

Eligibility for admission to Career Related First Degree Programme in Botany and Biotechnology (BSc.Botany and Biotechnology)

Candidates shall be admitted to the course provided he/ she has passed plus two examinations of the state or central board with biology as one of the subjects

Aim and Objectives

The Career related first degree programme in **Group 2(a)** is a two main course with **Botany** as core and **Biotechnology** as **Vocational Core** subject is designed to develop a scientific attitude and an interest towards the modern areas of biotechnology in particular and life science in general. It is aimed to get an aptitude in Biotechnology with out losing the importance of basic science such as Botany. It will help the students to become critical and curious in their outlook. The courses are designed to impart the essential basics in botany, Zoology, chemistry, Biochemistry and Biotechnology.

The programme consists of Language courses, foundation courses, Complementary courses, Core courses and open or Elective courses. There are two foundation courses, one is focused on the modern information technology, statistics and its application in modern life sciences, and a general introduction and awareness on Biotechnology and its influence in human life. The second foundation course is to give a general introduction and awareness in the general instrumentation and its principles and application in biology and biotechnology, in addition to give biophysical basics.

The various courses in the programme is aimed to develop proficiency in the theory as well as practical experiments, common equipments, laboratory, along with the collection and interpretation and presentation of scientific data in proper manner. In addition to this, students will be equipped with knowledge in the modern areas of biotechnology and its application in medical science, agriculture, industry, proteomics, genomics, bioinformatics, nanobiotechnology *etc.* Apart from understanding biotechnology and its power in developing the nation, it will create awareness about biotechnology and will help in eliminating public fear about the contribution of biotechnology and confusion on GM crops, GM foods and transgenic organisms. Students, who pursue this programme and pass out successfully, will surely have an urge to continue higher studies in Biotechnology and contribute significantly in its development.

The total minimum credits of the programme is 120 and the various courses and its corresponding credits are depicted in the following table, which is followed by the general structure and semester wise allocation of courses, its credits and contact hours.

The subject code is BB (Botany & Biotechnology)

- 1 - Language
- 1.1 - Additional Language
- 2 - Foundation course
- 3 - Complementary Course
- 4 - Core courses
- 5 - Open course
- 6 - Project
- 7 - Vocational Core Course
- 8 - Elective Course

Evaluation of Examination

Distribution of marks in theory and practicals between external and Internal assessment is 80:20. Pass minimum of 40% for external and overall components

Career Related First Degree Programme

Group 2(a)

BOTANY & BIOTECHNOLOGY

Summary of courses

Study Components		No. of courses	Credits /course		Max / Total Credits
1	Languages				
1	English	4	3		12
2	Additional Language	2	3		6
2	Foundation Course	2	2-3		5
1	Methodology and Perspective of Biotechnology	1	3		
2	Biophysics and Instrumentation	1	2		
3	Complementary Courses	5	2-4		14
	Biochemistry		T	P	
1	Introduction to Biochemistry		3		
2	General Biochemistry		3		
3	Physiological aspects of Biochemistry		4		
4	Metabolism		2		
5	Practical Biochemistry IV (Practical of 1, 2, 3 & 4)			2	
4	Core Courses	27	2-4		75
	Botany	13	L	P	35
1	Phycology, Mycology, Lichenology & Plant Pathology		2		
2	Bryology, Pteridology, Gymnosperms & Paleobotany		3		
3	Practical Botany I (Practical of 1 & 2)			2	
4	Angiosperm Anatomy and Reproductive Botany		3		
5	Environmental Studies		4		
6	Horticulture, Mushroom Cultivation & Marketing		2		
7	Cell biology, Plant breeding and evolutionary biology		2		
8	Practical Botany II (Practical of 4, 5,6 & 7)			2	
9	Plant Physiology		4		
10	Angiosperm Morphology & Systematic Botany		4		
11	Genetics		3		
12	Economic Botany, Ethanobotany & Medicinal Botany		2		
13	Practical Botany III (Practical of 9, 10,11 & 12)				2

