Shiv Chhatrpati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur (Autonomous)

Department of Biotechnology

Structured Work Plan for Teaching

Academic Year 2019-20 (Term-I)

स्थापना - १९७०

Sr. No.	Class	Name of Ass. Prof.	Subject	Paper
1	B.Sc. I Year (Semester I)	Udaybhanu P. Sirdeshmukh	Biotechnology	Course Title: Basic bioscience Course Code : U-BBS-188 Course Title: Lab Course II Course Code: U-LAC-192

1. Summary of Lesson Plan

Name of Teacher: Udaybhanu P. Sirdeshmukh **Class: B.Sc. BT. I year (First Semester)**

Course Title: Basic Bioscience **Course Code: U-BBS-188**

Sr. No.	Subject	Unit and Chapter to be covered	Date	No. of Lectures	Academic activities to be organized	No. of Test / Assignment with topic and date
1	Basic Bioscience	**Unit I** Whittaker's five kingdom system of classification	01-2/07/2019	2	PPT presentation	2 assignments
		Classification of plants with a suitable example	3/07/2019	1	seminar	
		Classification of animals with a suitable example	4/07/2019	1	Video lectures	
		prokaryotic cell –bacteria	6/07/2019	1		
		eukaryotic cell-plant cell and animal cell	8/07/2019	1		
		a brief idea about Levels of organization in plants and animals	9,10/07/2019	2		
		Origin of life	11/07/2019	1		

		Unit II: Nutrition and transport in flowering plant				
		Biophysical Process: Diffusion,	13/07/2019	1	PPT presentation	2 assignments
		Osmosis		1	seminar	
		Facilitated Diffusion, Surface Tension	15/07/2019	1	Video lecture	
		Cohesion, Adhesion, Osmotic Pressure	16/07/2019	1		
		Plant nutrition				
		Photosynthesis-Definition and equation of photosynthesis, A brief idea about the intake of CO2and water by plant ,The trapping of light energy by chlorophyll	17-19/07/2019	3		
		the conversion of light energy into chemical energy,				
		the formation of carbohydrates, their subsequent storage, and release of oxygen	22-25/07/2019	2		
		Dependence of life on photosynthesis				
		Leaf structure-Morphological and anatomical organization of Monocotyledonous	26-29/07/2019	2		
		Morphological and anatomical organization of Dicotyledonous leaf.	30/07/2019 & 2/08/2019	2		

		Mineral nutrition-A brief idea about functions of minerals in plant metabolism	03/08/2019	1		
		Transport in flowering plants				
		Water and ion uptake-A brief idea about structure and function of root hairs in relation to their Surface area, and to water and ion uptake, water transport through xylem	5/08/2019-8/08/2019	2		
		Transpiration –stomata structure and function	9/08/2019	1		
		Translocation of solute	10/08/2019	1		
		Osmotic Potential	13/08/2019	1		
		Photoperiodism, Vernalization	14-16/08/2019	1		
		Reproduction in Plant	19-21/08/2019	1		
		A Sexual reproduction in plant				
		Structure of Flower				
		Unit III:Life processes in animals-I				
		Animal Nutrition				
		Human alimentary canal-A brief idea about structure includes mouth, salivary glands, esophagus, Stomach, duodenum, pancreas, gall bladder,	22-24/08/2019	2	PPT presentation	2 assignments

		liver, ileum, colon, rectum and anus.				
		Function of alimentary canal-Mechanical and physical digestion, Chemical digestion, Absorption, assimilation and egestion of food	26/08/2019	1	seminar	
		Transport in humans				
		Circulatory system-structure and function of heart in terms of muscular contraction and the working Of valves	27-31/08/2019	3	Video lectures	
		the structure and function of arteries, veins and capillaries	3/09/2019	1		
		Components and functions of Blood-red blood cells, white blood cells, platelets and plasma.	4/09/2019	1		
		Unit IV: Life processes in animals-II				
		Respiration				
		Aerobic respiration-Definition and a brief explanation with equation of aerobic respiration	5/09/2019	1	PPT presentation	2 assignments
		Anaerobic respiration-Definition and a brief explanation with equation of anaerobic respiration	5/09/2019	1	seminar	
		Differences between inspired and expired air			Video lectures	

