



List of New Course(s) Introduced

Department : **Biotechnology**

Program Name : **M.Sc.**

Academic Year : **2021-22**

**List of New Course(s) Introduced**

Sr. No.	Course Code	Name of the Course
1.	MBT 208T	Human Genomics
2.	MBT 3 15T	Application in Biotechnology

Signature & Seal of HoD

विभागाध्यक्ष, जैव प्रौद्योगिकी विभाग  
Head, Department of Biotechnology  
गुरु घासीदास विश्वविद्यालय, बिलासपुर (छ.ग.)  
Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.)



## Minutes of Meetings (MoM) of Board of Studies (BoS)

**Academic Year : 2021-22**

**School : School of Studies of Interdisciplinary Education and Research**

**Department : Biotechnology**

**Date and Time : 09-11-2021- 12:00 Noon**

**Venue : Room of Head, Department of Biotechnology**

THE MEETING OF BOARD OF STUDIES IN BIOTECHNOLOGY GURU GHASIDAS VISHWAVIDYALYA MINUTES OF, BILASPUR HELD ON 09/11/2021

An online meeting of the board of studies in biotechnology under School of interdisciplinary education and Research was held on 09/11/2021 at 12:00 Noon under the chairmanship of Dr. Renu Bhatt, Head Department of Biotechnology. The following members were present.

I.	Dr. Renu Bhatt, Head	Chairman
II.	Prof. B.N. Tiwary, Professor	Member
III.	Prof. Keshavkant Sahu	Expert present online
IV.	Dr. Dhananjay Shukla	Member

The following agenda were placed to discuss:

1. To revise syllabus of CBCS M.Sc. Biotechnology Programme
2. To offer an elective course in M.Sc. biotechnology
3. To discuss and approve the amendment in the ordinance number 74 of CBCS in M.Sc. Biotechnology programme.

At the very outset the HOD, Chairman of Board of Studies welcomed all the BoS members and discussed the above agenda at length. Following resolution were made in this meeting.

1. The syllabus of different courses ( core and electives courses) taught in CBCS M.Sc Biotechnology programme was reviewed by the members and overlapping in the different course content was identified. After thorough discussion the syllabus of each course were revised accordingly and overlapping was removed after through discussion and approved by the BoS.
2. The open elective course will be offered to the Master students of the other departments as per the guidelines of the university . the title and the course content of open elective course were approved by the BoS.
3. The amendment in the ordinance for M.Sc Biotechnology under CBCS Pattern was discussed and approved by the board of studies and recommended to be placed before Academic Council.

The following new courses were introduced in the of M.Sc.:

Course Code	Name of the Course
MBT 208T	Human Genomics
MBT 3 15T	Application in Biotechnology

The meeting was ended with a vote of thanks by the Chairman.

Signature & Seal of HoD

विभागाध्यक्ष, जैव प्रौद्योगिकी विभाग  
Head, Department of Biotechnology  
गुरु घासीदास विश्वविद्यालय, बिलासपुर (छ.ग.)  
Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.)

**गुरु घासीदास विश्वविद्यालय**  
(केंद्रीय विश्वविद्यालय अधिनियम 2009 अ. 25 से अंतर्गत स्थापित केंद्रीय विश्वविद्यालय)  
कोनी, बिलासपुर - 495009 (छ.ग.)



**Guru Ghasidas Vishwavidyalaya**  
(A Central University Established by the Central Universities Act 2009 No. 25 of 2009)  
Koni, Bilaspur - 495009 (C.G.)

