



List of Revised Courses

Department : **Biotechnology**

Program Name : **M.Sc.**

Academic Year : **2016-17**

List of Revised Courses

Sr. No.	Course Code	Name of the Course
1.	LBTM 301	ANIMAL BIOTECHNOLOGY
2.	LBTM 302	ADVANCED IMMUNOLOGY
3.	LBTM 303	PLANT BIOTECHNOLOGY

Signature & Seal of HoD

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Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.)



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

Academic Year : 2016-17

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

Department : **Biotechnology**

Date and Time : **01-07-2015 - 03:00 pm**

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

MINUTES OF THE MEETING OF BOARD OF STUDIES IN BIOTECHNOLOGY HELD ON 01/07/2015

A meeting of the BOS was held on 01.07.2015 at 3 pm to discuss the following:

- To discuss and approve the course structure and scheme of examination of Int. UG/PG and M.Sc. courses in Biotechnology as per CBCS scheme of the UGC effective from academic session 2015-2016.
- Any other matter by permission of the Chair.

The following member were present:

(i)	Prof. B.N. Tiwary, Head	Chairman
(ii)	Dr. Renu Bhatt, Associate Professor	Member
(iii)	Dr. D.K. Parihar, Assistant Professor	Member

A copy of the draft of course structure and scheme of examination was sent in advance by email for perusal and comment to Prof. Ashok Kumar, Department of Biotechnology, BHU, the external subject expert. However, no reply was received till the time of meeting on 01.07.2015.

At the very outset the HOD and Chairman of BOS welcomed all the esteemed members and placed the draft prepared to revise course structure and scheme of examination in the light of UGC directives as per CBCS scheme to be implemented from 2015-2016. Further the chairman brought to the notice of all members about the resolution of meeting called by the Dean on **23.06.2015** regarding following changes to be made for undergraduate courses:

- There should be 03 core subjects at entry level of integrated courses in addition to AECC (Ability Enhancement Core Courses) and elective courses.
- There should be at least 02 groups in each undergraduate course of every Department of the school. The students may opt any one of the two groups for Biotechnology (Hons.)

The course structure and scheme of examination was approved by all members.

The chairman categorically pointed out that in UG courses only 03 core subjects have to be defined and the student shall have choice to opt for any of the subject to pursue, the Honors degree course in 05th sem.

The BOS resolved to have two groups

Group A : Biotechnology-Chemistry-Zoology

Group B: Biotechnology-Chemistry-Botany

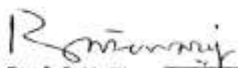
Each of the groups shall have a maximum of 30 seats, i.e. within the total approved seat of 60 in Biotechnology Honors. The number of students of other Departments of School of Life Sciences, opting Biotech as one of the core subjects in no case shall exceed 60.

However, one of the esteemed members, Dr. D.K. parihar, showed his descent ~~mentoring~~ ^{mentoring} that segregating students in Botany and Zoology will lead to incomplete and inadequate knowledge of Biological sciences, as this is an integral component of Biotechnology.

The meeting ended with a vote of thanks by the Chair.


Dr. Renu Bhatt
(Member)


Dr. D. K. Parihar
(Member)


Prof. B.N. Tiwary
(Chairman) 01.07.2015



In the meeting of BOS-Biotechnology held on 01-07-2015, the following courses were revised in the of Syllabus of B. Sc. and M.Sc. Course work:

Sr. No.	Course Code	Name of the Course
1.	LBTC 301	BIOSTATISTICS
2.	LBTC 401	IMMUNOLOGY
3.	LBTM 301	ANIMAL BIOTECHNOLOGY
4.	LBTM 302	ADVANCED IMMUNOLOGY
5.	LBTM 303	PLANT BIOTECHNOLOGY

The following new courses were introduced in the Syllabus of B. Sc. and M.Sc. Course:

