HIMACHAL PRADESH UNIVERSITY
SUMMER HILL, SHIMLA-171 005
(SESSION 2015-2016)

PROSPECTUS FOR

ADMISSION TO

M.Sc. BIOTECHNOLOGY

and

M.Sc. MICROBIOLOGY
## Contents

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### M.Sc. Biotechnology

- FORM 1 [APPLICATION FORM]
- FORM 2A [ADMISSION FORM]
- FORM 2B [UNDERTAKING BY CANDIDATE/ PARENT]
- FORM 3 [IDENTIFICATION CARD-BIOTECHNOLOGY]
- FORM 4 [ADMIT CARD-BIOTECHNOLOGY]
- Self-address information sheet

### M.Sc. Microbiology

- FORM 1 [APPLICATION FORM]
- FORM 2A [ADMISSION FORM]
- FORM 2B [UNDERTAKING BY CANDIDATE/ PARENT]
- FORM 3 [IDENTIFICATION CARD-MICROBIOLOGY]
- FORM 4 [ADMIT CARD-MICROBIOLOGY]
- Self-address information sheet

✿ Important Contact phone/ Fax numbers of the participating institutes

**Important:** The candidates who intend to appear in both M.Sc. Biotechnology as well as M.Sc. Microbiology Entrance Test-2015 shall fill FORMS of both the courses.
1. **Last date for receipt of Application form(s) for**
   Entrance Test of M.Sc. Biotechnology/ Microbiology
   In the Office of Chairman, Department of Biotechnology,
   Himachal Pradesh University, Summer Hill, Shimla-171 005
   **08-05-2015**

2. **Date of Entrance Examinations**
   - M.Sc. Microbiology: 23-05-2015 (2.00 PM)

3. **Venue of Entrance Test**
   H.P.U. Campus (Shimla), as per allotted Centre mentioned on the Admit Card

4. **Tentative date of declaration of result/ merit list**
   - M.Sc. Biotechnology: On or before 16.06.2015
   - M.Sc. Microbiology: On or before 16.06.2015

5. **Date & place of counseling**
   The date and place of counseling of the candidates (in order of merit) is mentioned below. 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 at H. P. University Auditorium: 02.07.2015 10.30 AM
   - M.Sc. Microbiology at H. P. University Auditorium: 02.07.2015 10.30 AM

   **Start of session**
TIME SCHEDULE FOR ENTRANCE EXAMINATIONS


(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


(a) Center of examination as indicated on the Admit Card
(b) Entry in the Examination Hall 1:30 PM
(c) Distribution of question booklet and answer sheet 1:50 PM
(d) Test commencement 2:00 PM
(e) Latest entry in the examination hall 2:30 PM
(f) Test conclusion 3:30 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
Writing of particulars and responses on the OMR ANSWER 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. Candidates not complying with the instructions shall be disqualified.
2. In case any candidate does not receive Roll number Card/ Admit Card by post before three days of the date of commencement of the Entrance Examination then he/ she can confirm his/ her Roll Number and Examination Center to collect a Roll Number/ duplicate Admit Card from the Office of the Chairman, Department of Biotechnology, Himachal Pradesh University, Summer Hill, Shimla-171 005 during office hours (11.00 AM to 3.00 PM). He/ She will have to provide sufficient proof(s) that he/ she has submitted the application form to The Chairman, Department of Biotechnology, Himachal Pradesh University, Shimla well in time, along with a request letter and a photograph duly attested by a Gazetted Officer.

IMPORTANT INSTRUCTIONS

1. Please ensure that the candidates appearing for the Entrance Examination for admission to M.Sc. Biotechnology OR M.Sc. Microbiology are using the correct application forms as prescribed for category concerned.
2. Write your corresponding/ present postal address carefully and legibly. Please note that all correspondence will be made on the address given for correspondence only.
Therefore, the address for correspondence should be same on the Application form, Identification Card, Admit card etc.

3. The Form 1, Form 3 & Form 4 along with the self-addresses sheet shall be submitted in the office of Chairman, Department of Biotechnology, Himachal Pradesh University, Shimla-171 005 along with the fee [in the form of a draft payable to Coordinator Microbiology Program, HPU, Shimla].

4. The candidate shall bring Form 1A and Form 1B along with attested copies of the relevant certificates on the day of counseling.

5. The candidate must also note down for his/ her own future reference the Application Form number and Examination Roll number (if applicable) to be allotted by the University for future correspondence including name of Examination Center, Category etc.

6. The candidates shall submit their application forms complete in all respect in the prescribed envelope either in person or by Registered/ Speed Post to The Chairman, Department of Biotechnology, Himachal Pradesh University, Summer Hill, Shimla-171 005 on or before the last date prescribed in the prospectus.

7. In case of any doubt, you may inquire personally or on phone 0177-2831948.

8. Incomplete application forms or application(s) filled in a language other than English is liable to be rejected.

9. The draft amount once submitted along with the application is not refundable in any case.

10. The candidate will retain Admit Card duly initiated by the invigilator after the completion of the Entrance Test.

11. All matters and disputes related to admissions to M.Sc. Biotechnology or M.Sc. Microbiology Entrance Test-2015 are subject to legal jurisdiction of courts in Shimla only.
IMPORTANT INSTRUCTION TO BE FOLLOWED IN THE EXAMINATION HALL

1. The correct answer against each question number 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;

<table>
<thead>
<tr>
<th>Wrong markings</th>
<th>Correct marking</th>
</tr>
</thead>
<tbody>
<tr>
<td>.  √  ×  o  ●</td>
<td></td>
</tr>
</tbody>
</table>

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 mishandled 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 Entrance Examination – 2015 will be supplied by the Centre Superintendent/ Invigilator in the Examination Hall.
1. INTRODUCTION

The Himachal Pradesh University, Summer Hill, Shimla will conduct process of admission of candidates to the M.Sc. Microbiology for its campus and affiliated private institutions and M.Sc. Biotechnology courses to be offered only at its affiliated institutions. The candidates will be admitted to the following programs during the academic session 2015-2016. The seats under M.Sc. Biotechnology and M.Sc. Microbiology programmes are currently available at various institutions as mentioned in Table 1. An entrance examination for the eligible candidates shall be conducted for admission under these courses.

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. The number of seats in the aforesaid courses is given below. 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. As the process of inspection/affiliation of a few other institutions who have proposed to start M.Sc. Biotechnology and/or M.Sc. Microbiology at their respective institutes is underway, the number of seats mentioned below may vary as per directions of the committee(s)/ Registrar/ Vice Chancellor, HPU, Shimla.

