Programme Project Report (PPR)

(As per Annexure V of UGC DEB Regulation 2020)

NAME OF PROGRAMME: BACHELOR OF SCIENCE (B.Sc.)

a) **Programme mission and objectives:** The mission of the programme is to take Science education to the doorsteps of the communities residing in far–flung difficult and remote areas. Further, the economic condition of the majority of the hill communities does not allow them to afford the higher cost involve in science education for which they have to send their children to cities. Therefore, the main objective of the programme is to provide opportunity of science education to all by taking it to the door steps of aspirants through Open and Distance Learning (ODL). This will help them to enhance their skills which in turn will enhance their employability or develop entrepreneurship.

b) **Relevance of the program with HEIs Mission and Goals:** One of the mission of higher education particularly Open and Distance Learning Institutions is to provide greater opportunities of access to Higher Education with equity to all the eligible persons and in particular to the vulnerable and weaker sections of society.

c) **Nature of prospective target group of learners**: Those learner who wish to opt career in science and related disciplines. Such aspirants may have an opportunity to find jobs in various government organizations, School Education, non-governmental organizations, scientific organizations, laboratories. These aspirants will constitute the target group for this programme.

d) **Appropriateness of programme to be conducted in Open and Distance Learning mode to acquire specific skills and competence:** In the light of Science Education being limited to selected colleges and Universities of the State, much of the aspirants remain devoid of science education. Conducting the programme in ODL mode will provide greater opportunity to these aspirants. It will help in catering to the needs and aspirations of larger section of hill society particularly representing to marginalized, deprived and weaker sections of the society. Further, it will also open up opportunities for those aspirants who are engaged in some kind of employment and cannot pursue their higher education from conventional system and wish to enhance their science education and skills. In order to communicate effectively with the learners, University has adopted the following tools:

- Self-instructional printed material
- audio / video DVDs/ CDs

- Audio-video programmes through zoom, Google meet, Ciclo Webex and also transmitted through FM Radio
- face-to- face counselling at study centres by academic counselors
- reference library at study centre
- web based academic support
- assignments
- practical

e) Instructional design:

i) Curriculum design: The curriculum structure is an outcome of comprehensive exercise done at University level after the release of UGC Curriculum Framework dated 12 December, 2022. Following this framework, initially University will be launching three year Bachelor of Science (B.Sc.) degree programme with 120 credits, however, in due course four year B.Sc. (Honors / Honors with Research Programmes) will also be launched.

In three year UG degree programme, a learner has to take 20 credits in each semester which will be distributed among Ability Enhancement Courses (AECC), Skill Enhancement Courses (SEC), Value Added Courses (VAC), Generic Electives (GEs), Core Courses and Disciplinary /or Interdisciplinary Minor courses. The semester-wise plan of course/s is given in the following table:

S. No.	COURSE TYPE	YEAR I		EXIT	YEAR II		EXIT	YEAR III		EXIT
		SEM I	SEM II		SEM III	SEM IV		SEM V	SEM VI	
A)	**COMPULSORY VAC, AECC, SEC & GE COURSES**									
1	VAC (Value Added Courses)	3	3		3					
2	GE (Generic Elective)	3	3							
3	AECC (Ability Enhancment Compulsory Course)	3	3		2					
4	SEC (Skill Enhancment Course)	3	3		3					
B)	**CORE COURSES**									
5	CORE A	A101	A102		A201	A202		A301	A302	
6	CORE B				B201	B202		B301	B302	
7	CORE C					C101		C301	C302	
8	CORE (Electives) (Any one to be chosen in sixth semester from the chosen core subjects)					C102			A350 or B350 or C350	
C)	**MINOR / MINOR (VOC) COURSES**									
9	Minor/ Minor (VOC)	Minor (100 level)	Minor (VOC) (100 level)		Minor (200 & above)	Minor (VOC) (200 & above)		Minor (200 & above)	Minor (VOC) (200 & above)	
D)	**SEMINAR/ PROJECT/ INTERNSHIP/ COMMUNITY REACH/ APPRENTICESHIP)**							4		

