

Rajarshi Shahu Mahavidyalaya, Latur

(Autonomous)

Structured Work Plan for Teaching

(Oct – 2020 to March- 2021 – B.Sc.Biotechnology First year)- Semester -I

(July-2020 to Dec-2020- B.Sc.Biotechnology Third year)- Semester - V

1. Details of Classes to be taught

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
2	B.Sc. III Year (Semester V)			Course Title: Developmental biology Course Code: U-DEB-630 Course Title: Lab Course XX Course Code: P-LAC-614

2. 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	9-	2	PPT presentation	2 assignments
		Whittaker's five kingdom system of classification	10/10/2020			
		Classification of plants with a suitable example	12/10/2020	1	seminar	
		Classification of animals with a suitable example	13/10/2020	1	Video lectures	
		prokaryotic cell –bacteria	14/10/2020	1		
		eukaryotic cell-plant cell and animal cell	15/10/2020	1		
		a brief idea about Levels of organization in plants and animals	19- 20/10/2020	2		
		Origin of life	21/10/2020	1		
		Unit II: Nutrition and transport in flowering plant				
		Biophysical Process: Diffusion,	22/10/2020	1	PPT presentation	2 assignments
		Osmosis	26/10/2020	1	seminar	

		Facilitated Diffusion, Surface Tension	27/10/2020	1	Video lecture	
		Cohesion, Adhesion, Osmotic Pressure	28/10/2020	1		
		Plant nutrition				
		Photosynthesis -Definition and equation of photosynthesis, A brief idea about the intake of CO ₂ and water by plant ,The trapping of light energy by chlorophyll	29/10/2020 To 03/11/2020	3		
		the conversion of light energy into chemical energy,				
		the formation of carbohydrates, their subsequent storage, and release of oxygen	04- 05/11/2020	2		
		Dependence of life on photosynthesis				
		Leaf structure-Morphological and anatomical organization of Monocotyledonous	09- 10/11/2020	2		

		Morphological and anatomical organization of Dicotyledonous leaf.	11-12/11/2020	2		
		Mineral nutrition-A brief idea about functions of minerals in plant metabolism	23/11/2020	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	24-25/11/2020	2		
		Transpiration –stomata structure and function	26/11/2020	1		
		Translocation of solute	30/11/2020	1		
		Osmotic Potential	01/12/2020	1		
		Photoperiodism, Vernalization	02/12/2020	1		
		Reproduction in Plant	03/12/2020	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, liver, ileum, colon, rectum and anus.	07-08/12/2020	2	PPT presentation	2 assignments
		Function of alimentary canal-Mechanical and physical digestion, Chemical digestion, Absorption, assimilation and egestion of food	09/12/2020	1	seminar	
		Transport in humans				
		Circulatory system-structure and function of heart in terms of muscular contraction and the working Of valves	10-15/12/2020	3	Video lectures	
		the structure and function of arteries, veins and capillaries	16-22/12/2020	4		
		Components and functions of Blood-red blood cells, white blood cells, platelets and plasma.	23-28/12/2020	3		

		Unit IV: Life processes in animals-II				
		Respiration	29-30/12/2020	2		
		Aerobic respiration-Definition and a brief explanation with equation of aerobic respiration	31/12/2020 To 06/01/2021	4	PPT presentation	2 assignments
		Anaerobic respiration-Definition and a brief explanation with equation of anaerobic respiration	07-12/01/2021	03	seminar	
		Differences between inspired and expired air	13-14/01/2021	02	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)	18-19/01/2021	02		
		Excretion in animals				
		Definition of excretion. A brief idea about structure of kidney and nephron	20-21/01/2021	02		

