



List of Revised Courses

Department : *Biotechnology*

Program Name : *B.Sc.*

Academic Year : *2018-2019*

List of Revised Courses

Sr. No.	Course Code	Name of the Course
1.	LS/BT/C-101L	Cell Biology(core-1)
2.	LS/BT/C-101P	Laboratory-1 based on core-1
3.	LS/BT/C-102L	Biochemistry and Metabolism(core-2)
4.	LS/BT/C-102P	Laboratory-2 based on core-2
5.	LS/BT/GE-101/B&B-L	Bioethics and Biosafety(GE-1)
6.	LS/BT/GE-101/B&B-P	Laboratory-GE1 based on GE-1
7.	ECA	ECA-Extracurricular activity/ Tour, Field visit/ Industrial training/ NSS/ Swachhta/ vocational Training/ Sports/ others
8.	LS/BT/C-203L	General Microbiology(core-3)
9.	LS/BT/C-203P	Laboratory-3 based on core-3
10.	LS/BT/C-204L	Genetics(core-4)
11.	LS/BT/C-204P	Laboratory-4 based on core-4
12.	LS/BT/GE-202/B &HW-L	Biotechnology and Human Welfare(GE-2)
13.	LS/BT/GE-202/B&HW-P	Laboratory-GE2 based on GE-2
14.	ECA	ECA-Extracurricular activity/ Tour, Field visit/ Industrial training/ NSS/ Swachhta/ vocational Training/ Sports/ others
15.	Swayam / Swachhta / NSS / Industrial/ others	Summer Internship: 15 days

गुरु घासीदास विश्वविद्यालय
(केन्द्रीय विश्वविद्यालय अधिनियम 2009 अ. 25 से अंतर्गत स्थापित केन्द्रीय 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.)

Signature & Seal of HoD

विभागाध्यक्ष, जैव प्रौद्योगिकी विभाग
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Minutes of Meetings (MoM) of Board of Studies (BoS)

Academic Year : 2018-2019

School : School of Studies of Interdisciplinary Education and Research

Department : Biotechnology

Date and Time : 13-04-2018 - 12:00 Noon

Venue : Room of Head, Department of Biotechnology

MINUTES OF THE MEETING OF BOARD OF STUDIES IN BIOTECHNOLOGY GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR HELD ON 13/04/2018

A Meeting of the Board of Studies in Biotechnology under School of Life Sciences was held on 13/04/2018 at 12:00 Noon under the chairmanship of Dr. Renu Bhatt, Head Department of Biotechnology for approval of the CBCS, B.Sc (Hons) courses in Biotechnology.

Any other matter by permission of the Chair.


To discuss and approve the course structure and scheme of examination of B.Sc. (Hons.) Biotechnology, following members were present:

(i) Dr. Renu Bhatt, Head	Chairman
(ii) Prof. B.N. Tiwary, Professor	Member
(iii) Prof. Ragini Gothalwal,	Expert
(iv) Ms. Alka Ekka, Assistant Professor	Member


At the very outset the HOD and Chairman of BOS welcomed all the esteemed members and placed the draft prepared for the course structure and scheme of examination of 3 year B.Sc. (Hons) degree course in biotechnology as per guidelines of the UGC for CBCS was discussed at length. The external subjects expert suggested that the semester wise title of papers may be slightly inter-changed for step wise academic development of undergraduate students. Accordingly, the semester-wise papers and course content was restructured. The members after a thorough deliberations approved the course structure and scheme of examinations of B.Sc. (Hons) to be implemented from the Academic session 2018-2019.

The meeting ended with a vote of thanks by the Chair


13/4/18
Dr. Renu Bhatt
Chairman


Prof. B. N. Tiwary
Member


Prof. Ragini Gothalwal
Expert


Ms. Alka Ekka
Member



In the meeting of BOS-Biotechnology held on 13-10-2018, the following courses were revised in the of Syllabus of B. Sc. :

LS/BT/C-101L	Cell Biology(core-1)
LS/BT/C-101P	Laboratory-1 based on core-1
LS/BT/C-102L	Biochemistry and Metabolism(core-2)
LS/BT/C-102P	Laboratory-2 based on core-2
LS/BT/GE-10I/B&B-L	Bioethics and Biosafety(GE-1)
LS/BT/GE-101/B&B-P	Laboratory-GE1 based on GE-1
ECA	ECA-Extracurricular activity/ Tour, Field visit/ Industrial training/ NSS/ Swachhta/ vocational Training/ Sports/ others
LS/BT/C-203L	General Microbiology(core-3)
LS/BT/C-203P	Laboratory-3 based on core-3
LS/BT/C-204L	Genetics(core-4)
LS/BT/C-204P	Laboratory-4 based on core-4
LS/BT/GE-202/B &HW-L	Biotechnology and Human Welfare(GE-2)
LS/BT/GE-202/B&HW-P	Laboratory-GE2 based on GE-2
ECA	ECA-Extracurricular activity/ Tour, Field visit/ Industrial training/ NSS/ Swachhta/ vocational Training/ Sports/ others
Swayam / Swachhta / NSS / Industrial/ others	Summer Internship: 15 days

