Resources, VAC, etc.	--	2	--	--	--
	Total	24 (186)	30	165	435	600 (4900)

FIFTH YEAR - IX SEMESTER

Course Code	Name of the Course	Credits	Teaching Hours	Maximum Marks		
				CIA	ESE	Total
CC15 BM59C17	Core Course-15: Stem Cell Biology and Regenerative Medicine	5	5	25	75	100
CC16 BM59C18	Core Course-16: Cancer Biology	5	5	25	75	100
CO03 BM59C19 N/B	Core Choices Course Nutraceuticals / Biomaterials and Biosystems	5	5	25	75	100
EC03 BM59E3	Elective Course: Biopharmaceutics & Pharmacokinetics / Research Methodology and Biostatistics	4	5	25	75	100
LC08 BM59CP8	Laboratory Course - Cell and Tissue Culture Techniques	3	5	40	60	100
NMEC02	Non-Major Elective Course	2	3	25	75	100
CP02 BM510P2	Project	--	2	--	--	--
	Seminar, Library, Leveraging E-Resources, VAC, etc.	--	--	--	--	--
	Total	24(210)	30	165	435	600 (5500)

FIFTH YEAR - X SEMESTER

Course Code	Name of the Course	Credits	Teaching Hours	Maximum Marks		
				CIA	ESE	Total
CC17 BM510C20	Core Course -17: Nanomedicine	5	5	25	75	100
CC18 BM510C21	Core Course- 18: Biosafety, Bioethics & IPR	5	5	25	75	100
EIBC01 BM510EIB1	Entrepreneurship/Industry Based Course	5	5	25	75	100
CP02 BM510PW	Project	5	15	50	150	200
	Seminar, Library, Leveraging E-Resources, VAC, etc.	--	--	--	--	--
	Total	20	30	125	375	500
	Overall Total	230	300	1875	4125	6000

DISTRIBUTION OF CREDITS (TABLE 3)

Course	S.No.	SEMESTER	CREDITS		HOURS/W	
			T	P	T	P
M.Sc., Biomedical Science (5 Year Integrated)	1	I	18	3	26	4
	2	II	18	3	26	4
	3	III	18	3	26	4
	4	IV	20	3	26	4
	5	V	24	3	26	4
	6	VI	24	3	26	4
	Total		122 + 18 = 140*		156 + 24 = 180	
	7	VII	19	3	25	5
	8	VIII	21	3	25	5
	9	IX	21	3	25	5
10	X	20	0	30	0	
Total		81 + 9 = 90*		105 + 15 = 120		
TOTAL		140 + 90 = 230*		180 + 120 = 300		
Total		230		300		

* Students should earn minimum of 140 credits for their BSc., Biomedical Science and minimum of 230 credits for their Integrated M.Sc Biomedical Science program.