		Human gaseous exchange –the role of the exchange surface of the alveoli in gaseous exchange, exchange of gaseous by cell (limited up to uptake of oxygen and release of carbon dioxide)	7/09/2019	1		
		Excretion in animals				
		Definition of excretion. A brief idea about structure of kidney and nephron	9/09/2019	1		
		A brief explanation of the removal of carbon dioxide from the lungs, and of water and Urea through the kidneys	11//09/2019	1		
		Co-ordination and response	12/09/2019	1		
		Hormones-definition, endocrine gland source and function in human	13/09/2019	1		
		A Brief Idea about nervous system in human	14-18/09/2019	2		
		Sexual reproduction in humans-				
		the male reproductive system and give the functions of: testes, scrotum, sperm ducts, and Prostate glands, urethra and penis	19-23/09/2019	2		
		the female reproductive system and give the	24-27/09/2019	2		

		functions of: ovaries, oviducts, uterus, cervix and Vagina				
		the menstrual cycle with reference to the alternation of menstruation and ovulation,	28/09/2019 To 1/10/2019	2		
		the effect of factors, such as diet and emotional state, which affect the menstrual cycle	4/10/2019	1		
		Methods of birth control: natural, chemical (spermicides), mechanical, hormonal and Surgical.	9/10/2019	1		

Lab course: II (Basic bioscience) **Course code: U-LAC-192**

Sr. No.	Practicals	Date	No. of Practicals
1	To study parts of a compound microscope	12/07/2019	2
2	To identify and study the morphology of representative types of bacteria, fungi and different animal and plant groups		2
3	Study of tissues and diversity in shapes and sizes of plant cells.	To	2
4	To study anatomy of stem and root of monocots and dicots		2
5	Preparation of herbarium sheets of flowering plants		2
6	To study the distribution of stomata on the upper and lower surfaces of leaves		2
7	To investigate and measure factors affecting rate of transpiration using a photometer.		2
8	To detect the presence of carbohydrates like glucose, sucrose and starch		2
9	To detect the presence of proteins		2
10	To detect the presence of fats (lipid) in different plants and animal materials		2
11	To detect the presence of urea in the given sample of urine		2
12	To test the presence of sugar in the given sample of urine.		2
13	To show that light is essential for photosynthesis.		2
14	To show that carbon dioxide is essential for photosynthesis.		2
15	To study the liberation of carbon dioxide gas during aerobic respiration.		2

16	To study the liberation of carbon dioxide gas during fermentation		2
17	To study the reproductive parts of commonly available flowers		2
18	To understand diversity of living organisms through educational tour.	10/10/2019	2

Date: 26/08/2019

Course Teacher **HOD** **Principal**

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Structured Work Plan for Teaching

Academic Year 2019-20 (Term-I)

Sr. No.	Class	Name of Ass. Prof.	Subject	Paper
2	**B.Sc. III Year** (Semester V)	Udaybhanu P.Sirdeshmukh	Biotechnology	**Course Title: Developmental biology** **Course Code: U-DEB-610** **Course Title: Lab Course XX** **Course Code: P-LAC-614**

Class: B.Sc.BT. III (Fifth Semester) **Name of Teacher: Sirdeshmukh U.P.**

Course Title: Developmental biology **Course Code: U-DEB-610**

Sr. No.	Subject	Unit and Chapter to be covered	Date	No. of Lectures	Academic activities to be organized	No. of Test / Assignment with topic and date
	Developmental biology	**UNIT I-How development works in Animals**				
		Developmental biology- Introduction	18/06/2019	1	PPT presentation	2 assignments
		Gametogenesis-Spermatogenesis and Oogenesis in animals	24-26/06/2019	2	seminar	
		Fertilization in animals	27/06/2019 To 1/08/2019	2	Video Lectures	