7	Biotechnology (Vocational)	14			40
1	Microbiology	1	4		
2	Microbial Metabolism, Genetics & Diseases	1	3		
3	Biotechniques I (Practical of 1 and 2)			2	
4	Protista and Animal Diversity	1	4		
5	Animal Physiology and Anatomy	1	3		
6	Molecular Biology	1	3		
7	Immunology	1	2		
8	Biotechniques II (Practical of 4,5,6,& 7)			2	
9	Recombinant DNA Technology	1	4		
10	Plant Biotechnology	1	2		
11	Animal Biotechnology	1	3		
12	Food and Industrial Biotechnology	1	3		
13	Environmental Biotechnology	1	2		
14	Biotechniques III (Practical of 9,10,11,12 & 13)			2	
8	Open Courses of Vocational Subject	3		2	2
1	Bioinformatics	3	-		
2	Food and dairy Biotechnology	3			
3	Basics of Environmental Biotechnology	3			
5	Elective Courses of Vocational Subject	2			2
1	Bioinformatics and Nanobiotechnology		2		
2	Genetic Engineering		2		
3	Food and dairy Biotechnology		2		
6	1 Project	1		4	4
				Total C	120

T- Theory

P- Practical

Course structure and syllabus of Career Related First Degree in Biotechnology (2a) as per the regulations of CBCS

The Career related first degree programme in Group **2(a)** Botany as core subject Biotechnology as Vocational Core subject consists of total of 42 courses including the language courses distributed in eight categories. They are language courses, foundation courses, Complementary courses, Core courses, Core course of Vocational subject, Open course of core subjects and vocational core subject and a project. The project is compulsory and the students may be assigned a topic for the project in the 5th semester itself and should be completed and submitted during the practical assessment at the end of VI semester. The total credits of the entire programme is 120, and the distribution of credits, contact hours *etc* for each course in each semester is summarized below as tables. Total credits for each semester is 20 and contact hours is 25 per week and the total working hours for a semester is 450.

Each course title is represented by a course code consisting of a two letter subject code followed by four digits. The first digit indicates the first degree programme, which is always one. The second digit indicated the semester number which is 1-6, the 3rd digit denotes the category of the course which ranges from 1-8, since there are eight categories and the last digit indicates the serial number of the course with in a semester. The following are the category of courses included in the Career Oriented First Degree Programme under the group 2(a).

Summary of Semester wise hour distribution

SEMESTER I

Course code	Course Title	Teaching hrs./week		Total Hrs	Total Credits	Duration of University	Marks for Evaluation	
		T	P				Exam	CE
EN 1111	English	5		90	3	3Hrs.	20	80
1111.1	Additional language	5		90	3	3Hrs.	20	80
BB 1121	Methodology and Perspective of Biotechnology	3		54	3	3Hrs.	20	80
BB 1131	Introduction to Biochemistry	3	2	90	3	3Hrs.	20	80
BB 1141	Phycology, Mycology, Lichenology & Plant Pathology	2	2	72	2	3Hrs.	20	80
BB 1171	Microbiology	2	1	54	4	3Hrs.	20	80
	Total	25		450	18			

Hour distribution: BT-3+3, BO-4, CC- 5, LC-5+5 = 25

SEMESTER II

Course code	Course Title	Teaching hrs./week		Total Hrs	Total Credits	Duration of University	Marks for Evaluation	
		T	P				Exam	CE
EN1211	English	5		90	3	3Hrs.	20	80
1211.1	Additional language	5		90	3	3Hrs	20	80
BB1221	Biophysics and Instrumentation	2		36	2	3Hrs	20	80
BB1231	General Biochemistry	3	2	90	3	3Hrs	20	80
BB1241	Environmental Studies	3	2	90	4	3Hrs	20	80
BB1242	Practical Botany I (Practical of BB1141 & BB1241)				2	3Hrs	20	80
BB1271	Microbial Metabolism, Genetics and Diseases	2	1	54	3	3Hrs	20	80
BB1272	Biotechniques I (Practical of BB1171, BB1271)				2	3Hrs	20	80
	Total	25		450	22			

