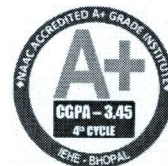


**Institute for Excellence in Higher Education (IEHE),
Bhopal (MP)**



**NAAC Re-accredited (Fourth Cycle) Autonomous College
Under the UGC Scheme with 'A+' Grade (CGPA-3.45)**

**Program Outcomes (POs),
Program Specific Outcome (PSOs)
&
Course Outcomes (COs)
of
Department of Biotechnology**

**B.Sc./B.Sc. (Honours) Biotechnology
&
M.Sc. Biotechnology**

(Session: 2023-2024)

Programmes offered in the Institute

Under Graduate Programmes

- B.Com.(4-Year UG programme under NEP-2020)
- B.Com. Honours (Management/Account) (3-Year UG programme under old pattern)
- B.A. (Major: Economics/History/Psychology/Sociology/Political-Science/English-Literature/Hindi-Literature/Geography/Fashion Designing) (4-Year UG programme under NEP-2020)
- B.A. Honours (Economics/History/Psychology/Sociology/Political Science/English-Literature/Hindi-Literature/Geography/Fashion-Designing) (3-Year UG programme under old pattern)
- **B.Sc. (Major: Physics/Chemistry/Computer-Science/Mathematics/Electronics/**Biotechnology**/Geography/Forensic-Science/Clinical Nutrition and Dietetics) (4-Year UG programme under NEP-2020)**
- **B.Sc. Honours** (Physics/Chemistry/Computer-Science/Mathematics/Electronics/**Biotechnology**/Geography/Forensic-Science) (3-Year UG programme under old pattern)
- B.B.A. (4-Year UG programme under NEP-2020)
- B.P.E.S. (4-Year UG programme under NEP-2020)

Post Graduate Programmes

- MA (Economics)
- MA (English)
- MA (Hindi)(New)
- MA (History)
- MA (Political Science)
- MA (Psychology)(New)
- MA (Public Administration)
- MA (Sociology)(New)
- MA (Social Work)
- **M.Sc. (Biotechnology)**
- M.Sc. (Chemistry)
- M.Sc. (Mathematics)
- M.Sc. (Physics)
- M.Com. (Marketing Management)

Courses offered by Vocational Cell (IEHE)

Diploma Courses (16)

1. Diploma in Financial Services (DFS)
2. Diploma in Human Resources Development (DHRD)
3. Diploma in Communicative English (DCE)
4. Diploma in Guidance and Counselling Psychology (DGC)
5. Diploma in Industrial Work & Management System (DIWMS)
6. Diploma in Statistical Analysis (DSA)
7. Diploma in Taxation (DIT)
8. Diploma in Creative Arts (DCrA)
9. Diploma in Computer Application (DCA)
10. Diploma in Tourism & Hospitality Management (DTHM)
11. Diploma in Forensic Science (DFSc.)
12. Diploma in Remote Sensing & GIS (DRSG)
13. Diploma in Hostel Management (DHM)*
14. Diploma in Retail Marketing Management (DRMM)
15. Diploma in Banking Financial Services and Insurance (DBFSAI)
16. Diploma in Data Science and Analysis (DDA) – NEW

Certificate Courses (16)

1. Certificate Courses in English Creative Writing (CECW)
2. Certificate Courses in Research Methodology (CRM)
3. Certificate Courses in Instrumentation & Electronic Maintenance (CIEM)
4. Certificate Courses in Cyber Security (CCS)
5. Certificate Courses in Spoken English (CSE)
6. Certificate Course in Intellectual Property Right (CIPR)
7. Certificate Courses in French Language (CFL)
8. Certificate Courses in Hostel Management (CHM)
9. Certificate Courses in Retail Marketing Management (CRMM)
10. Certificate Courses in Banking Financial Services and Insurance (CBFSAI)
11. Certificate Course in Advance Excel (CCAE) – NEW
12. Certificate Course in Psychological Assessment and Tool Development (CPATD) – NEW
13. Certificate Course in Basics in Geogebra (CCBG) – NEW
14. Certificate Course in Cooking and Baking (CCCB) – NEW
15. Certificate Course in Emotional Intelligence (CCEI) – NEW
16. Certificate Course in Packaging and Designing (CCPD) - NEW

