

PROSPECTUS

(2020-2021)



FOR ADMISSION TO

M.Sc. BIOTECHNOLOGY

(Affiliated Institutions only)

&

M.Sc. MICROBIOLOGY

(Both for H. P. University campus and affiliated Institutions)



HIMACHAL PRADESH UNIVERSITY

SUMMER HILL, SHIMLA-171 005 (HP)

(NAAC Accredited “A” Grade University)

www.hpuniv.ac.in

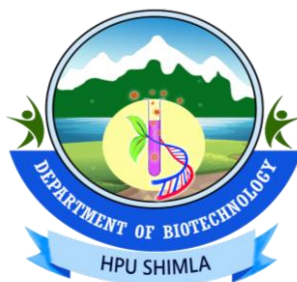
ADMISSION TO POST GRADUATE TEACHING PROGRAMS

M.Sc. BIOTECHNOLOGY

&

M.Sc. MICROBIOLOGY

(Academic Session 2020 – 2021)



Important Dates (Online Form submission)	STARTING DATE	LAST DATE
	June 5, 2020	June 30, 2020
APPLICATION FEE	Amount Payable	Mode of Payment
GENERAL Category	Rs. 1,500/-	Through Challan or online payment mode
SC/ ST Categories	Rs. 750/-	Through Challan or online payment mode

NOTE: The candidates seeking admission in M. Sc. Biotechnology Degree program at **HPU Campus** may visit the websites of Regional Centre for Biotechnology (RCB) and Himachal Pradesh University (<https://rcb.res.in/GATE/>; www.hpuniv.ac.in/biotech). The Graduate Aptitude Test-Biotechnology (GAT-B), previously Combined Entrance Examination for Biotechnology (CEEBS) by JNU, is being conducted by the Regional Centre for Biotechnology on behalf of the Department of Biotechnology, Government of India. **The last date of application is 18th June, 2020.** The admission will be made by HP University after the result is declared by RCB.

FOR FURTHER CLARIFICATIONS, PLEASE CONTACT:

CHAIRMAN

Department of Biotechnology (Multi-Faculty Building Phase-I)
Himachal Pradesh University, Shimla - 171 005, HP (India)

E-mail: chairmanbiotechhpusml@gmail.com; bhatrvind@yahoo.com

Phone: +91-177-2831948; 2833705, Telefax: +91-177-2831948; 2830775

CONTACT PERSONS: Mr. Mahesh Chander Negi (Supdt. 80917-39564,
Mrs. Leena Mishra (DEO) : 94183-87224)



आचार्य सिकन्दर कुमार
कुलपति

हिमाचल प्रदेश विश्वविद्यालय
राष्ट्रीय मूल्यांकन एवं प्रत्यायन परिषद् द्वारा प्रत्यायित “ए” ग्रेड विश्वविद्यालय
ज्ञान पथ, समरहिल, शिमला – 5



संदेश

मुझे यह जानकारी हार्दिक प्रसन्नता हो रही है कि हिमाचल प्रदेश विश्वविद्यालय के जैव प्रौद्योगिकी विभाग में शैक्षणिक सत्र 2020-21 में छंटनी परीक्षा के माध्यम से प्रवेश प्रक्रिया आरम्भ करने के लिए विवरणिका तैयार कर ली गई है।

इस विश्वविद्यालय ने अपने अस्तित्व के लगभग 50-वर्षों के इतिहास में शिक्षा के प्रचार-प्रसार में कई कीर्तिमान स्थापित किए हैं तथा यह विश्वविद्यालय पूरे प्रदेश का केवल एक मात्र सम्बद्धता प्रदान करने के अतिरिक्त अकेला सह-आवासीय उच्च शिक्षा का प्रगतिशील केन्द्र भी है। उच्चतर शिक्षा की चुनौतियों एवं नई सम्भावनाओं को मध्यनजर रखते हुए इसे अधिक आकर्षक बनाने हेतु प्रतिस्पर्धात्मक परीक्षाओं में बेहतर प्रदर्शन हेतु अधिक ध्यान दिया जाना चाहिए। इस विश्वविद्यालय का उपयुक्त वातावरण उच्चतर शिक्षा ग्रहण करने के लिए अति अनुकूल है।

मैं हिमाचल प्रदेश विश्वविद्यालय में शिक्षा ग्रहण करने के लिए आने वाले सभी छात्र-छात्राओं को अपनी हार्दिक शुभकामनायें प्रेषित करता हूँ तथा उनके उज्ज्वल भविष्य की कामना करता हूँ। इसके अतिरिक्त मैं सभी छात्र-छात्राओं से अपेक्षा करता हूँ कि आप सभी कोविड-19 “कोरोना वायरस” महामारी के संक्रमण से सुरक्षित रहें।


(सिकन्दर कुमार)

CONTENTS		
S. No.	PARTICULARS	PAGE NO.
1.	• Important dates and instructions	5-6
2.	• Introduction	7-8
3.	• Eligibility, reservation of seats, tuition fees <i>etc.</i>	9-13
4.	• Pattern/ Syllabus of Entrance Examination	14- 15
5.	• Result and merit list	16
6.	• General Instructions	17-19
7.	• Application	20-21
8.	• Counseling	22
9.	• Participating Institutes	23-28
10.	• Ragging in Educational Institutions and consequence(s)	28
11.	• Prevention of forced obstruction of teaching in institutions	28
12.	• Fee, caution money, library security refund <i>etc.</i>	28-29
13.	• Model/ sample questions for Entrance Test	29
	• M.Sc. Biotechnology/ M.Sc. Microbiology	29-32
15.	• FORM 1A [ADMISSION FORM] • FORM 1B [UNDERTAKING BY CANDIDATE/ PARENT]	33-38
16.	• Important Contact phone/ Fax numbers of the participating institutes	43
<p><u>Important:</u> The candidates, who intend to apply for both courses i.e. M.Sc. Biotechnology as well as M.Sc. Microbiology Entrance Test-2020 conducted by HP University, will have to fill separate forms for both the courses.</p>		

IMPORTANT DATES AND INSTRUCTIONS

1. **Submission of Online Application form(s)** **Start date – End date**
 For Entrance Test of M.Sc. Biotechnology/ Microbiology **June 05, 2020 - June 30, 2020**

2. **Date of Entrance Examination**
M.Sc. Biotechnology (*HPU Campus, CEEB-JNU*) *As per schedule approved by JNU*
M.Sc. Biotechnology **to be communicated later on**
M.Sc. Microbiology **to be communicated later on**

3. **Venue of Entrance Test** **H.P.U. Campus (Shimla), at the allotted Centre and mentioned in the Admit Card**

4. **Tentative date of declaration of result/merit list**
 Both M.Sc. Biotechnology & M.Sc. Microbiology **to be communicated later on**

5. **Date & place of counseling** **to be communicated later on**
Central Counseling of the candidates (in order of merit) for both M.Sc. Biotechnology (Only for affiliated institutions) and Microbiology (Both for HPU Campus and affiliated institutions) will be held in the Department of Biotechnology, Himachal Pradesh University, Shimla. No separate communication/ letters will be sent to the candidates as the counseling schedules have been incorporated in the prospectus itself under Clause 7.4.
M.Sc. Biotechnology (*HPU Campus, GAT-B: RCB*) *As per schedule approved by RCB*

Start of session

M.Sc. Biotechnology	to be communicated later on
M.Sc. Microbiology	to be communicated later on



TIME SCHEDULE FOR ENTRANCE EXAMINATION

M.Sc. Biotechnology – Morning Session (00.00.2020)

(a)	Center of examination as indicated on the Admit Card	
(b)	Entry in the Examination Hall	9:30 AM
(c)	Distribution of question booklet and answer sheet	9:50 AM
(d)	Test commencement	10:00 AM
(e)	Latest entry in the examination hall	10:30 AM
(f)	Test conclusion	11:30 AM

M.Sc. Microbiology – Evening Session (00.00.2020)

(a)	Center of examination as indicated on the Admit Card	
(b)	Entry in the Examination Hall	2:00 PM
(c)	Distribution of question booklet and answer sheet	2:20 PM
(d)	Test commencement	2:30 PM
(e)	Latest entry in the examination hall	3:00 PM
(f)	Test conclusion	4:00 PM

Materials to be brought on the day of examination: Admit card, card board, ballpoint pens (blue/ black) *etc.* ***The carrying of mobile(s) is strictly prohibited in the Examination Hall. The invigilation staff will not be accountable for any deposit or loss of mobile(s).***

Rough work: All rough work is to be done in the question booklet in the space provided at the end of the questions section. ***The candidate shall not do any rough work or put stray mark(s) on the answer sheet.***

Use of ballpoint pen (blue/ black) only for;

- i) Writing of particulars on the Question Booklet: Roll number, Candidate's name, Father's name & Examination Centre
- ii) Writing of particulars and responses on the OMR sheet: Roll number, Candidate's name, Father's name Center of Examination, Signature & Responses.

Note :

1. Candidates must follow the instruction strictly as contained in the prospectus.
2. Candidates not complying with the instructions shall be disqualified.

1. INTRODUCTION

The Himachal Pradesh University, Summer Hill, Shimla will conduct process of admission of candidates to the M.Sc. Microbiology Course for (i) HPU Campus, (ii) Central Research Institute (CRI), Kasauli and (iii) Affiliated private institutions and M.Sc. Biotechnology course being offered only at its affiliated institution *i.e.* SILB, Solan. The candidates will be admitted to the following programs during the academic session 2020-2021. The admission to M.Sc. Biotechnology at HP University campus is through National Level Test GAT-B conducted by Regional Centre for Biotechnology (RCB) on behalf of Department of Biotechnology, Govt. of India New Delhi, alongwith other institutes. The details of the seats for M.Sc. Biotechnology and M.Sc. Microbiology programs currently available at various institutions are as mentioned in Table 1. An entrance examination for the eligible candidates shall be conducted for admission under these courses for the academic session 2020-21.

The duration of M.Sc. Biotechnology/Microbiology course will be of two years. All the below mentioned institutions are affiliated with the Himachal Pradesh University, Shimla. All these institutes are regularly inspected by the authorized committee(s) of Himachal Pradesh University, Shimla to maintain high standards of academics and infrastructural facilities.

Table 1: Number and distribution of seats under different courses			
	Institutes	M.Sc. Biotechnology	M.Sc. Microbiology
1.	H.P. University, Shimla Campus (Department of Biotechnology)*	30 ^a	30 + 7* (02 for SGC + 02 for JK Domiciles + 03 for Wards of HPU Employees)
2.	Central Research Institute (CRI) Kasauli, Solan (H.P.)	Nil	15 + 5** (** in-service candidates)
3.	Gautam Girls College (GGC), Hamirpur (H.P.)	Nil	30
4.	Shoolini Institute of Life Sciences & Business Management (SILB), Solan (H.P.)	40	30
	Total seats available	40 + 30^a	117

^a **Through Graduate Aptitude Test - Biotechnology (GAT-B)**, previously Combined Entrance Examination for Biotechnology (CEEB) by JNU, and now conducted by the Regional Centre for Biotechnology on behalf of the Department of Biotechnology, Government of India, as per the schedule approved by RCB and also uploaded on the website of University (www.hpuniv.ac.in)

* **Two seats will be available for Jammu & Kashmir domicile candidates, two seats for Single Girl Child and three seats for wards of HP University employees in M.Sc. Microbiology only for HPU Campus.**

** The in-service non-teaching category employee shall fulfill the eligibility criteria as per **First Ordinances of HPU, Shimla “Additional leave rules for employees in category B, C & D PART-C [Vol-II]”** as applicable to the Himachal Pradesh State Government employees and the candidate shall also appear in the Entrance Test.

