

Education for Knowledge, Science and Culture”

-Shikshanmahashri Dr. Bapuji Salunkhe

Shri Swami Vivekanand Shikashan Sanstha's

## **Vivekanand College, Kolhapur (Autonomous)**

**Department of Zoology**

**Academic Year 2020-2021**

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### **Add On Course on Bioinstrumentation**

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Shri Swami Vivekanand Shikshan Sanstha's  
**Vivekanand College, Kolhapur (Autonomous)**  
**DEPARTMENT OF ZOOLOGY**  
Academic year 2020-2021

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Date : 20/08/2021

**NOTICE**

All the students are hereby informed that Add on course on "Bioinstrumentation" is going to start from 26/08/2021 onwards by online/offline mode. The fee for above said course is Rs. 500. All interested students have to register their name and pay course fee in the Department of Zoology before 31/08/2021



**Dr. G. K. Sontakke**  
Head,  
Department of Zoology  
Vivekanand College,  
Kolhapur (Autonomous)



Jr. College Recog. No. H.S.C./1074/R-1/Dt. 8-8-1976  
Jr. College Code No. 23-09-002

"ज्ञान, विज्ञान आणि सुसंस्कार यासाठी शिक्षण प्रसार"  
- शिक्षणमहर्षी डॉ. बापुजी साठुंखे

Estd. : June 1964



Shri Swami Vivekanand Shikshan Sanstha's  
**VIVEKANAND COLLEGE, KOLHAPUR [Autonomous]**

(Affiliated to Shivaji University, Kolhapur)