UG CERTIFICATE IN RELEVANT DISCIPLINE

UG DIPLOMA IN RELEVANT DISCIPLINE

UG DEGREE IN RELEVANT DISCIPLINE

TOTAL CREDITS PER SEMESTER	20	20		20	20		20	20	

Abbreviations used: AECC=Ability Enhancement Compulsory Courses, SEC=Skill Enhancement Courses, GE=Generic Elective /Multidisciplinary Course, VAC=Value Addition Course

A learner may select three core courses of his choices from either the basket A (Physical sciences) OR Basket B (Biological sciences) in each year.

A) COMPULSORY VAC, AECC, SEC & GE COURSES

The compulsory VA, AECC, SEC and GE courses are compulsory and will be avialble to the learner from the University pool.

Each Core course and minor courses are of four (04) credits, each. The category wise list of core courses is as follows:

B) CORE COURSES

Core courses and core (electives) will be offered by the concerned Department. At present, eight (08) subjects are avalable in the School of Sciences and School of Earth and Environmetnal Sciences together. There subjects have been divided into two categories i.e., Category A and Category B. A leraner has to choose all the core course / core (Elective) from either Category A or Category B. The list of codes is given below:

A) SUBJECT WISE LIST / CODES OF CORE COURSES (NATURAL AND PHYSICAL SCIENCES)

CORE COURSE - CATEGORY A							
SUBJECTS	**SEM I**	**SEM II**	**SEM III**	**SEM IV**	**SEM V**	**SEM VI**	**SEM VI (ELECTIVE)**
Chemistry	CHE(N) 101	CHE(N)102	CHE(N)201	CHE(N)202	CHE(N) 301	CHE(N) 302	CHE(N) 350
Geography	GE(N)101	GE(N)102	GE(N)201	GE(N)202	GE(N)301	GE(N)302	GE(N)303
Geology	GEOL101	GEOL102	GEOL201	GEOL202	GEOL301	GEOL302	GEOL303 or GEOL304
Mathematics	MT(N)101	MT(N)102	MT(N)201	MT(N)202	MT(N)301	MT(N)302	MT(N)350
Physics	PHY(N) 101	PHY(N) 102	PHY(N) 201	PHY(N) 202	PHY(N) 301	PHY(N) 302	PHY(N) 350
CORE COURSE - CATEGORY B							
Botany	BOT(N)101	BOT(N)102	BOT (N)201	BOT(N)202	BOT(N)301	BOT(N)302	BOT(N)350
Chemistry	CHE(N) 101	CHE(N)102	CHE(N)201	CHE(N)202	CHE(N) 301	CHE(N) 302	CHE(N) 350
Forestry	FRN 101	FRN 102	FRN 201	FRN 202	FRN 301	FRN 302	FRN 303
Geology	GEOL101	GEOL102	GEOL201	GEOL202	GEOL301	GEOL302	GEOL303 or GEOL304
Geography	GE(N)101	GE(N)102	GE(N)201	GE(N)202	GE(N)301	GE(N)302	GE(N)303
Zoology	ZO(N)101	ZO(N)102	ZO (N)201	ZO(N)202	ZO(N)301	ZO(N)302	ZO(N)350

N.B. Student will have to opt subject/s either from basket A or Basket B. A learner has an option to change his / her core course/s at the end of second semester and during initiation of third semester. The subject/s declared by the student in third semester will remain same for rest of the period.