* & ** **The supernumerary seats should not be filled from the open merit list if these remain vacant after counseling.**

Note: The number of affiliated institutions and their seat number may vary

All the seats under Biotechnology/ Microbiology programs shall be filled from the merit list of Entrance Test-2020 conducted by HP University.

However, the 30 seats available in PG Campus - HPU will be filled through National Entrance test "GAT-B" conducted by RCB – Faridabad on behalf of Department of Biotechnology, Govt. of India, New Delhi. ***No separate merit list shall be prepared for the non-Himachali candidates.***

Note: The 120 Point Reservation Roster for each category will be maintained as mentioned in Hand Book of Information (for admission through entrance test), for academic session 2020-21, Himachal Pradesh University.

- a) 15% and 7.5% of the total seats shall be reserved for bonafide Himachali Scheduled Caste and Scheduled Tribe candidates respectively who have passed the qualifying examination from HPU or from any other University established by law in India which is equivalent to the qualifying examination of HPU, Shimla.
- b) The remaining 77.5% seats shall be filled as under:
 - i. 25% of the seats shall be open for all the candidates irrespective of the institution from where they have passed their qualifying examination. No separate merit list shall be made for the non Himachal domicile candidates.
 - ii. 75% of the seats shall be filled out of the candidates who have passed their qualifying examination from HP University, Shimla or HP Agriculture University (HPKV) or Dr. Y. S. Parmar University of Horticulture and Forestry, Himachal Pradesh Technical University, and Central University of Himachal Pradesh or the candidates who possess Himachal Pradesh domicile irrespective of passing qualifying examination from any other University established by law in India which is equivalent to the qualifying examinations of Himachal Pradesh University, subject to the following reservations:
 - a. 5% of the seats shall be reserved for Outstanding Sportspersons [OSP] men/ women.
 - b. 5% of the seats shall be reserved for Outstanding Cultural Activists [OCA]; and
 - c. 5% of the seats shall be reserved for Persons with Disabilities (PWD)

In the event of non-filling of above seat(s) in these two courses, all vacant seats will be treated as open and shall be filled on the basis of wait listed candidates in the merit of the qualifying test (within 15 days), subject to the fulfillment of eligibility criteria as prescribed by the Himachal Pradesh University.

Bonafide Himachali/ Himachal Pradesh Domicile means a person:

- I. Having his permanent home in Himachal Pradesh, or
- II. A Government employee residing in Himachal Pradesh for at least a period of 20 years or more, or
- III. Residing in Himachal Pradesh for a period of 25 years or more, or
- IV. Having his permanent home in Himachal Pradesh but living outside Himachal Pradesh on account of his/ her occupation(s).

2. ELIGIBILITY CONDITIONS / RESERVATION

(2.1) Educational qualification for M.Sc. Biotechnology under Self Financing Scheme

The candidate should have passed a Bachelor Degree under 10+2+3 pattern of education in Science in Physical, Biological, Agricultural, Veterinary and Fisheries Sciences, Pharmacy, Engineering/Technology, 4 years B.S. (Physician Assistant Course) or Medicine (M.B.B.S.) or B.D.S. from any Institute/ University recognized by the Himachal Pradesh University, Shimla/ University Grant Commission, New Delhi with at least 55% marks for general and other categories and 50% for SC/ ST category candidates.

(2.2) Educational qualification for M.Sc. Microbiology

The candidate should have passed a Bachelor Degree under 10+2+3 pattern of education in Science in Microbiology, Biochemistry, Biotechnology, Genetics, Molecular Biology, Botany or Zoology or M.B.B.S./B.V.Sc from any Institute/ University recognized by the Himachal Pradesh University, Shimla/ University Grant Commission, New Delhi with at least 50% marks for general and other category and 45% for SC/ ST category candidates.

NOTE: *The candidates who have appeared in the qualifying examination and whose results have so far not been declared, their eligibility for the entrance test will be purely provisional subject to the condition that the candidate must produce the documentary proof of passing the exam as per the existing criteria as on the day and time of counseling.*

(2.3) Age / Date of birth

Male candidates should not be more than 26 years; female candidates should not be more than 28 years and SC/ ST candidates not more than 29 years in age as on 1st July of the year 2020. The date of birth as recorded in the Secondary Education Board/ University certificate only will be considered as authentic.

(2.4) Reservation of seats

Out of the total seats, 15% of the seats shall be reserved for Schedule Castes and 7.5% Schedule Tribes. These candidates must however, qualify the Entrance Examination. Further, the SC and ST candidates will be required to produce, in original, a certificate issued by a competent authority at the time of counseling, failing which they will not be considered for the admission. In case sufficient number of the candidates in either of categories i.e. SC & ST are not available, the seats will be filled from unreserved categories.

Two supernumerary seats at HPU Campus (M.Sc. Microbiology), Shimla shall be available for a 'Single Girl Child' having a Himachal Pradesh bonafide / domicile certificate. This shall be in addition to the existing 30 seats available at HPU campus.

Two additional seats for Jammu & Kashmir domicile candidates have been approved in each of the courses being run at HPU, Shimla. Three additional seats for wards of HP University employees will be available at the campus only.

(2.5) Category wise distribution of seats and fee structure

(2.5.1) M.Sc. Biotechnology:

A: University Campus through GAT-B (RCB):

The Department admits 30 (Thirty) candidates under M.Sc. Biotechnology Program through an All India Combined Entrance Examination conducted for the participating Universities by the Regional Centre for Biotechnology (RCB), Faridabad on behalf of the Department of Biotechnology, Government of India New Delhi. (previously CEEB conducted by JNU). The admission will be made by HP University after the result is declared by RCB.

Category	Number of seats				Annual Fee*
	Gen	SC	ST	Total	
Total seats	23	5	2	30	Rs. 9630/-(approx.)

Annual Fee of Rs. 9630/- includes Admission Fee Rs. 3250/- + Continuation fee Rs. 2500/- Examination Fee Rs. 1860/- x2 + Developmental Fee Rs. 500/-

Eligibility: *Strictly as per the eligibility criteria mentioned by RCB (DBT-Gol) in the prospectus uploaded on the website of RCB.*

B: Affiliated Institutes: Under Self Financing Scheme:

The total number of seats is 40 in M.Sc. Biotechnology course in the affiliated institutes with the following distribution and tuition fee structure.

Category	Number of seats				Annual Fee* (total)
	Gen	SC	ST	Total	
Total seats	31	6	3	40	Rs. 72,000/-

**Students will also have to pay annual charges, monthly Hostel/ Mess (if availed) and other charges over and above this fee.*

(2.5.2) M.Sc. Microbiology - Self Financing Scheme:

The Department admits 30 (thirty) candidates under M.Sc. Microbiology Self Financing Scheme every year through a Combined Entrance Test conducted by HP University for the participating Institutes for admitting total 117 students.

A: University Campus: 30seats

Category	Number of seats				Annual Fee* (in Rs.)
	Gen	SC	ST	Total	
Total seats	23	5	2	30	72,000/- + Annual Charges
Caution Money one time (Refundable)					10,000/-
Departmental Library Security (Refundable)					2,000/-

30+03 [Wards of University Employees] +02 [JK] +02[SGC]

* Two Supernumerary seats for Single Girl Child available at H.P.U. campus only	02
* Two Supernumerary seats for Jammu & Kashmir domicile candidates available at H.P.U. campus only	02
* Three additional seats for wards of HP University employees will be available at the H.P.U. campus only.	03

B: Affiliated Institutes: 117 seats

The total number of seats is 117 (37 HPU + 80 Affiliated Institutes) in M.Sc. Microbiology course with the following distribution and tuition fee structure.

Category	Number of seats				Tuition fee* per annum
	Gen	SC	ST	Total	
Total seats	60	12	8	80	Rs. 72,000/-

(2.5.3) Other charges to be paid for M.Sc. Biotechnology and M.Sc. Microbiology courses at private institutes affiliated to Himachal Pradesh University, Shimla.

a) Caution money (one time) refundable

1. M.Sc. Biotechnology/ Microbiology	10,000.00
--------------------------------------	-----------

b) Library charges

1. Library Security (refundable)	2,000.00
2. Admission Fee	1,000.00

c) Annual charges

1. Continuation Fee	1,000.00
2. Sports Fee	100.00
3. Medical Fee	100.00
4. Holiday Home Fee	100.00
5. Student Aid Fund	100.00
6. Youth Welfare Fund	100.00
7. Identity card Fee	100.00
8. Breakage Fee	1,000.00
9. Annual Dinner Charges	500.00
10. Cultural Activities Fund	50.00
11. Common Room Charges	50.00

d) Monthly Charges

1. Dilapidation	10.00
2. Amalgamated Fund	100.00
3. Population Education Fee	10.00

e) Examination Fees

1. Examination Fee	1000.00
2. Practical Examination Fee	500.00
3. University Registration Fee	
a) H.P. Board/ H.P. University Student	100.00
b) Other Students	500.00

(2.5.4) Other charges to be paid for the seats available under M.Sc. Microbiology Program at Himachal Pradesh University, Shimla.

a) Caution money (one time) refundable

1. M.Sc. Microbiology	10,000.00
-----------------------	-----------

b) Library Charges

1. Departmental Library Security (refundable)	2,000.00
---	----------

c) Annual Charges

1. Admission Fee	100.00
2. Sports Fee	100.00
3. Central Library Security	300.00
4. HPU Caution Fee	300.00
5. Cultural Activities Fee	50.00
6. Poor Students Aid Fund	50.00
7. Tuition Fee	2400.00 [#]
8. Dilapidation Fee	120.00
9. Continuation Fee	100.00
10. Breakage Fee	1000.00
11. Population Education Fee	120.00
12. Identity Card Fee	50.00
13. Medical Fund	50.00
14. Youth Welfare Fund	50.00
15. Holiday Home Fee	20.00
16. Magazine Fee	50.00
17. Amalgamate Fund	1200.00
18. Common Room Fee	20.00
19. Educational/Excursion/Industrial Tour Fund*	500.00

Total charges: 6580.00

[#] Girls are not required to pay the tuition fee

* It will be utilized by the department for covering expenses incurred on Travel/Refreshments/Entry Fee etc. during the tour.

⁺⁺The details of the *annual charges/ fee to be paid to the University*

Particulars	Boys	Girls
<i>Admission Fee</i>	3250	3250
<i>Examination Fee</i>	3720	3120
<i>Continuation Fee</i>	2500	1900
<i>Development Fund</i>	500	500
Total	9970	8170

Other University Charges

HPU Green Environment Club Fee (Annual) 100.00

d) Examination Fees

1. Examination fee including practical examination as decided and notified by H.P.U., Shimla from time to time for campus-based courses.

Presently Rs. 1860/= for boys and Rs. 1560/= for girls

2. University Registration fee

a) Non HPU registered candidates 400.00

(2.5.6) Fee schedule

For all categories of students admitted to M.Sc. Biotechnology and M.Sc. Microbiology courses at private institute(s) 1st July to 15th July of the academic year for 3rd semester, and 7th December to 21st December for 2nd and 4th semester [If a holiday falls on any of these stated days, the next working day will be the last day for deposition of fee] or as per the schedule notified by HP University from time to time.