Training Courses (06)

1. 45 Hours Training Programme in Food Processing & Preservation (FPP)
2. 30 Hours Training Programme in (MATLAB)
3. 30 Hours Training Programme in (SPSS)
4. 30 Hours Training Programme in Tally
5. 30 Hours Training Programme in Traditional Art (TPTA)
6. CII-IWN-IEHE Finishing School

Special Courses

1. Foundation Course in Civil Services Examinations (FCCSE)
2. Joint Admission Test for M.Sc. (JAM)

Program Outcomes (PO) of the Under-Graduate Courses Offered in the Institute

- PO1: Domain Knowledge:** Capable of demonstrating comprehensive knowledge & understanding of one or more other disciplines that form a part of an undergraduate programme of study.
- PO2: Critical Thinking:** Critically evaluate practices, policies and theories by following scientific approach to knowledge development. Take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from different perspectives.
- PO3: Problem Solving and Analytical Skills:** Ability to think rationally, analyse situations and solve problems adequately.
- PO4: Information and Digital Literacy:** Capability to use ICT in a variety of learning situations. Demonstrate ability to access, evaluate and use a variety of relevant information sources; and use appropriate software for analysis of data.
- PO5: Communication Skills:** The capacity to communicate effectively using appropriate media, to present complex information in a clear & concise manner. Acquire the learning abilities by focusing on LSRW (Listening, Speaking, Reading & Writing skill, which provide a stage to the students to sharpen their capacity to learn more.
- PO6: Social Interaction and sensitivity towards the societal issues:** Work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group and act together as a group or a team in the interests of a common cause. Elicit views of others, mediate disagreements and help reach conclusions in group settings.
- PO7: Self-directed & Life-long Learning:** Acquire the potential to engage in independent & life-long learning in the broadest context socio-technological changes. Critical sensibility to live experiences, with self-awareness and reflexivity of both and society.
- PO8: Environment and Sustainability:** Understand the issues of environmental contexts & sustainable development.
- PO9: Moral and Ethical Awareness:** Ability to embrace moral/ ethical values in conducting one's life, possess knowledge of the values and beliefs of multiple cultures and a global perspective; and capability to effectively engage in a multicultural society and interact respectfully with diverse groups.
- PO10: Effective Citizenship:** Demonstrate empathetic social concern and equity centred national development, and the ability to act with an informed awareness of issues and participate in civic life through volunteering.
- PO11: Research-related skills:** A sense of inquiry and capability for asking relevant/appropriate questions, problematizing, synthesizing and articulating; Ability to recognize cause and effective relationships, define problems, formulate hypotheses, interpret and draw conclusions from data, ability to plan, execute and report the results of an experiment or investigation. Efficiency to apply one's learning to real life situations or in interdisciplinary areas.
- PO12: Leadership and Management Skills:** Competence to use skills in organizing for people to reach a shared goal. During leading a project, ability to motivate others to complete a series of tasks, often according to a schedule.
- PO13: Employability and Entrepreneurial Skill:** Ability to develop employability skills such as, positive attitude, good business sense, willingness to learn, resilience, ability to work under pressure, optimism, adaptability, perseverance and motivation, and a host of similar skills.

Department of Biotechnology

PROGRAMME OUTCOMES (PO): B.Sc. (Honours)