		A brief explanation of the removal of carbon dioxide from the lungs, and of water and Urea through the kidneys	25- 27/01/2021	02		
		Co-ordination and response	28/01/2021 To 01/02/2021	02		
		Hormones-definition, endocrine gland source and function in human	02- 04/02/2021	3		
		A Brief Idea about nervous system in human	08- 09/02/2021	2		
		Sexual reproduction in humans-				
		the male reproductive system and give the functions of: testes, scrotum, sperm ducts, and Prostate glands, urethra and penis	10- 11/02/2021	2		
		the female reproductive system and give the functions of: ovaries, oviducts, uterus, cervix and Vagina	15- 16/02/2021	2		

		the menstrual cycle with reference to the alternation of menstruation and ovulation,	17- 24/02/2021	4		
		the effect of factors, such as diet and emotional state, which affect the menstrual cycle	01/03/2021 To 02/03/2021	2		
		Methods of birth control: natural, chemical (spermicides), mechanical, hormonal and Surgical.	10/03/2021	03		

Lab course: II (Basic bioscience)

Course code: U-LAC-192

Sr. No.	Subject	Practicals	Date	No. of Practicals
		1. To study parts of a compound microscope		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.	2

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	07/07/2020	1	PPT presentation	2 assignments
		Gametogenesis-Spermatogenesis and Oogenesis in animals	10-11/07/2020	2	seminar	
		Fertilization in animals	13-14/07/2020	2	Video Lectures	
		Embryonic Development in Animals				
		<i>1.Drosophila melanogaster</i>	17-21/07/2020	4		
		Blastulation, gastrulation, Germ layers, Neurulation				
		<i>2.Xenopus laevis</i>	24-28/07/2020	4		

		Blastulation, gastrulation, Germ layers, Neurulation				
		<i>3.The Chick(Gallus gallus)</i>	31/07/2020 To 07/08/2020	4		
		Blastulation, gastrulation, Germ layers, Neurulation				
		UNIT II-				
		Cell division and Growth	08- 10/08/2020	2	PPT presentations	2- assignments
		Cell lineage	11- 14/08/2020	2	seminar	
		Apoptosis and Aging	17- 21/08/2020	3	Video lectures	
		Abnormal development	24/08/2020	1		
		Teratogens and Teratogenesis	25/08/2020	1		
		Unit III				
		Morphogenesis	28/08/2020	1	PPT presentations	2- assignments
		Stem cell, Cell fate and potency	29/08/2020	1	seminar	
		Organogenesis	31/08/2020 To 01/09/2020	2	Video Lectures	

		Axes and symmetry determination	04/09/2020	1		
		Developmental commitment	05- 08/09/2020	3		
		Fate Determinants, Inducers (induction), Competence				
		Potency, Determination (commitment/specification), Differentiation				
		Control of gene expression	11- 19/09/2020	6		
		Signaling systems -inducers, Signal (ligand) Binds receptor				
		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	21- 22/09/2020	2		
		Regeneration of missing parts in animals- Planarian regeneration, vertebrate limb Regeneration	25- 26/09/2020	2		
		UNIT IV-.Plant Development				

		Plant Life Cycles	28/09/2020	1	PPT presentations	2-assignments
		Gamete Production in Angiosperms	29/09/2020	1	seminars	
		Pollination, Fertilization in plant	03-05/10/2020	2	Video lectures	
		Germination, Senescence	09/10/2020	1		
		Embryonic Development in plant				
		Embryonic Development in Monocotyledonous plant	10-12/10/2020	2		
		Arabidopsis thaliana (A dicotyledonous plant)-Role of genes in embryogenesis	13-16/10/2020	2		
		Role of genes in Organogenesis-Shoot patterning	17-26/10/2020	2		
		Root patterning	27-31/10/2020	2		
		Leaf Patterning	01-09/11/2020	3		
		Flower patterning	10-25/11/2020	3		

Lab course XX (Developmental biology)**U-LAC-614**

Sr. No.	Subject	Practicals	Date	No. of Practical
		1. Introduction to developmental biology-embryo protocols, ethics, and model Systems.●General embryo protocols and ethic		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.		04

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Structured Work Plan for Teaching