However, the students admitted under the M.Sc. Microbiology Program at H.P.U. campus will deposit their semester/ examination fee according to the notification(s) issued by the University from time to time. In case of fresh admission in M.Sc. Microbiology, the candidate must deposit the full fee within three days of the date of counseling. The Self- Finance fee of Rs. 72,000 for the second year of M.Sc. Microbiology shall be deposited **by due date (to be notified later on)** without late fee. **Otherwise a Late fee of Rs.1000/- shall be charged till due date (to be notified later on).**

(2.6) Duration: The duration of M.Sc. Biotechnology and M.Sc. Microbiology is 2 years (4 semesters).

(2.7) IMPORTANT NOTES

1. Fee shall be payable by draft in the name of the concerned institute where a candidate has been admitted/ or by the means notified by University. 20% of the total tuition fee shall be paid at the time of counseling.
2. In case the fee is not deposited till the due date, a late fee of Rs. 1000/- will be charged for the next ten days and failing to meet this dead line, the name of the student will be automatically struck off from the rolls.
3. **Fee once deposited shall not be refunded ordinarily (Refer to Clause 13). However, the refundable component(s) of the deposited fee i.e. Caution money as well as the Library security shall be refunded.**

Note: A candidate should choose only one category in which he/she is eligible and intends to seek admission. Category once opted will not be allowed to be changed.

3. Pattern/ Syllabus of Entrance Examinations

3.1 M.Sc. Biotechnology

The question paper for M.Sc. Biotechnology Entrance Examination 2020 will be of 100 marks. The paper shall contain a total of 100 multiple-choice questions of one mark each. The Examiner will set 20 questions from each of the following sections and the candidate shall attempt all these questions by putting an appropriate choice on the OMR answer script/ sheet. There shall be no negative marking in the entrance examination. The duration of entrance Test shall be 1 hour and 30 minutes.

Cell Biology & Microbiology: Structure and function of cell organelles, ultra structure of cell membrane, cytosol, Golgi bodies, endoplasmic reticulum (rough and smooth), ribosomes, cytoskeletal structures (actin, microtubules *etc.*) Mitochondria, chloroplasts, lysosomes, peroxysomes, nucleus (nuclear membrane, nucleoplasm, nucleolus chromatin); Cell division and cell cycle: mitosis, meiosis, stages of cell cycle and binary fission. History of microbiology, general account of bacteria, mycoplasma and viruses; ultra-structure of eukaryotic and prokaryotic cells; microbial nutrition and nutrient uptake; asexual reproduction in bacteria; applications of microbes in agriculture, food and fermentation, medicine and environment.

Basic Biochemistry & Instrumental Techniques: Biomolecules, chemistry of carbohydrates, proteins, lipids and nucleic acids; classifications of enzymes, enzyme action; high energy compounds; vitamins and co-enzymes, glycolysis, hexose mono-phosphate pathway, Krebs's cycle, glycogenesis, gluconeogenesis, ED pathway, photosynthesis and respiration; beta oxidation, deamination, transamination and urea cycle; structure and functions of cell membrane, mitochondria, chloroplast, Golgi bodies, endoplasmic reticulum, peroxisomes and nucleus; cell division; types of immunity, antigen and antibody reactions; centrifugation: rate zonal, density gradient, ultracentrifugation, colorimetry and spectroscopy, crystallography, electrophoresis and chromatography, microscopy and scanning probe microscopes; radioisotopes and their applications in biology..

Industrial & Bioprocess Technology: Cultivation of microbes, bioreactors and their types, downstream processing, fermentation processes; environmental pollutants, their types and impact on the human health, biodegradation & bioremediation, biomining & bioleaching; kinetics of enzyme reactions, K_m and V_{max} determination, types of enzyme inhibitions, immobilization of whole cells/ enzymes; patenting of biotechnological inventions; management of bio-business.

Fundamentals of Genetics & Molecular Biology: Mendel's laws of inheritance, linkage, alleles, sex linked inheritance, cytoplasmic inheritance, crossing over, chromatin structure and organization; DNA structure, replication, transcription, translation, reverse transcription, genetic code, regulation of gene expression in prokaryotes and eukaryotes; mitochondrial and plastid DNA; plasmids; spontaneous and induced mutations, transposable genetic elements and genetic recombination: transformation, conjugation and transduction.

Plant & Animal Tissue Culture Techniques: Totipotency in plants, somatic embryogenesis, micropropagation and somaclonal variation; Protoplast culture and somatic cell hybridization, Induction of haploids and polyploidy through tissue culture, embryo rescue embryo culture, production of secondary metabolites by plant tissue culture. Primary animal cells culture, anchorage and non-anchorage dependent cells; secondary cultures, transformed animal cells, established/ continuous cell lines; measurement of growth and viability of cells in culture, tissue culture media and their components; growth kinetics of cells in culture, differentiation of cells, organ culture, production of monoclonal antibodies; transgenic animals; *in vitro* fertilization and embryo transfer.

3.2 M.Sc. Microbiology

The Entrance Examination for **M.Sc. Microbiology 2020-2021** will consist of one question paper and will be of 100 maximum marks. The paper shall contain a total of 100 multiple-choice questions of one mark each. There shall be no negative marking in the entrance examination and the medium of examination shall be English. The duration of entrance Test shall be one and half hour.

The syllabus for the question paper of the Entrance Examination for **M.Sc. Microbiology 2020-2021** shall be multidisciplinary covering various subjects related to Microbiology that shall cover various subjects taught in three years degree course (B.Sc.) with core subjects like Biochemistry, Molecular Biology, Genetics, Zoology, Botany, Microbiology, Immunology, Mycology, Phycology, Biochemical & Biophysical Techniques *etc* as per subjects/ disciplines/ specializations given under educational qualifications. The broader guidelines of the syllabus for Entrance Examination shall be as under;

SYLLABUS FOR M.Sc. MICROBIOLOGY ENTRANCE EXAMINATION 2020-2021

NOTE: The question paper for M.Sc. Microbiology Entrance Examination 2020-2021 will be of 100 marks. The paper shall contain a total of 100 multiple-choice questions of one mark each. The Examiner will set 20 questions from each of the following sections and the candidate shall attempt all these questions by putting an appropriate choice on the OMR answer script/ sheet. There shall be no negative marking in the entrance examination. The duration of entrance Test shall be 1 hour and 30 minutes.

General Microbiology: History of microbiology, general account of bacteria, mycoplasma and viruses; ultra-structure of eukaryotic and prokaryotic cells; microbial nutrition and nutrient uptake; asexual reproduction in bacteria; applications of microbes in agriculture, food and fermentation, medicine and environment.

Basics of Biochemistry and Cell Biology: Elementary idea of centrifugation, spectroscopy, electrophoresis and chromatography; chemistry of carbohydrates, proteins, lipids and nucleic acids; classifications of enzymes, enzyme action and coenzymes; high energy compounds; glycolysis, hexose mono-phosphate pathway, Krebs's cycle, glycogenesis, gluconeogenesis, photosynthesis and respiration; beta oxidation, deamination, transamination and urea cycle; structure and functions of cell membrane, mitochondria, chloroplast, golgi bodies, endoplasmic reticulum, peroxisomes and nucleus; cell division.

Basics of Parasitology and Immunology: Host-parasite interactions, study of diagnostic characteristics and diseases caused by leishmania, plasmodium, entamoeba, giardia, and trypanosoma; morphology and diseases caused by helminths, nematodes, trematodes and cestodes. Types of immunity, innate, acquired active and passive, antigen and antibody reactions, elements of immune system, humoral and cell mediated immunity; and general concept(s) of vaccines.

Basics of Mycology and Phycology: General characters, classification and economic importance; important features and life history of Cyanophyceae (*Spirulina*, *Oscillatoria*, *Anabaena*), Chlorophyceae (*Volvox*, *Oedogonium*), Bacillariophyceae (*Diatoms*), Xanthophyceae (*Voucheria*), Phaeophyceae (*Actocarpus*), Rhodophyceae (*Polysiphonia*). General characters, classification and economic importance, important features and life history of Mastigomycotina (*Albugo*, *Phytophthora*), Zygomycotina (*Rhizopus*), Ascomycotina (*Saccharomyces* and *Neurospora*), Basidiomycotina (*Puccinia* and *Agaricus*) and Deuteromycotina (*Cercospora* and *Colletotrichum*).

Fundamentals of Genetics and Molecular Biology: Mendel's laws of inheritance, linkage, alleles, sex linked inheritance, cytoplasmic inheritance, crossing over, chromatin structure and organization; DNA structure, replication, transcription, translation, reverse transcription, genetic code, regulation of gene expression in prokaryotes and eukaryotes; mitochondrial and plastid DNA; plasmids; spontaneous and induced mutations, transposable genetic elements and genetic recombination: transformation, conjugation and transduction.

The pattern of question paper(s) will be multiple-choice questions (MCQ). Some of the sample questions are attached at the end of the prospectus to give a feel of pattern of questions in the Entrance Examination Test.

4. RESULT AND MERIT LIST

- 4.1** The results/ merit list indicating marks in respect of all candidates considered under M.Sc. Biotechnology and M.Sc. Microbiology Entrance Test-2020 for admission to M.Sc. Biotechnology/ Microbiology programmes will be declared as per schedule given in the prospectus and will be displayed on the University notice board and/ or may also be published in prominent Newspapers and/ or may be made available on the University web site www.hpuniv.nic.in. The result of each of the candidates will be provisional. No separate result card(s) will be sent to the individual candidates regarding M.Sc. Biotechnology/ Microbiology entrance test.
- 4.2** The merit shall be determined on the basis of marks obtained in the Entrance Test- 2020 by the candidates and the merit list will be prepared accordingly. The inter-se ranking of the candidates obtaining equal aggregate marks in the entrance examination shall be as under:
- (i) **In case of tie(s) in M.Sc. Biotechnology/ Microbiology Entrance Test-2020, the preference shall be given to the candidate who has secured higher aggregate marks in the last qualifying (B.Sc.) examination. If the tie is still not resolved, the candidate older in age shall be given preference.**
- 4.3** The merit will be declared and displayed on the notice board of the University and may also be published in the prominent Newspapers. Merely, assigning the rank in the merit list to the candidate will not confer him/her right of admission to the degree program. The admission will be made if the candidate(s) satisfy the prescribed eligibility criteria on verification of the original certificates/ documents at the time of counseling/ admission.
- 4.4** The evaluation of answer scripts of the Entrance Test 2020 will be done through computerized OMR system leaving no scope for mistake(s) in totaling and non-marking of any answers. Under the computerization system of evaluation, re-evaluation of the OMR Answer Sheet will not be permitted.
- 4.5** After the declaration of the result and display of merit list for admission to M.Sc. Biotechnology and M.Sc. Microbiology the same will be sent to the participating institutes offering the said degree programs.
- 4.6 Role of the University in conducting the Entrance Test:** No certificate will be obtained by the University from the applicants and the test will be held purely on information supplied by the candidate in the online Application Form. The final eligibility and authenticity of the original certificates of the candidates to be admitted under the M.Sc. Biotechnology or M.Sc. Microbiology Program as per merit list will be checked by the Counseling Committee approved by the Vice Chancellor of HPU, Shimla on the day of counseling before depositing of admission fee. The counseling will be conducted as per schedule prescribed in the prospectus (clause 7.4) and no separate communication/intimation will be sent to the qualified candidates by the University or the participating institutes. The admission will be strictly according to the merit list supplied by the University (if the candidate is otherwise eligible).