C) MINOR / MINOR (VOCATIONAL) COURSES

A student will have the option to choose courses from disciplinary or interdisciplinary minors and skill-based courses relating to a chosen vocational educatin programme. A learner may declare his / her

choice of the minor / minor (vocational) at the end of the second semester after exploring various courses. The pool of Disciplinary/ Interdisciplinary course is as follows:

B) POOL OF DISCIPLIANRY / INTERDISCIPLINARY MINOR / MINOR (VOC)

DEPARTMENTS / SUBJECTS	MINOR /MINOR (VOC) COURSES					
	SEMESTER I	SEMESTER II	SEMESTER III	SEMESTER IV	SEMESTER V	SEMESTER VI
BOTANY	BOT(N)120	BOT(N)121	BOT(N)220	BOT(N)221	BOT(N)320	BOT(N)321
CHEMISTRY	CHE(N)120	CHE(N)121	-	-	-	-
FORESTRY	FRN121	FRN122	FRN221	FRN222	FRN321	FRN322
GEOGRAPHY	BTTMN 602	GE(N) 110	GE (N) 210/ BCM (N) 104	GE (N) 211	GE (N) 310	GE (N) 311
GEOLOGY	GEOL105	GEOL106	-	-	-	-
MATHEMATICS	MT(N)120	MT(N)121	MT(N)220	MT(N)221	MT(N)320	MT(N)321
PHYSICS	PHY(N)120	PHY(N)121	PHY(N)220	PHY(N)221	PHY(N)320	PHY(N)321
ZOOLOGY	ZO(N)120	ZO(N)121	ZO(N)220	--	--	--

C) POOL OF GENERIC ELECTIVES

DEPARTMENTS / SUBJECTS	COURSE CODE	TITLE
BOTANY	BOT(GE)	Plant Sciences
CHEMISTRY	CHE(GE)	Elementary Chemistry
FORESTRY	FRGE100	Elementary Forestry
GEOGRAPHY	GE 100	Basics of Physical Geography
GEOLOGY	GEOL 206	Medical Geology
GEOLOGY	GEOL 305	Gemology
GEOLOGY	GEOL 306	Climatology and Climate Change
MATHEMATICS	MT(GE)	General Mathematics
PHYSICS	PHY(GE)	INtroductory Physics
ZOOLOGY	ZO(GE)	Basic Concept of Zoology

The details of Department wise courses in CORE and MINOR categories are as follows:

1) DEPARTMENT OF BOTANY

Sem.	Course Code	Course Title/ Name	Credits
A. CORE			
I	BOT(N) 101/ BOT(N) 101L	Plant diversity- I/ Laboratory Course-I	4
II	BOT(N) 102/ BOT(N) 102L	Plant diversity- II/ Laboratory Course-II	4
III	BOT(N) 201/ BOT(N) 201L	Taxonomy of Angiosperms// Laboratory Course-III	4
IV	BOT(N) 202/ BOT(N) 202L	Anatomy, Embryology and Elementary Morphogenesis/ Laboratory Course-IV	4
V	BOT(N) 301/ BOT(N) 301L	Cell Biology, Molecular Biology and Biotechnology/ Laboratory Course-V	4
VI	BOT(N) 302/ BOT(N) 302L	Plant Physiology & Biochemistry/ Laboratory Course-VI	4
B. CORE ELECTIVE			
VI	BOT(N) 350/ BOT(N) 350L	Plant Ecology and Biostatistics/ Laboratory Course-VII	4
C. MINOR/ MINOR (VOC)			

I	BOT(N) 120/BOT(N) 120L	Economic Botany and Biodiversity Conservations/ Laboratory Course-VIII	4
III	BOT(N) 220/ BOT(N) 220L	Genetics and Plant Breeding/ Laboratory Course-IX	4
V	BOT(N) 320/ BOT(N) 320L	Plant Pathology and plant pathology and disease management/ Laboratory Course-X	4
D. MINOR/ MINOR (VOC)			
II	BOT(N) 121/ BOT(N) 121L	Bio-Fertilizers/Laboratory Course-XI	4
IV	BOT(N) 221/ BOT(N) 221L	Herbal Medicines/ Laboratory Course-XII	4
VI	BOT(N) 321/ BOT(N) 321L	Entrepreneurship In Plant Science/ Laboratory Course-XIII	4
E. GENERIC ELECTIVE (GE)			
I	BOT (GE)	Plant Sciences	3
F. SKIL ENHANSMENT COURSE (SEC)			
III	BOT (SEC)	Medicinal Botany	3