Course Code	Course Name
LBTC 402	Biophysical Techniques
LBTM 304	A . Bioprocess Engineering and Technology
LBTM 304	B. Molecular Docking
LBTM 304	C. Molecular Diagnostics
LBTM 304	D. Plant Metabolic Engineering
LBTM 401	Immunotechniques
LBTM 402	Environmental Technology
LBTM 403	A. Microbial and Fermentation Technology
LBTM 403	B. Chemoinformatics and Drug Designing
LBTM 403	C. Plant Genetic Engineering and Molecular Breeding

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Scheme and Syllabus

Semester III					
Code	Course Opted	Subject	Hours/ Semester	Hours/ Week	Credits
LBTM-301	Core-1	Animal Biotechnology	48	3	3
LBTM-302	Core-2	Advanced Immunology	48	3	3
LBTM-303	Core-3	Plant Biotechnology	48	3	3
LBTM-304	Elective	Paper-4a.: Bioprocess Engineering and Technology	48	3	3
		Paper-4b.: Molecular modeling			
		Paper-4c.: Molecular Diagnostics			
		Paper-4d.: Plant Metabolic Engineering			
LBTM-305	Core-1 & 2	Laboratory V Based on Core-1 & 2	96	6	3
LBTM-306	Core-3 & Elective	Laboratory VI Based on core-3 & elective	96	6	3
LBTM-307		Review writing and Seminar	32	2	2
Total			416	26	20

Semester IV					
Code		Subject	Hours/ Semester	Hours/ Week	Credits
LBTM-401	Core-1	Immunotechniques	48	3	3
LBTM-402	Core-2	Environmental Technology			
LBTM-403	Elective Paper	Paper-4a.: Microbial and fermentation technology	48	3	3
		Paper-4b.: Chemoinformatics and drug designing			
		Paper-4c.: Gene therapy and Nano medicine			
		Paper-4d.: Plant Genetic Engineering and molecular breeding			
LBTM-404	Core-1 & 2	Laboratory VII Based on Core-1 & 2	96	6	3
LBTM-405		Project Dissertation & Viva	288	18	6+3
LBTM-406	Soft Skill Development-2	Entrepreneurship & Management in Biotechnology	48	3	3
Total			528	42	21

Baskets of Electives: Microbial Technology, Bioinformatics, Animal Biotechnology and Plant Biotechnology

* B.Sc Biotechnology (Hons.) students shall opt one Elective from the Basket of electives offered by the Department.

* Project work/ Field Study will be based on major elective paper (s) opted by the student, in consultation with the faculty concerned and on recommendation of the Head of the Department.

Dr. Shakti

Rajy

[Signature]



Course: Animal Biotechnology
Course Code:
Course Credit: (3-0-0) 3

Unit - 1

Laboratory requirements for animal cell culture: Sterile handling area, Sterilization of different materials used in animal cell culture, Aseptic concepts, Instrumentation and equipments for animal cell culture, History of cell culture, Primary and secondary cell culture

Unit - 2

Media and reagents: Types of cell culture media, Ingredients of media, Physiochemical properties, Antibiotics, growth supplements, Foetal bovine serum; Serum free media, Trypsin solution, Selection of medium and serum, Conditioned media, Other cell culture reagents, Preparation and sterilization of cell culture media, serum and other reagents

Unit - 3

Different types of cell cultures, Trypsinization, Cell separation, Continuous cell lines, Suspension culture, Organ culture, Development of cell lines, Characterization and maintenance of cell lines, stem cells, Cryopreservation, Common cell culture contaminants

Unit - 4

Stem cell research: Current status and application in medicine. Application of animal cell culture for *in vitro* testing of drugs; Application of cell culture technology in production of human and animal viral vaccines and pharmaceutical proteins. Types of blood substituents, Artificial blood, General account of *in vitro* regulation of blood cells production

Unit - 5

Gene transfer technology in animals: Viral and non-viral methods, Production of transgenic animals and molecular pharming, current status of production of transgenic animals. Animal cloning: Techniques, relevance and ethical issues

Evaluation Scheme:

S.No.	Examination	Duration	% of Marks
1	Internal Assessment I	1 hour	30
2	Internal Assessment II	1 hour	30
3	End Semester	3 hours	60
4	Attendance/Assignment/Class performance	Each semester	10

Note: The best one out of two Internal Assessments will be taken into consideration.