5. GENERAL INSTRUCTIONS

- 5.1** The candidate should go through the eligibility criteria and fill up the application form carefully.
- 5.2** **The candidate shall bring Form 1A and Form 1B along with attested copies of the relevant certificates on the day of counseling.**
- 5.3** No request for change of particulars in the application form once filled in and submitted by the candidate to the Himachal Pradesh University, Shimla will be entertained under any circumstances. Examination Center once allotted shall not be changed in any case.
- 5.4** No examination will be re-conducted by the University under any circumstances for those candidates who are unable to appear in M.Sc. Biotechnology/Microbiology Entrance Test 2020 on the schedule date and time.
- 5.5** In case of any doubt, you may inquire personally or on phone 0177-2831948.
- 5.6** The candidate will write with blue/black ballpoint pen the required information regarding his/her Roll number, Name, Father's name, Center of Examination *etc.* on the Question Booklet.
- 5.7** The OMR sheets will be distributed along with the Question Booklet. The candidates are advised to go through it and be conversant with marking the answers on the OMR sheet, during the examination without making any mistake or loss of time.
- 5.8** The OMR answer sheet used will be scanned on optical scanner. There will be only one side of the answer sheet for marking correct answer(s).
- 5.9** The candidate must ensure that the answer sheet is not folded. He/She should not make any stray marks on it.
- 5.10** The candidate will bring his/ her own ballpoint (blue/black) pens and HB pencil *etc.*, in the examination hall.
- 5.11** The candidate will also bring his/ her own sharpener and eraser. He/She will have to ensure that no mark is visible after erasing the pencil dots.
- 5.12** The candidate will fill in the required particulars including his/ her (i) Roll number (ii) Name (iii) Father's name (iv) Center of Examination (v) Question paper booklet number (vi) Signature of the candidate in the appropriate box on the answer sheet itself with a ballpoint pen and the corresponding circles of Roll number are to be darkened completely with a blue/ black ball point pen only.
- 5.13** All matters and disputes related to admission to M.Sc. Biotechnology and M.Sc. Microbiology Entrance Test-2020 are subject to legal jurisdiction of courts in Shimla only.
- 5.14** **Writing of responses:** There will be four alternatives for each of the question. The candidate should attempt the responses according to their option as per Clause 3.4. The candidate will indicate his/her response to the question by completely darkening the appropriate circle/ ovals. For example, question No. 009 in the Question Booklet reads as follows.

The causative agent of Q-fever is

- (A) *Coxiellaburnetii*
- (B) *Mycobacterium tuberculosis*
- (C) *Corynebacteriumdiphtheriae*
- (D) *Staphylococcus aureus*

The correct response to the question is (A) *Coxiellaburnetii*.

The candidate will locate Question number 009 in the OMR answer sheet and darken the circle/ oval (A) as shown below:



If the candidate does not want to attempt any question, he/ she should not touch/ darken the circle/ oval given against that question.

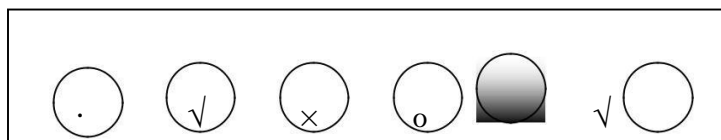
- 5.15** If a candidate is unsure about the correct answer of a question, he/ she may put a dot with HB pencil within the appropriate circle and then finally deeply darken the appropriate circle with blue/black ballpoint pen. The candidate must ensure that he/she does not leave any visible mark after finalizing the answer otherwise the response will be treated as wrong.
- 5.16** If more than one circle is darkened or if the responses are marked in any other manner, this shall be treated as wrong way of marking and shall be rejected by the optical Scanner/University.
- 5.17** The candidate is advised to decide about the answer before he/ she marks it on the answer sheet. He/She must ensure that the circle is completely darkened with a ball pen. A lightly or faintly darkened circle might be rejected by the optical Scanner/University.
- 5.18** Important instructions for marking the circles/ ovals
- I. Use HB pencil only for putting dot and then darken the appropriate circle with blue/ black ball pen.
 - II. Marks should be dark and should completely fill the circle.
 - III. Darken only one circle for each entry/ question.
 - IV. Make the marks only in the space provided.
 - V. Please do not fold the answer sheet or perform any **ROUGH WORK** on this sheet.
- 5.19** Carrying/use of a mobile phone is strictly prohibited inside the examination hall.
- 5.20** Procedure to be followed in the Examination Hall.
- (i) Ten minutes before the commencement of the test, each candidate will be given a Question booklet along-with an Answer sheet (OMR).
 - (ii) Immediately on receipt of the Question booklet the candidates will fill in the required particulars only on the cover page of the question booklet with ballpoint pen. He/ she will open the booklet only when asked by the invigilator.
 - (iii) The test will start exactly at the time mentioned in the Admit Card and an announcement to this effect will be made by the invigilator
 - (iv) During the examination time, the invigilator will check Admit Card with the Identification Proof of the candidate to satisfy himself/ herself about their identity. The candidate will retain card after the examination is over. The invigilator will also put his/ her signature in the space provided on the OMR Answer sheet.
 - (v) After completing the test and before handing over the question booklet and the answer sheet, the candidate should check again that all particulars required in the Question booklet and Answer sheet have been correctly written. Ensure that the Roll number and other particulars are correctly written on the answer sheet.
 - (vi) A signal will be given at the beginning of the examination and at half time. A signal will also be given before the closing time when the candidate must stop marking the responses.

- (vii) The candidate will check and ensure that the Question booklet supplied to him/ she contains required number of pages as written on the top of the first page. The candidate shall not remove any page(s) from the Question booklet. If any of the pages in the Question booklet given to him/ her are found missing he/ she will proceed against and shall be liable for criminal action.

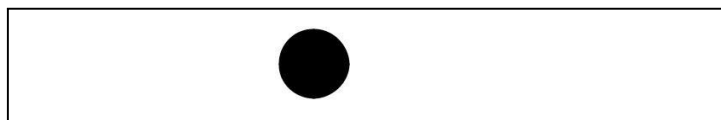
IMPORTANT INSTRUCTION TO BE FOLLOWED IN THE EXAMINATION HALL

1. The correct answer against each question shall be entered in an appropriate circle/ oval printed on the OMR Answer Sheet by darkening the hollow space with a blue/ black ball pen only (**Entries made in red or green ink shall be rejected by the computer OMR Machine!**)
2. For Roll number and respective answers appropriate circles be darkened with blue/ black ball pen only. Partially filled circles, dot matrix, X or tick marked circle(s) shall be liable to be rejected by the machine. Darkening of circles/ ovals shall be done correctly as indicated below;

Wrong markings



Correct marking



3. The scanner/ OMR machine will reject darkening of more than one circle.
4. Booklet number shall be filled on the OMR Answer sheet at the prescribed place. Similarly, the Roll number shall also be indicated on your Question booklet at the given place.
5. Use of calculator is not allowed. But log tables can be obtained from the invigilator on request.
6. There will be no negative marking.
7. **Do not either fold or put any stray mark(s) on the OMR Answer Sheet.** Such marked or mis-handled OMR Answer sheets(s) will be likely to be rejected by the OMR machine.
8. Rough work shall be done on the blank sheet(s) provided at the end of the booklet.
9. There is a space provided for signature of candidate at the bottom of the OMR Answer Sheet where the candidate must put his/ her signatures before attempting the question paper.
10. OMR Answer sheet to the candidates appearing for the M.Sc. Biotechnology/ Microbiology Entrance Examination – 2020 will be supplied by the Centre Superintendent/ Invigilator in the Examination Hall.

6. APPLICATION

The candidate should go through the eligibility criteria and fill up the application form carefully as per the instructions given below.

Instructions for Filling the Application Form

(Read the instructions/ Pre-requisite carefully before filling the application form)

(A) Before proceeding to apply, please ensure that you have:

1- Scanned copy of applicant's recent photograph with following specification.

Photograph should be in formals

Photograph must be a passport size color picture.

- Photograph must be taken in full face view directly facing the camera. Photograph should have no shadows and red eyes.
- Maximum size 100KB.
- Photo format should be .jpg or .jpeg only.
- File name should be of 10-character maximum

2- Scanned copy of applicant's signature with following specifications.

- Applicant should sign with black ink on a white paper and get the signature scanned. The signature must be signed only by the applicant and not by any other person.
- Maximum size 100 KB.
- Scanned signature format should be .jpg or .jpeg only. File name should be of 10-character maximum.

3- Scanned copy of applicant's Father/Mother signature with following specifications.

- Applicant's Father/Mother should sign with black ink on a white paper and get the signature scanned.
- The signature must be signed only by the applicant's Father/Mother and not by any other person.
- Maximum size 100 KB.
- Scanned signature format should be .jpg or .jpeg only. File name should be of 10-character maximum.

4- Upload documents with following specifications.

- Maximum size 2MB.
- Scanned signature format should be in PDF format only. File name should be of 10-character maximum.

5- Create an email account if you already don't have one.

6- You must give a mobile number in basic details. If you don't have mobile number, please enter your guardian's mobile number for any further correspondence in this regard.

7- All mandatory fields are marked with red star.

(B) Instructions for filling the ONLINE APPLICATION FORM

1. Click on “PG/UG/Ph.D./Certificate Diploma” to access the list of programs.
2. Choose the program and click on the program name.
3. online Entrance Application form has following subsequent information
 - a) Personal Information
 - b) Education and Document Details
 - c) Application Summary
 - d) Payment
 - e) Submit Reference number and application form
4. Please fill the personal information first.
5. After filling the personal information click on save button at the last of the page.
6. System will generate the unique Registration number along with password. Applicants are advised to note the same.
7. The unique Registration number along with password will be sent on the email and the entered mobile number. Note down the Registration number for all future references.
8. After that you can continue and fill other required information or logout and login again with unique Registration number along with password.
9. After that Click on “PG/UG/Ph.D./Certificate Diploma” and click on “Click here for Student Login”
10. Login with unique Registration number along with password and you will get all the earlier submitted information in personal information page.
11. Applicants are required to fill all information required in different sections like Education and Documents details.
12. Fill Education and document detail and upload related documents.
13. Photo and signature uploaded should be as per specifications, kindly refer to section (A) at the starting of the document.
14. To save the data please click on 'Continue and Save' button at the bottom of each screen.
15. Step for making Application Fees Payment, you can pay the fees through online mode or by choosing Challan mode.

Payment through Challan

- a) If you select payment through **challan option**, you have to select bank and click on generate challan. After that you have to download the Challan and submit the same to the selected bank. Bank will give a reference number against the challan.
- b) Login again and submit your reference number under submit **reference number and application form** tab.

Online Payment

- a) if you select online payment mode, click on make payment
- b) on the next page select your payment gateway
- c) Click on continue for payment
- d) Choose among the given options (debit card, credit card, net banking etc.)
- e) If the payment is successfully done, you will receive a success message with all the details
- f) Click on the Submit button to get the form finally submitted.