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

Sr. No.	Course Code	Name of the Course
1.	LS/BT/C-102L	Biochemistry and Metabolism(core-2)



2.	LS/BT/C-102P	Laboratory-2 based on core-2
3.	LS/BT/GE-101/B&B-L	Bioethics and Biosafety(GE-1)
4.	LS/BT/GE-101/B&B-P	Laboratory-GE1 based on GE-1
5.	ECA	ECA-Extracurricular activity/ Tour, Field visit/ Industrial training/ NSS/ Swachhta/ vocational Training/ Sports/ others
6.	LS/BT/GE-202/B &HW-L	Biotechnology and Human Welfare(GE-2)
7.	LS/BT/GE-202/B&HW-P	Laboratory-GE2 based on GE-2
8.	ECA	ECA-Extracurricular activity/ Tour, Field visit/ Industrial training/ NSS/ Swachhta/ vocational Training/ Sports/ others
9.	Swayam / Swachhta / NSS / Industrial/ others	Summer Internship: 15 days

Signature & Seal of HoD

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

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Scheme and Syllabus

Semester	Course Opted	Course Code	Name of the course	Credit	Hour / week
I	Core-1	LS/BT/C-101L	Cell Biology	4	4
	Core -1 Practical	LS/BT/C-101P	Laboratory-1 based on core-1	2	4
	Core -2	LS/BT/C-102L	Biochemistry and Metabolism	4	4
	Core -2 Practical	LS/BT/C-102P	Laboratory-2 based on core-2	2	4
	Generic Elective - 1 (GE- 1)	LS/BT/GE-101/B&B-L	Bioethics and Biosafety	4	4
	Generic Elective - Practical	LS/BT/GE-101/B&B-P	Laboratory-GE1 based on GE-1	2	4
	Ability Enhancement Compulsory Course (AECC)	LS/BT/AE-101/EC	English Communication / MIL (Hindi Communication)	4*	4
	ECA		ECA-Extracurricular activity/ Tour, Field visit/ Industrial training/ NSS/ Swachhta/ vocational Training/ Sports/ others	2	(2)
TOTAL				24	28

II	Core-3	LS/BT/C-203L	General Microbiology	4	4
	Core -3 Practical	LS/BT/C-203P	Laboratory-3 based on core-3	2	4
	Core -4	LS/BT/C-204L	Genetics	4	4
	Core -4 Practical	LS/BT/C-204P	Laboratory-4 based on core-4	2	4
	Generic Elective -2 (GE-2)	LS/BT/GE-202/B&HW-L	Biotechnology and Human Welfare	4	4
	Generic Elective - Practical	LS/BT/GE-202/B&HW-P	Laboratory-4 based on core-4	2	4
	Ability Enhancement Compulsory Course (AECC)	LS/BT/AE-201/EVS	Environmental Science	4*	4
	ECA		ECA-Extracurricular activity/ Tour, Field visit/ Industrial training/ NSS/ Swachhta/ vocational Training/ Sports/ others	2	(2)

	Total	24	28
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SUMMER Internship: 15 days	SwayamSwachhta / NSS / Industrial/ others	2	100
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B.Sc. (Hons.) Biotechnology, Semester-I, Core-1
Course: Cell Biology
Course Code: C1
Course Credit: (4-0-0) 4

UNIT I

Cell: Introduction and classification of organisms by cell structure, cytosol, compartmentalization of eukaryotic cells, cell fractionation types: Differential and Density Gradient Centrifugation. Cell Membrane and Permeability: Chemical components of biological membranes, their organization and Fluid Mosaic Model, membrane as a dynamic entity, cell recognition and membrane transport

UNIT II

Membrane Vacuolar system, cytoskeleton and cell motility: Structure and function of microtubules, microfilaments, intermediate filaments. Extracellular Matrix: Composition, molecules that mediate cell adhesion, membrane receptors for extra cellular matrix, regulation of receptor expression and function