2) DEPARTMENT OF CHEMISTRY

Sem.	Course Code	Course Title/ Name	Credits
A. CORE			
I	CHE(N) 101/ CHE(N) 101L	Fundamental Chemistry-I / Laboratory Course-I	4
II	CHE(N) 102/ CHE(N) 102L	Fundamental Chemistry-II/Laboratory Course-II	4
III	CHE(N) 201/ CHE(N) 201L	General Chemistry-I/ Laboratory Course-III	4
IV	CHE(N) 202/CHE(N) 202L	General Chemistry-II/Laboratory Course-IV	4
V	CHE(N) 301/ CHE(N) 301L	Advanced Chemistry-I/ Laboratory Course-V	4
VI	CHE(N) 302/CHE(N) 302L	Advanced Chemistry-II/ Laboratory Course-VI	4
B. CORE ELECTIVE			
VI	CHE(N) 350/CHE(N) 350L	Applied Chemistry/ Laboratory Course-VII	4
C. MINOR			
I	CHE(N) 120/CHE(N) 120L	Basics of Chemistry/Laboratory Course-VIII	4
D. MINOR (VOC)			
II	CHE(N) 121/CHE(N) 121L	Analytical Chemistry/Laboratory Course-IX	4
E. GENERIC ELECTIVE (GE)			
I	CHE (GE)	Elementary Chemistry	3

3) DEPARTMENT OF FORESTRY AND ENV. SC.

SEMESTER	Course code	Title of the Course	Credits
CORE COURSES			
SEM I	FRN 101/FRN101(L)	Introduction to Forestry	3
SEM II	FRN 102/FRN102(L)	Forest Ecology	3
SEM III	FRN 201/FRN201(L)	Plantation Forestry	3
SEM IV	FRN 202/FRN202(L)	Principles of Silviculture	3
SEM V	FRN 301/FRN301(L)	Forest Mensuration	3
SEM VI	FRN 302/FRN302(L)	Social Forestry and Agro Forestry	3
CORE ELECTIVE			
SEM VI	FRN 303/FRN303(L)	Forest Management, Policy and Legislation	3
MINOR COURSES			
SEM I	FRN 121	Non Wood Forest Products (NWFP)	4

SEM III	FRN 221	Biodiversity Conservation and Management	4
SEM V	FRN 321	Watershed Management	4
MINOR VOCATIONAL COURSES			
SEM II	FRN 122	Nursery Technology	4
SEM IV	FRN 222	Eco-tourism	4
SEM VI	FRN 322	Biotechnology: Applications in Environment and Forestry	4
GENERIC ELECTIVE (GE)			
SEM I	FRGE100	Introduction to Forest and Forestry	3
VALUE-ADDED COURSE (VAC)			
SEM I	FESN 10	Environmental Studies	3

4) DEPARTMENT OF GEOGRAPHY

SEMESTER	Course Code	Course Title/ Name	Credits
A. CORE			
SEM I	GE(N) 101/ GE(N) 101L	Fundamentals of physical Geography/ Basic Cartographic Techniques	4
SEM II	GE(N) 102/ GE(N) 102L	Geography of India/ Weather Maps and Climate Data	4
SEM III	GE(N) 201/ GE(N) 201L	Human Geography/ Quantitative Techniques	4
SEM IV	GE(N) 202/ GE (N) 202L	Geography of Asia/Surveying	4
SEM V	GE (N) 301/ GE(N) 301L	Geographical Thought & Evolution/Techniques of Map Projection	4
SEM VI	GE(N) 302/ GE(N) 302L	Economic Geography/ Basics of Remote Sensing & GIS	4
B. CORE ELECTIVE			
SEM VI	GE(N)303/ GE(N) 303L	Environmental Geography & Disaster Risk Reduction/Practical	4
C. MINOR			
SEM I	BTTM (N) 602	Geography of Tourism (Adopted from Tourism Department)	4
SEM II	GE(N) 210 BCM(N) 104	1-Geography of Himalaya with Spatial Reference to Uttarakhand 2- Indian Economy (Adopted from Commerce Department)	4
SEM III	GE(N) 310	Regional Development & Disparities Spatial Reference to Himalayan State	4
D. MINOR (VOC)			
SEM II	GE(N) 110	Cartography	4
SEM IV	GE(N) 211	Photogrammetry & Remote Sensing	4
SEM VI	GE(N) 311	GIS	4
E. GENERIC ELECTIVE (GE)			
I	GE 100	Basics of Physical Geography	3