		Embryonic Development in Animals				
		1.Drosophila melanogaster		4		
		Blastulation, gastrulation, Germ layers, Neurulation	2-10/07/2019			
		2.Xenopus laevis		4		
		Blastulation, gastrulation, Germ layers, Neurulation	11/07/2019 To 16/07/2019			
		3.The Chick(Gallus gallus)		4		
		Blastulation, gastrulation, Germ layers, Neurulation	17-25/07/2019			
		UNIT II-				
		Cell division and Growth	29-31/07/2019	2	PPT presentations	2- assignments
		Cell lineage	1/08/2019 TO 6/08/2019	2	seminar	
		Apoptosis and Aging	7-19/08/2019	3	Video lectures	
		Abnormal development	20/08/2019	1		
		Teratogens and Teratogenesis	21/08/2019	1		
		Unit III				
		Morphogenesis	22/08/2019	1	PPT presentations	2- assignments

		Stem cell, Cell fate and potency	26/08/2019	1	seminar	
		Organogenesis	27-28/08/2019	2	Video Lectures	
		Axes and symmetry determination	29/08/2019	1		
		Developmental commitment		3		
		Fate Determinants, Inducers (induction), Competence	3-11/09/2019			
		Potency, Determination (commitment/specification),Differentiation				
		Control of gene expression		4		
		Signaling systems -inducers, Signal (ligand) Binds receptor	12-19/09/2019			
		Receptor is altered: modification/ second messengers/ cascade				
		And alters cell function via changing = metabolism, gene expression, shape Leading to change in fate				
		Drosophila melanogaster-Role of genes in Patterning during development	23-24/09/2019	2		
		Regeneration of missing parts in animals-Planarian regeneration, vertebrate limb Regeneration	25-30/09/2019	2		
		UNIT IV-.Plant Development				
		Plant Life Cycles	1/10/2019	1	PPT presentations	2-assignments

		Gamete Production in Angiosperms	3/10/2019	1	seminars	
		Pollination, Fertilization in plant	7-9/10/2019	2	Video lectures	
		Germination, Senescence	10/10/2019	1		
		Embryonic Development in plant				
		Embryonic Development in Monocotyledonous plant	14-15/10/2019	2		
		Arabidopsis thaliana (A dicotyledonous plant)-Role of genes in embryogenesis	16-17/10/2019	2		
		Role of genes in Organogenesis-Shoot patterning	21/10/2019	2		
		Root patterning	22/10/2019	2		
		Leaf Patterning	23/10/2019	2		
		Flower patterning	24/10/2019	2		

Lab course XX (Developmental biology)
Course code: U-LAC-614

Sr. No.	Practicals	Date	No. of Practicals
1	Introduction to developmental biology-embryo protocols, ethics, and model Systems.•General embryo protocols and ethic	3/07/2019	04
2	Study of frog development by using permanent mounted slides from zygote to Tadpole		04
3	Study of chick development by using permanent slides from 18 hours to 96 hours Of chick embryo.		04
4	A study types of egg by using chart, as well as real specimen eggs		04
5	A study of blastodisc of chick for their feature from hen egg.	TO	04
6	A study of chick development up to eight days through egg incubation, candling and Egg dissection technique.		04
7	A study of different types of sperms and its features by using chart		04
8	A study of pollen genesis by using T.S. of Anther preparation technique.		04
9	A study of T.S. of ovary for arrangement of ovules within ovary.		04
10	A study of Flower development from vegetative shoot of any suitable plant.		04
11	A study of morphological and anatomical changes in plants-(about tissue organization) during plant development from germinated seed, seedling and other stages of development.	10/10/2019	04

Date: 15/06/2019

Course Teacher **HOD** **Principal**

Head
Department of Biotechonlogy
Rajarshi Shahu Mahavidyalaya
(Autonomous) Latur-413 531

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स्थापना - १९७०

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Structured Work Plan for Teaching
Academic Year 2019-20 (Term-II)

Sr. No.	Class	Name of Ass. Prof.	Subject	Paper
1	B.Sc. I Year (Semester II)	Udaybhanu P. Sirdeshmukh	Biotechnology	Course Title: Genetics Course Code: U-GEN-288 Course Title: Lab Course VI Course Code: U-LAC-292

1. Summary of Lesson Plan

Name of Teacher: Udaybhanu P. Sirdeshmukh **Class: B.Sc. BT. I year (Second Semester)**

