

COURSE OUTLINE

**B.Sc. MAJOR IN MICROBIOLOGY
CBCS-2013**

HIMACHAL PRADESH UNIVERSITY

SHIMLA

Effective from session 2013-14

HIMACHAL PRADESH UNIVERSITY
SUMMER-HILL, SHIMLA-171005

B.Sc. MAJOR IN MICROBIOLOGY PROGRAMME

GENERAL INSTRUCTIONS/ GUIDELINES FOR EXECUTION OF CURRICULUM

1. The B.Sc. Major in Microbiology will be of three years duration semester-based Choice Based Credit System [CBCS] course.
2. There will be broadly four types of courses for B.Sc. with Major in Microbiology programme.
 - A. The **Compulsory Courses** will be of 3 credits each and a candidate has to choose a minimum of 3 Compulsory courses being offered by the concerned college/ institute. Thus a minimum of 9 [3 X 3 credits] will be opted by a candidate. Each of 3-credit courses will carry 75 marks.
 - B. The core courses will comprise **Hard Core Courses** [Compulsory subject courses where no choice will be available] and **Soft-Core Courses** [Choice for opting a course will be available] of 4-credits each, and a candidate will opt at least a total of 14 courses of 4-credits each [4 X 14 = 56 credits] including Soft-core courses. Each course will carry 100 marks. Each of Hard/ Soft-core courses will comprise a practical of 25 marks, theory End semester examination of 40 marks, and an Internal Assessment component of 35 marks. The Internal Assessment [35 marks] will include two Multi Choice Questions (MCQ)-based examinations of 10 marks each [20 questions of 0.5 mark each], a presentation and assignment of 10 marks and Classroom Attendance Incentive marks (5 marks). The Lab-based practical will be of 2-hours [One credit].

Classroom Attendance Incentive: Those having greater than 75% attendance (for those participating in Co-curricular activities, 25% will be added to per cent attendance) will be awarded CCA marks as follows:

≥ 75% but < 80%	1 marks
≥ 80% but < 85%	2 marks
≥ 85 but < 90%	3 marks
≥ 90% but < 95%	4 marks
≥ 95%	5 marks
 - C. **Elective Courses** will comprise related to Minor subjects. Each Elective course will be of 4-credits each and a candidate opts for 5 courses of a Minor subject [say Chemistry, Mathematics, Computers and Physics] or at least 5 courses of two different minor subjects. A minimum of 10 Elective courses [4 X 10 = 40 credits] will be chosen by a candidate to get specialization in one or two minor subjects.
 - D. **General Interest and/ or Hobby Courses** will comprise such courses as the name suggests and each candidate will opt for at least one course of 1 credit and this course shall carry 25 marks.
3. (a) The admission to B.Sc. Major with Microbiology programme of Himachal Pradesh University will be as per guidelines of Himachal Pradesh University, Shimla from time to time.

- (b) The candidate should have passed 10+2 (class XII) Examination or its equivalent from a recognized Board/University with any of the three subjects out of Physics, Chemistry and Biology or any other science subjects with 50% or equivalent grade (for SC/ST candidates marks of eligibility will be 45% or equivalent grade).
 - (c) In case of candidates who are studying in University/ Board/ College/ Schools in any of the foreign countries the eligibility/ Qualifying marks will be the same as recognized/equivalent to 10+2 by the University or the association of the Indian University with 50% marks of equivalent grade (for SC/ST candidates, eligibility will be 45% marks or equivalent grade).
 - (d) The candidate who has appeared in the qualifying examination but whose result has so far not been declared can also apply but his/her eligibility for the entrance test will be purely provisional subject to the condition that he/she has to produced a passing certificate scoring at least the minimum percentage of marks as prescribed for the qualifying examination on the day and the specified time of counseling.
 - (e) The candidate shall not be more than 22 years of age as on 01st July of the year of admission. Date of birth as recorded in the Secondary Education Board/ University Certificate Only will be considered as authentic.
4. Admission will be based on the merit of the entrance test to be conducted by HP University or any other mode as to be decided by the University from time to time.
 5. The tuition fee and other monthly/annual charges will be as per University rules.

Selection of various courses

A. Compulsory courses [Minimum 3 courses; 3 X 3 = 9 credits]

(a) Languages

- i. Compulsory English
- ii. Compulsory Hindi

(b) Social Sciences/Commerce/Management

- iii. Compulsory Social Science/ Commerce/management course
- iv. Compulsory Geography of Himachal Pradesh
- v. Compulsory Indian Constitution
- vi. Compulsory Himachal Past, Present and Future

(c) Science

- vii. Compulsory Basic Science (not for students majoring in science subjects)
- viii. Climate Change and its impact on mountain sustainability
- ix. Compulsory Environmental Science (Audit Pass Course)

(d) Skill-based courses

- x. Functional English
- xi. Office Computing
- xii. Functional Hindi
- xiii. Application Packages for finance
- xiv. Secretarial practice
- xv. Short hand and word processing
- xvi. Web applications