Suggested Readings

1. Culture of Animal Cells: Freshney
 2. Animal Cell Culture: John RW Masters
 3. Animal Cell Culture Techniques: Martin Clynes
- Transgenic Animals: Generation and Use: Louis-Marie Houdebine

Q. Shelt

R. Singh

[Signature]



Course: **Advanced Immunology**
Course Code:
Course Credit: (3-0-0) 3

Unit - 1

Introduction: Phylogeny of Immune system, innate and acquired immunity, Clonal nature of immune response. Organisation and structure of lymphoid organs

Unit - 2

Cells of immune system: Hematopoiesis and differentiation, lymphocyte trafficking, B-lymphocyte, T-lymphocytes, macrophages, Dendritic cells, natural killer and lymphokine activated killer cells. Eosinophils, neutrophils and mast cells. Differentiation and activation of B and T lymphocytes, cytokine structure and function, cytokine receptor.

Unit - 3

Nature and Biology of antigens and super antigens. Antibody structure and function, antigen and antibody interactions, Major histocompatibility complex, HLA, Generation of antibody diversity and complement system, Cell mediated cytotoxicity: mechanism of T cell and NK cell mediated lysis, antibody dependent cell mediated cytotoxicity and macrophage mediated cytotoxicity

Unit - 4

Antigen processing and presentation, generation of humoral and cell mediated immune responses, cytokines and their role in immune regulation, T- cell regulation, Immunological tolerance, Hypersensitivity, Autoimmunity.

Unit - 5

Transplantation, Immunity to infectious agents (intracellular parasites, helminths & viruses,) Tumor Immunology, AIDS and other immunodeficiencies, Hybridoma Technology and Monoclonal Antibodies

Evaluation Scheme:

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Suggested Readings

1. Essentials of Immunology: Roitt IM
2. Immunology: Kuby
3. Advanced Immunology: Male D, Champion B, Cooke A. and Owen M.
4. Principle and practice of Immunoassay: Christopher P. Price and David J
5. Culture of Animal cell- Ian: Freshney
6. Elements of Biotechnology: Gupta PK
7. Immunology : Rao CV

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Course: Plant Biotechnology
Course Code:
Course Credit: (3-0-0) 3

Unit - 1

Introduction to the techniques of plant tissue culture, Concept of cellular totipotency, Nutritional requirements, single cell culture, micro-propagation, somaclonal variation, somatic embryogenesis and production of embryoids

Unit - 2

Haploid and double haploid production, Protoplast isolation and culture, Somatic hybridization and cybrid production and their applications in crop improvement, Productions of virus free plants using meristem culture

Unit - 3

Basis of tumor formation, hairy roots, features of Ti and Ri plasmids, mechanisms of transformation, binary vectors, use of 35S and other promoters, genetic markers, use of reporter genes, transformation on monocots, Transgene stability and gene silencing, Herbicide and insect resistance, Plant Genetic Engineering: Transgenic plants, Genetically modified (GM) plants (Bt cotton, Bt Brinjal)

Unit - 4

Photoregulation and phytochrome regulation of nuclear and chloroplast genes expression, Molecular biology of light and dark reactions of photosynthesis, Molecular mechanism of nitrogen fixation, Genetics of *nif* genes

Unit - 5

Plant secondary metabolites: Control mechanisms and manipulation metabolic pathways of production of alkaloids and industrial enzymes, biodegradable plastics, therapeutic proteins, Edible vaccines, purification strategies, Green house Technology, Biotic and Abiotic stress

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Suggested Readings

1. Plant Tissue Culture: MK Razdan and SS Bhojwani
2. Genetic Transformation of Plants: Jackson JF, Linskens H
3. Plant Tissue Culture Concepts and Laboratory Exercises: Robert N Trigiano, Dennis J Gray
4. Applied and fundamental Aspects of Plant Cell, Tissue, and Organ Culture: Reinert J and Bajaj yPS
5. Elements of Biotechnology: PK Gupta

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