Course Title: Genetics **Course code: U-GEN-288**

Sr. No.	Subject	Unit and Chapter to be covered	Date	No. of Lectures	Academic activities to be organized	No. of Test / Assignment with topic and date
1	Genetics	**Unit I** Introduction: Genetics and the organisms	2/12/2019	1	PPT presentation	2 assignments
		Scope and significance of genetics,			seminar	
		a brief idea from gene to phenotype,			Video lectures	
		genetic symbols	3/12/2019	1		
		Transmission genetics				
		Mendelism: An overview Mendel's work, Monohybrid cross	04-05/12/2019	2		
		Dihybrid cross	09/12/2019	1		
		Test cross, reciprocal cross	10/12/2019	1		
		principles of Mendel	11-12/12/2019	2	PPT presentation	2 assignments
		application of Mendelian principles in the study of human traits.	16/12/2019	1	seminar	

		Extentions and modifications of basic principles: Lethal alleles	17/12/2019	1	Video lecture	
		Multiple alleles	18/12/2019	1		
		Gene interactions – complementary gene interaction	19/12/2019	1		
		epistasis	23/12/2019	1		
		duplicate gene interaction.	24/12/2019	1		
		Interaction between sex and heredity: sex- influenced and sex- limited characteristics	25/12/2019	1		
		Cytoplasmic inheritance.	26-30/12/2019	2		
		UNIT II				
		Linkage,	31/12/2019	1		
		recombination and eukaryotic gene mapping	02-06/01/2020	2		
		crossing over-mechanism of crossing over	07-08/01/2020	2		
		Sex determination in animals: chromosomal theory of sex determination	09-13/01/2020	2		
		genic balance theory Sex determination in plants	16/01/2020	1		
		Sex linkage,	20-21/01/2020	2		
		Pedigree analysis	22-23/01/2020	2		
		Prokaryotic gene mapping by using conjugation,	27-29/01/2020	3		
		, transformation and transduction techniques.				
		Unit III: Gene mutation and chromosomal mutations				

		Concept of Mutation, Mutagens	30-03/01-02/2020	2		
		spontaneous and induced mutation	04/02/2020	1		
		complementation test	05/02/2020	1		
		Benzer's experiment about rII locus inT4 bacteriophage	06-10/02/2020	2	PPT presentation	2 assignments
		point mutation	11-12/02/2020	2	seminar	
		Cytogenetics: chromosome structure, number and size	13-17/02/2020	2		
		Karyotyping of chromosomes	18/02/2020	1	Video lectures	
		structural chromosomal mutations	20-24/02/2020	2		
		numerical Chromosomal mutations	25-26/02/2020	2		
		Chromosomal aberrations: syndromes-Down syndrome	27/02/2020	1		
		kleneifelter syndrome, Turner syndrome, Cri-du-chat syndrome	02/03/2020	1		
		Application of mutation in improvement of plants and microbes for human welfare.	03/03/2020	1	PPT presentation	2 assignments
					seminar	
		Unit IV: Recent trends in genetics			Video lectures	
		A brief idea about 1. Quantitative genetics	04-09/03/2020	3		
		2. Population genetics: Gene and genotypic frequencies, Hardy –Weinberg equilibrium.	10-12/03/2020	3		

Lab course: VI (Genetics) **Course code: U-LAC-292**

Sr. No.	Practicals	Date	No. of Practicals
1	Problems based on monohybrid and dihybrid cross.	10/12/2019	2
2	Problems based on interaction of genes		2
3	Problems based on pedigree analysis.	To	2
4	Problems based on Hardy-Weinberg equilibrium.		2
5	To study the human blood group by using given blood sample.		2
6	Study of Human traits, Animal traits and plant traits for its diversity in phenotype.		2
7	Study of karyotype.	10/02/2020	2

Date: 30/11/2019

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Department of Biotechonlogy
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Academic Year 2019-20 (Term-II)

Sr. No.	Class	Name of Ass. Prof.	Subject	Paper
2	B.Sc. III Year (Semester VI)	Udaybhanu P. Sirdeshmukh	Biotechnology	Course Title: Agriculture biotechnology Course Code: U-AGB-730 Course Title: Lab Course XXIV Course Code: P-LAC-736