Table 1: Number and distribution of seats under different courses.

<table>
<thead>
<tr>
<th>Institutes</th>
<th>M.Sc. Biotechnology</th>
<th>M.Sc. Microbiology</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Department of Biotechnology*, H. P. U. Shimla (H.P.)</td>
<td>Nil</td>
<td>30+02 [JK]+01 [SGC]</td>
</tr>
<tr>
<td>2 Shoolini Institute of Life Sciences &amp; Business Management, Solan (H.P.)</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>3 Bhojia Institute of Life Sciences, Budh, Nalagarh (H.P.)</td>
<td>35</td>
<td>40</td>
</tr>
<tr>
<td>4 Himachal Institute of Life Sciences, Poanta (H.P.)</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>5 Central Research Institute**, Kasauli, Solan (H.P.)</td>
<td>Nil</td>
<td>05 (+05 In-service candidates)</td>
</tr>
<tr>
<td>6 Gautam Girls College, Hamirpur (H.P.)</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td><strong>Total seats available</strong></td>
<td>145</td>
<td>188 + 05**</td>
</tr>
</tbody>
</table>

*Two seats will be available for Jammu & Kashmir domicile candidates and one seat will be available for Single Girl Child.

**The in-service non-teaching category employee shall fulfill the eligibility criteria as per “Additional leave rules for employees in category B, C & D PART-C [Vol-II First Ordinances of HPU, Shimla]” as applicable to the Himachal Pradesh State Government employees. In-service candidates shall submit their candidature before the last date [May 08, 2015] by filling the application forms in the prospectus and shall also appear in the Entrance Test.

All the seats under Biotechnology/ Microbiology programs shall be filled from the merit list of Entrance Test-2015. **No separate merit list shall be prepared for the non-Himachali candidates.**

Note:

a) 15% and 7.5% of the total seats shall be reserved for bonafide Himachal Scheduled Caste and Scheduled Tribes candidates respectively who have passed the qualifying examination from HPU or from any other Universities 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 Himachal Pradesh University or Himachal Pradesh Krishi Vishvodayalaya or Dr. Y. S. Parmar University of Horticuture 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. 3% of the seats shall be reserved for Persons with Disabilities [PwD]

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

Bonafide Himachali/ Himachal Pradesh Domicile mean 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 OF SEATS

(2.1) Educational qualification for M.Sc. Biotechnology

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 category 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 with any of the subjects i.e. 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 but whose results have so far not been declared can also apply but their eligibility for the entrance test will be purely provisional subject to the condition that they have to produce passing certificate scoring the percentage at least prescribed there to in the qualifying exams 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 2015. 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, 22.5 percent of the seats shall be reserved for Schedule Castes (15%) and Schedule Tribes (7.5%). These candidates must however, qualify in 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.

One supernumerary seat at H.P.U. campus (M.Sc. Microbiology), Shimla shall be available for a 'Single girl child' having a Himachal Pradesh bonafide/ domicile certificate (Notification No. 1-15/2010/HPU (DS) dated March 10, 2010). This shall be in addition to the existing 30 seats available at HP University.

Two additional seats for Jammu & Kashmir domicile candidates have been approved in each of the courses being run at HPU, Shimla in the EC meeting held on March 31, 2015.

(2.5) Category wise distribution of seats and fee structure

(2.5.1) M.Sc. Biotechnology

The total number of seats is 145 in M.Sc. Biotechnology course with the following distribution and tuition fee structure.

<table>
<thead>
<tr>
<th>Category</th>
<th>Number of seats</th>
<th>Tuition fee* per annum</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gen</td>
<td>SC</td>
</tr>
<tr>
<td>Total seats</td>
<td>112</td>
<td>22</td>
</tr>
</tbody>
</table>

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

(2.5.2) M.Sc. Microbiology

The total number of seats is 188 in M.Sc. Microbiology course with the following distribution and tuition fee structure.

<table>
<thead>
<tr>
<th>Category</th>
<th>Number of seats</th>
<th>Tuition fee* per annum</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gen</td>
<td>SC</td>
</tr>
<tr>
<td>Total seats</td>
<td>143</td>
<td>28</td>
</tr>
<tr>
<td>*Supernumerary seat for a Single Girl Child available at H.P.U. campus only</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Two seats for Jammu &amp; Kashmir domicile candidates available at H.P.U. campus only.</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

(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
   01. Continuation fee  1,000.00
   02. Sports fee  100.00
   03. Medical fee  100.00
   04. Holiday Home fee  100.00
   05. Student aid fund  100.00
   06. Youth welfare fund  100.00
   07. Identity card fee  100.00
   08. Breakage fee  1,000.00
   09. Annual dinner charges  500.00
   10. Cultural activities fund  50.00
   11. Common Room charges  50.00

d) Monthly charges
   1. Dilapidation  10.0
   2. Amalgamated fund  100.00
   3. Population education fee  10.0

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
   01. Admission fee  100.00
   02. Sports fee  100.00
   03. Central Library security  300.00
   04. HPU Caution fee  300.00
   05. Cultural Activities fee  50.00
   06. Poor Students Aid fund  50.00
   07. Tuition fee  2400.00
   08. Dilapidation fee  120.00
   09. 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

---------------------------------------------------------------------------------------------
Total charges:  6080.00
Other University Charges

HPU Green Environment Club fee/ annum 100.00

c) 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.
   2. University Registration fee
      a) Non HPU registered candidates 111.00

(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].

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. 65,000 for the second year of M.Sc. Microbiology shall be deposited by July 07, 2015 without late fee. Otherwise a Late fee of Rs. 1000 shall be charged till July 21, 2015

(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. 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 additionally charged for the next fifteen days, failing to meet this dead line will automatically cause the name of the student to be struck off from the rolls.
3. Fee once deposited shall not be refunded ordinarily (Refer to Clause 14). 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 chose only one category in which he/she is eligible and intends to seek admission. Category once opted will not be allowed to be changed. In case a candidate darkens more than one category or has left the category column blank in the Application Form. In such a case he/she shall be treated under General Category students. The category codes are given under “Guidelines to fill application form column wise”.

3. Pattern/Syllabus of Entrance Examinations

3.1 M.Sc. Biotechnology

The question paper for M.Sc. Biotechnology Entrance Examination 2015 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 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, Kreb’s cycle, glycogen, 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 polyplody 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 2015-2016 will consists 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. These 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 2015-2016 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 2015-2016

NOTE: The question paper for M.Sc. Microbiology Entrance Examination 2015-2016 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 1 hour and 30 minutes.

