

# SRI DEV SUMAN UTTARAKHAND UNIVERSITY

Badshahithaul (Tehri Garhwal) 249199

## BOARD OF STUDEIES MEETING (BIOTECHNOLOGY) - 17 MARCH 2020

As per the letter number ...../SDSUV/प्रशासन/ 2020 DATED 6 March 2020, after discussions and permission from Prof. Sushama Gupta, Dean, Sridev Suman Uttarakhand University, a BOS was held on 17 March, 2020. Due to the unprecedented situation of Corona Virus pandemic, the BOS was held in Dehradun as all the institutions were closed due to Government orders and also keeping in mind the health related issues of expert.

### **The members of the Committee:**

#### **SIGNATURES**

1. Invited member – Prof. Sushma Gupta, Dean Science, Sridev Suman University
2. Prof. Ashish Thapliyal – Professor of Biotechnology, Graphic Era Deemed to be University
3. Dr. Anju Teotia – Associate Professor, Department of Life Sciences, GEU
4. Dr. Madhu Thapliyal – Associate Professor Department of Zoology, Govt. PG College, Maldevta, Raipur, Dehradun
5. Dr. Abhishek Goel (Former Coordinator Biotechnology), Assistant Professor, Dept. of Chemistry Govt. P. G. College, Kotdwar

### **TABLED AGENDA:**

Agenda tabled by Sridev Suman Uttarakhand University was as follows:

- A. Develop a syllabus of B. Sc. Biotechnology Semester based program as per Choice Based Credit System (CBCS) guidelines of UGC.
- B. Develop a syllabus of B. Sc. Biotechnology (ongoing program of University) as per annual system of examination.

The committee conducted the meeting. Syllabus of several universities offering same programs was consulted as reference for UG and PG programs. Names of some Universities are:

- i. UGC model syllabus for CBCS programs (B. Sc. (H) Biotechnology)
- ii. Sridev Suman Uttarakhand University
- iii. Uttarakhand Technical University, Dehradun
- iv. Jamia Milia Islamia, New Delhi
- v. University of Mumbai, Mumbai
- vi. Bangalore University, Bangalore.

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### Minutes of Meetings and recommendations:

#### A. Agenda item A.

1. **Semester based B. Sc. Biotechnology program with CBCS** was adopted in total as per model syllabus of University Grants Commission. Colleges would be free to choose the optional papers as per their convenience.
2. The core courses should be followed and adhered to strictly.
3. Colleges that offer this program can also offer HONOURS degree if the student completes a project work which is of minimum 60 days duration (45 duration work and 15 days of writing). This project report should clear the plagiarism report with minimum 10 % where the word limit is set to maximum of 14. The plagiarism report should be generated by the library of the institution and the software should be that recommended by the university. The project work should be completed during the duration of the program.
4. **The recommended CBCS system as per UGC would be applicable for the 2020 batch starting July-August, 2020. The degree will mention subject as per UGC.**

#### CHOICE BASED CREDIT SYSTEM - B.Sc. Biotechnology

<b>SEMESTER I</b> C1 Biochemistry & Metabolism C2 Cell Biology AECC1 English/ /MIL communication GE1	<b>SEMESTER II</b> C3 Mammalian Physiology C4 Plant Physiology AECC2 English/MIL communication <b>EVS (compulsory)</b> GE2
<b>SEMESTER III</b> C5 Genetics C6 General Microbiology C7 Chemistry - 1 SEC1 GE3	<b>SEMESTER IV</b> C8 Molecular Biology C9 Immunology C10 Chemistry -2 SEC2 GE4
<b>SEMESTER V</b> C11 Bioprocess Technology C12 Recombinant DNA Technology DSE1 DSE2	<b>SEMESTER VI</b> C13 Bio Analytical Tools C14 Genomics and Proteomics DSE3 DSE4 <b>(OPTIONAL - PROJECT WORK FOR HONORS)</b>
<b>TOTAL – 26 THEORY (14 CORE THEORY, 4 GE, 4 DSE, 2 AECC, 2 SEC) 14 LABS</b>	
Honors program to have a project work and project report submission – total 60 days (45 days lab based training + 15 days for writing). Training can only be conducted by Universities/Institutions/Companies recommended by Sridev Suman Uttarakhand University	