Hour distribution: BT-3+2, BO- 5, CC-5, LC-5+5 = 25

SEMESTER III

Course code	Course Title	Teaching hrs./week		Total Hrs	Total Credits	Duration of University	Marks for Evaluation	
		T	P				Exam	CE
EN1311	English	5		90	3	3 Hrs	20	80
BB1331	Physiological aspects of Biochemistry	3	2	90	4	3 Hrs.	20	80
BB1341	Angiosperm Anatomy and Reproductive Botany	3	1	72	3	3 Hrs	20	80
BB1342	Bryology, Pteridology, Gymnosperms & Paleobotany	3	1	72	3	3 Hrs	20	80
BB1371	Protista and Animal Diversity	3	1	72	4	3 Hrs	20	80
BB1372	Animal Physiology and anatomy	2	1	54	3	3 Hrs	20	80
	Total	25		450	20			

Hour distribution: BT-7, BO-8, CC-5, EN-5 = 25

SEMESTER IV

Course code	Course Title	Teaching hrs./week		Total Hrs	Total Credits	Duration of University	Marks for Evaluation	
		T	P				Exam	CE
EN1411	English	5		90	3	3 Hrs.	20	80
BB1431	Metabolism	3	2	90	2	3 Hrs.	20	80
BB1432	Practical Biochem IV (Practicals of BB1131, BB1231, BB1331, & BB1431)				2	3 Hrs.	20	80
BB1441	Horticulture, Mushroom Cultivation & Marketing	3	1	72	2	3 Hrs.	20	80
BB1442	Cell biology, Plant breeding and evolutionary biology	3	1	72	2	3 Hrs.	20	80
BB1443	Practical Botany II (Practicals of BB1341, BB1342, BB1441 & BB1442)				2	3 Hrs.	20	80
BB1471	Molecular Biology	3	1	72	3	3 Hrs.	20	80
BB1472	Immunology	2	1	54	2	3 Hrs.	20	80
BB1473	Biotechniques II (Practical of BB1371, BB1372, BB1471 & BB1472)				2	3 Hrs.	20	80
	Total	25		450	20			

Hour distribution: BT-7, BO-8, CC-5, EN-5 = 25

SEMESTER V

Course code	Course Title	Teaching hrs./week		Total Hrs	Total Credits	Duration of University	Marks for Evaluation	
		T	P				Exam	CE
BB1541	Plant Physiology	4	2	108	4	3 Hrs	20	80
BB1542	Angiosperm Morphology, systematic Botany	4	2	108	4	3 Hrs	20	80
BB1571	Recombinant DNA Technology	3	1	72	4	3 Hrs	20	80
BB1572	Plant Biotechnology	2	1	54	3	3 Hrs	20	80
BB1573	Animal Biotechnology	2	1	54	3	3 Hrs	20	80
BB1581	Open course Bioinformatics	3		54	2	3 Hrs	20	80
BB1582	Food and Dairy Biotechnology	3		54	2	3 Hrs	20	80
BB1583	Basics of Environmental Biotechnology	3		54	2	3 Hrs	20	80
	Total	19	6	450	20			

Hour distribution: BT-11+EC 2, BO-12 = 25

SEMESTER VI

Course code	Course Title	Teaching hrs./week		Total Hrs	Total Credits	Duration of University	Marks for Evaluation	
		T	P				Exam	CE
BB1641	Genetics	4	3	126	3	3 Hrs.	20	80
BB1642	Economic Botany, Ethanobotany & Medicinal Botany	4	2	108	2	3 Hrs.	20	80
BB1643	Practical Botany III (Practical of BB1541, BB1542, BB1641, BB1642)				2	3 Hrs.	20	80
BB1671	Food and Industrial Biotechnology	3	2	90	3	3 Hrs.	20	80
BB1672	Environmental Biotechnology	2	2	72	2	3 Hrs.	20	80
BB1673	Biotechniques III (Practical of BB1571, BB1572, BB1573, BB1671 & BB1672)				2	3 Hrs.	20	80
BB1681	Elective Course Bioinformatics and Nanobiotechnology	2		36	2	3 Hrs.	20	80
BB 1682	Genetic Engineering	2		36	2	3 Hrs.	20	80
BB 1683	Food & Dairy Biotechnology	2		36	2	3 Hrs.	20	80
BB1661	Project on Biotechnology Tutorial 1			18	4	3 Hrs.	20	80
		25		450	20			

Hour distribution: BT-10+EC2, BO-7+6 =25