General Microbiology: History of microbiology, general account of bacteria, mycoplasma and viruses; ultra-structure of eu karyotic 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, Kreb’s cycle, glyco genesis, 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 (Spirullina, Oscillatoria, Anabaena), Chlorophyceae (Volvox, Oedogonium), Bacillariophyceae (Diatoms), Xanthophyceae (Voucheria), Pheophyceae (Actocarpus), Rhodophyceae (Polysyphonia). General characters, classification and economic importance, important features and life history of Mastigomycotina (Albugo, Phytophthora), Zygomycotina (Rhizopus), Ascomycotina (Sacchromyces and Neurospora), Basidiomycotina (Puccinia and Agaricus) and Deuteromycotina (Cercospora and Coletotrichum).

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 who were considered under M.Sc. Biotechnology and M.Sc. Microbiology Entrance Test-2015 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 website 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-2015 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-2015, 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 2015 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 on the OMR 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 deposition 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 carefully and fill up the application forms given in the prospectus, along with the Identification card and Admit card with blue/ black ballpoint pen.

5.2 No column of application forms shall be left blank. Any overwriting, erasing etc. in the application form may lead to rejection of candidature.

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-held by the University under any circumstances for those candidates who are unable to appear in M.Sc. Biotechnology/ Microbiology Entrance Test 2015 on the schedule date and time.
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.

The OMR sheet will be distributed along with the Question Booklet. The candidates are advised to go through instructions given in the question booklet and be conversant with the requirement of giving particulars and marking the answers on the OMR sheet, so that during the examination they could do so without any difficulty and without making any mistake or loss of time.

The OMR answer sheet used will be of special type, which will be scanned on optical scanner. There will be only one side of the answer sheet for marking correct answer(s).

The candidate must ensure that the answer sheet is not folded. He/She should not make any stray marks on it.

The candidate will bring his/her own materials such as ballpoint (blue/black) pens and HB pencil etc., in the examination hall.

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.

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 ballpoint pen only.

Write and mark your Roll number as per specimen answer sheet Annexure-II for example Roll No. 123567.

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) Coxiella burnetii
(B) Mycobacterium tuberculosis
(C) Corynebacterium diptheriae
(D) Staphylococcus aureus

The correct response to the question is (A) Coxiella burnetii.

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

A [Black] B C D

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

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.

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.
5.16 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.

5.17 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.

5.18 Carrying and use of a mobile phone are strictly prohibited inside the examination hall.

5.19 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 on the cover page of the question booklet with ballpoint pen only he/she will deal with the booklet 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 card of the candidate to satisfy himself/herself about the identity of each candidate. The candidate will retain card after the examination is over. The invigilator will also put his/her signature in the place provided on the OMR Answer sheet.
(v) The candidate shall bring their own ballpoint pen, HB pencil, sharpener and eraser of good quality. The University will not supply these items.
(vi) 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.
(vii) 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.
(viii) The candidate will check and ensure that the Question booklet supplied to him/her 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.

6. APPLICATION

6.1 Application form(s) for entrance test placed in the prospectus shall be complete and duly filled by the candidate in his/her handwriting in all respects. The completely filled application form with appropriate enclosures if any must be sent to the Chairman/Coordinator, Department of Biotechnology, Himachal Pradesh University, Summer Hill, Shimla-171 005 preferably by Registered post/Speed post or shall be submitted in person in his office by the prescribed last date, as notified in the prospectus. The photograph which will be affixed on the Application form, Identification card and Admit card should be same; the photograph(s) as well as appended testimonials shall be self-attested. In case the candidate submits Application form, Identification card and Admit card without getting his/her photograph self-attested as mentioned above, the application form may be rejected by the screening committee. Hence, it shall be the sole responsibility of the candidate to comply with the instructions as above.
An apprehension that may arise while self-attesting the documents is “What if any person gives a false or incorrect declaration?” In this context a reference is invited to Section 199 and 200 of the Indian Penal Code which is sufficient to allay such apprehensions. For ready reference the same are reproduced below;

Section 199: False Statement made in declaration which is by Law receivable as evidence.

“Whoever, in any declaration made or subscribed by him, which declaration any court or Justice, or any public servant or other person, is bound or authorized by law to receive as evidence of any fact, makes any statement which is false, and which he either knows or believes to be false or does not believe to be true, touching any point material to the object for which the declaration is made or used, shall be punished in the same manner as if he gave False Evidence.”

Section 200: Using as true such declaration knowing it to be false.

“Whoever corruptly uses or attempts to use as true any such declaration, knowing the same to be false in any material point, shall be punished in the same manner as if he gave False Evidence.”


6.2 The application form must be accompanied by the following documents in the separate envelope.

Please place the application form in envelop as prescribed.

(ii) Identification card as given in the prospectus
(iii) Admit card as given in the prospectus
(iv) A self-addressed sheet of stickers, as given in the prospectus.

(Please place the above documents (i) to (iv) in the envelope mentioning in bold letters “Application for M.Sc. Biotechnology Entrance Test-2015” or “Application for M.Sc. Microbiology Entrance Test-2015” [Whichever is applicable].)

6.3 Checklist for dos and don’t

I. The applicant must ensure that course applied for i.e. M.Sc. Biotechnology or M.Sc. Microbiology is written in bold letters on the top of envelopes, along with other forms and self-addressed sheet.

II. A candidate applying for M.Sc. Biotechnology OR M.Sc. Microbiology is required to fill the Application Form 1, Form 3 and Form 4; all these forms shall be sealed in separate envelopes with bold insertions as given in note 1 above.

III. The candidate appearing for the counseling shall bring the duly signed/ attested Form 2A and Form 2B for submission in person.

IV. No documents/ certificates of any other type other than those mentioned above are to be sent along with the application form.
a) Candidates while submitting their application to Himachal Pradesh University, should not forward/ attach original or photo-copies of the certificates of academic qualifications; but must produce the original certificates besides a copy of each of the academic certificates/ and proof of Date of Birth, domicile/ category/ caste certificate at the time of counseling/ admission on the said day.

b) Unwanted documents/ certificates if attached with the application form shall not be returned in any case.

c) The application form(s) received after the specified closing date will not be entertained.

d) There will be a preliminary scrutiny of the applications for determining the eligibility as per eligibility criteria given in the prospectus for taking entrance test for M.Sc. Biotechnology and M.Sc. Microbiology and it will be entire responsibility of the concerned candidate to supply correct and authentic information in the application forms. It is further clarified that the candidates shall be taking the test at their own risk as responsibility as far as their eligibility is concerned, and the University shall in no way be responsible if they are found to be ineligible, later, leading to cancellation of their result/ merit or any other consequences(s) emanating from the same. The final scrutiny of the application with reference to original documents will be done at the time of counseling/ admission. The counseling/ admission will be done by the Counseling Committee constituted for making such admissions.

