BAGALKOT UNIVERSITY

Mudhol Road, Jamkhandi – 587301 Dist: Bagalkote

The Draft

REGULATIONS AND COURSE STRUCTURE

Governing the Choice Based Credit System (CBCS) Semester Scheme with multiple entry and exit options in

BACHELOR OF SCIENCE WITH ZOOLOGY

III Semester

As Per NEP – 2020 and Adapted from RCU Belagavi

Applicable from the Academic Year 2024-25

SECOND YEAR;SEMESTER-III										
Catgory	**Course code**	**Title of the Paper**	**Marks**			**Teaching hours/week**			**Credit**	**Duration of exams (Hrs.)**
			IA	**SEE**	**Total**	**L**	**T**	**P**		
L5	----------	Languages	40	60	100	4	-	-	3	2
L6	----------	Languages	40	60	100	4	-	-	3	2
DSC3	126BSC03ZOODSC03T	Molecular Biology, Bioinstrumentation & Biotechniques	40	60	100	4	-	-	4	2
	126BSC03ZOODSC03L	Molecular Biology, Bioinstrumentation & Biotechniques	25	25	50	-	-	4	2	4
DSC3	----------	Another department course code	40	60	100	4	-	-	4	2
			25	25	50	-	-	4	2	4
SEC2	126COM03XXXSEC03T	Artificial Intelligence	25	25	50	1	-	2	2	2
VBC5	126COM03XXXVBC05T	NCC/NSS/R&R(S &G)/Cultural	25	-	25	-	-	2	1	-
VBC6	126COM03XXXVBC06B	Physical Education Sports	25	-	25	-	-	2	1	-
OEC3	126BSC03ZOOOEC03T	Endocrinology	40	60	100	3	-	-	3	2
Total Marks			**700**		**Semester Credits**				**25**	

III Semester BSc Zoology
Core Course Content

Course Title/Code: **Molecular Biology, Bioinstrumentation &Techniques in Biology**	Course Credits:**4**
Course Code: 126BSC03ZOODSC03T	L-T-P per week:4-0-0
Total Contact Hours**: 56**	Duration of ESA: 2Hours
Formative Assessment Marks:4**0**	Summative Assessment Marks: **60**

Course Outcomes (COs):

At the end of the course the student should be able to understand:

1. After successful accomplishment of the course, the learners will be able to acquire betterunderstanding and comprehensive knowledge regarding most of the essential aspects of Molecular Biology subject which in turn will provide a fantastic opportunity to develop professional skill related to the field of molecular biology.
2. The course will mainly focus on the study of principal molecular events of cell incorporating DNA Replication, Transcription and Translation in prokaryotic as wellas eukaryotic organisms.
3. Acquiring knowledge on instrumentation and techniques in biology.

Semester III-Zoology
Core Course III Content:

Content	Hours
Unit I	**14**
Chapter1: Process of Transcription • Fine structure of gene (Cistron, Recon, Muton) • RNA polymerases-types and functions • Transcription in prokaryotes and eukaryotes	8

Chapter2: Process of Translation • Geneticcode and it ssalien tfeatures • Translation in prokaryotes and eukaryotes	6
Unit II	**14**
Chapter3: Regulation of gene expression-I Regulation of gene expression in prokaryotes- lac operon (inducible) and trp operon (repressible) in *E.coli* Regulation of gene expression in eukaryotes-Role of chromatin (euchromatin and heterochromatin) in gene expression Post-transcriptional modification: capping, splicing, polyadenylation Concept of RNA editing (mRNA), gene silencing, and RNAi.	9
Chapter4: Regulation of gene expression-II Post-translational modifications: purpose, advantages, and significance; glycosylation, methylation, phosphorylation, and acetylation. Intracellular protein degradation (lysosomal autophagy and ubiquitin proteosome Pathway).	5
Unit III	**14**
Chapter5: Microscopy • Principles and applications of Light microscopy, Dark field microscopy, Phase contrast microscopy, Fluorescence microscopy, confocal microscopy and Electron microscopy (SEM and TEM).	9
Chapter6: Centrifugation and Chromatography • Centrifugation: Principles, types, and applications (High speed and Ultracentrifugation) • Chromatography: Principle and applications of: TLC, HPLC and GC	5
Unit IV	**14**
Chapter 7: Biochemical Instrumentation • Colorimetry and Spectrophotometry: Beer-Lambert'slaw, Absorption spectrum, UV-VL Spectrophotometer. • pH meter, measurement of pH • Principle, applications and safety measure sofa Radio-tracer techniques-Autoradiography.	6
Chapter 8: Molecular Techniques • Principle and applications of Agarose gel-electrophoresis, SDS-PAGE, DNA Sequencing (Sanger's Dideoxymethod) • , PCR, DNA Fingerprinting, ELISA, Southern Blotting and Western Blotting.	8

Semester III (Practical III)

Course Title: **Molecular Biology, Bioinstrumentation and Techniques in Biology**	Course Credits:2
Course Code: 126BSC03ZOODSC03L	L-T-P per week: 0-0-4
Total Contact Hours**: 56**	Duration of ESA: 4Hours
Formative Assessment Marks: **25**	Summative Assessment Marks: **25**

Course Outcomes (COs):

At the end of the course the student should be able to:

1. At the end of the course, students will be able to understand the applications of biophysicsand principle involved in bio-instruments.
2. Understand the methodology involved in biotechniques.
3. Students can demonstrate knowledge and practical skills of using instruments in biology andmedical field.
4. They can perform techniques involved in molecular biology and diagnosis of diseases.