## **Scheme and Syllabus**



**Syllabus**  
**M.Sc. Biotechnology**  
**(2021-22)**

M.Sc. Biotechnology PG Semester I				
Code	Course opted	Subjects	Hours/ week	Credits
MBT 101 T	Core -1	Biochemistry	03	3
MBT 102T	Core -2	Cell and Molecular Biology	03	3
MBT 103T	Core -3	Plant and Animal Biotechnology	03	3
MBT 104T	Core -4	Microbiology	02	2
MBT 105T	Core-5	Genetics	02	2
MBT 106T	Core-6	Biostatistics	03	3
<b>Laboratory</b>				
MBT 107L	Lab 01	Biochemistry and Analytical Techniques	08	4
MBT 108L	Lab 02	Microbiology	04	2
MBT 109L	Lab 03	Plant and Animal Biotechnology	04	2
<b>Total</b>			<b>32</b>	<b>24</b>
M.Sc. Biotechnology PG Semester II				
Code	Course opted	Subjects	Hours/ week	Credits
MBT 201 T	Core -1	Genetic Engineering	03	3
MBT 202T	Core -2	Immunology	03	3
MBT 203T	Core -3	Bioinformatics	03	3
MBT 204T	Core-4	Genomics and Proteomics	02	2
MBT 205T	Core -5	Molecular Diagnostics	02	2
MBT 206T	Core -6	Research Methodology and Scientific Communication Skills	02	2
MBT 207T	Elective-1	Environmental Biotechnology	02	2
MBT 208T	Elective-1	Human Genomics		
MBT 209T	Elective-1	Nanobiotechnology		
*MBT 210S	Elective	MOCs course to be selected/opted from SWAYAM portal (SWAYAM-BIOTECH-1)		
<b>Laboratory</b>				
MBT 211L	Lab 01	Molecular Biology and Genetic Engineering	08	4
MBT 212 L	Lab 02	Immunology	06	3
<b>Total</b>			<b>31</b>	<b>24</b>
M.Sc. Biotechnology PG Semester III				
Code	Course opted	Subjects	Hours/ week	Credits
MBT 301 T	Core -1	Bioprocess Engineering and Technology	03	3
MBT 302T	Core -2	Emerging Technologies	02	2
MBT 303T	Core -3	Critical Analysis of Classical Papers	02	2
MBT 304T	Core-4	Bioentrepreneurship	02	2
MBT 305T	Core -5	Intellectual Property Rights, Biosafety and Bioethics	02	2
MBT 306T	Core -6	Project Proposal Preparation and Presentation	02	2
MBT 307T	Core -7	Research Seminar	02	2

*ml. anand*  
21/11/21

*Abhant*  
21/11/21

*12-02/21*  
21/11/21



Department of Biotechnology, GGV

MBT 308T	Elective	Microbial Technology	02	2
MBT 309 T	Elective	Computational Biology		
MBT 310 T	Elective	Drug Discovery and Development		
MBT 311 T	Elective	Vaccines		
MBT 312 T	Elective	Protein Engineering		
MBT 313 T	Elective	Medical Microbiology and Infection Biology		
MBT 314S	Elective	MOOCs course to be selected/opted from SWAYAM portal (SWAYAM-BIOTECH-1)		
MBT 3 15T	Open Elective	Application in Biotechnology (The students will have to opt an open elective course from the basket of elective courses offered by other departments of University)	05	5
<b>Laboratory</b>				
MBT 315L	Lab 01	Laboratory VI: Bioprocess Engineering and Technology	08	4
MBT 316 L	Lab 02	Laboratory VII: Bioinformatics	04	2
<b>Total</b>			<b>34</b>	<b>28</b>
<b>M.Sc. Biotechnology PS Semester IV</b>				
<b>Code</b>	<b>Course opted</b>	<b>Subjects</b>	<b>Hours/week</b>	<b>Credits</b>
MBT 401	Core -1	Dissertation	32	20
<b>Total</b>			<b>32</b>	<b>20</b>
<b>Total Credits</b>				<b>96</b>

**Note:**

- The students will undertake industrial tour/visit during first year of M.Sc. programme as part of skill development. After visit students will be required to submit a report/certificate for record.
- The summer/winter training 4 – 8 weeks is compulsory for DBT sponsored students and optional for other M.Sc. students. After training, students will be required to submit the certificate for record.
- Open elective course will be offered in the odd or even semester as approved by the university.

*Dr. [Signature]*  
*9/11/2021*  
*Rouf*



Department of Biotechnology, GGV



**Recommended Textbooks and References:**

1. RajagopalVadivambal.DigvirS. Jayas (2015) *Bio-Imaging-Principles,Techniques, and Applications*. ISBN 9781466593671 -CAT#K20618.
2. AlbertoDiaspro,MarcA.M.J.vanZandvoort (2016) *Super-ResolutionImagingin Biomedicine*. ISBN 9781482244342 -CAT#K23483.
3. Taatjes,Douglas,Roth,Jürgen(Eds.)(2012) *CellImagingTechniquesMethodsand Protocols*. ISBN978-1-62703-056-4.

**Human Genomics**

(Credits: 2)

**Unit I: Studying human chromosomes**

Chromosomes identification by size and staining pattern, Chromosome banding (G-banding, Q-banding, R-banding, T-banding, C-banding), Molecular cytogenetics (Chromosome fluorescence *in situ* hybridization (FISH), Chromosome painting and molecular karyotyping, Comparative genome hybridization (CGH)); Chromosome abnormalities (Numerical chromosomal abnormalities involve gain or loss of complete chromosomes: Polyploidy, Aneuploidy, Mixoploidy, Clinical consequences); Structural chromosomal abnormalities resulting from misrepair or recombination errors.