UNIT III

Structure, biogenesis and functions of endoplasmic reticulum, Golgi complex, Lysosomes, Vacuoles and micro bodies, Ribosomes, Mitochondria, Chloroplasts and Nucleus

UNIT IV

Cell Cycle, mitosis & meiosis, Cancer: Carcinogenesis, agents promoting carcinogenesis, characteristics and biological basis of cancer

Dr. Subh
Pravinkumar Singh
4/11/19



B.Sc. (Hons.) Biotechnology, Semester-I, Lab-1
Course: Laboratory-1 based on Core-1
Course Code: Lab1
Course Credit: (0-0-4) 2

1. To study the effect of temperature and organic solvents on semi permeable membrane.
2. To study the plasmolysis
3. To study the de-plasmolysis
4. To study the structure of Prokaryotic cell (Bacteria).
5. To study the structure of Eukaryotic cell (Plant, Animal).

SUGGESTED READING

1. Karp, G. Cell and Molecular Biology: Concepts and Experiments. John Wiley & Sons. Inc.
2. De Robertis, E.D.P. and De Robertis, E.M.F. Cell and Molecular Biology. Lippincott Williams and Wilkins, Philadelphia.
3. Cooper, G.M. and Hausman, R.E. The Cell: A Molecular Approach ASM Press & Sunderland, Washington, D.C.; Sinauer Associates, MA.
4. Becker, W.M., Kleinsmith, L.J., Hardin. J. and Bertoni, G. P. The World of the Cell. Pearson Benjamin Cummings Publishing, San Francisco.

Qshitt
Rong
Arun
Pranish



B.Sc. (Hons.) Biotechnology, Semester-I., Core-2
Course: Biochemistry and Metabolism
Course Code: C-2
Course Credit: (4-0-0) 4

UNIT I

Introduction to Biochemistry: Amino acids & Proteins: Structure and properties of Amino acids, Synthesis of aromatic and aliphatic amino acids, amino acid oxidation and production of urea. Types of protein and their classification structure and shape. Different levels of structural organization of proteins (primary, secondary, tertiary and quaternary).

UNIT II

Structure, classification, functions and properties of carbohydrates Glycolysis, fate of pyruvate under aerobic and anaerobic conditions, Pentose phosphate pathway and its significance, Gluconeogenesis, Glycogenolysis, TCA cycle, Electron Transport Chain, Oxidative phosphorylation.

UNIT III

Structure, classification, functions and properties of fatty acid, Biosynthesis of saturated and unsaturated fatty acids. β -oxidation of fatty acids. Structure, functions, and properties of DNA, double helical model of DNA structure and forces responsible for A, B & Z - DNA. Structure, functions, and properties of RNA

UNIT IV

Nomenclature and classification of Enzymes, Holoenzyme, apoenzyme, Cofactors, coenzyme, prosthetic groups, metalloenzymes, monomeric & oligomeric enzymes, activation energy and transition state, enzyme activity, specific activity.

Abhatt
Raj
Sally
Bhatnagar



B.Sc. (Hons.) Biotechnology, Semester-1, Lab-2
Course: Laboratory-2 based on Core-2
Course Code: Lab-2
Course Credit: (0-0-4) 2

1. To calculate the molarity, molality, normality and their relationship of given sample.
2. To prepare the buffers (acetate and phosphate buffers).
3. To maintain the pH of different types of buffer using pH meter.
4. To study the Qualitative tests for carbohydrates (for reducing and nonreducing sugars), lipids (Zak's test for cholesterol) and proteins (ninhydrin test, biuret test).
5. To estimate the content of protein by using Lowery method/Bradford method.

SUGGESTED READING

1. Berg, J. M., Tymoczko, J. L. and Stryer, L. Biochemistry. W.H Freeman and Co.
2. Buchanan, B., Gruissem, W. and Jones, R. Biochemistry and Molecular Biology of Plants. American Society of Plant Biologists.
3. Nelson, D.L., Cox, M.M. Lehninger Principles of Biochemistry, WH Freeman and Company, New York, USA.
4. Hopkins, W.G. and Huner, P.A. Introduction to Plant Physiology. John Wiley and Sons.
5. Salisbury, F.B. and Ross, C.W. Plant Physiology, Wadsworth Publishing Co. Ltd.