Note: *Before proceeding further please make sure that all the fields are filled in correctly in the confirmation screen before clicking the submit button.*

7. COUNSELING

- 7.1 Admission shall be made through counseling to be conducted by the **Counseling Committee as per schedule prescribed in the prospectus under the “Important dates and instructions at a glance”**. The qualified candidates as per merit rank as Clause 7.4 should attend the counseling at Himachal Pradesh University or any other participating Institute designated for this purpose as per prescribed schedule for which no separate communication will be sent to the candidates. All queries regarding admission/ counseling *etc.* be addressed to the above office.
- 7.2 The qualified candidates are required to attend the counseling as per schedule already given for which no separate communication will be sent. The candidates are required to bring original documents i.e. Bonafide Himachali Certificate, detailed marks certificate of qualifying exams, certificate for SC/ST Category if any, High School certificate (10th Class) showing the date of birth, character certificate from the Institution last attended and their attested true copies and other certificates along with Form numbers 2 & 2A separately according to the course applied for. **No call letters for attending the counseling will be sent individually to the candidates appearing in the merit list.** The merit list along with all other relevant record will be handed over by the University to the participating private institutions for admissions of the candidates allocated to them. The admission will be made strictly according to the merit list supplied by the University if the candidate is otherwise eligible.

In case the seats remain vacant in M.Sc. Biotechnology and M.Sc. Microbiology, the concerned participating institutions will inform the Chairperson, Department of Biotechnology for prior approval and will issue an open advertisement to fill up the vacant seats after exhausting the merit list on all India basis. Those seats too will be filled up by way of second counseling by the affiliated institutes on the basis of marks obtained in the qualifying examination and the candidate should fulfill the minimum eligibility criteria as prescribed in the prospectus for admission. The second counseling shall be conducted on scheduled date for M.Sc. Biotechnology and M.Sc. Microbiology programs, as per advertisement notice to be given by the concerned institutions. The Director/ Dean/ Principal/ HOD of the concerned private institutions, and the Chairperson, Department of Biotechnology, H. P. University or his Nominee will be the members of the Second Counseling Committee to be held at respective institutes.

The entire process of admissions to M.Sc. Biotechnology and M. Sc. Microbiology courses shall be completed by due date (to be notified later on)

- 7.3 In the light of implementation of judgment of Hon'ble High Court of Himachal Pradesh in (CWP No. 1397 of 2007) in the matter of Dreamz College of Pharmacy and others Vs. State of Himachal Pradesh and others; the Himachal Pradesh University, Summer Hill shall not admit any student mid-stream in the campus based courses or in any of the private institutions affiliated to Himachal Pradesh University and running same course(s) at their institutes.
- 7.4 Candidates falling in merit as under should attend the counseling as per schedule given below:

Date & place of counseling

(to be notified later on)

Central Counseling of the candidates (in order of merit) for both M.Sc. Biotechnology (Only for affiliated institutions) and Microbiology (Both for HPU Campus and affiliated institutions) will be held in the Department of Biotechnology, Himachal Pradesh University, Shimla. No separate communication/ letters will be sent to the candidates.

Note 1: Every candidate attending the counseling must report at 10.00 AM sharp and will be required to pay Rs. 500/- as University Counseling Fee against a valid receipt.

Note 2: To ensure his/ her seat, the selected candidate shall deposit at least a minimum of 20% of the total tuition fee to the authorized representative of the private institution. However, the candidates admitted to the H.P.U., Shimla under M.Sc. Microbiology Program will have to deposit the fee in total by the due date notified by the Chairman, Department of Biotechnology, HP University, Shimla.

8.0 Participating institutes

It's the sole responsibility of the participating institutions to seek the affiliation with Himachal Pradesh University, Summer Hill, Shimla to run the M.Sc. Biotechnology and/ or M.Sc. Microbiology program(s) at their respective institution(s) for the session 2020-2021.

8.1 Department of Biotechnology, H. P. University, Summer Hill, Shimla

The Department of Biotechnology at Himachal Pradesh University, Shimla was established in the year 1995 with financial support from Govt. of India, Department of Biotechnology, Ministry of Science & Technology, New Delhi and the State Government and. The Department is presently running M.Sc. (Two years), M.Phil. (One year) and Ph.D. programs in Biotechnology. The Department admits 30 (Thirty) candidates under M.Sc. Biotechnology Program every year through an All India level Graduate Aptitude Test - Biotechnology (GAT-B), conducted by the Regional Centre for Biotechnology on behalf of the Department of Biotechnology, Government of India (previously Combined Entrance Examination for Biotechnology (CEEb) by JNU). **The last date of application is 18th June, 2020.** The admission will be made by HP University after the result is declared by RCB. RCB. **The candidates seeking admission in M. Sc. Biotechnology Degree program at HPU Campus** may visit the websites of Regional Centre for Biotechnology (RCB) and Himachal Pradesh University (<https://rcb.res.in/GATE/> & www.hpuniv.ac.in/biotech).

The department also admits 30 candidates for the M.Sc. Microbiology course under Self-Financing-Scheme since July 2007. Since its inception the Department has created a niche in academics and research at national level because of strong academic and research programs. The highly trained Faculty of Biotechnology has excelled in various fields of Biotechnology and Microbiology by attracting major grants from national funding agencies and has immensely contributed in creating and maintaining high quality infrastructure. A strong infrastructure is a prerequisite for imparting quality practical training to the students as well as to maintain high standards in research. The Department has identified '**Industrial enzymes and processes**' as the thrust area with the following major objectives:

- ☐ Exploration and conservation of microbial diversity of Himachal Pradesh.
- ☐ Enzyme and fermentation technology.
- ☐ Isolation and characterization of extremophiles for novel enzymes/products
- ☐ Screening and evaluation of active principle(s) of medicinal plants.
- ☐ Ready to work manpower for Biotechnology -based Industries, R&D Institutes
- ☐ Promotion of Entrepreneurial skills in multidisciplinary areas of Biotechnology for innovative and R&D and Business activities.

Various microbial enzymes that are being purified and studied for their potential diverse applications include nitrilases, amidases, hydratases, lipases, pectinases, cholesterol oxidases, peroxidases, xylanases, glutaminases, asparaginases, ribonucleases, methionases, chitinases, phenol lysase and acyl transferases. Other areas of research include use of animal cell culture as host system for viruses, cytotoxic assay and isolation and development of human mesenchymal stem cell culture from human placenta/cord blood. The outcome of these academic and research activities is development of trained human resources in Himachal Pradesh.

Based on the past progress and performance of the Department in-terms of infrastructure for Teaching, Research, R&D and Entrepreneurial/ Business Activities in Biotechnology, it has been rated as B⁺⁺ by the DBT through a survey conducted by BCIL and is among top 10 Biotechnology Institutes in the country. The Biotechnology Incubation Centre set up in the Department aims to strengthen the entrepreneurial skills and provide students with facilities to emerge as successful entrepreneur's/ job generators for future. The Department has strong linkage with other R&D Institutions and several industries which support the R&D funding in core areas where students are getting fellowships are either absorbed in Industries or start their own businesses.

The University department has produced excellent alumni working all across the globe in Universities, R&D Institutes, IITs, IISc, Industries, Govt., and also few have set up their Business Ventures in India & abroad. The Department has been one of the few top choices of the students for PG among all DBT supported Universities. Most of the students qualify National Level tests conducted by NTA/UGC/CSIR/ICMR /ICAR/DBT/ GATE and others.

The University has Hostel Facility for both Boys and Girls, one dedicated Central Placement Cell which helps the students from within University in finding placements although the students prefer to go for Research as Career mostly but others are helped through the Placement Cell to find jobs in Industry and other organizations. The students are imparted quality education with the help of modern teaching aids/ gadgets and techniques. The students are also taught about recent teaching/ learning methods/ techniques in the relevant fields. Eminent scholars are invited on specific topics, tutorials, the students are encouraged to prepare for entrance examinations including UGC/CSIR, ICMR, DBT, GATE and other competitive examination. If need be short refresher classes are arranged from time to time on voluntary basis. Efforts are being made continuously to address need-based research problems and wherever needed efforts are made to work jointly with related industries. The Department has its own library section besides the central library, IT lab and Bioinformatics Centre to cater to the ICT & research needs of the students besides HPU Alumni association and Association of Biotechnologists of Himachal Pradesh (ABHI).

The Department of Biotechnology has one Separate Biotechnology Incubation Centre (under Chief Minister's Start-up Scheme) established with the help of financial support from State Govt. through Department of Industries since July, 2016. The University also provides partial assistance to run the Incubator. Till date 18 Incubatees have joined the Incubator and four have also developed their Prototype and rest are in the process. The state Govt. provides Infrastructure Grant besides recurring grant every year to the Incubation Centre while the Incubatees are also provided stipend @ Rs. 25,000/- per month for one year besides the facilities of the department to carry out their work leading to business development.

The University is working in collaboration with various related Industries where students are trained for specific skills for short –term as well as long-term courses. The Department in collaboration with the Directorate of Skill Development, Himachal Pradesh State Council for Science, Technology & Environment (HIMCOSTE) organizes skill development workshops and other activities from time to time. The Department has also signed MoUs with several Industries for joint research work. The Industry sponsored research activities are also part of the regular R&D in the department where fellowships are provided to the students.

In pursuance and furtherance of its academic and research efforts, the Department of Biotechnology started a two-year Program in Microbiology from the session 2007-08. The candidates are trained in culture, maintenance and use of various microbial isolates/ stains in production of industrially and medically useful products, enzymes and processes. The two years M.Sc. Biotechnology Program is a self-financed program with emphasis on practical training and confidence building of the admitted candidates that shall enable them to face the globally competitive world. The candidates are exposed to exploitation of sophisticated techniques and equipments that include, High Performance Liquid Chromatography System, AKTA Prime Liquid Chromatography System, Gas Liquid Chromatography, Real Time PCR, Freeze Drying System(s), *in situ* sterilizable bioreactor, Gel documentation System, advanced rDNA Technology, PCR, ELISA, *in vitro* culture of viruses on animal cell culture systems *etc.* The Department has the following core faculties who have established themselves in their respective research fields. The faculty is fully supported by a strong workforce of research scholars pursuing their research career under M.Phil. and Ph.D. programs.

Core Faculty of Department of Biotechnology

PERMANENT CORE FACULTY			
Name	Designation	Field(s) of Specialization	E-mail and phone nos.
Dr. Arvind Kumar Bhatt	Professor & Head	Industrial Biotechnology, Fermentation Technology and Plant Biotechnology	09418450009, 0177-2833705 bhatarvind@yahoo.com
Dr. T. C. Bhalla	Professor Emeritus-UGC	Enzyme Technology, Bioinformatics	09418439910; 0177-2833701 bhallatc@rediffmail.com

Dr. S. S. Kanwar	Professor	Animal Biotechnology, Microbiology, Biochemical and Biophysical Techniques	09418085397; 0177-2833703 kanwarss2000@yahoo.com
Dr. Reena Gupta	Professor	Biochemistry Immunology	09418462552; 0177-2833702 reenagupta_2001@yahoo.com
Dr. Duni Chand	Professor	Molecular Biology, Plant and Environmental Biotechnology	09418276448, 0177-2833704 dunichand_2000@yahoo.com
Dr. Wamik Azmi	Professor	Biochemical Engineering and Biobusiness	09418311183, 0177- 2833706 wamikazmi@rediffmail.com
Dr. Savitri	Assistant Professor	Food Technology, Environmental Biotechnology	09418306308, 0177-2833707 savvy2000in@yahoo.com
Guest Faculty	As per requirements	Maths & Statistics, Computer Science, and other Courses of Microbiology	
TECHNICAL STAFF			
Dr. Nikhil Sharma	Information Officer (Scientific)	Bioinformatics & Biochemistry	09816690779 sharma.n2380@yahoo.co.in
Er. J.S. Sodhi	Instrument Engineer	Instrumentation and IT	09418274334 Issodhi_2000@yahoo.com
Dr. Ram Chand	Lab. Technician	Laboratory Work	09418029732
Dr. Ravi Kant	UGC-Post Doc & Manager-BIC	Industrial Biotechnology Microbiology	09418272803
Mr. Manoj Kumar Sharma	Technical Assistant	Sub-DIC	09459028838
Mrs. Leena Mishra	Data Entry Operator	Sub-DIC	09418387224
MINISTERIAL STAFF			
Mr. Mahesh Chander Negi	Spdt.	Office work	08091739564
Mr. Sanjeev Bharadwaj	JOA	Office Work	-----
Mr. Yogesh Kumar	Peon	Class IV	7018890470

The Department has previously availed Emerging Area Scheme of UGC (2000-2005), New Delhi and is currently supported under FIST (Level I) Program (2005-2010), Department of Science & Technology, New Delhi. The Department has established a Microbial Germplasm Bank (MGB) with the financial assistance from Department of Biotechnology, Ministry of Science & Technology, Government of India. The Bioinformatics Center (Sub-DIC) provides Internet/ WWW support to the students and Faculty. The Department regularly organizes/conducts workshops and seminars on specialized and related fields. The department also offers short-term research training to the candidates coming from other institutions on request.