Any wrong or misleading entry in the application forms can lead to the rejection of the candidature by Counseling Committee without assigning any reason and the candidate himself/ herself shall be responsible for the consequences. The application form is required to be attested by any Gazetted Officer or Principal of the College or by the Principal of the School last attended who will ensure that the form and the other information supplied in that form is correct to the best of his/ her knowledge and he/ she has completely satisfied himself/ herself before signing the form.

e) Admit card to the candidates for sitting in the competitive examination will be issued to the candidate whose application forms are received on or before the last date notified by the H. P. University and the same have been provisionally found in order as per provision of the prospectus.

(f) Examination Center opted by the candidate will not be changed. However, Himachal Pradesh University, Shimla reserves the right to allot any centre in view of any emergency.

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 appeared in the merit list. All queries regarding admission/ counseling etc. be addressed to the office of the Chairman, Department of Biotechnology, HPU, Shimla-171 005.

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 or other categories, 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 2A & 2B 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 or M.Sc. Microbiology, the concerned participating institutions will inform the Chairman, Department of Biotechnology for prior approval and will issue an open advertisement in News Papers 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 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 Chairman, Department of Biotechnology, H. P. University or his Nominee will be the members of the Second Counseling Committee.

**The entire process of admissions shall be completed before the final cut off date of admission to B.Sc. (Hons.) Biotechnology and M.Sc. Biotechnology courses i.e. 25th July, 2015.**

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 The candidates falling in merit as under should attend the counseling as per schedule given below:

**Date & place of counseling**

<table>
<thead>
<tr>
<th>Program</th>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>M.Sc. Biotechnology</td>
<td>02.07.2015</td>
<td>10.30 AM</td>
</tr>
<tr>
<td>M.Sc. Microbiology</td>
<td>02.07.2015</td>
<td>10.30 AM</td>
</tr>
</tbody>
</table>

**Note 1:** Every candidate attending the counseling must report at 10.00 AM sharp and will be charged Rs. 500/- as University Counseling Fee against a valid receipt issued by H.P.U., Shimla.

**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 institutions. However, the candidates admitted to the H.P.U., Shimla under M.Sc. Microbiology Programme will have to deposit the fee in total by the due date notified by the Chairman, Department of Biotechnology.

**8.0 Participating institutes at a glance**

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 2015-2016.

**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 the State Government and Department of Biotechnology, Ministry of Science & Technology, New Delhi. The Department is presently running M.Sc. (Two years), M.Phil. (One year) and Ph.D. programs in
Biotechnology. The Department admits 15 candidates under its M.Sc. Biotechnology Program every year through an All India Combined Entrance Examination conducted by Jawaharlal Nehru University, New Delhi on behalf of participating Universities. The department has also been admitting 30 candidates under the M.Sc. Microbiology course 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 Government of India, Ministry of Science & technology, Department of Biotechnology, New Delhi has ranked M.Sc. Biotechnology Program as '++'. 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 development.
- Isolation and characterization of extremophiles for novel enzymes/ products and
- Screening and evaluation of active principle(s) of medicinal plants.

Various microbial enzymes that are being purified and studied for their potential diverse applications include nitrilases, amidases, hydrolases, lipases, pectinases, cholesterol oxidases, peroxidases, xylanases, glutaminases, asparaginases, ribonucleases, methionases, chitinases, phenol lyses 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.

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.

The Department has previously availed Emerging Area Scheme of UGC (2000-2005), New Delhi, FIST (Level I) Program (2005-2010), Department of Science & Technology, New Delhi, and is currently being supported by UGC-Special Assistance Program (2010-2015) The Department has established a Microbial Germ-plasm 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, symposia and seminars on specialized and related fields. The department also offers short-term research training to the candidates coming from other institutions on request. The department is also publishing a journal ‘Innovative Trends in Biotechnology’. 
### Core Faculty of Department of Biotechnology

<table>
<thead>
<tr>
<th>Faculty</th>
<th>Designation</th>
<th>Field(s) of specialization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. T. C. Bhalla M.Sc., M.Phil., Ph.D.</td>
<td>Professor</td>
<td>Recombinant DNA Technology and Microbial Enzyme Technology</td>
</tr>
<tr>
<td>Dr. S. S. Kanwar M.Sc., Ph.D.</td>
<td>Professor &amp; Chairman</td>
<td>Microbiology, Virology and Animal Cell Culture</td>
</tr>
<tr>
<td>Dr. Mrs. Reena Gupta M.Sc.(Hons.), Ph.D.</td>
<td>Professor</td>
<td>Biochemistry and Immuno-technology</td>
</tr>
<tr>
<td>Dr. Duni Chand M.Sc., Ph.D., Post.Doc. (Germany)</td>
<td>Professor</td>
<td>Plant Biotechnology, Environmental Biotechnology, Microbiology and Molecular Biology</td>
</tr>
<tr>
<td>Dr. A. K. Bhatt M.Sc., M.Phil., Ph.D.</td>
<td>Associate Professor</td>
<td>Microbiology and Fermentation Technology</td>
</tr>
<tr>
<td>Dr. W. Azmi M.Sc., M.Tech., Ph.D.</td>
<td>Associate Professor</td>
<td>Biochemical Engineering and Bio-business Management</td>
</tr>
</tbody>
</table>

For further information contact: The Chairman, Department of Biotechnology, Himachal Pradesh University, Shimla-171 005. Telefax: 91-177-2831948.

### 8.2 CENTRAL RESEARCH INSTITUTE (CRI), KASAULI, H.P.-173204

CRI at Kasauli which is a small cantonment hill station 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.