Abhatt
Rony
Akhil
Jain



B.Sc. (Hons.) Biotechnology, Semester-II, Core-3
Course: General Microbiology
Course Code: C3
Course Credit: (4-0-0) 4

UNIT I

History and scope of microbiology, Microbial taxonomy, Classification of microorganisms: criteria used including molecular and polyphasic approaches, microbial phylogeny and current classification of bacteria. Microbial Diversity: Distribution and characterization of Prokaryotic and Eukaryotic cells, Morphology and cell structure of major groups of microorganisms eg. Bacteria, Algae, Fungi, Protozoa and Viruses

UNIT II

Cultivation and maintenance of microorganisms: methods of isolation, purification and preservation. Nutritional categories of micro-organisms, Control of microorganisms by physical, chemical and chemotherapeutic agents

UNIT III

Microbial growth: Growth curve, Generation time, synchronous, batch and continuous culture, methods of measurement of growth and factors affecting growth of bacteria. Microbial Metabolism: Metabolic pathways, amphi-catabolic and biosynthetic pathways Bacterial Reproduction: Asexual reproduction (binary fission, endospores and sporulation in bacteria), Genetic recombination (Transformation, Transduction and Conjugation).

UNIT IV

Bacteria, fungi, algae and cyanobacteria pollutants of water, sewage composition and its disposal Important microorganisms in food: moulds, yeasts, bacteria, major food born infections and intoxications in humans, food spoilage and preservation of various types of foods.

Abhatt Roy Akshay Prakash



B.Sc. (Hons.) Biotechnology, Semester-II, Lab-3
Course: Laboratory-3 based on Core-3
Course Code: Lab3
Course Credit: (0-0-4) 2

1. To study the methods of sterilization (autoclave and hot air oven)
2. To study the methods of isolation of bacteria from different sources
3. To prepare the media for cultivation of bacteria/fungi.
4. To perform the biochemical characterization of isolated bacteria.
5. To perform the staining of isolated bacteria using different methods (Gram staining, Spore staining, Negative staining).
6. To determine the bacterial cell size by micrometry.
7. To enumerate the total & viable cell count of microorganism by using haemocytometer.

SUGGESTED READING

1. Alexopoulos CJ, Mims CW, and Blackwell M. (Introductory Mycology. John and Sons, Inc.
2. Jay JM, Loessner MJ and Golden DA. Modern Food Microbiology. CBS Publishers and Distributors, Delhi, India.
3. Kumar HD. Introductory Phycology. Affiliated East Western Press.
4. Madigan MT, Martinko JM and Parker J. Brock Biology of Microorganisms. Pearson Benjamin Cummings.
5. Pelczar MJ, Chan ECS and Krieg NR. Microbiology. McGraw Hill Book Company.
6. Stanier RY, Ingraham JL, Wheelis ML, and Painter PR. General Microbiology. McMillan.
7. Tortora GJ, Funke BR, and Case CL. Microbiology: An Introduction. Pearson Education.
8. Willey JM, Sherwood LM, and Woolverton CJ. Prescott, Harley and Klein's microbiology McGraw Hill Higher Education.

Santh *Roy* *Arup* *Prasanna*



B.Sc. (Hons.) Biotechnology, Semester-II, Core-4
Course: Genetics
Course Code: C4
Course Credit: (4-0-0) 4

UNIT I

Mendelian genetics: Mendel's law, test and back crosses, Allelic interactions: Concept of dominance, recessiveness, incomplete dominance, co-dominance, pleiotropy, polygenic inheritance, multiple allele, pseudo-allele, essential and lethal genes, Non allelic interactions: Interaction producing new phenotype complementary genes, epistasis (dominant & recessive), Genetic linkage, crossing over and chromosome mapping: Linkage and Recombination of genes in a chromosome crossing over

UNIT II

Chromosome and genomic organization: Eukaryotic nuclear genome nucleotide sequence composition -unique & repetitive DNA, satellite DNA, Centromere and telomere DNA sequences, middle repetitive sequences- VNTRs & dinucleotide repeats, repetitive transposed sequences- SINES & LINES, middle repetitive multiple copy genes, noncoding DNA. Eukaryotic chromosome: chromosome morphology, concept of euchromatin and heterochromatin, chromosome banding pattern, karyotype, giant chromosomes, one gene one polypeptide hypothesis, genetic code.

UNIT III

Chromosome and gene mutations: Definition and types of mutations, causes of mutations, Ames tests for mutagenic agents, variations in chromosomes structure, point mutation. Chromosomal aberrations in human beings, abnormalities: Aneuploidy (Down, Turner, Klinefelter syndrome) and Euploidy, non-disjunction.

UNIT-IV

Sex determination and sex linkage: Mechanisms of sex determination, Barr bodies, genetic balance theory, Fragile-X- syndrome and chromosome, sex linked diseases and inheritance, Pedgree analysis, Evolution and population genetics: Hardy Weinberg law, allelic and genotype frequencies,

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Raj
Aakash
Bansal