Predefined Programme Outcomes	<i>Students taking admission to this program of B.Sc. get equipped with following outcomes:</i>
PO1	Domain Knowledge: Acquiring knowledge of fundamentals, basic Mathematics, domain knowledge of proper scientific models and Computing Specialization from defined problems and explaining the basic scientific principles and methods.
PO2	Scientific thinking: Inculcating scientific thinking and awareness, getting an ability to use necessary current techniques, skills, and modern tools.
PO3	Problem Analysis: Identifying, formulating, & analysing complex problems, reaching substantiated conclusions using first principles of Mathematics, natural sciences and electronic sciences.
PO4	Communication: Communicate concepts, designs, and solutions of scientific activities effectively and professionally with society at large.
PO5	Information & Digital Literacy: Capability to use ICT in a variety of learning situations. Demonstrate ability to access, evaluate and use a variety of relevant information sources; and use appropriate software for analysis of data.
PO6	Ethical Awareness: Ability to embrace moral/ ethical values in conducting one's life, possess knowledge of the values and beliefs of multiple cultures and a global perspective; and capability to support the values required for collaborative work such as mutual trust & fairness.
PO7	Environment & Sustainability: Understanding the impact of scientific solutions on societal and environmental contexts and demonstrate knowledge of and need for sustainable development.
PO8	Self-directed and Life-long Learning: Acquire the ability to engage in independent and life-long learning in the broadest context socio-technological changes. Critical sensibility to live experiences, with self-awareness and reflexivity of both and society.
PO9	Research-related skills: <ul style="list-style-type: none"> • Acquiring familiarity with emerging areas of different subjects in science and their applications in various spheres of sciences and getting appraise of its relevance in future studies. • Getting ability to apply various statistical tools to research problems and ability to build statistical knowledge and knowing the statistical organization in India and abroad. • Developing scientific intuition, ability and techniques to tackle problems either theoretical or experimental in nature.
PO10	Employability Skill: Ability to develop employability skills such as, positive attitude, good business sense, willingness to learn, resilience, ability to work under pressure, optimism, adaptability, perseverance and motivation, and a host of similar skills.

Department of Biotechnology

Programme Specific Outcomes (PSO): Biotechnology (Honours/Major Subject)

Programme Specific Outcomes	<i>The students taking up this program of B.Sc. with Biotechnology (Honours/Major) as a special subject of study, receive the following outcomes:</i>
PSO-1	Acquire knowledge in the biotechnology domain that enables their application in industry.
PSO-2	Enable students to understand the emerging and advanced concepts of engineering in life sciences.
PSO-3	Acquire technical know-how by linking biotechnology disciplinary and interdisciplinary aspects.
PSO-4	Recognize importance of bioethics, IPR and entrepreneurship skills.
PSO-5	Inculcate nature care by imparting knowledge of advance modern techniques.
PSO-6	Extensive hands-on experiences in high tech lab techniques.
PSO-7	Students gain marketable skills and qualifications for career opportunities.
PSO-8	Bestow students with all research skills to work independently.
PSO-9	Skill enhancement with the help of laboratory exposure and project activities fostering global competence.
PSO-10	Able to use biotechnology as a tool in solving broad societal and national issues.

Mapping of PSOs (BSc Biotechnology with POs of BSc)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13
PSO-1	✓												
PSO-2		✓											
PSO-3			✓										
PSO-4									✓				
PSO-5				✓				✓					
PSO-6											✓		
PSO-7													✓
PSO-8												✓	
PSO-9													
PSO-10		✓				✓							

Department of Biotechnology

Course Outcomes (CO)s

Semester: I

General Microbiology (Paper code: MJS-185) (Major)

Course Outcomes	<i>The students taking up this course of B.Sc. with General Microbiology(Major) as a special subject of study receive the following outcomes:</i>
CO-1	To describe micro-organisms as model system to study basic microbiology.
CO-2	Use of molecular approach to identify and characterize microbes and their application in biotechnology.
CO-3	Cultivation and maintenance of micro-organisms and their use in industry to generate marketable skills.
CO-4	Ability to assess microbial growth, metabolism and bacterial reproduction in laboratory to enhance research skills.
CO-5	Ability to illustrate microbial control, water and food microbiology by means of advance modern techniques.

Semester: I

Microbiology and Immunology (Paper Code: MNS-186) (Minor)

Course Outcomes	<i>The students taking up this course of B.Sc. with Microbiology and Immunology(Minor) as a special subject of study receive the following outcomes:</i>
CO-1	Ability to understand microbial diversity and nutrition.
CO-2	Ability to understand immune system, immune responses and vaccination.
CO-3	Ability to explain cultivation and maintenance of micro-organisms and their use in industry to gain marketable skills.
CO-4	Ability to assess microbial growth, metabolism and bacterial reproduction in laboratory to enhance research skills.
CO-5	Ability to perform immunodiagnostic methods like RIA, FIA and ELISA for better career opportunities.