B. Core courses

CORE COURSES [Minimum 14 courses; 14 X 4 = 56 credits]							
L: Lecture		T: Tutorial		P: Practical		C: Total credits	
Code	Hard core courses	L-T-P-C	Code	Soft core courses	L-T-P-C		
*Micro-101	General Microbiology	3-0-1-4	Micro-121	Parasitology	3-0-1-4		
Micro-102	Basic Biochemistry	3-0-1-4	Micro-122	Applied Microbiology	3-0-1-4		
*Micro-103	Microbial Metabolism	3-0-1-4	Micro-123	Mycology	3-0-1-4		
*Micro-104	Genetics & Molecular Biology	3-0-1-4	*Micro-124	Medical Microbiology	3-0-1-4		
*Micro-105	Industrial Microbiology	3-0-1-4	Micro-125	Animal Cell Culture Techniques	3-0-1-4		
Micro-106	Immunology	3-0-1-4	Micro-126	Phycology	3-0-1-4		
Micro-107	Instrumental Methods of Analysis	3-0-1-4	Micro-127	Fermentation Technology	3-0-1-4		
Micro-108	Intellectual Property Rights & Entrepreneurship	3-1-0-4					
*Micro-109	Animal Virology	3-0-1-4					
Micro-110	Bacteriology	3-0-1-4					
*Micro-111	Environmental Microbiology	3-0-1-4					
Micro-112	Recombinant DNA Technology	3-0-1-4					

Elective Minor courses for students doing Major with other subject(s) except major with Microbiology: The course number(s) Micro-101, Micro-103, Micro-105, Micro-109, Micro-111 and Micro-124 which have been highlighted (*) will be offered/ considered as Minor elective courses.

C. Elective Courses

Details of the syllabus will be as prescribed by the University. Each elective course will be of 3 credits [Minimum 10 courses; 4 X 10 = 40 credits]. **These courses will be distinctly different from the various disciplines of Microbiology.** Chemistry shall be compulsory minor elective for B.Sc. students majoring with Microbiology and second minor elective will be one of following subjects:

1. Economics
2. Computer
3. Physics
4. Mathematics

D. General Interest (GI) and / or Hobby (H): Details of the syllabus will be as prescribed by the University.

General interest or Hobby [Minimum 1 course; 1 X 1 = 01 credit]
Commercial arts
German language
Russian language
Spoken English
Photography
General computer applications
Fine arts
Playing musical instrument(s)

Semester-wise breakup of courses to be chosen by the candidate

Semester	Courses to be opted	Course name	Credits	
			Course	Cumulative
I [ODD]	Compulsory Course-I	Select from the listed compulsory courses	3	Compulsory: 03 Core: 08 Elective: 08 GI & H: 01 Total: 20
	Major Core Course-I Micro-101	General Microbiology	4	
	Major Core Course-II Micro-102	Basic Biochemistry	4	
	Minor Elective Course-I (a)	To be selected from the list of minor elective courses	4	
	Minor Elective Course-I (b)	To be selected from the list of minor elective courses	4	
	GI & H Course-I	To be selected from the list of GI & H courses	1	
II [EVEN]	Major Core Course-III Micro-103	Microbial Metabolism	4	Compulsory: 03 Core: 08 Elective: 08 GI & H: 01 Total: 20
	Major Core Course-IV Micro-104	Genetics & Molecular Biology	4	
	Compulsory Course-II [Skill based]	To be selected from the list of compulsory courses	3	
	Minor Elective Course-II (a)	To be selected from the list of minor elective courses	4	
	Minor Elective Course-II (b)	To be selected from the list of minor elective courses	4	
	GI & H Course-II	To be selected from the list of GI & H courses	1	
III [ODD]	Major Core Course-V Micro-105	Industrial Microbiology	4	Compulsory: 03 Core: 08 Elective: 08 GI & H: 01 Total: 20
	Major Core Course-VI Micro-106	Immunology	4	
	Compulsory Course-III	To be selected from the list of compulsory courses	3	
	Minor Elective Course-III (a)	To be selected from the list of minor elective courses	4	
	Minor Elective Course-III (b)	To be selected from the list of minor elective courses	4	
	GI & H Course-III	To be selected from the list of GI & H courses	1	
IV [EVEN]	Major Core Course-VII Micro-107	Instrumental Methods of Analysis	4	Compulsory: 03 Core: 08 Elective: 08 GI & H: 01 Total: 20
	Major Core Course-VIII Micro-108	Intellectual Property Rights & Entrepreneurship	4	
	Compulsory Course-IV [Skill based]	To be selected from the list of compulsory courses	3	

	Minor Elective Course-IV (a)	To be selected from the list of minor elective courses	4	
	Minor Elective Course-IV (b)	To be selected from the list of minor elective courses	4	
	GI & H Course-IV	To be selected from the list of GI & H courses	1	
V [ODD]	Major Core Course-XI Micro-109	Animal Virology	4	Core: 12 Elective: 08
	Major Core Course-X Micro-110	Bacteriology	4	Total: 20
	Major Core Course-XI Micro-111	Recombinant DNA Technology	4	
	Minor Elective Course-V (a)	To be selected from the list of minor elective courses	4	
	Minor Elective Course-V (b)	To be selected from the list of minor elective courses	4	
VI [EVEN]	Major Core Course-XII Micro-112	Environmental Microbiology	4	Core: 12 Elective: 08
	Major Soft Core Course [Micro-121 to 127]	To be selected from the list of Major Soft core courses	4	Total: 20
	Major Soft Core Course [Micro-121 to 127]	To be selected from the list of Major Soft core courses	4	
	Minor Elective Course-VI (a)	To be selected from the list of minor elective courses	4	
	Minor Elective Course-VI (b)	To be selected from the list of minor elective courses	4	