For further information contact:

Chairman
Department of Biotechnology
Himachal Pradesh University, Shimla - 171 005, HP (India),
Phone: +91-177-2831948; 2833705, Telefax: +91-177-2831948; 2830775
E-mail: chairmanbiotechhpusml@gmail.com
CONTACT PERSONS:
Mr. Mahesh Chander Negi (Supdt.) 80917-39564,
Mrs. Leena Mishra (DEO): 94183-87224)

8.2 Central Research Institute (CRI), Kasauli, H.P.-173204

CRI at Kasauli which is a small cantonment hill station situated in Solan District of Himachal Pradesh at a height of 6,000 feet above sea level. The Institute is one of the pioneer institutes of national importance dedicated to the production and supply of DTP group of vaccines, Yellow fever vaccine, various antisera products and diagnostic reagents. The Institute was established in the year 1905 under the Directorship of Lieut-Colonel Sir David Semple, who was credited with the research and development of the world's first Sheep Brain Vaccine, and was the mainstay for Rabies Treatment in India. In 1947, Lieut-Colonel M.L Ahuja took over as first Indian Director of the Institute. So far the vaccine production in the institute was being done in the conventional laboratories. However, the institute is soon to start production of DPT group of vaccine in the new cGMP (current Good Manufacturing Practices) facility. Central Research Institute, Kasauli is the only Institute known as pioneer Institution for all Vaccine Producing Units in India. Since its inception in 1905, Central Research Institute, Kasauli, has been working tirelessly for last 114 years with several significant contributions to the Nation in the field of Production of life saving immunobiologicals. The Institute has international recognition in the field of production of life saving immunobiologicals, surveillance activities, teaching and training programmes in the field of microbiology.

CRI, Kasauli is one of the most important suppliers of vaccines for the Government's Universal immunization programme (UIP). The Institute is also involved in manufacture and supply of various lifesaving therapeutic antisera for snake bites, Rabies and Diphtheria in addition to supply of Yellow Fever Vaccine and diagnostic reagents to different parts of the country. The Institute also contributes in surveillance of infectious diseases of public health importance and has dedicated surveillance centres for Influenza, poliomyelitis and zika. National reference centre for *Salmonella* and *Escherichia coli*s providing services to the nation since 1958 for typing of *Salmonella* and *E.coli*. National Salmonella and Escherichia Centre also possesses culture collection of bacteria which are also supplied to different institutions/organizations in the country. Rabies Research Centre extends its services of rabies diagnosis to the country and is one of the few laboratories involved in rabies diagnosis. Recently, CRI has been recognized as COVID-19 testing laboratory and catering the nation, round the clock, by testing suspected COVID-19 samples from Solan and Sirmour districts.

Being the pioneer in the field of microbiology and centre of excellence in teaching and training in microbiology, the institute runs M.Sc.(Microbiology) and PGDVI (Postgraduate Diploma in Vaccinology and Immunobiology) courses affiliated to the Himachal Pradesh University, Shimla. The Institute also provides summer and winter training courses/project work in the field of microbiology and biotechnology to the students from various institutes/universities form throughout the country. To contribute towards skill development among youth of the country, CRI is has started certificate course in 'Production of Immunobiologicals and Animal care'. The course is affiliated to the State Council of Vocational Training (SCVT), Himachal Pradesh.

• The Institute is currently involved in following activities:

- Production and supply of DTP group of vaccines.
- Production and supply of Yellow Fever Vaccine (the only one of its kind in Asia).
- Production and supply of Anti-sera preparations against Rabies, Snake venom, Tetanus and Diphtheria.
- Production and supply of Diagnostic reagents for diagnosis of infectious diseases e.g. cholera, enteric fever, brucella and rickettsial infection.
- National Regulatory Laboratory (Central Drugs Laboratory) for vaccine, sera and blood products.
- Surveillance activities related to *Salmonella* spp. and *Escherichia coli*. Rabies Research Centre.
- Surveillance activities related to Influenza – with a state of art BSL-3 Laboratory commissioned.
- Surveillance activities related to Poliomyelitis.
- State Level Lab. For COVID-19 testing
- Training students of various colleges and universities in production and testing of vaccines and sera.
- Academic courses affiliated to HP University – M.Sc. (Microbiology) and Ph.D. (Microbiology).
- Treatment Centre and well established Clinical Laboratory which caters to patients of CRI and the local population for Routine Pathology, Biochemical and Culture Sensitivity testing.

M.Sc. (Microbiology)

The Central Research Institute is involved in teaching since 1959. The Institute was recognized for the post graduate training (MD Pathology & Bacteriology). On the 17th of April 1961 the Institute was affiliated to Punjab University for conducting B.Sc. (Hons) and M.Sc. (Hons) courses in the subject of Microbiology. In 1973 the Institute was affiliated to Himachal Pradesh University for conducting B.Sc., M.Sc. and M.Phil. courses in Microbiology. A total of 297 thesis (M.Sc. and Ph.D. Microbiology) have been submitted since the inception of the courses. The Institute presently is recognized centre for M.Sc. (Micro), and it takes 20 students for M.Sc. (Microbiology) course out of which 15 seats are filled through combined entrance test conducted by Himachal Pradesh University and 5 seats are for in- service candidates.

For further details, visit website of Himachal Pradesh University

For further information, please contact:

Dr. Dr. Ajay Kumar Tahlan – Director

director-crik-hp@gov.in; tahlan.ak@gov.in

Dr. Subhadip Mahapatra – Coordinator Microbiology

Central Research Institute (CRI), Kasauli, Distt – Solan, HP

01792-273191, 272114, 272059 and 272060; Fax: 01792-272016, 272049

cric.academic@gmail.com

website: www.crikasauli.nic.in

8.3 Shoolini Institute of Life Sciences and Business Management (SILB), Solan

The Shoolini Institute of Life Sciences and Business Management (SILB), Solan was established in the year 2004 under the aegis of Foundation for Life Sciences and Business Management. The Institute aims to generate skilled human resource for future leadership positions in biotechnology, microbiology, food and fruit processing industries and research organizations. SILB aspires to sharpen the conceptual, personal and entrepreneurial skills of the students, and to train human resource for job opportunities in biotechnology and management. SILB has been set up in the serene and scenic environs of Solan (HP); an educational hub in Himachal Pradesh, and the 'Fastest Growing Metropolitan Hill Town in Asia'. The town located mid-way between Kalka and Shimla (45 km from Shimla and 75 km from Chandigarh), with pleasant summers (the temperature rarely rises above 30°C), occasional snow-fall, average rainfall of 1200mm and an altitude of 1,600 meters, is one of the district headquarters of Himachal Pradesh. It can be reached from Delhi (about 300 km) by train/ road *via* Chandigarh/ Kalka. Chandigarh and Shimla are the nearest airports.

Salient features:

- Graded 8th amongst private biotechnology Institutes of the country (Biospectrum Biotech Schools Survey, 2008).
- Only Private approved research institute in H.P. by the DSIRO (Department of Scientific Industrial and Research Organizations). GOI, New Delhi.
- Eighteen Gold Medalists and 135 rank holders in Himachal Pradesh University, Shimla. State of the art infrastructure facilities for teaching and research purposes.
- Special Coaching Cell for NET.
- Placement and Career Development Cell provides gainful engagements in Industries, educational Institutes or in pursuing higher education.
- Well qualified and dedicated faculty.
- Regular guest lectures are also organized so as to enable students to broaden their vision by interacting with learned scholars in their respective fields of specialization.

Courses offered:

- | | | |
|---------------------------------|-------------------------|--------------------------------|
| 1. B. Sc. (Hons.) Biotechnology | 2. M. Sc. Biotechnology | 3. B. Sc. (Hons.) Microbiology |
| 4. M. Sc. Microbiology | 5. M. Sc. Botany | 6. BBA (Hons.) |
| 7. M.Sc. Chemistry | | |

Laboratories: Well-equipped labs with equipment such as Thermocycler, UV-Vis Spectrophotometer, Fermenter, Gel documentation, system, ELISA plate reader, Deep freezers, Refrigerated Centrifuge, CO₂ Incubator, Hybridization oven, Inverted Microscope *etc.*

Library: Well stocked library with 7,000 Books, 38 Journals and 15 on-line journals.

IT Facilities: Two Information Technology Labs with 40 computers installed with latest hardware and software catering to the needs of the students. The campus is connected to all time high speed 4mbps Broadband and to National Knowledge Network via 2mbps connectivity and is fully WiFi.

Hostels: Separate well-furnished hostels for both boys and girls equipped with WiFi and 24X7 internet facilities.

CONTACT PERSON:

Dr. Mrs. Saroj Khosla (President)

Dr. Shalini Sharma - Director

Dr. Sushila Negi (Head Microbiology): 09418500071,

Dr. Meenu Thakur (Head Biotechnology): 09418859803

Shoolini Institute of Life Sciences & Business Management (SILB) (Affiliated to HP University, Shimla)

NAAC Accredited 'A' Grade University: Approved by UGC)

Anand Campus, Near Head Post Office, The Mall, Solan, Himachal Pradesh, PIN 173212

Phones; Enquiry: 01792-226674, 01792-226674, 093187 59522, 09418151616,

8.4 Gautam Group of Colleges, Hamirpur, HP

Gautam Group of Colleges at Hamirpur H.O. in Hamirpur, HIMACHAL PRADESH, are focused on acquiring knowledge rather than imparting knowledge wherein teachers act as facilitators. The learning process is made more enjoyable by adopting an unconventional methodology of education where students are encouraged to learn through research & model-making, leading to greater retention. Our aim is to ensure all-round development of the students personality. Gautam College offers various graduate and post graduate programmes like B.Com, B.Sc. (Med./Non Med.), B.B.A.,B.C.A., PGDCA, B.Sc. (Hon's), M.Sc. (Physics), M.Sc. (Chemistry), M.Sc. (Botany), M.Sc. (Microbiology), M.Sc. (Biotechnology), M.Sc. (Zoology), M.Sc. (Mathematics) and Bachelor of Hotel Management, M.A. English and Political Science. All these courses of Gautam College are affiliated to Himachal Pradesh University, Shimla. Vide Letter No. (B.Sc.)1-213/2000 - HP (ACAD) - 3222 dated 20/09/2000 for degree classes.