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.
- Teaching and training students of various colleges and universities in production and testing of vaccines and sera.
- Academic courses affiliated to Himachal Pradesh 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.
8.3 Shoolini Institute of Life Sciences and Business Management (SILB)

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 snowfall, average rainfall of 1200mm and an altitude of 1,600 meters, is one of the district head quarters 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.
- Seven Gold Medalists 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. with Major in Biotechnology
2. M. Sc. Biotechnology
3. B.Sc. with Major in Microbiology
4. M. Sc. Microbiology
5. M.Sc. Botany
6. BBA

Laboratories: Well equipped labs with equipments such as Thermocycler, UV-Vis Spectrophotometer, Fermenter, Gel documentation system, ELISA plate reader, , Deep freezers, Refrigerated Centrifuge, CO_{2} 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.) Shalini Sharma (Director); Mobile: 09418151616
Admission Helpline: 01792 – 226674, 09318759522; Fax: 01792226364; and E-mail: shoolinitc09@gmail.com
8.4 Bhojia Institute of Life Sciences, Bhud (Baddi), Solan

Bhojia Institute of Life Sciences, a co-educational premier institution was established by charitable organization “Bhojia Charitable Trust for Science Research & Social Welfare” with prime motto “Empowerment through Academic Excellence” in 2006 to provide opportunities to the student community to make mark as Life Sciences professional and to transform & globalize their personalities. This Institute is a research-oriented forefront, providing complete end-to-end solution system, integration and support services to the students opting for careers in Life Sciences around the Globe. The institute is located in foothills of Shiwaliks on Chandigarh-Nalagarh Highway (NH No.-21-A). The nearest bus stop is Village: Bhud, nearest railway stations are Kalka and Ropar, nearest airport is at Chandigarh.

Courses offered:

1. B.Sc. with Major in Biotechnology  
2. B.Sc. with Major in Microbiology  
3. M.Sc. Chemistry  
4. M.Sc. Botany  
5. M.Sc. Biotechnology  
6. M.Sc. Microbiology

Teaching Staff: Teaching staff consists of a galaxy of highly qualified professionals, well experienced in their subject as per the norms of H.P.U., Shimla.

Library: Library is well equipped with text books, E-books, reference books and scientific journals on concerned subjects. It also has the provision of Wi-fi broad band internet connectivity so that the students remain in touch with the day to day developments in Life Sciences.

Laboratories: The Institution houses various labs i.e. Microbiology, Cell and Molecular Biology, Computer and Bioinformatics, Physics, Chemistry, Biochemistry, Media and Sterilization, Fermentation Room, Central Instrumentation Facility, Animal and Plant Tissue Culture, Botany and Research Laboratories. All the labs are well equipped with modern facilities and instruments.

Placement: BILS values the significance of overall development of personality through interactions on Communication Skills, Negotiation Skills, Critical Reasoning Ability, Right Attitude, Self-Image, Motivation, Goals, and Resume Writing etc. Institute’s Placement Cell is actively engaged to liaise with the industry to update prospective employers of the skill levels of the students and create suitable career prospects for the students.

For further information please contact: 01795-247621, 09816-003230, 098057-42685, 098160-89981, Fax: 01795-247621; Email: bilsoffice@gmail.com, Visit us at: www.bhojiamededu.com

8.5 Himachal Institute of Life Sciences (HILS), Poanta

HILS is premier, co-educational institute for higher achievements in the field of life sciences. Established in 2007, HILS is located at Rampur Ghat Road, Paonta Sahib, and District: Sirmour (H.P.) under the aegis of Dr. Puran Chand Medical Charitable Trust. The institute is 125 km from Chandigarh, 150 km from Shimla and 50 km from Dehradun. The Institute is situated in a lush green, pollution free environment. HILS assists the students in becoming competitive individuals in the field of Microbiology, Biotechnology, Biochemistry and Bioinformatics.
Accommodation: Institute offers in campus accommodation with well furnished comforts, amenities and attached toilets for girls and boys. Separate common rooms with required facilities have been provided for students.

Academics: The institute has a spacious library having more than 2500 books and 10 different Indian and International journals. Broad band internet facility is also provided in the computer laboratory, having 30 terminals. The college has state of art facilities for teaching and research. The pillars of any institute are its faculty and the college has experienced, qualified and dedicated faculty.

Laboratories: Institute can boast of state of art laboratories (Microbiology, Biotechnology, Biochemistry, Chemistry, Physics, and Animal and Plant tissue culture lab) fitted with latest equipments. Besides these there is a Central Research Laboratory where students are exposed to sophisticated technologies and equipments such as: UV-visible Spectrophotometer, Fermenter, PCR, Orbital Shaker, Cooling Centrifuge, Gel Electrophoresis, Chromatography, BOD incubator, CO$_2$ incubator, Medical Microscope and UV-Trans-illuminator etc. The institute regularly organizes guest lectures in the fields Microbiology, Biotechnology, and Biochemistry.

Extracurricular activity: The College has provided indoor (Table tennis, Chess, Carom) and outdoor (Badminton, Volleyball, Kho-Kho, Cricket and Football) games facilities. Besides this the Annual sports, Fresher Annual function and festivals like Deepawali, Lohri and Holi are celebrated with the students in the college.

Transport facility: Transport facility within the city has been provided to the students.

Placement cell: The institute also having a placement cell to arrange the industrial and educational visits.

For further information please contact: Dr. Virender Singh, Head, Dept of Life Sciences, Mobile 09817267961; Telephone 01704-223298; Fax 01704-223726; E-Mail: hilps@google.com

8.6 Gautam College, Hamirpur (Now Co-educational)

Gautam College, Hamirpur is a premier institute in the state which provides excellent facilities for quality education in various academic, technical and professional courses. The college dedicated to provide quality education to the aspirant students, started functioning in 1999 and has emerged since then as a premier college in the state.

Gautam College is ideally located in the heart of the Hamirpur Town, at a stone throw from the inter-State Bus Stand. The College has a beautiful complex with a majestic look and feel of a Victorian classic type institution. It has two sprawling multistory buildings which house a number of unimaginable facilities which help to provide an ideal environment for soulful learning. The College has a well-equipped Gym, rich library with a well-furnished reading hall, a huge auditorium cum conference hall, well equipped and furnished Laboratories and facility of indoor as well as outdoor games. The college is affiliated to H.P. University Shimla. Apart from Post Graduate and Graduate Academic Courses it also provides technical and professional courses such as BBA, BCA, PGDCA and B.Sc. with Major in Biotechnology etc.

The facilities include:

1. Girls Hostel “Kamla” a multi storied building in the vicinity of the College with well furnished rooms and accommodation for about 200 students. The Hostel facility is provided purely on merit and on first cum first serve bases with reservation for ex-Service men’s wards.
2. Canteen and Mess on no profit no loss basis- providing hygienic and healthful eatables and meals.
4. Auditorium cum conference Hall: The auditorium is housed in the College main building with a capacity of 600 seats.
5. Rich Library: The College Library has more than 5000 books including classic and rare books on various subjects. It also subscribes to a score of journals and newspapers in English and Hindi. The Library is equipped with on line computers.

6. Thoroughly Equipped Labs: The College has well equipped laboratories providing excellent facilities for practical work in different Science subjects.