Semester: I

Ecology and Environment management (Paper code: GES-185) (Generic Elective)

Course Outcomes	<i>The students taking up this course of BSc with Ecology and Environment management(Generic Elective) as a special subject of study receive the following outcomes:</i>
CO-1	Ability to define ecology, including population ecology, community ecology and ecosystem function
CO-2	Differentiate and identify biotic and abiotic components of ecosystem and inculcate nature care.
CO-3	Ability to classify pollution and types and their health related issues, its impact on society and environment.
CO-4	Use of environmental biotechnologies in environmental changes and hazardous waste management.
CO-5	Ability to classify biotechnology as an interdisciplinary in protection and preservation of environment.

Department of Biotechnology

Semester: II

Cell and Molecular Biology (Paper code: MJS-285) (Major)

Course Outcomes	<i>The students taking up this course of B.Sc. with Cell and Molecular Biology(Major) as a special subject of study receive the following outcomes:</i>
CO-1	Ability to outline basics of cell and molecular biology.
CO-2	Ability to illustrate the basic function of cell and cell organelles by learning latest lab techniques.
CO-3	Ability to perform extensive study on protein synthesis, genomics and biogenesis.
CO-4	Develop research skills and scientific approach towards cell physiology.
CO-5	Create awareness regarding cancer promoting agents and solve broad societal issues.

Semester: II

Cell Biology and Biochemistry (Paper code: MNS-286) (Minor)

Course Outcomes	<i>The students taking up this course of B.Sc. with Cell Biology and Biochemistry(Minor) as a special subject of study receive the following outcomes:</i>
CO-1	Outline the knowledge about emerging trends of cell biology and biochemistry.
CO-2	Ability to define basic function of cell and cell organelles by learning latest lab techniques.
CO-3	Appraise the importance of bonding and spatial arrangements of molecules for proper functioning and stability.
CO-4	Develop research skills and scientific approach towards cell physiology and biochemical aspects of cell.
CO-5	Ability to construct a career in biochemical testing and medical laboratory, opening opportunities in hospitals and pathological laboratories.

Semester: II

Biotechnology in Human welfare (Paper code: GES-285) (Generic Elective)

Course Outcomes	<i>The students taking up this course of BSc with Biofertilizer Technology(Generic Elective) as a special subject of study receive the following outcomes:</i>
CO-1	Understand the biotechnological Scope & importance.
CO-2	Appraise the contributions of biotechnology to Medical diagnosis.
CO-3	Understand the biotechnological applications in agriculture.
CO-4	Understand the biotechnological applications in the Food industry.
CO-5	To assess the importance of industrial fermentation processes.

Department of Biotechnology

Semester: III

Genetics (Paper code: MJS-385) (Major)

Course Outcomes	<i>The students taking up this course of B.Sc. with Genetics (Major) as a special subject of study receive the following outcomes:</i>
CO-1	Ability to analyze the chemical basis of heredity
CO-2	Ability to categorize cellular and molecular mechanism of genetic methodology.
CO-3	Ability to exemplify the effects of various genetic concepts affecting broad societal issues
CO-4	Evaluate the role of genetics in evolution –bioethics and IPR
CO-5	Ability to validate the concepts of genetics in association with allied sciences.

Semester: III

Genetics and Molecular Biology (Paper code: MNS-386)(Minor)

Course Outcomes	<i>The students taking up this course of B.Sc. with Genetics and Molecular Biology(Major) as a special subject of study receive the following outcomes:</i>
CO-1	Ability to analyze the chemical basis of heredity
CO-2	Ability to categorize cellular and molecular mechanism of genetic methodology.
CO-3	Ability to exemplify the effects of various genetic concepts affecting broad societal issues
CO-4	Ability to perform extensive study on protein synthesis, genomics and biogenesis.
CO-5	Ability to validate the concepts of genetics in association with allied sciences.