(March – 2021 to June- 2021 – B.Sc. Biotechnology First year)- Semester -II

(FEB-2020 to MAY-2021- B.Sc. Biotechnology Third year)- Semester - VI

1. Details of Classes to be taught

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
2	B.Sc. III Year (Semester VI)			Course Title: Agriculture biotechnology Course Code: U-AGB-730 Course Title: Lab Course XXIV Course Code: P-LAC-736

2. 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-

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	10/03/2021	1	PPT presentation	2 assignments
		Introduction: Genetics and the organisms				
		Scope and significance of genetics,			seminar	
		a brief idea from gene to phenotype,			Video lectures	
		genetic symbols	17/03/2021	1		
		Transmission genetics				
		Mendelism: An overview Mendel's work, Monohybrid cross	18-19/03/2021	2		
		Dihybrid cross	20/03/2021	1		
		Test cross, reciprocal cross	24/03/2021	1		
		principles of Mendel	25-26/03/2021	2	PPT presentation	2 assignments
		application of Mendelian principles in the study of human traits.	27/03/2021	1	seminar	
		Extentions and modifications of basic principles: Lethal alleles	31/03/2021	1	Video lecture	
		Multiple alleles	01/04/2021	1		

	Gene interactions –complementary gene interaction	02/04/2021	1		
	epistasis	03/04/2021	1		
	duplicate gene interaction.	07/04/2021	1		
	Interaction between sex and heredity: sex- influenced and sex-limited characteristics	08/04/2021	1		
	Cytoplasmic inheritance.	09-10/04/2021	2		
	UNIT II				
	Linkage,	14/04/2021	1		
	recombination and eukaryotic gene mapping	15-16/04/2021	2		
	crossing over-mechanism of crossing over	17-22/04/2021	2		
	Sex determination in animals: chromosomal theory of sex determination	23-24/04/2021	2		
	genic balance theory Sex determination in plants	28/04/2021	1		
	Sex linkage,	29-30/04/2021	2		
	Pedigree analysis	01-	2		

			05/05/2021			
		Prokaryotic gene mapping by using conjugation,	06-08/05/2021	3		
		, transformation and transduction techniques.				
		Unit III: Gene mutation and chromosomal mutations				
		Concept of Mutation, Mutagens	12-13/05/2021	2		
		spontaneous and induced mutation	14/05/2021	1		
		complementation test	15/05/2021	1		
		Benzer's experiment about rII locus in T4 bacteriophage	19-20/05/2021	2	PPT presentation	2 assignments
		point mutation	10/05/2021	2	seminar	
		Cytogenetics: chromosome structure, number and size	21-22/05/2021	2		
		Karyotyping of chromosomes	26/05/2021	1	Video lectures	
		structural chromosomal mutations	27-28/05/2021	2		
		numerical Chromosomal mutations	29-2/06/2021	2		
		Chromosomal aberrations: syndromes-Down syndrome	03/06/2021	1		

		kleneifelter syndrome, Turner syndrome, Cri-du-chat syndrome	4/06/2021	1		
		Application of mutation in improvement of plants and microbes for human welfare.	5/06/2021	1	PPT presentation	2 assignments
					seminar	
		Unit IV: Recent trends in genetics			Video lectures	
		A brief idea about 1. Quantitative genetics	09-11/06/2021	3		
		2. Population genetics: Gene and genotypic frequencies, Hardy – Weinberg equilibrium.	12-18/06/2021	3		

Lab course: VI (Genetics)

Course code: U-LAC-

Sr. No.	Subject	Practicals	Date	No. of Practicals
	Genetics	1. Problems based on monohybrid and dihybrid cross.	16/03/2021	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.	16/05/2021	2

		6. Study of Human traits, Animal traits and plant traits for its diversity in phenotype.		2
		7. Study of karyotype.		2
				2
				2

Lab course: II (Basic bioscience)

Course code: U-LAC-192

Sr. No.	Subject	Practicals	Date	No. of Practical
		1. To study parts of a compound microscope	11/05/2021	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		2

		photosynthesis.		
		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	10/06/2021	2
		18:To understand diversity of living organisms through educational tour.		2

Class: B.Sc.BT. III (Sixth Semester)

Name of Teacher: Sirdeshmukh U.P.