Well-equipped labs with equipment such as Thermocycler, UV-Vis Spectrophotometer, Deep freezers, Refrigerated Centrifuge, CO2 Incubator, Hybridization oven, Inverted Microscope etc. Well stocked library with Books, Journals and on-line journals. Two Information Technology Labs with 40 computers installed with latest hardware and software catering to the needs of the students. The campus is connected to all time high speed 4mbps Broadband and to National Knowledge Network via 2mbps connectivity and is fully WiFi., Separate well-furnished hostels for both boys and girls equipped with WiFi and 24X7 internet facilities.

Contact Details

GAUTAM GROUP OF COLLEGES

Near Bus Stand Hamirpur, Himachal Pradesh - 177001

1	Dr. Rajneesh Gautam	Principal/ Director	094180-10420
2	Mr. Arvind Sharma	Assistant Professor, HOD [M.Sc., NET, GATE,CISR (NET),ICAR (NET)]	088940-64799
3	Dr. Reena Kumari	Assistant Professor, M.SC., Ph.D.	09459538498
Phone: +91-9736391060, +91-9736991060, +91-9418010420, 01972-221493			
E-mail: ggchmr@gmail.com , Website: www.ggchmr.com			

9. Ragging in educational institutes and consequence(s)

The ragging of fresher/ newly admitted students under the M.Sc. Biotechnology/Microbiology two year courses is strictly banned in the Department of Biotechnology as well as in the Himachal Pradesh University campus or other private institutes affiliated to Himachal Pradesh University, Shimla. As per UGC directions issued vide letter No. F.1-9/2006 (CPP-II) dated 04th March 2008, addressed to the Registrar, Himachal Pradesh University, Shimla-171 005 in the light of Honorable Supreme Court of India's order(s) as contained in SLP [C] No. 2495/2006 in the matter of University of Kerala v/s Council of Principals, College of Kerala and others, the Apex court has expressed displeasure on the incidents of ragging in the Educational Institutions. The Report of Raghavan Committee constituted as per directions of the Supreme Court of India to give suggestions on means of prevention of ragging in Educational Institutions is already posted on UGC web site: www.ugc.ac.in. It has been impressed upon by the Hon'ble Supreme Court of India that henceforth in every prospectus relating to admission of the students in any Educational Institution, it shall be clearly stated that if any incidence of ragging comes to the notice of the authorities of Himachal Pradesh University, Shimla, the concerned student shall be given liberty to explain and if his/ her explanation is not found satisfactory, the candidate would be expelled/ rusticated from the institution.

1. Prevention of forced obstructions of teaching classes in the institutes

The Honorable High Court of Himachal Pradesh observed during the hearing of the case entitled "Anjana Chauhan v/s State and other" on dated 12-03-2007 that no respondent/ person can be allowed to disturb the students pursuing their studies and prevent them from attending the classes. The students admitted under the Biotechnology/Microbiology Program in its affiliated Private Insti-

tution if found indulging in any unlawful activities or creating indiscipline will be strictly dealt with as per existing law of the State as well as University Ordinances. Maintaining the conducive and congenial atmosphere in the University/ educational institutes is the responsibility of all the admitted/ bonafide students.

2. Fee, caution money, library security refund etc.

- i. In the light of a notification issued by University Grants Commission, New Delhi vide F. No. 1-3/2007(CPP-II) dated April 23, 2007 regarding Institutions and Universities including institutions deemed to be Universities that are admitting students to various programs of studies long before the actual starting of academic session; collecting full fee from the admitted students; and retaining their school/ institution leaving certificates in original. The institutions and Universities are also reportedly confiscating the fee paid if a student fails to join by such dates
- ii. The Commission is of the view that Institutions/ Universities by way of retaining the certificates in original, force retention of admitted students which limits the opportunities for the candidates from exercising other options of joining other institutions of their choice. However, it would not be permissible for institutions and universities to retain the School/ Institution Leaving certificate(s), mark sheet(s), caste certificate and other documents in original.
- iii. The Ministry of Human resource development and University Grants Commission have considered the issue and decided that the institutions and Universities, in the public interest, shall maintain a wait list of the students/ candidates. In the event of a student/ candidate withdrawing before the starting of the course, the waitlisted candidate should be given admission against the vacant seat. The entire fee collected from the student, after a deduction of the processing fee of not more than rupees one thousand (Rs. 1000/-) only be made and the remaining amount shall be refunded and returned by the institution/ University to the student/ candidate withdrawing from the programme. Should a student leave after joining the course and if the seat consequently falling vacant has been filled by another candidate by the last date of admission, the institution must return the fee collected with proportionate deductions of monthly fee and proportionate hostel rent, where ever applicable.
- iv. The UGC, New Delhi has desired that all Universities/ Institutions must abide by the instructions issued as above. The UGC on its own or on receipt of specified complaints from those affected shall take all such steps as may be necessary to enforce these directions.
- v. The security deposits like caution money, library security *etc.* initially deposited by the admitted student/ candidate will be refunded to him/ her after the completion of the tenure [2 years for M.Sc. Biotechnology and 3 years for B.Sc. (Hons.) Biotechnology] of the course. In case an admitted student/ candidate leaves the course in between, for what so ever reason without depositing the fee for the current academic session/ year; the whole of the deposited caution money, library security *etc.*, shall be confiscated.
- vi. The candidate for what so ever reason, if intends to leave the course after completion of one year, and before the start of the next semester [M.Sc. Biotechnology/ Microbiology]/ academic year [B.Sc. (Hons.) Biotechnology/Microbiology] shall inform the Principal/ Director/ Coordinator of the concerned institution in written with due approval of his/ her parents.

Model / Sample Questions

MODEL QUESTION PAPER FOR M. Sc. BIOTECHNOLOGY ENTRANCE EXAMINATION-2020

The question paper for M.Sc. Biotechnology Entrance Examination 2020 will be of 100 marks. The paper shall contain a total of 100 multiple- choice questions of one mark each. The Examiner will set 20 questions from each of the following sections and the candidate shall attempt all these questions by putting an appropriate choice on the OMR answer script/ sheet. These shall be no negative marking in the entrance examination. The duration of entrance Test shall be of 1 hour and 30 minutes.

Section A: Cell Biology & Microbiology

1. Which cellular organelles are also known as 'Suicide bags'?
(A) Mesosomes (B) Carboxysomes
(C) Ribosomes (D) Lysosomes
2. Which bacterial cells produce cord factor that accounts for their pathogenicity?
(A) *Escherichia coli* (B) *Staphylococcus aureus*
(C) *Mycobacterium tuberculosis* (D) *Salmonella typhi*
3. Which bacterial genus produces exospores?
(A) *Clostridium* (B) *Methylosinus*
(C) *Bacillus* (D) *Lactobacillus*
4. Which mammalian virus causes fatal hemorrhagic disease in humans?
(A) Rabies (B) Hepatitis B
(C) Ebola (D) HERPES

Section B: Basic Biochemistry & Instrumental Techniques

5. Which compound is a potent inhibitor of serine proteases?
(A) Protamine (B) EDTA
(C) PMSF (D) DMSO
6. Which of the followings is a basic amino acid?
(A) Glycine (B) Aspartic acid
(C) Lysine (D) Proline
7. Who built the first Transmission Electron Microscope?
(A) Ernst Abbe (B) Kohler and Milstein
(C) Steven Spielberg (D) Ernst Ruska
8. Which of the followings is an example of scanning probe microscope?
(A) Magnifying microscope (B) Atomic Force Microscope
(C) Compound microscope (D) Transmission electron microscope

Section C: Industrial & Bioprocess Technology

9. What is a biotransformation?
(A) A reaction of organic compounds by enzyme(s).
(B) A reaction of organic compounds by whole cells.
(C) A reaction of organic compounds in organic medium.
(D) A reaction of organic compo by either enzyme or whole cells.
10. Which term is most suitable to refer to the synthetic insecticides, pesticides and herbicides?
(A) Disinfectants (B) Xenobiotics
(C) Antibiotics (D) Antiseptics
11. Which term refers to the maximum number of substrate molecules converted to product per unit time per active site of an enzyme?
(A) k_{cat} (B) K_M
(C) K_s (D) T_m

12. Which technical term is used to refer to the concept that the idea is new and 'not a logical extension of prior work' even to a person skilled in that particular field while filing a patent?
- (A) Novel (B) Useful
(C) Nonobviousness (D) Unique

Section D: Fundamentals of Genetics & Molecular Biology

13. What shall be the concentration of the DNA in micrograms/ml if A_{260} of the solution is 0.5?
- (A) 100 (B) 50
(C) 25 (D) 10
14. Which term is used to describe a series of extremely rapid mitotic divisions in the zygote that forms a blastocyst?
- (A) Embryogenesis (B) Implantation
(C) Cleavage (D) Amniocentesis
15. Which anticancer drug binds microtubules leading to inhibition of mitotic spindles and cell death?
- (A) Colcimid (B) Taxol
(C) Puromycin (D) Oubain
16. What is the basis of separation of plasmid molecules in isopycnic density gradient centrifugation?
- (A) Their Mr
(B) Their shape(s)
(C) their fibrous nature
(D) Their densities
17. The enzymes that differ in electrophoretic mobilities as a result of allelic differences in a single gene are known as
- (A) Abzymes (B) Allozymes
(C) Isozymes (D) Holozymes

Section E: Plant & Animal Tissue Culture Techniques

18. Who attempted the *in vitro* culture of frog tissue for the first time that led to the development of concept of animal tissue culture techniques?
- (A) O' Bredel (B) Ross Harrison
(C) Alex Carrel (D) Robert Koch
19. Which classical term refers to the 'lifetime limit' of a mammalian cell-line?
- (A) Growth limit (B) Senescence
(C) Hayflick limit (D) Apoptosis
20. Which plant tissue possesses totipotency?
- (A) Parenchymal tissue (B) Meristematic tissue
(C) Phloem (D) Xylem
-

**FORMS FOR COUNSELING
FOR
M.Sc. BIOTECHNOLOGY
COURSE**

FORM No. 1A

For official use only. Serial No. assigned:

ADMISSION FORM FOR M.Sc. BIOTECHNOLOGY COURSE FOR SESSION 2020-2021

Note: This form shall be carried in person by the candidate for submission to the Counseling Committee on the day of counseling.