Semester: III

Vermicomposting (Paper Code: GES-385) (Generic Elective)

Course Outcomes	<i>The students taking up this course of B.Sc. with Vermicomposting(Generic Elective) as a special subject of study receive the following outcomes:</i>
CO-1	Ability to describe the importance of vermicomposting and vermin culture.
CO-2	To produce good quality vermicomposting and vermiculture.
CO-3	Ability to invent opportunities for entrepreneurship such as vermicomposting production.
CO-4	Give the examples and need of vermicomposting organic farming in India.
CO-5	Will help to construct a pollution free environment.

Department of Biotechnology

Semester: III

Medical Diagnostics (Paper code: SEC- 385)

Course Outcomes	<i>The students taking up this course of BSc with Vermicomposting(Vocational/SEC) as a special subject of study receive the following outcomes:</i>
CO-1	Understand and identify the disease and diagnostic procedure.
CO-2	Facilitate treatment procedure and ensure recovery by maintaining good relations with patients.
CO-3	Explain diseases and diagnostic medical techniques used.
CO-4	Learn various lab techniques by getting knowledge of fundamental concepts of medical diagnostics technology.
CO-5	Equip the skills required to handle diagnostic equipment.

Semester: IV

Biochemistry and Metabolism (Paper code: MJS-485)

Course Outcomes	<i>The students taking up this course of B.Sc. with General Microbiology(Major) as a special subject of study receive the following outcomes:</i>
CO-1	To describe fundamental concept of biochemistry
CO-2	Use of molecular approach to identify and characterize various inter-related physiological and metabolic events and inter-disciplinary aspects.
CO-3	To identify proteins, carbohydrates, lipids and enzymes involved in various biological processes and their lab protocols.
CO-4	Ability to assess structure, function and properties of macromolecules and their use in proteomics
CO-5	Use of enzymes in food, Agricultural and pharmaceutical industries.

Semester: IV

Recombinant DNA Technology (Paper code: MNS-486) (Minor)

Course Outcomes	<i>The students taking up this course of B.Sc. with Recombinant DNA Technology (Minor) as a special subject of study receive the following outcomes:</i>
CO-1	Understand role of enzymes required for gene manipulation in biotechnology.
CO-2	Ability to use modern and advanced techniques like PCR, Blotting, mapping, sequencing and preparation of recombinant DNA molecules.
CO-3	Illustrate molecular markers, mechanism such as RFLP, RAPD, AFLP- inculcate research skills among students.
CO-4	Ability to integrate extensive hands-on experience of genetic engineering techniques for societal and environmental issues...
CO-5	Ability to devise skills on techniques of construction of recombinant DNA - Cloning vectors and isolation of gene of interest..

Semester: IV

Mushroom Technology (Paper code: GES-485) (Generic Elective)

Course Outcomes	<i>The students taking up this course of B.Sc. with Mushroom Technology(Generic Elective) as a special subject of study receive the following outcomes:</i>
CO-1	Ability to identify and classify morphology and types of Mushrooms. They will gain understanding of edible and poisonous mushrooms.
CO-2	Ability to carry out mushroom cultivation.
CO-3	Identify the fruiting stages and application of life cycle and culture of many mushrooms in research.
CO-4	Ability to build a small scale industry of Mushroom Cultivation-entrepreneurship skills.
CO-5	Ability to understand diseases, post harvesting techniques of mushroom cultivation.

Semester: IV

IPR, Entrepreneurship, Bioethics & Biosafety (Paper code: SEC- 485)

Course Outcomes	<i>The students taking up this course of BSc with IPR and Entrepreneurship(VOC/SEC) as a special subject of study receive the following outcomes:</i>
CO-1	Ability to outline Intellectual Property provisions and its application in the real world.
CO-2	Ability to understand drafting and filing of own Patent application.
CO-3	Ability to discuss bioethics, entrepreneurship and IPR in terms of usage in current scenario.
CO-4	Ability to explain National and International Ethical issue.
CO-5	Ability to discuss IPR laws on primary basis for their future understanding in the field of allied subjects.