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<b>GENERIC SUBJECTS (GE)</b> (any one per semester in semesters 1-4) <ul style="list-style-type: none"><li>• Entrepreneurship Development</li><li>• Bioethics and Biosafety</li><li>• Biotechnology and Human Welfare</li><li>• Developmental Biology</li></ul>	<b>ELECTIVE</b>	<b>SKILL ENHANCEMENT COURSES (SEC)</b> (any one per semester in semesters 3-4) <ul style="list-style-type: none"><li>• Molecular Diagnostics</li><li>• Enzymology</li><li>• Industrial Fermentations</li><li>• Drug Designing</li><li>• Basics of Forensic Science</li></ul>
<b>DISCIPLINE SPECIFIC ELECTIVE (DSE) –</b> (any two per semester in semesters 5-6)		
<ul style="list-style-type: none"><li>• Bioinformatics</li><li>• Animal Biotechnology</li><li>• Medical Microbiology</li><li>• Animal Diversity I</li><li>• Plant Diversity I</li><li>• Animal Diversity II</li><li>• Plant Diversity II</li><li>• Plant Biotechnology</li></ul>		<ul style="list-style-type: none"><li>• Environmental Biotechnology</li><li>• Intellectual Property Rights</li><li>• Microbial Physiology</li><li>• Biostatistics</li><li>• Ecology and Environment Management</li><li>• Evolutionary Biology</li><li>• Chemistry 3</li></ul>

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### B. Agenda item B - 1.

1. **It is recommended that the annual system of examination should be in sync with the semester program as recommended by UGC.** This is recommended because new students will benefit from this as their curriculum would be similar to most of the students all over the country.
2. **It is recommended that there should be 27 theory papers and 12 practical. This will be applicable only for new batch starting July – August 2020:**

### ANNUAL SYSTEM OF EXAMINATION – AS PER UGC - B.Sc. Biotechnology

<b>YEAR I</b> 1. C7 Chemistry - 1 2. C2 Cell Biology 3. C8 Molecular Biology 4. C3 Mammalian Physiology 5. C4 Plant Physiology 6. AECC English/ /MIL communication 7. GE1 8. GE2 9. DSE1 PRACTICAL – I (CHEMISTRY) PRACTICAL II (Cell & Mol. Bio.) PRACTICAL III (Plant Physiology) PRACTICAL IV (GE -Assignment / Case Report)	<b>YEAR II</b> 1. C10 Chemistry -2 2. C6 General Microbiology 3. C1 Biochemistry, 4. C14 Genomics and Proteomics 5. C9 Immunology 6. EVS (compulsory - QUALIFYING) 7. GE3 8. DSE2 9. SEC1 PRACTICAL – V (Micro.) PRACTICAL – VI – Immun.) PRACTICAL – VII (Biochem.) PRACTICAL – VIII (GE/DCS/SEC - Assignment / Case Report)
<b>YEAR III</b> 1. C5 Genetics 2. C12 Recombinant DNA Technology(RDT) 3. C11 Bioprocess Technology 4. C13 Bio Analytical Tools 5. SEC2 6. GE4 7. DSE3 8. <b>DSE4 (Biostats – Compulsory)</b> 9. <b>SEMINAR PRESENTATION (evaluation by external examiner )</b> PRACTICAL IX (Genetics & RDT) PRACTICAL X ( Bioprocess Tech & Bio. Analytical Tools) PRACTICAL XI (SEC/GE/DSE –Assignment / Case Report) <b>PRACTICAL XII (DSE 4 - Compulsory)</b>	
<b>Total = 27 Theory (14 Core Course, 4 GE, 4 DSE, 2 SEC, 1 SEMINAR, 1 AECC, 1 EVS, ) 12 PRACTICALS</b>	

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### Agenda item B - 2.