7. An open stage with a lush green lawn and lining of decorative hedges, bushes and creepers for inter college cultural activities.

8. Highly Qualified and Experienced Faculty: The teachers in different faculties are selected according to UGC and HPU norms and are highly qualified, experienced and dedicated one.

9. The Gautam College has a unique privilege to run B.Sc. with Major in Bio-Technology course since 2009-10 session. It is the only College in the lower Shivaliks which has this facility in this newly emerged branch of science having a huge scope of employment in public as well as private concerns.

10. A highly furnished Computer lab: The Computer lab has a majestic furnish and has as many as 200 lap-tops connected to internet.

For further information please contact: Principal, Gautam College, Hamirpur. Mobile: 9418010420 Tel: 01972-221493; Website: www.ggchamipur.com; E-Mail: ggchmr@gmail.com

9. GUIDELINES TO FILL THE APPLICATION FORM COLUMN WISEI

Please carefully read the instruction given in the section before filling the application forms.

Candidate should first write the relevant information in the appropriate boxes with blue/ black ballpoint pen in capital letters and also the corresponding circles are to be darkened completely with blue/ black ball point pen,

1. Name of the candidate
   Write your name in capital letters as given in your metric certificate or your first Board University Examination. Write a single letter in a box. Within any part of your name do not leave any blank box. Leave one and only one space between any two parts of the name.

2. Father’s name (exactly as per metriculation certificate)
   Write your Father’s Name in capital letters as given in your original certificate of the High School of your first Board/ University Examination.

3. Sex: Write either Male or Female or Transgender (TG).

4. Date of birth
   Enter the date, month and year of your birth as per the English calendar and as recorded in your Board Examination Certificate. Use numerals 01 to 31 for DATE 01 to 12 MONTHS and the last two digits for the year of birth. For example Rohit’s date of birth is 17 July 1985 will be entered as follows 17.071985.

5. Bonafide Himachali/ Domicile: Yes or No.


7. Write mobile number and email currently in use.

For admission under various categories the codes are:

<table>
<thead>
<tr>
<th>Category</th>
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<tr>
<td>Schedule Caste</td>
<td>01</td>
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<tr>
<td>Schedule Tribe</td>
<td>02</td>
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<tr>
<td>General category</td>
<td>03</td>
</tr>
</tbody>
</table>
Outstanding Sports Person [OSP] 04
Outstanding Cultural Activists [OCA] 05
Person with Disability [PwD] 06
Jammu & Kashmir bonafide candidate 07

7. For M.Sc. Biotechnology percentages of marks in qualifying B.Sc. examination.
8. For M.Sc. Biotechnology: Have you passed Bachelor Degree under 10+2+3 pattern of education with Botany or Microbiology as one of the subject with at least Second division or with 45% marks or Honours in the subject concerned or B.Sc. Microbiology/ M.B.B.S./ B.V.Sc. from any University/ Institute recognized by Himachal Pradesh University/ UGC.
10. Detail of marks obtained by you in qualifying exam or its equivalent exam is given.

**Note:** After filling all the columns of application forms, please ensure that you have signed the Application forms and the same have been counter signed by your parents, wherever applicable. Get your photograph on the application forms attested by a Gazetted Officer with his official seal.

**10. Instruction for filling up Identification/ Admit Card**

1. **Identification Card:** The candidates are advised to write full name, father’s name, category, complete correspondence and permanent home addresses in capital letters same as filled in the OMR application form and also sign at the appropriate place, on the identification card. The photograph shall be firmly affixed with gum and get it attested as advised.

2. **Admit Card:** The candidates are advised to write full father’s name, address etc. in capital letters and also sign at the appropriate place on the admit card provided along with the application form. The photograph be firmly affixed and get it attested as advised. In the reverse page of the admit card, correspondence address in the capital letters be written by the candidate.

3. Please ensure that the photograph must be firmly affixed on the identification card and admit card with gum and shall also be got attested.

**CHECK LIST BEFORE MAILING/ DESPATCHING THE APPLICATION FORMS ALONG WITH ITS ENCLOSURES TO THE UNIVERSITY**

- Please ensure before posting/submitting the complete application form that the letter is addressed to the concerned office.
- Please see that you have written your address and also properly affixed the photograph(s) on the admit card.
- Please place the admit card, identification card, self-addresses sheet and application form in the envelopes as prescribed for mailing it.
- Do not enclose any other thing except admit card, self-addresses sheet and application form in the envelopes provided for this purpose.
- Do not remit any extra fee.

**11 Ragging in educational institutes and consequence(s)**

Theragging 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 a copy of the letter No. F.1-9/2006 (CPP-II) dated 04th March 2008 received from Mr. V. K. Jaiswal, Under Secretary, U.G.C., New Delhi addressed to the 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 Kerela 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.

12. 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 Program in its affiliated Private Institution 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.

13. Refund of fee, caution money, library security 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 programmes 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.

14. Model/sample questions

MODEL QUESTION PAPER FOR M.Sc. BIOTECHNOLOGY ENTRANCE EXAMINATION-2015

The question paper for M.Sc. Biotechnology Entrance Examination 2015 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 compounds 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) $k_{\text{cat}}$
(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?
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) Colcemid
   (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’ Brefled
   (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
   (A) Apoptosis

20. Which plant tissue possesses totipotency?
   (A) Perenchymal tissue
   (B) Merismatic tissue
   (C) Pholeum
   (D) Xylem
MODEL QUESTION PAPER FOR M.Sc. MICROBIOLOGY
ENTRANCE EXAMINATION-2015

Section-I [General Microbiology]
1. Which of the following represents a series of microorganisms of increasing size?
   a) Fungi, viruses, bacteria           b) Viruses, bacteria, fungi
   c) Protozoa, fungi, rickettsiae      d) Rickettsiae, viruses, protozoa
2. Which of the following is not a prokaryote?
   a) Bacteriump) Amoeba               c) Blue green algae    d) Archaebacteria

Section-II [Biochemistry and Cell Biology]
3. V_{max} of an enzyme measures the
   a) substrate affinity    b) catalytic efficiency   c) enzyme activity   d) coenzyme affinity
4. Which of the following is NOT involved in mitochondrial ET
   a) NADH                  b) cytochrome P_{450}      c) cytochrome b      d) non heme iron

Section-III [Parasitology and Immunology]
5. What causes cerebral malaria?
   a) Plasmodium vivax         b) P. falciparum       c) P. ovale        d) P. malariae
6. Reduviid bug is the vector for which parasite?
   a) Trypanosoma cruzi       b) Trypanosoma brucii   c) Loa loa         d) Brugia malayi