Semester: V

Immunology and Animal Cell Culture (Paper code: MJS-585)

Course Outcomes	<i>The students taking up this course of B.Sc. with Immunology and Animal Cell Culture as a special subject of study receive the following outcomes:</i>
CO-1	To understand role of immune cells and antigen-antibody interaction-use of modern scientific research techniques.
CO-2	Applying the knowledge of immunology in analyzing human diseases and their clinical know-how.
CO-3	Ability to evaluate clinical results by methods such as RIA, FIA, ELISA etc.
CO-4	Learn to prepare animal cell culture media and culture cells.
CO-5	Ability to create immobilized cells, learn applications of animal cell culture.

Department of Biotechnology

Semester: V

Plant Tissue Culture and Environmental Biotechnology (Paper code: DSE-586)

Course Outcomes	<i>The students taking up this course of B.Sc. with Immunology and Animal Tissue Culture(Honours-II/Subsidiary) as a special subject of study receive the following outcomes:</i>
CO-1	To discuss plant growth and differentiation, preparation of growth nutrients, and basics of physiological and molecular process in plants.
CO-2	To understand the concepts of totipotency, and different kinds of plant culture techniques. To increase the awareness and appreciation for plants in environment.
CO-3	To apply knowledge about bioremediation, biofertilizers and bioleaching, Treatment of industrial and municipal effluents.
CO-4	Ability to identify and classify types and their health related issues, its impact on society and environment. Environmental changes, hazardous waste- use of environmental biotechnologies.
CO-5	Illustrate the role of Biotechnologies in protection and preservation of environment- interdisciplinary approach.

Semester: V

Computational Tools for Biotechnology (Paper code: SEC- 585)

Course Outcomes	<i>The students taking up this course of B.Sc. with Bioprocess and Industrial Biotechnology as a special subject of study receive the following outcomes:</i>
CO-1	Demonstrate a thorough understanding of the fundamental components of genome architecture.
CO-2	Apply the principles of data science to the field of genomics and healthcare.
CO-3	Interpret and evaluate variations in genome structure and sequence within the context of physiological function and disease across diverse human populations.
CO-4	Explain the key concepts and core elements of machine learning (ML), artificial intelligence (AI) and block chain (BC)
CO-5	Critically evaluate the potential benefits and limitations of these technologies, and apply them to real-world healthcare scenarios.

Semester: VI

Genetic Engineering (Paper code: MJS-685)

Course Outcomes	<i>The students taking up this course of B.Sc. with Genetic Engineering as a special subject of study receive the following outcomes:</i>
CO-1	Understand role of enzymes required for gene manipulation in biotechnology.
CO-2	Learn modern and advanced techniques like PCR, Blotting, mapping, sequencing and preparation of recombinant DNA molecules.
CO-3	Illustrate molecular markers, mechanism such as RFLP, RAPD, AFLP- inculcate research skills among students.
CO-4	Strategize research methodologies employing genetic engineering techniques- extensive hands-on experiences.
CO-5	To identify serves as a platform for more advanced cutting-edge technologies.

Department of Biotechnology

Semester: VI

Plant Science (Paper code: DSE I 685)

Course Outcomes	<i>The students taking up this course of B.Sc. with Plant Science I as a special subject of study receive the following outcomes:</i>
CO-1	To have the knowledge and understanding of the range of plant diversity in terms of structure, function and environmental relationships.
CO-2	To understand the taxonomy of flora of M.P. and prevent loss of biodiversity.
CO-3	Classify algae, fungi, lichens, bryophytes, pteridophytes, gymnosperms and angiosperms
CO-4	To contrast the anatomy and embryology of plants.
CO-5	To compare different physiology of plants.

Semester: VI

Animal Science (Paper code: DSE II 685)

Course Outcomes	<i>The students taking up this course of B.Sc. with Animal Science I as a special subject of study receive the following outcomes:</i>
CO-1	To classify non-chordates and chordates on the basis of their morphological characteristics and structures
CO-2	To compare diversity and evolution of non-chordates and chordates.
CO-3	To describe unique characters of chordates
CO-4	To assess the knowledge of animal behaviour in practical approach.
CO-5	To understand physiology of important organ system.