Core Course Lab Content

lab Course Content

List of experiments	14 units(1unit-4hrs)
1.To study the principle and applications of simple,compound and binocular microscopes.	1
2.Tostudytheprinciple and applications of various lab equipments-pH meter, Electronic balance, Vortex mixer, use of glass and micropipettes, Laminar airflow, Incubator, shaker, Waterbath and centrifuge.	2
3.To prepare Buffer solutions (Phosphate, Citrate, Tris-HCl buffer)	1
4. To estimate amount of RNA by Orcinol method.	2
5. Demonstration of differential centrifugation to fractionate components in a Given mixture.	1
6. To estimate amount of protein by Lowry's method.	2
7.To identify different unknown amino acids using ascending paper Chromatography.	1
8. Extraction of DNA from the given animal tissue sample.	2
9. To estimate amount of DNA by di-phenyl amine (DPA) method.	2

Suggested Readings:

1. Bruce Alberts, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts, and Peter Walter. Molecular Biology of the Cell, 4th edition. New York: Garl and Science (2002).
2. Daniel L. Hartl and Maryellen Ruvolo. Genetics: Analysis of Genes and Genomes, 8th Edition. Burlington, Mass.: Jones & Bartlett Learning (2012).
3. Gerald Karp.Cell and Molecular Biology:Concepts and Experiments,5th Edition.Wiley Publication (2008).
4. Harvey Lodish , Arnold Berk,Paul Matsudaira,ChrisA.Kaiser,Monty Krieger,Freeman.Molecular Cell Biology, 5th edition.W.H. & Company (2003).
5. James D. Watson, Tania A. Baker, Stephen P. Bell, Alexander Gann, Michael Levine, Richard Losick. Molecular Biology of the Gene, 5th edition. Cold Spring Harbor Laboratory Press (2003).
6. Stryer, Lubert.Biochemistry, 2nd Edition.W.H. Freeman and Company, New York (1981).

Semester: III

ZOOLOGY **Open Elective Course Content**

Course Title: **ENDOCRINOLOGY**	Course Credits: 02
CourseCode:126BSC03ZOOOEC03T	Duration of ESA: 3Hours
Total Contact Hours**: 42** Formative	Summative Assessment
Assessment Marks:**40**	

Course Outcomes (Cos):

At the end of the course the student should be able to:

Differentiate among endocrine, paracrine and autocrine systems.

1. Describe the different classes and chemical structures of hormones.
2. Identify the glands, organs, tissues and cells that synthesize and secretehormones, hormone precursors and associated compounds.
3. Identify and discuss the integration of the endocrine system in general with focuson specific interactions.

Course Content

Content	Hrs.
Unit I	**14**
Chapter 1. About Endocrine glands • Endocrine glands and classifications of hormones. • Characteristics and Transport of Hormones. **Chapter 2.Hypothalamus-Hyphophysis** • Hypothalamus as a neuroendocrine organ • Pituitary– Structure and functions • Chemical nature, mode of action, and functions. • Pituitary disorders **Chapter 3. Pineal gland** • Structure and functions of Pineal gland. • Hypo-and hyperactive states of the gland.	
Unit II	**14**
Chapter 4. Thyroid and parathyroid • Histological structure of the glands. • Chemical nature, mode of action, and functions of the hormones. • Hypo- and hyperactive states of the glands. **Chapter 5.:Adrenalcortexandmedulla**– • Histological structure of the gland. Chemical nature, and functions • Hypo-and hyperactive states of the gland. **Chapter 6.** Prostaglandins	
Unit– III	**14**

Chapter7:Pancreas: • Pancreatic islets-histological structure. Chemical nature and function. Hormonal control of blood sugar. • Hyperinsulinism and diabetes mellitus. **Chapter8:Gastro-intestinal hormones**– • Functions and regulation of secretion of the hormones. **Chapter9:Differenttypesof Rhythms**– • Ultradian, circadian, infradian. Different zeitgebers and their relation with circadian clock • Neural basis of biological clock and role of suprachiasmatic nuclei. Sleep-wakefulness cycle. Time keeping genes. Jet-lagand shift work.	

Text Books & Suggested Readings:

1. William's TextBook of Endocrinology Larsen et al.: An Imprint of Elsevier.
2. Endocrinology, Mac E.Hadley, Pearson Education.
3. The Kidney-An outline of Normal and Abnormal Functions, by H.E.Dewardener, ELBS.
4. Vander's Human Physiology, E.P.Widmaier et al., McGraw- Hill, Higher Education.
5. Concise Medical Physiology by S.K.Chaudhuri, New Central Book Agency.
6. Endocrinology.Vols.I, II and III by L.O.DeGroot. W.B.Saunders Co.
7. The PhysiologyofReproduction, Vols.I&II, byE.KnobilandJ.D.Neil.RavenPress.
8. Guyton and Hall. Textbook of Medical Physiology. 13th Edition.
9. Histology:ATextandAtlas.SixthEdition.Ross&Pawlina.LippincottWilliams&Wilkins.
10. Vertebrate Endocrinology by David O.Norris.