Section-IV [Mycology and Phycology]
7. The formation of starch in many species of Chlorophyta is intimately associated with organelles called
   a) heterocysts              b) eye-spots           c) pyrenoids         d) cysts
8. Which of the following algae is commonly called the ‘water net’?
   a) Chlorella               b) Scenedesmus         c) Pediastrum       d) Hydrodictyon

Section-V [Genetics and Molecular Biology]
9. During interaction of the drug Actinomycin-D with DNA, it intercalates between
   a) A & T                   b) G & G               c) A & U            d) G & C
10. A nucleic acid was analyzed and found to contain 37 percent A, 16 percent G, 22 percent C, and 25 percent T. The nucleic acid must be:
    a) s-stranded RNA  b) s-stranded DNA  c) d-stranded RNA  d) d-stranded DNA
APPLICATION AND OTHER FORMS FOR ENTRANCE TEST/ COUNSELING FOR M.Sc. BIOTECHNOLOGY COURSE
**FORM 1**

**APPLICATION FOR APPEARING IN M.Sc. BIOTECHNOLOGY ENTRANCE TEST-2015**

**NOTE: TO BE FILLED BY THE CANDIDATE IN HIS/ HER OWN HANDWRITTING**

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<td>1</td>
<td>Name of the candidate in capital letters as given in Matriculation certificate</td>
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<td>Affix a recent photograph duly attested by a Gazetted Officer</td>
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<td>Name of the candidate’s father in capital letters as given in Matriculation certificate</td>
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<td>Guardian’s name (If applicable)</td>
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<td>Category applied [Encircle the appropriate one]</td>
<td>H.P. domicile</td>
<td>General</td>
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<td>Date of birth [day-month-year]</td>
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<td>Age as on 1st July 2015</td>
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<td>If you a bonafide resident/ domicile of Himachal Pradesh, name of the institution/ college last attended</td>
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<td>9</td>
<td>Address for correspondence in capital letters along with PIN code</td>
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<td>Personal contact information</td>
<td>Mobile number:</td>
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<td>12</td>
<td>Detailed marks obtained in the qualifying examination [10+2+3]</td>
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<td>Total marks:</td>
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I further certify that particulars as furnished by me as above are correct and are the same as filled in the Admission Form [FORM 2A] to be submitted to the University at the time of counseling. 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-2015 for the course I have applied for in the Himachal Pradesh University/ or any of its affiliated institutions.

Place: …………………

(Date) (Signatures of the candidate)

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)
ADMISSION FORM FOR M.Sc. BIOTECHNOLOGY COURSE FOR SESSION 2015-2016

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

<table>
<thead>
<tr>
<th>M.Sc. Biotechnology</th>
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<tr>
<td>The candidate shall give the choice of institute for his/her admission in the following order:</td>
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<td>1&lt;sup&gt;st&lt;/sup&gt; choice</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; choice</td>
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<td>Affix a recent photograph duly attested by a Gazetted Officer</td>
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FOR OFFICIAL USE ONLY

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<tr>
<th>Course applied for</th>
<th>Eligibility</th>
<th>Category applied</th>
<th>Choice of institutes</th>
<th>Deficiency if any</th>
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<tr>
<td>Biotechnology</td>
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<td>Signature(s) of the committee members: →</td>
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<td>Coordinator</td>
<td>Member</td>
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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-2015 Course Roll No. Marks

5 Sex [Male/ Female/ TG]

6 Date of birth

7 Age as on 1<sup>st</sup> July 2015

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):

12 Detailed marks obtained in the qualifying examination [10+2+3] S. No. Subject Marks obtained Maximum marks Percentage

1

33
| 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.


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-2015 to the Himachal Pradesh University/ or any of its affiliated institutions.

Place: ……………………

Date: ……………………

(Signatures of the candidate)

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)
**FORM No. 2B**

**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

<table>
<thead>
<tr>
<th>Name of the candidate: [Mr./ Ms.]</th>
<th>Category:</th>
<th>Affix a recent photograph duly attested by a Gazetted Officer</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>General</td>
<td></td>
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<td></td>
<td>PH</td>
<td></td>
</tr>
<tr>
<td>[Circle the one that is applicable]</td>
<td>JK</td>
<td></td>
</tr>
</tbody>
</table>

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): ……………………………………………

Telephone 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)

[Name & Signature of the parent(s)]

Date: ………………..  Mother: ………………..  Father: ………………..
FORM 3

TO BE FILLED AND ASSIGNED BY THE OFFICE

<table>
<thead>
<tr>
<th>Serial No.</th>
<th>Roll Number</th>
</tr>
</thead>
</table>

Affix a recent photograph duly attested by a Gazetted Officer

IDENTIFICATION CARD M.Sc. Biotechnology-2015
[To be filled by the candidate]

1 Name in capital letters
2 Father’s name
3 Category applied for
4 Address for correspondence
   [Official correspondence shall be made at this address!]
   PIN Code:
5 Permanent home address
   Land-line phone number
   PIN Code:
   Mobile number
   Email address
6 Specimen signatures of the candidate

----------------------------- Not to be filled by the candidate below this line -----------------------------

<table>
<thead>
<tr>
<th>Date: May 23, 2015</th>
<th>Signature of the candidate at the time of examination</th>
<th>Signature of Invigilator</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:00 AM to 11:30 AM</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Serial Number: .................

HIMACHAL PRADeSH UNIVERSITY
SUMMER HILL, SHIMLA-171 005
[ACKNOWLEDGEMENT CARD]

Your application form for M.Sc. [Biotechnology] Entrance Test-2015 has been received and entered at Serial No. ........... dated ................. in the Dairy Register. In any correspondence with this office in future please quote this Serial Number.

Chairman
Department of Biotechnology

Note: Acknowledgement of your application form does not entail you to appear in the above test. The candidate shall carry the admit card issued to him/ her at the time of Entrance Examination-2015.
FORM 4

TO BE FILLED AND ASSIGNED BY THE OFFICE

<table>
<thead>
<tr>
<th>Serial No.</th>
<th>Roll Number</th>
</tr>
</thead>
</table>

Affix a recent photograph duly attested by a Gazetted Officer

ADMIT CARD M.Sc. Biotechnology Entrance Test-2015

[To be filled by the candidate]

Admit (Name of candidate in capital letters) Mr./ Ms. …………………………………
son / daughter of Mr./ Ms. ………………………………………………… to appear in
M.Sc. Biotechnology Entrance Test-2015 to be held at the specified
Examination Centre at Himachal Pradesh University, Shimla-171 005 as per
Date-Sheet hereunder.