A brief note on Bloom's Taxonomy:

According to the revised version of Bloom's Taxonomy there are six levels of cognitive learning. Each level is conceptually different. The six levels are (1) remembering,

(2) understanding, (3) applying, (4) analyzing, (5) evaluating, and (6) creating. We follow the Bloom's Taxonomy in deciding the course outcome & the levels (1/2/3/4/5/6) are displayed in the mapping table of COs with the PSOs of each program of NEP-2020. Details of the terms used in the levels are as follows:

Level-1: **REMEMBER** - this level include:

cite, define, describe, identify, label, list, match, name, outline, quote, recall, report, reproduce, retrieve, show, state, tabulate, and tell.

Level-2: **UNDERSTAND** - this level include:

abstract, arrange, articulate, associate, categorize, clarify, classify, compare, compute, conclude, contrast, defend, diagram, differentiate, discuss, distinguish, estimate, exemplify, explain, extend, extrapolate, generalize, give examples of, illustrate, infer, interpolate, interpret, match, outline, paraphrase, predict, rearrange, reorder, rephrase, represent, restate, summarize, transform, and translate.

Level-3: **APPLY** - this level include:

apply, calculate, carry out, classify, complete, compute, demonstrate, dramatize, employ, examine, execute, experiment, generalize, illustrate, implement, infer, interpret, manipulate, modify, operate, organize, outline, predict, solve, transfer, and use.

Level-4: **ANALYZE** - this level include:

analyze, arrange, break down, categorize, classify, compare, contrast, deconstruct, detect, diagram, differentiate, discriminate, distinguish, divide, explain, identify, integrate, inventory, order, organize, relate, separate, and structure.

Level-5: **EVALUATE** - this level include:

appraise, apprise, argue, assess, compare, conclude, consider, contrast, convince, criticize, critique, decide, determine, discriminate, evaluate, grade, judge, justify, measure, rank, rate, recommend, review, score, select, standardize, support, test, and validate.

Level-6: (highest level): **CREATE** - this level include:

arrange, assemble, build, collect, combine, compile, compose, constitute, construct, create, design, develop, devise, formulate, generate, hypothesize, integrate, invent, make, manage, modify, organize, perform, plan, prepare, produce, propose, rearrange, reconstruct, reorganize, revise, rewrite, specify, synthesize, and write.

Department of Biotechnology

Programme: BSc (Honours) Biotechnology Mapping of COs with PSOs for Semester-I

Course		PS01	PS02	PS03	PS04	PS05	PS06	PS07	PS08	PS09	PS010
<i>Paper Title: General Microbiology</i> <i>Paper Code: MJS-186</i>	CO1	1									
	CO2		3								
	CO3							3,6			
	CO4								5		
	CO5										3

Mapping of COs and PSOs for Semester-I

<i>Paper Title: Microbiology and Immunology</i> <i>Paper Code: MNS-186</i>	CO1	2									
	CO2		2								
	CO3							2,3			
	CO4								5		
	CO5									6	

Mapping of COs and PSOs for Semester-I

<i>Paper Title: Ecology and Environment management</i> <i>Paper Code: GES-185</i>	CO1	1									
	CO2									1,4	
	CO3						3				
	CO4						3				
	CO5										3

Mapping of COs and PSOs for Semester-II

<i>Paper Title: Cell and Molecular Biology</i> <i>Paper Code: MJS-285</i>	CO1	1									
	CO2										2
	CO3	6									
	CO4								6		
	CO5						6				

Mapping of COs and PSOs for Semester-II

<i>Paper Title: Cell Biology and Biochemistry</i> <i>Paper Code: MNS-286</i>	CO1	1									
	CO2									1	
	CO3	5									
	CO4								6		
	CO5							6			

Mapping of COs and PSOs for Semester-II

<i>Paper Title: Biotechnology in Human Welfare</i> <i>Paper Code: GES-285</i>	CO1	2									
	CO2										5
	CO3										2
	CO4										2
	CO5										4