**Unit II: Analyzing the Structure and Expression of Genes and Genomes**

DNA library: Genomic DNA libraries, cDNA libraries, Library screening, Library amplification and dissemination. Sequencing DNA: Dideoxy DNA sequencing involving enzymatic DNA synthesis using base-specific chain terminators, Automation of dideoxy DNA sequencing, Iterative pyrosequencing, Massively parallel DNA sequencing for simultaneous sequencing of huge numbers of different DNA fragments. Genome structure analysis and genome projects, The linear ordering of genomic DNA clones in a contig and matching their original subchromosomal locations. The Human Genome Project as an international endeavor and biology's first Big Project, Major milestones in mapping and sequencing the human genome.

**Unit III: Basic gene expression analyses**

Different levels of expression mapping: tissue *in situ* hybridization, cellular *in situ* hybridization, northern blot hybridization, RNA dot-blot hybridization, ribonuclease protection assay, RT-PCR/qPCR, DNA microarray hybridization; Detection methods used in quantitative real time PCR: Nonspecific detection using SYBR Green I Dye, Specific detection by hybridization probes by Molecular Beacon probes and TaqMan double-dye probes.

**Unit IV: Organization of the Human Genome**

General organization of the human mitochondrial and nuclear genome, Distribution of genes within chromosomes, Duplication of DNA segments resulting in copy-number variation and gene families, Protein coding genes, The origins, prevalence, and functionality of pseudogenes, RNA genes (Ribosomal RNA genes, Transfer RNA genes, Spliceosomal small nuclear RNA (snRNA) genes, Non-spliceosomal small



Department of Biotechnology, GGV  
nuclear RNA genes, Small nucleolar RNA (snoRNA) genes, Small Cajal body RNA genes, major classes of human noncoding RNA), Highly repetitive DNA: heterochromatin and transposon repeats

#### **Unit V: Human Genetic Variability and Its Consequences**

Types of variation between human genomes, Single nucleotide polymorphisms, Polymorphic variation in interspersed and tandem repeated sequences, Large-scale variations in copy number in human genomes, Common markers used in constructing framework DNA maps of complex genomes: Restriction fragment length polymorphism (RFLP), Microsatellite, Single nucleotide polymorphism (SNP); Sequence-tagged site (STS) Expressed sequence tag (EST).

#### **Recommended Textbooks and References:**

- Human Molecular Genetics By Tom Strachan and Andrew Read
- Brown TA. Genomes. 2nd edition. Oxford: Wiley-Liss; 2002. Chapter 1, The Human Genome. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK21134/>



### Applications of Biotechnology

Credit: 05

#### Unit-I: Applications of Biotechnology in Environment

Environmental bioremediation of hazardous contaminants, environmental protection and monitoring, Conversion of organic wastes into useful bioresources.

#### Unit-II: Applications of Biotechnology in Medicine

Production of drugs and therapeutics, genetically modified organism, analysis of genes in genetic diseases, corrections of genetic defects, gene therapy.

#### Unit-III: Applications of Biotechnology in Agriculture

Increased crop productivity, enhanced crop protection, improved nutritional value, better flavour, abiotic stress tolerance, bio pesticides, and bio fertilizers.

#### Unit-IV: Applications of Biotechnology in Food Processing

Food processing, food additives, food formulations, fermented foods, production of enzymes, amino acids, vitamins, organic acids, carbohydrates and flavouring agents, food spoilage and preservation

#### Unit-V: Application of Biotechnology in Industry

Industrial fermentation, application of microbes and fermentation process for industrial production of useful products such as chemicals, feeds, detergents, paper, bioplastics.

#### Recommended Textbooks and References

1. Pelczar, M.J., Reid, R.D., & Chan, E.C. (2001). *Microbiology* (5<sup>th</sup> ed.). New York: McGraw-Hill.
2. Brown, T.A. (2006). *Genomes* (3<sup>rd</sup> ed.). New York: Garland Science Pub.
3. Shuler, M.L., & Kargi, F. (2002). *Bioprocess Engineering: Basic Concepts*. Upper Saddle River, NJ: Prentice Hall.
4. G.M. Evans and J.C. Furlong (2003). *Environmental Biotechnology: Theory and Applications*, Wiley Publishers.