5) DEPARTMENT OF GEOLOGY

Sem.	Course Code	Course Title/ Name	Credits
A. CORE			
I	GEOL 101/ GEOL 101L	Physical & Structural Geology/ Practical	4
II	GEOL 102/ GEOL 102L	Elements of Mineralogy & Gemology/ Practical	4
III	GEOL 201/ GEOL 201L	Petrology/ Practical	4
IV	GEOL 202/ GEOL 202L	Paleontology/ Practical	4

V	GEOL 301/ GEOL 301L	Economic Geology and Mineral Exploration/ Practical	4
VI	GEOL 302/ GEOL 302L	Stratigraphy/ Practical	4
B. CORE ELECTIVE			
VI	GEOL 303/ GEOL 304/ GEOL 304L	Remote Sensing and Elementary Engineering Geology Or Geohydrology and Environment Geology/Practical	4
C. MINOR			
I	GEOL 105	General Geology	4
II	GEOL 106	Geotourism	4
D. GENERIC ELECTIVE (GE)			
I	GEOL 206	Medical Geology	3
II	GEOL 305	Gemology	3
III	GEOL 306	Climatology and Climate Change	3

6) DEPARTMENT OF MATHEMATICS

Sem.	Course Code	Course Title/ Name	Credits
A. CORE			
I	MT(N) 101	Calculus	4
II	MT(N) 102	Differential equation	4
III	MT(N) 201	Real analysis	4
IV	MT(N) 202	Abstract Algebra	4
V	MT(N) 301	Linear Algebra	4
VI	MT(N) 302	Complex Analysis	4
B. CORE ELECTIVE			
VI	MT(N) 350	Mechanics	4
C. MINOR			
I	MT(N) 120	3-D Geometry	4
II	MT(N) 121	Algebra, Matrices and vector analysis	4
III	MT(N) 220	Discrete Mathematics	4
IV	MT(N) 221	Numerical analysis	4
D. MINOR (VOC)			
V	MT(N) 320	Basic Statistics	4
VI	MT(N) 321	Linear Programming Problem and Game Theory	4
E. GENERIC ELECTIVE (GE)			
III	MT (GE)	General Mathematics	3
F. VALUE ADDED COURSE (VAC)			
IV	MT(VAC)	Vedic Mathematics	3

7) DEPARTMENT OF PHYSICS

Sem.	Course Code	Course Title/ Name	Credits
A. CORE			
I	PHY (N)-101	Mechanics	4
II	PHY (N)-102	Electromagnetism	4
III	PHY(N)-201	Oscillations and Waves	4
IV	PHY(N)-202	Thermal and Statistical Physics	4
V	PHY(N)-301	Elements of Quantum Mechanics	4
VI	PHY(N)-302	Elementary Solid-State Physics	4
B. CORE ELECTIVE			
VI	PHY(N)-350	Basic Electronics	4
C. MINOR			
III	PHY (N)-220	Optics	4
IV	PHY (N)-320	Modern Physics	4

III			4
IV			4
C. MINOR/ MINOR (VOC)			
II	PHY (N)-121	Renewable Energy	4
VI	PHY (N)-321	Digital Electronics and Communication Devices	4
D. GENERIC ELECTIVE (GE)			
	PHY(GE)	**INtroductory Physics**	3