M.Sc. Biotechnology						Affix a recent self attested photograph
The candidate shall give the choice of institute for his/ her admission in the following order:						
1 st choice	2 nd choice	3 rd choice	4 th choice	5 th choice	6 th choice	

FOR OFFICIAL USE ONLY

Course applied for	Eligibility	Category applied	Choice of institutes	Deficiency if any
Biotechnology				
Signature(s) of the committee members:→			Coordinator	Member

TO BE FILLED BY THE CANDIDATE IN HIS/ HER OWN HANDWRITING

1	Name of the candidate in capital letters:			
2	Name of the candidate in capital letters:			
3	Guardian's name (If applicable)			
4	Marks secured in Entrance Test-2020	Course	Roll No.	Marks
5	Sex [Male/ Female/ TG]			
6	Date of birth			
7	Age as on 1 st July 2020			
8	Are you a bonafide resident/ domicile of Himachal Pradesh [Yes or No.]			
9	Address for correspondence in capital letters along with PIN code			
10	Permanent home address in capital letters along with PIN code			
11	Personal contact information	Mobile number(s):		
		Email ID:		

12	Detailed marks obtained in the qualifying examination [10+2+3]	S. No.	Subject	Marks obtained	Maximum marks	Percentage
		1				
		2				
		3				
		4				
		5				
Total marks:						
13	i. Have you passed qualifying examination from a recognized Institute/ University situated in the state of Himachal Pradesh?					
	ii. What is the name of the recognized Institute/ University with place and name of the Board/ University from where you have passed the qualifying examination?					
14	Important documents to be attached and submitted by the candidate with this form at the time of counseling.		<p>i. A certificate of having passed qualifying examination under 10+2+3 pattern as per eligibility criteria of the course applied for.</p> <p>ii. Matriculation/ Higher Secondary Part-I/ Indian School Certificate showing the date of birth. No other certificate in respect of date of birth will be <u>entertained</u>.</p> <p>iii. A certificate of good conduct and character issued by the Principal/ Director/ Head of the institution last attended by the candidate in original.</p> <p>iv. A certificate of passing the qualifying examination from the recognized institution showing the location of institute in the State of Himachal Pradesh.</p> <p>v. Himachal Pradesh State bonafide/ domicile certificate.</p> <p>vi. SC/ ST/ PH/ SGC/ J&K domicile (If applicable)/ Cultural Activity/ Sports Activity certificate issued by the competent authority.</p> <p>vii. Any other certificate you deem fit to be attached.</p> <p>viii. Bring all the above documents in original at the <u>time of counseling along with a complete set of self-attested photo copies of the above documents.</u></p> <p>ix. Admit card of Entrance examination issued by the Himachal Pradesh University.</p>			

I further certify that particulars as furnished by me as above are correct and are the same as filled in the Application Form [FORM 1] submitted to the University along with my complete application. In case any of the information's and/ or documents are found false/ or different at any time, my candidature is liable to be cancelled and I shall have no claim for admission on the basis of Entrance Test-2020 to the Himachal Pradesh University/ or any of its affiliated institutions

Place:

(Signatures of the candidate)

Date:

I hereby certify that the information's as above provided by the candidate are true to best of my knowledge and belief.

Name of the parent:

(Signatures of the parent)

Note: This form shall be carried in person by the candidate for submission to the Counseling Committee on the day of counseling.

UNDERTAKING BY THE CANDIDATE

Affix a recent self-
attested photograph

Name of the candidate: [Mr./ Ms.]

Category: General ST SC SGC EB*
 OSP OSA PH JK

[Circle the one that is applicable]

Date of Birth: (Day/Month/Year) Sex: Male/ Female/ TG Age: years

Name of the Institute/ College and place from where Bachelor's degree has been passed:

.....

Percentage of marks: Matric:% 10+2:% B.Sc.:%

Father's name: Father's occupation:

Gross annual salary: Rupees Per-

manent home address

..... Tel-

ephone with STD code: Mobile:

Email: [The working mobile/ email shall be provided!] Address

for correspondence (if different from above):

..... Tele-

phone with STD code: Mobile:

I Mr./ Mshereby testify that the above information given in the Form 2A is true to the best of my knowledge and belief. In case of my selection/ admission after counseling in any of the institutes affiliated to HPU/ HPU, Shimla running Microbiology courses, I shall abide by the rules and regulations of the institute/ Ordinances of Himachal Pradesh University, and shall take every precaution to maintain utmost discipline in the campus. I shall also desist from any form of ragging in the class/ institute or outside of my juniors the consequences of which I have known. I shall deposit the Self-finance fee/ University fee *etc.* in time as notified by the institute from time to time.

Date:

(Signature of the candidate)

[Name & Signature of the parent(s)]

Date:

Mother:

Father:

***EB: Economically Backward candidates whose family annual income from all sources is less than Rs. 8.0 lakhs.**

FORMS FOR COUNSELING

FOR

**M.Sc. MICROBIOLOGY
COURSE**

ADMISSION FORM FOR M.Sc. MICROBIOLOGY COURSE FOR SESSION 2020-2021

Note: This form shall be carried in person by the candidate for submission to the Counseling Committee on the day of counseling.

M.Sc. Microbiology						Affix a recent self attested photograph
The candidate shall give the choice of institute for his/ her admission in the following order:						
1 st choice	2 nd choice	3 rd choice	4 th choice	5 th choice	6 th choice	

FOR OFFICIAL USE ONLY

Course applied For	Eligibility	Category applied	Choice of institutes	Deficiency if any
Microbiology				
Signature(s) of the committee members:→			Coordinator	Member

.....
TO BE FILLED BY THE CANDIDATE IN HIS/ HER OWN HANDWRITING

1	Name of the candidate in capital letters:			
2	Name of the candidate in capital letters:			
3	Guardian's name (If applicable)			
4	Marks secured in Entrance Test-2020	Course	Roll No.	Marks
5	Sex [Male/ Female/ TG]			
6	Date of birth			
7	Age as on 1 st July 2020			
8	Are you a bonafide resident/ domicile of Himachal Pradesh [Yes or No.]			
9	Address for correspondence in capital letters along with PIN code			
10	Permanent home address in capital letters along with PIN code			
11	Personal contact information	Mobile number(s): Email ID :		

12	Detailed marks obtained in the qualifying examination [10+2+3]	S. No.	Subject	Marks obtained	Maximum marks	Percentage
		1				
		2				
		3				
		4				
		5				
Total marks:						
13	i. Have you passed qualifying examination from a recognized Institute/ University situated in the state of Himachal Pradesh?					
	ii. What is the name of the recognized Institute/ University with place and name of the Board/ University from where you have passed the qualifying examination?					
14	Important documents to be attached and submitted by the candidate with this form at the time of counseling.		i. A certificate of having passed qualifying examination under 10+2+3 pattern as per eligibility criteria of the course applied for. ii. Matriculation/ Higher Secondary Part-I/ Indian _____ School Certificate showing the date of birth. No other certificate in respect of date of birth will be entertained. iii. A certificate of good conduct and character issued by the Principal/ Director/ Head of the institution last attended by the candidate in original. iv. A certificate of passing the qualifying examination from the recognized institution showing the location of institute in the State of Himachal Pradesh. v. Himachal Pradesh State bonafide/ domicile certificate. vi. SC/ ST/ PH/ SGC/ J&K domicile (If applicable)/ Cultural Activity/ Sports Activity certificate issued by the competent authority. vii. Any other certificate you deem fit to be attached. viii. Bring all the above documents in original at the time of counseling along with a complete set of self-attested photocopies of the above documents. ix. Admit card of Entrance examination issued by the Himachal Pradesh University.			

I further certify that particulars as furnished by me as above are correct and are the same as filled in the Application Form [FORM 1] submitted to the University along with my complete application. In case any of the information's and/ or documents are found false/ or different at any time, my candidature is liable to be cancelled and I shall have no claim for admission on the basis of Entrance Test-2020 to the Himachal Pradesh University/ or any of its affiliated institutions

Place:

(Signatures of the candi-

date) Date:

I hereby certify that the information's as above provided by the candidate are true to best of my knowledge and belief.

Name of the parent:

(Signatures of the parent)

Note: This form shall be carried in person by the candidate for submission to the Counseling Committee on the day of counseling.

UNDERTAKING BY THE CANDIDATE

**Affix a recent self-
attested photograph**

Name of the candidate: [Mr./ Ms.]

Category: General ST SC SGC EB*
 OSP OSA PH JK

[Circle the one that is applicable]

Date of Birth: (Day/Month/Year) Sex: Male/ Female/ TG Age: years

Name of the Institute/ College and place from where Bachelor's degree has been passed:

.....

Percentage of marks: Matric:% 10+2:% B.Sc.:%

Father's name: Father's occupation: Gross

annual salary: Rupees Permanent

home address

.....

Telephone with STD code: Mobile:

Email [The working mobile/ email shall be provided!]

Address for correspondence (if different from above):

..... Tele-

phone with STD code: Mobile:

I Mr./ Ms hereby testify that the above information given in the Form 2A is true to the best of my knowledge and belief. In case of my selection/ admission after counseling in any of the institutes affiliated to HPU/ HPU, Shimla running Microbiology courses, I shall abide by the rules and regulations of the institute/ Ordinances of Himachal Pradesh University, and shall take every precaution to maintain utmost discipline in the campus. I shall also desist from any form of ragging in the class/ institute or outside of my juniors the consequences of which I have known. I shall deposit the Self-finance fee/ University fee *etc.* in time as notified by the institute from time to time.

Date:

(Signature of the candidate)

Date:

Mother:

[Name & Signature of the parent(s)] Father:

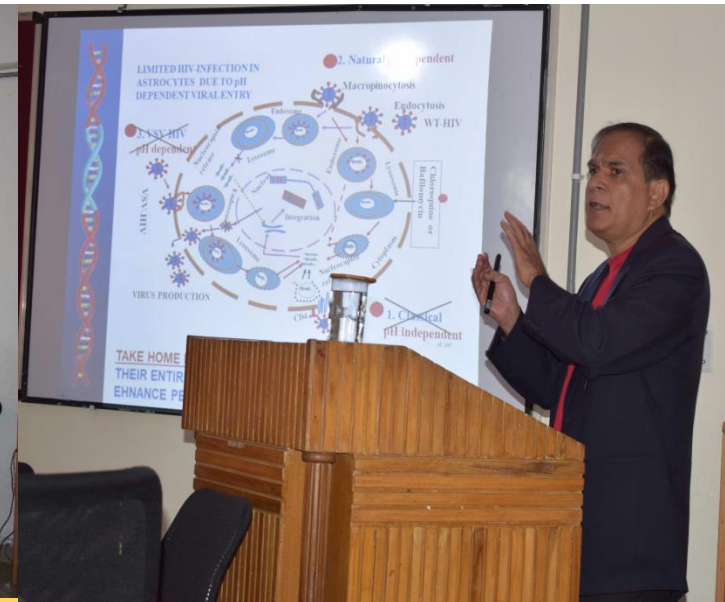
***EB: Economically Backward candidates whose family annual income from all sources is less than Rs. 8.0 lakhs.**

Biotechnology Infrastructure at HP University



Teaching and Research Labs





Conferences/ workshops/ Special Lectures



Biotechnology Incubation Centre (BIC-HPU)

Awareness workshop for research scholars to pursue entrepreneurship



IMPORTANT CONTACT PHONE/ FAX NUMBERS
(HPU – Shimla)

S. No.	Dignitary	EPBAX*	Phone/ Fax
1	Vice Chancellor	500	0177- 2831363
2	Dean of Studies	667	0177- 2830922
3	Dean Students' Welfare	722	0177- 2830926
4	Registrar	511	0177- 2830912
5	Controller of Examination	551	0177- 2830911
6	Finance Officer	480	0177- 2830913
7	Deputy Registrar (Academics)	521	0177- 2830890
8	Assistant Registrar (Entrance Tests)	587	0177- 2830891
9	Public Relations Officer	538	0177- 2831396
10	Chairman, Department of Biotechnology, H. P. University, Shimla	800	0177- 2831948
11	Examination Reception (Enquiry)	555	0177 - 2833555
12	Forms Inquiry	515	
14	Director, Central Research Institute, Kasauli, Solan (HP)	01792-272114	01972- 272016
15	Director, Shoolini Institute of Life Sciences & Business Management (SILB), Solan (H.P.)	-	01792-226674 01972- 226364
16	Director, Gautam Group of Institutes, Hamirpur, HP	094180-10420	01972-221493 01972- 223557

Prefix '2833' if calling from outside Shimla. Say one has to contact the Registrar, please dial phone number 0177-2833511