Category applied for:

Specimen signatures of the candidate:

---------------------- Not to be filled by the candidate below this line -------------------

FOR OFFICE USE ONLY

NAME OF EXAMINATION CENTRE:

Schedule of M.Sc. Biotechnology Entrance Test-2015

<table>
<thead>
<tr>
<th>Date of Entrance Test:</th>
<th>May 23, 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entry in the Examination Hall:</td>
<td>9:30 AM</td>
</tr>
<tr>
<td>Duration of the test</td>
<td>10:00 AM to 11:30 AM</td>
</tr>
</tbody>
</table>

Chairman
Department of Biotechnology
Himachal Pradesh University
Shimla-171 005

Note: The Roll Number assigned to the candidate is purely provisional and subject to the eligibility of the candidate to be determined on the day of counseling/ admission in the institute based on the merit of the Entrance Examination-2015.
<table>
<thead>
<tr>
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<tr>
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<td><strong>Course: Biotechnology/ Microbiology 2015</strong></td>
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<td>Name: ………………………………………</td>
<td>Name: ………………………………………</td>
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<td>Father’s name: ……………………………</td>
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</table>
APPLICATION AND OTHER FORMS FOR ENTRANCE TEST/ COUNSELING FOR M.Sc. MICROBIOLOGY COURSE
FORM 1

APPLICATION FOR APPEARING IN M.Sc. MICROBIOLOGY
ENTRANCE TEST-2015

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

<table>
<thead>
<tr>
<th></th>
<th>Name of the candidate in capital letters as given in Matriculation certificate</th>
<th>Affix a recent photograph duly attested by a Gazetted Officer</th>
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<tbody>
<tr>
<td>2</td>
<td>Name of the candidate’s father in capital letters as given in Matriculation certificate</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Guardian’s name (If applicable)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Category applied [Encircle the appropriate one]</td>
<td>H.P. domicile</td>
</tr>
<tr>
<td>5</td>
<td>Sex [Male/ Female/ TG]</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Date of birth [day-month-year]</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Age as on 1st July 2015</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>If you a bonafide resident/ domicile of Himachal Pradesh, name of the institution/ college last attended</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Address for correspondence in capital letters along with PIN code</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Permanent home address in capital letters along with PIN code</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Personal contact information</td>
<td>Mobile number:</td>
</tr>
<tr>
<td></td>
<td>Email ID:</td>
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<tr>
<td>12</td>
<td>Detailed marks obtained in the qualifying examination [10+2+3]</td>
<td>S. No.</td>
</tr>
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<tr>
<td>5</td>
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</table>

Total marks:

I further certify that particulars as furnished by me as above are correct and are the same as filled in the Admission Form [FORM 2A] to be submitted to the University at the time of counseling. 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-2015 for the course I have applied for in 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)
ADMISSION FORM FOR M.Sc. MICROBIOLOGY COURSE FOR SESSION 2015-2016

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

The candidate shall give the choice of institute for his/ her admission in the following order:

| 1<sup>st</sup> choice | 2<sup>nd</sup> choice | 3<sup>rd</sup> choice | 4<sup>th</sup> choice | 5<sup>th</sup> choice | 6<sup>th</sup> choice |
---|---|---|---|---|---|

Affix a recent photograph duly attested by a Gazetted Officer

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-2015 Course Roll No. Marks
5 Sex [Male/ Female/ TG]
6 Date of birth
7 Age as on 1<sup>st</sup> July 2015
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
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?

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.


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-2015 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)
**FORM No. 2B**  
For official use only. Serial No. assigned:

**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

<table>
<thead>
<tr>
<th>Name of the candidate: [Mr./Ms.]</th>
<th>Category:</th>
<th>Neck the one that is applicable</th>
<th>Affix a recent photograph duly attested by a Gazetted Officer</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>General</td>
<td>ST SC SGC OSP OSA PH JK</td>
<td></td>
</tr>
</tbody>
</table>

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): ……………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………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# FORM 3

**TO BE FILLED AND ASSIGNED BY THE OFFICE**

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Affix a recent photograph duly attested by a Gazetted Officer

**IDENTIFICATION CARD M.Sc. Microbiology Entrance Test-2015**

[To be filled by the candidate]

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Serial Number: .................

HIMACHAL PRADESH UNIVERSITY
SUMMER HILL, SHIMLA-171 005
[ACKNOWLEDGEMENT CARD]

Your application form for M.Sc. [Microbiology] Entrance Test-2015 has been received and entered at Serial No. ............. dated ................. in the Dairy Register. In any correspondence with this office in future please quote this Serial Number.

Coordinator [Microbiology Program]
Department of Biotechnology

Note: Acknowledgement of your application form does not entail you to appear in the above test. The candidate shall carry the admit card issued to him/ her at the time of Entrance Examination-2015.
FORM 4

**TO BE FILLED AND ASSIGNED BY THE OFFICE**

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Affix a recent photograph duly attested by a Gazetted Officer

**ADMIT CARD M.Sc. Microbiology Entrance Test-2015**

[To be filled by the candidate]

Admit (Name of candidate in capital letters) Mr./ Ms. ………………………………… son / daughter of Mr./ Ms. ………………………………………………….. to appear in M.Sc. Microbiology Entrance Test-2015 to be held at the specified Examination Centre at Himachal Pradesh University, Shimla-171 005 as per Date-Sheet hereunder.

Category applied for:

Specimen signatures of the candidate:

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**FOR OFFICE USE ONLY**

**NAME OF EXAMINATION CENTRE:**

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**Coordinator [Microbiology Program]**
Department of Biotechnology
Himachal Pradesh University
Shimla-171 005

**Note:** The Roll Number assigned to the candidate is purely provisional and subject to the eligibility of the candidate to be determined on the day of counseling/ admission in the institute based on the merit of the Entrance Examination-2015.
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# IMPORTANT CONTACT PHONE/ FAX NUMBERS OF THE INSTITUTES

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Prefix ‘2833’ if calling from outside Shimla. Say one has to contact the Registrar, please dial phone number 0177-2833511.
SESSION 2015-2016

M.S.C. BIOTECHNOLOGY
AND
M.S.C. MICROBIOLOGY

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Attach a draft for a sum of Rs. 1500/- in favor of Coordinator [Microbiology Program] payable at Summer Hill, Shimla-171 005 along with applications and other enclosures.

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Published by:

The Chairman
[Coordinator Microbiology Program]
Department of Biotechnology
H. P. University, Shimla-171 005
Phone: 0177-2831948