Class: B.Sc.BT. III (Sixth Semester) **Name of Teacher: Sirdeshmukh U.P.**

Course Title: Agriculture Biotechnology **Course Code: U-AGB-730**

Sr. No.	Subject	Unit and Chapter to be covered	Date	No. of Lectures	Academic activities to be organized	No. of Test / Assignment with topic and date
	Agriculture Biotechnology	UNIT- I: Agriculture and its recent trends				
		Basics of agriculture, Methods of agriculture	02/12/2019	1	PPT presentation	2 assignments
		Agricultural crops Need of agricultural management	04-05//12/2019	2	seminar	
		Plant pathology/diseases, Plant - pathogen interaction	06-07/12/2019	2	Video Lectures	
		Plant breeding – Concept and types				
		Agricultural nanotechnology	11-14/12/201	4		

			9			
		UNIT-II:				
		Biomass: Composition, Types, Biomass as a energy Source, Biomass conversion and Utilization.	18-21/12/2019	4		
		Bioethanol production				
		Mushroom cultivation	25-28/12/2019	4		
		-Biofertilizers: Concept and Types of Biofertilizer	01-02/01/2020	02		
		Microbial Inoculum - Rhizobium Inoculant, Azotobacter, and Phosphate Solubilizing Biofertilier	03-04/01/2020	02		
		Bio-pesticides- Definition and Types (Microbial and Botanical)	08-09/01/2020	02	PPT presentations	2- assignments
		Advantages of Biopesticides over chemical pesticides.	10/01/2020	1	seminar	
		Single Cell Protein and its Nutritive Value eg. Spirulina	11/01/2020	1	Video lectures	
		Secondary metabolites and its applications	16-17/01/2020	2		
		UNIT- III:				
		Molecular markers - hybridization and PCR based markers	18-22/01/2020	2		
		RFLP, RAPD	23-24/01/2020	03	PPT presentations	2- assignments
		STS, SSR	25-29/01/2020	02	seminar	

		AFLP, SNP markers	30-31/01/2020	02	Video Lectures	
		Development of population, RILs, BCILs, NIL, ILs	01-05/02/2020	02		
		DNA fingerprinting-principles and applications	06/02/2020	01		
		introduction to mapping of genes/QTLs	07-08/02/2020	2		
		Marker assisted selection (MAS)-strategies for Introducing genes of biotic and abiotic stress resistance in plants	12-13/02/2020	2		
		molecular diagnostics of pathogens in plants . -A Case study	14-15/02/2020	2		
		UNIT- IV: Plant Genetic engineering				
		Agrobacterium-plant interaction; virulence; Ti and Ri plasmids; opines and their significance; T-DNA transfer; disarmed Ti plasmid	20=27/02/2020	5		
		Genetic transformation - Agrobacterium-mediated gene delivery; co integrate and binary vectors and their utility	28-06/02-04/2020	5		
		direct gene transfer - PEG-mediated, electroporation, particle bombardment and alternative methods	05-06/03/2020	2		
		screen able and selectable markers	07/03/2020	1		
		characterization of transgenics; chloroplast transformation	11-12/03/202	2	PPT presentati	2-assignments

		characterization of transgenics; chloroplast transformation	11-12/03/2020	2	PPT presentations	2-assignments
		marker-free methodologies	13/03/2020	1	seminars	
		advanced methodologies - cisgenesis, intragenesis and genome editing	14/03/2020	1	Video lectures	
		molecular pharming - concept of plants as biofactories,	18-19/03/2020	2		
		production of industrial enzymes and pharmaceutically important compounds				

Lab course XXIV (Agriculture biotechnology) **Course code: U-LAC-736**

Sr. No.	Practicals	Date	No. of Practicals
1	Isolation of Rhizobium sp.from root nodule and application of rhizobium bio fertilizer for Leguminous crops.	10/12/2019	
2	Isolation of phosphate solubilizing bacteria from given soil sample and its application in the Field.		
3	Determination of Total Phosphorus, sulphur and nitrogen of soil.		
4	Study of stress response in plant		
5	Extraction and identification of plant secondary metabolites.	TO	
6	Preparation of bio extract for the detection of antimicrobial / anti pathogenic activity.		
7	Production of pearl oyster mushroom from agricultural residues.		
8	A study of percentage seed germination.	20/02/2020	
9	Visit to Cell Culture Facilities /Production /Biofertilizer Industry.		

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