Course Title: Agriculture Biotechnology

Course code :U-AGB-

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	23/02/2021	1	PPT presentation	2 assignments
		Agricultural crops Need of agricultural management	24-25/02/2021	2	seminar	
		Plant pathology/diseases, Plant -pathogen interaction	01-02/03/2021	2	Video Lectures	
		Plant breeding – Concept and types				
		Agricultural nanotechnology	03-09/03/2021	4		
		UNIT-II:				
		Biomass: Composition, Types, Biomass as a energy Source, Biomass conversion and Utilization.	10-17/03/2021	4		
		Bioethanol production				

		Mushroom cultivation	18- 24/03/2021	4		
		-Biofertilizers: Concept and Types of Biofertilizer	25- 29/03/2021	02		
		Microbial Inoculum - Rhizobium Inoculant, Azotobacter, and Phosphate Solubilizing Biofertilier	30- 31/03/2021	02		
		Bio-pesticides- Definition and Types (Microbial and Botanical)	1-5/04/2021	02	PPT presentations	2- assignments
		Advantages of Biopesticides over chemical pesticides.	06/04/2021	1	seminar	
		Single Cell Protein and its Nutritive Value eg. Spirulina	7/04/2021	1	Video lectures	
		Secondary metabolites and its applications	08- 12/04/2021	2		
		UNIT- III:				
		Molecular markers - hybridization and PCR based markers	13- 14/04/2021	2		
		RFLP, RAPD	15- 20/04/2021	03	PPT presentations	2- assignments
		STS, SSR	22- 26/04/2021	02	seminar	
		AFLP, SNP markers	27- 28/04/2021	02	Video Lectures	

		Development of population, RILs, BCILs, NIL, ILs	29-03/04-05/2021	02		
		DNA fingerprinting-principles and applications	06/05/2021	01		
		introduction to mapping of genes/QTLs	10-11/05/2021	2		
		Marker assisted selection (MAS)- strategies for Introducing genes of biotic and abiotic stress resistance in plants	12-13/05/2021	2		
		molecular diagnostics of pathogens in plants . -A Case study	17-18/05/2021	2		
		UNIT- IV: Plant Genetic engineering				
		Agrobacterium-plant interaction; virulence; Ti and Ri plasmids; opines and their significance; T-DNA transfer; disarmed Ti plasmid	19-26/05/2021	5		
		Genetic transformation - Agrobacterium-mediated gene delivery; co integrate and binary vectors and their utility	27-03/05-06/2021	5		
		direct gene transfer - PEG-mediated, electroporation, particle bombardment and alternative methods	07-08/06/2021	2		
		screen able and selectable markers	09/06/2021	1		
		characterization of transgenics; chloroplast transformation	10-14/06/2021	2	PPT presentations	2-assignments
		marker-free methodologies	15/06/2021	1	seminars	

		advanced methodologies - cisgenesis, intragenesis and genome editing	16/06/2021	1	Video lectures	
		molecular pharming - concept of plants as biofactories,	17-18/06/2021	2		
		production of industrial enzymes and pharmaceutically important compounds				

Lab course XXIV (Agriculture biotechnology)

U-LAC-

Sr. No.	Subject	Practicals	Date	No. of Practicals
	Agriculture biotechnology	1. Isolation of Rhizobium sp. from root nodule and application of rhizobium bio fertilizer for Leguminous crops.	06/03/2021	
		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.	20/05/2021	
		9. Visit to Cell Culture Facilities /Production /Biofertilizer Industry.		

Lab course XX (Developmental biology)**U-LAC-614**

Sr. No.	Subject	Practicals	Date	No. of Practicals
		1. Introduction to developmental biology-embryo protocols, ethics, and model Systems. •General embryo protocols and ethic	13/03/2021	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.	20/05/2021	04