Department of Biotechnology

Mapping of COs with PSOs for Semester-III

Course		PS01	PS02	PS03	PS04	PS05	PS06	PS07	PS08	PS09	PS010
<i>Paper Title: Genetics</i> <i>Paper Code: MJS-385</i>	CO1	4									
	CO2		4								
	CO3						2				
	CO4					5					
	CO5		5								

Mapping of COs and PSOs for Semester-III

<i>Paper Title: Genetics and Molecular Biology</i> <i>Paper Code: MNS-386</i>	CO1	4									
	CO2		4								
	CO3						2				
	CO4										6
	CO5		5								

Mapping of COs and PSOs for Semester-III

<i>Paper Title: Vermicomposting</i> <i>Paper Code: GES-385</i>	CO1	1									
	CO2									6	
	CO3					6					
	CO4						2				
	CO5						6				

Mapping of COs and PSOs for Semester-III

<i>Paper Title: Medical Diagnostics</i> <i>Paper Code: SEC-385</i>	CO1		2								
	CO2										
	CO3						2				
	CO4	1									
	CO5									4	

Mapping of COs and PSOs for Semester-IV

<i>Paper Title: Biochemistry and metabolism</i> <i>Paper Code: MJS-485</i>	CO1	1									
	CO2		3								
	CO3	1									
	CO4									3,5	
	CO5										3

Mapping of COs and PSOs for Semester-IV

<i>Paper Title: Recombinant DNA Technology</i> <i>Paper Code: MNS-486</i>	CO1	2									
	CO2										3
	CO3								3		
	CO4						4				
	CO5									6	

Department of Biotechnology

Mapping of COs and PSOs for Semester-IV

Course		PS01	PS02	PS03	PS04	PS05	PS06	PS07	PS08	PS09	PS010
Paper Title: Mushroom Technology Paper Code: GES-485	CO1	1,2,3									
	CO2									3	
	CO3								1,3		
	CO4				6			6		2	
	CO5										

Mapping of COs and PSOs for Semester-IV

Paper Title: IPR, Entrepreneurship, Bioethics and Biosafety Paper Code: SEC-485	CO1	1,3									
	CO2			2							
	CO3				2						
	CO4				4						
	CO5		2								

Mapping of COs and PSOs for Semester-V

Paper Title: Immunology and Animal Cell Culture Paper Code: MJS-585	CO1		2								
	CO2							3			
	CO3									5	
	CO4										6
	CO5										6

Mapping of COs with PSOs for Semester-V

Course		PS01	PS02	PS03	PS04	PS05	PS06	PS07	PS08	PS09	PS010
Paper Title: Plant Tissue culture and environmental biotechnology Paper Code: DSE-586	CO1	2									
	CO2							2			
	CO3							3			
	CO4						1,3				
	CO5							3			

Mapping of COs and PSOs for Semester-V

Paper Title: Computational Tools for Biotechnology Paper Code: SEC-585	CO1	3									
	CO2		3								
	CO3								3,5		
	CO4									2	
	CO5										5

Department of Biotechnology

Mapping of COs and PSOs for Semester-VI

Course		PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
Paper Title: Genetic engineering Paper Code: MJS-685	CO1	2									
	CO2									1	
	CO3									3	
	CO4										5
	CO5										1

Mapping of COs and PSOs for Semester-VI

Plant Science (Paper code: DSE I- 685)	CO1	2									
	CO2	2									
	CO3	3									
	CO4								5		
	CO5							4			

Mapping of COs and PSOs for Semester-VI

Animal Science (Paper code: DSE II 685)	CO1	3									
	CO2		4								
	CO3	1									
	CO4	5									
	CO5					2					



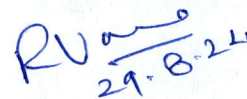
(IQAC Coordinator)





(Convenor, Academic Committee)

अकादमिक समिति
उच्चशिक्षा उत्कृष्टता संस्थान
भोपाल


29.8.24

(HOD Biotechnology)


(Dr. Pragyesh Kumar Agarwal)
Director