1. There is an **ongoing** batch of **B. Sc. Biotechnology (CBZ with Biotechnology)** in the colleges affiliated to Sridev Suman Uttarakhand University.
2. These students have completed first semester of their program.
3. This program has been now converted into annual system. As the students have completed their first semester, they have completed some of the courses in the program as per current scheme..
4. The **current semester wise scheme provided by the University is as follows:**

SEM	SUBJECTS – AS PER SDS	
SEM 1	<b>ZOOLOGY 1 (NON-CHORDATA) , 2 (CELL BIO &amp; GENETICS), LAB</b> <b>BOTANY 1 (MICROBIO.), 2 (FUNGI, ELEMNT. PLANT. PATH. &amp; LICHEN), LAB (1 &amp; 2)</b> CHEMISTRY 1,2 LAB (1&2) PAPER 1 – BIOCHEMISTRY AND METABOLISH (core course), LAB TOTAL – 7 THEORY, 4 LABS	
SEM 2	<b>ZOOLOGY 3 (CHORDATA) , 4 (TAXONOMY EVOLUTION), LAB</b> <b>BOTANY 1 (ALGAE &amp; BRYOPHYTA) , 2 (PTERIDO. GYMNO. ELEMNT. PALAEO), LAB</b> CHEMISTRY 1,2, LAB PAPER 2 – GENERAL BIOTECHNOLOGY (core course), LAB <b>EVS – COMPULSORY COURSE - QUALIFYING</b> TOTAL – 7 THEORY, 4 LABS	
SEM 3	<b>ZOOLOGY 5 (PHYSIOLOGY &amp; BIOCHEM) , 6 (DEV. BIO &amp; ENDOCRIN.), LAB</b> <b>BOTANY 1 (TAXON &amp; ANGIOSPERM), 2 (ANATOMY &amp; EMBRYOLOGY) , LAB</b> CHEMISTRY BOTANY 1,1,2, LAB PAPER 3 – GENERAL MICROBIOLOGY (core course), LAB TOTAL – 7 THEORY, 4 LABS	
SEM 4	<b>ZOOLOGY 7 (ECOLOGY &amp; ENVIRONMENT) , 8 (ANIM. BEHAV. &amp; CONS. BIO), LAB</b> <b>BOTANY 1 (CYTOLOGY &amp; GENETICS), 2 (PLANT ECOLOGY), LAB</b> CHEMISTRY 1,2, LAB PAPER 4 – IMMUNOLOGY (core course), LAB TOTAL – 7 THEORY, 4 LABS	
SEM 5	<b>ZOOLOGY 9 (MOL. BIO &amp; BIOCHEM) , 10 (MICRO &amp; IMMUNO), LAB</b> <b>BOTANY 1 (MOL. BIO &amp; BIOTECHNOLOGY), 2 (PLANT BREED. &amp; BIOSTAT), LAB</b> CHEMISTRY 1,2, LAB <b>THEORY – BT (DSE), LAB</b>	<b>SEM 5 – 6 – PLANT BIOTECNOLOGY (DSE), LAB</b> <b>SEM 5 – 6 – ANIMAL BIOTECHNOLOGY (DSE), LAB</b> <b>SEM 5 – 6 – BIOINFORMATCIS (dse), LAB</b> <b>SEM 5 – 6 – ENV. BIOTECHNOLOGY (dse), LAB</b> <b>SEM 5 – 6 – MEDICAL MICRO. (dse), LAB</b>
SEM 6	<b>ZOOLOGY 11 (ECONOMIC ZOOLOGY) ,12 (BIOSTAT &amp; COMP.), LAB</b> <b>BOTANY 1 (PLANT. PHYSIOL., ELEMENT MORPH. &amp; BIOCHEM.) ,2 (ECONOMIC BOT.) . LAB</b> CHEMISTRY 1,2, LAB <b>THEORY – BT (DSE), LAB</b>	<b>*ANY ONE AS PER COLLEGE IN EACH SEMESTER</b>
<b>GRAND TOTAL – 42 THEORY, 24 LABS</b>		

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5. FOLLIWNG CHANGES ARE RECOMMENDED FOR THE ONGOING BATCHES OF UNIVERSITY (CBZ – WITH BIOTECHNOLOGY) – shifting from semester system to annual system (only for 2019-22 batch).
6. Efforts have been made to align the syllabus as per UGC guideline and at the same time keeping the essential papers of ongoing syllabus of Zoology, Botany and Chemistry annual system of SDU. Papers added will have syllabus as per UGC guideline for the program.
7. The syllabus of all courses will be same as previously followed (can be taken from approved BOS of annual and semester system or UGC model syllabus) and the scheme will be as:

Year	SUBJECTS – AS PER SDS ONGOING PROGRAM (highlighted courses modified)	
YEAR 1	ZOOLOGY :	PAPER 1 (NON-CHORDATA – ANIMAL DIVERSITY) ,
		PAPER 2 (CELL BIO & GENETICS),
		PAPER 3 (TAXONOMY & EVOLUTION),
		Lab B
	BOTANY:	PAPER 1 (FUNGI, ELEM. PLANT. PATH. & LICHEN),
		PAPER 2 (ALGAE & BRYOPHYTA) ,
		PAPER 3 (PTERIDO. GYMNO. - ELEM. PALAEO),
		LAB
	CHEMISTRY	PAPER 1
		PAPER 2
		PAPER 3
		LAB
	(Biotechnology with CBZ)	PAPER 1 – BIOCHEM. AND METABOLISH (core course),
		PAPER 2 – GENENERAL BIOTECHCHNOLOGY (core course),
LAB – BASED ON BIOTECH. PAPER 1 & 2		
TOTAL – 11 THEORY, 4 LABS		
YEAR 2	ZOOLOGY:	PAPER 4 (CHORDATA) ) ,
		PAPER 5 (ANIMAL PHYSIOLOGY & MEDICAL BIOCHEMISTRY) ,
		PAPER 6 (MOLECULAR BIOLOGY AND BASIC MICROBIOLOGY) ,
		PAPER 7 (BIOSTATISTICS)
	BOTANY	LAB
		PAPER 4 (TAXON & ANGIOSPERM),
		PAPER 5 (ANATOMY, EMBRYOLOGY, ELEMENTARY MORPHOGENSIS) ,
		PAPER 6 (ECOLOGY AND REMOTE SENSING) , LAB
		PAPER 7 (COMPUTER APPLICATIONS AND BIOINFORMATICS)
	CHEMISTRY	LAB
		PAPER 1

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		PAPER 2
		PAPER 3
		LAB
	<b>EVS – COMPULSORY COURSE – QUALIFYING</b>	
	(Biotechnology with CBZ)	PAPER 3 –MICROBIOLOGY (industrial & medical) (core course),
		PAPER 4 – IMMUNOLOGY (core course),
		LAB – BASED ON BIOTECH. PAPER 3 & 4
	TOTAL – 14 THEORY, 5 LABS	
<b>YEAR 3</b>	<b>ZOOLOGY</b>	<b>PAPER 8 (ENDOCRINOLOGY &amp; APPL. ZOOLOGY &amp; BIOTECHNOLOGY)</b>
		<b>PAPER 9 (ECOLOGY, CONS. BIOL &amp; ANIM. BEHAV).,</b>
		<b>PAPER 10 (DEV. BIOLOGY &amp; TOXICOLOGY)</b>
		<b>LAB</b>
	<b>BOTANY</b>	<b>PAPER 8 (CYTOGENETICS &amp; PLANT BIOTECHNOLOGY)</b>
		<b>PAPER 9 (PLANT PHYSIOL., BIOCHEMICAL PATHWAY OF PLANTS)</b>
		<b>PAPER 10 (PLANT BREEDING)</b>
		<b>PAPER 11 (ECONOMIC BOT.)</b>
		<b>LAB</b>
	<b>CHEMISTRY</b>	PAPER 1
		PAPER 2
		PAPER 3
		LAB
	(Biotechnology with CBZ)	PAPER 5 – RECOMBINANT DNA TECH. - LAB
		PAPER 6 – OMIC TECHNOLOGIES (LAB - REPORT / ASSIGNMENT)
<b>PAPER 7 – ELECTIVE &amp; LAB</b>		
		<ul style="list-style-type: none"> <li>➤ ANIMAL BIOTECHNOLOGY</li> <li>➤ ENVIRONMENTAL BIOTECHNOLOGY</li> <li>➤ MEDICAL MICROBIOLOGY</li> </ul>
	TOTAL – 13 THEORY, 6 LABS	