8) DEPARTMENT OF ZOOLOGY

Sem.	Course Code	Course Title/ Name	Credits
A. CORE			
I	ZO(N) 101/ ZO(N) 101L	Non-Chordata	4
II	ZO(N) 102/ ZO(N) 102L	Cell and Molecular Biology	4
III	ZO (N) 201/ ZO(N) 201L	Chordata	4
IV	ZO(N) 202/ ZO(N) 202L	Genetics, Taxonomy and Evolution	4
V	ZO(N) 301/ ZO(N) 301L	Environmental Biology & Animal Behavior	4
VI	ZO(N) 302/ ZO(N) 302L	Physiology and Bio- Chemistry	4
B. CORE ELECTIVE			
VI	ZO(N) 350/ ZO(N) 350L	Developmental Biology and Applied Zoology	4
C. MINOR			
I	ZO(N) 120/ ZO(N) 120L	Microbiologyand Immunology and Animal Biotechnology	4
III	ZO(N) 220/ ZO(N) 220L	Bioinformatics ,Biostatistics and Instrumentation techniques	
D. MINOR (VOC)			
II	ZO(N) 121/ ZO(N) 121L	Applied Zoology	4
D. GENERIC ELECTIVE (GE)			
II	ZO (GE)	Basic Concept of Zoology	3

iii) Duration of the programme: Minimum duration of programme is three (03) years and maximum duration if six (06) years

iv) Faculty and support staff requirement: At present there are thirty two (32) faculty members available in the concerned Departments altogether to run the programme. There is one Professor, two Associate Professors and ten (10) Assistant Professors at regular position whereas nineteen (19) are contractual faculties (Assistant Professors). However, there is an urgent need to have one professor, one Associate Professor and three assistant professors in each Department in order to conduct the programmes efficiently and smoothly.

v) Instructional delivery mechanism: The programme will be offered in the Open and Distance Learning (ODL) mode. Guided Self Instructional Learning Material (SILM) using print and electronic media; lecture/ counseling sessions; special counseling sessions and group interactions in Workshop at cluster level; debate on key environmental issues; self-reliant study activities; individual / group work assignment; Project work; Lab sessions and excursion. The delivery material will include printed SLM, assignment, Face to face counseling at the designated study centres during Saturday and Sundays. In order to ensure and maintain the quality in science education, special counselling Laboratory Workshop will be conducted in selected locations within the State for about ten (10) to fifteen (15) days.

f) Proceedure for admission, curriculum transaction and evaluation

Eligibility: 10+2 Science subjects
Fee Structure: 3000/ per semester
Evaluation norms: A learner will be evaluated through continuous evaluation (Assignments) and term end evaluation (Term end examination) at the end of semester. Continuous evaluation will carry 30% weightage whereas term end evaluation will carry 70% weightage.

g) **Requirement of the laboratory support and Library Resources:** In order to carry out laboratory exercises, laboratory is compulsory requirement of the programme and in order to meet this requirement, the laboratory facilities of study centres will be utilized. S/he will be provided laboratory manual as per the need of the programme. Similarly for library, a learner may utilize the resources available at the designated study centres.

h) **Cost estimates for development of the programme**: In order to develop our own study material for each subject financial assistance is required as per details given below:

Subject	Amount (Rs.)
Botany	500000.00
Chemistry	500000.00
Forestry	500000.00
Geology	500000.00
Geography	500000.00
Mathematics	500000.00
Physics	500000.00
Zoology	500000.00

i) **Quality assurance mechanism and expected programme outcomes:**

The programme will be implemented through only those Government Degree Colleges/ Universities / Institutions which have facilities for conducting laboratory counseling. In addition to this University will organize Laboratory workshop in designated places once (year/semester) for additional back up to the students so that competent and skilled human resource is produced. Further, the Programme and SLM developed will be continuously upgraded and necessarily be revised after a period of 5 years.

Programme outcomes:

- Learners residing in far flung rural hilly areas will be benefitted
- Marginalized and economically backward communities will get opportunity to learn science education.
- In-service learners will have opportunity to pursue their higher education in science disciplines