NAAC Reaccredited : "A" with CGPA 3.24

College With Potential For Excellence

ISO 9001-2015

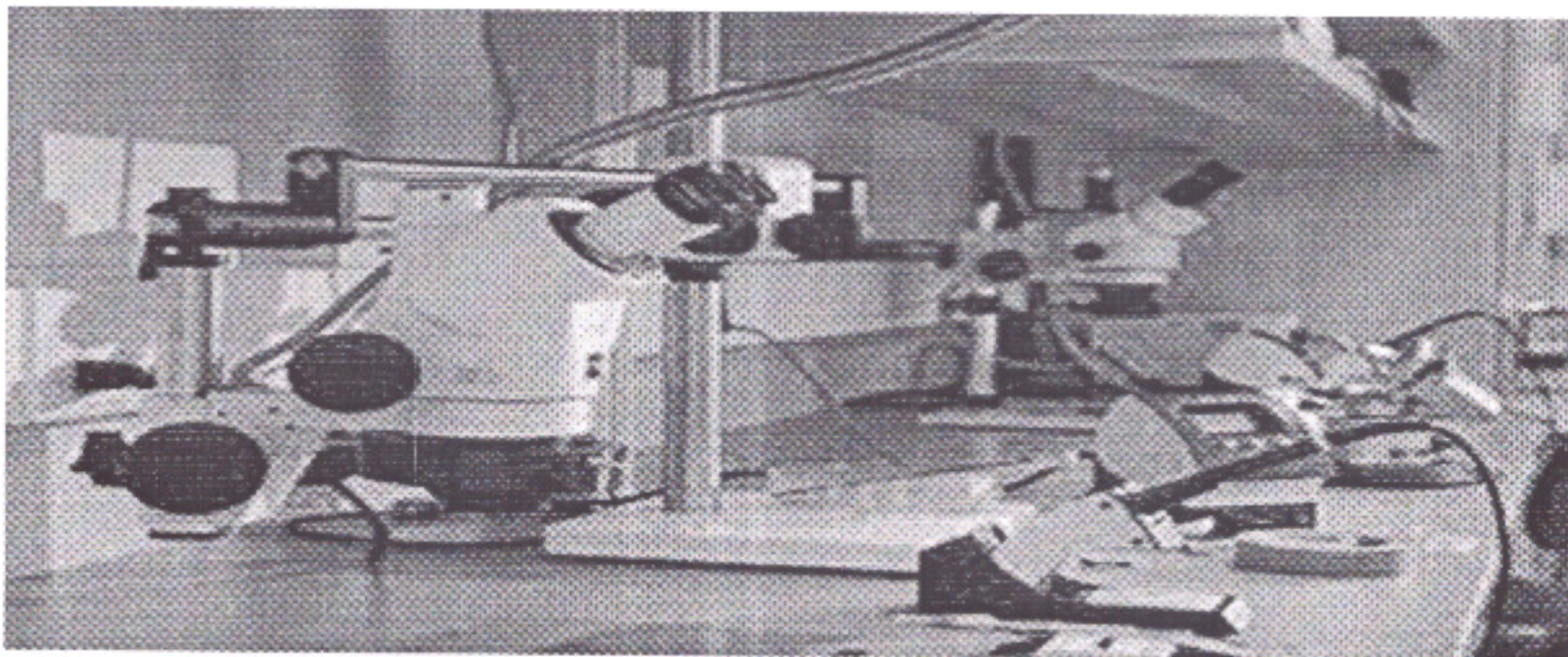


## DEPARTMENT OF ZOOLOGY

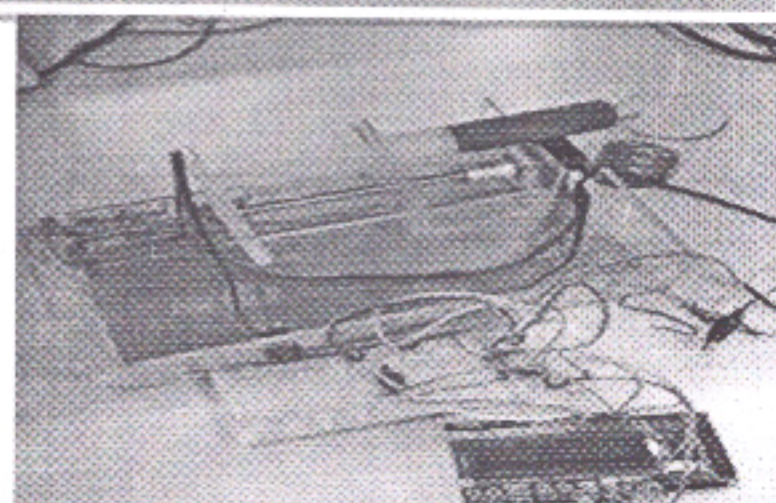
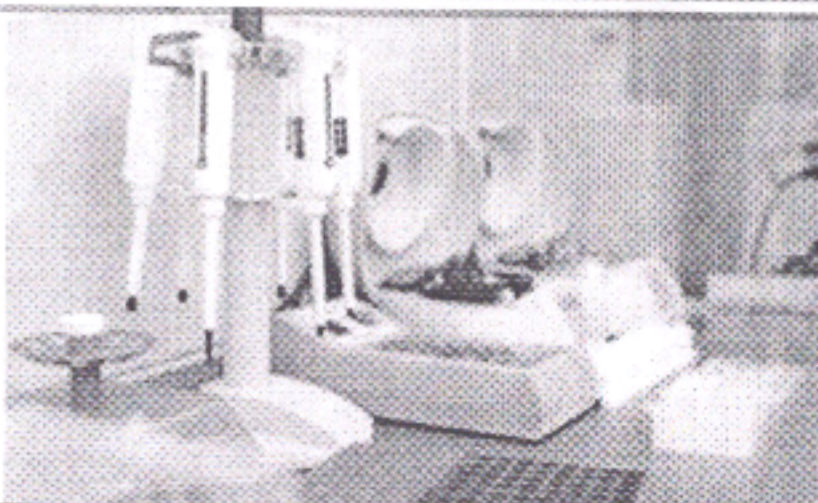
Academic year 2020 - 21

### Add on Course : Bioinstrumentation

Eligibility: 12<sup>th</sup> pass Intake: 40 Duration: 30 Hrs



**About Course:** Bioinstrumentation is the measurement of physical, physiological, and biological parameters using instruments in any living organism (including human beings) and manipulation of parameters within biological systems, focusing on the application for the diagnosis and treatment of disease.



**Dr. G. K. Sontakke**  
Course Co-ordinator  
Department of Zoology

**Dr. R. R. Kumbhar**  
Principal  
Vivekanand College, Kolhapur



Shri Swami Vivekanand Shikshan Sanstha's  
Vivekanand College Kolhapur [Autonomous]  
**DEPARTMENT OF ZOOLOGY**  
2020-21

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**Add On Course 'Bioinstrumentation'**

**WORKLOAD**

**Duration of course:** 30 Hrs

**Mode:** Online/Offline

**Lectures:** 40

Dr. Gaupale T.C	=	09
Ms. Patel N.A	=	09
Dr. Desai S. S	=	09
Ms. Kamble K.L	=	09
Dr. Sontakke G.K	=	04

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**TOTAL** = 40

*G.K. Sontakke*  
(Dr.Sontakke G.K)  
Head  
Department of Zoology  
Vivekanand College,  
Kolhapur

Shri Swami Vivekanand Shikshan Sanstha's  
Vivekanand College Kolhapur [Autonomous]  
**DEPARTMENT OF ZOOLOGY**  
2020-21

**Add On Course 'Bioinstrumentation'**

**TIME TABLE**

Time/Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
08.00 to 08.48	NAP	TCG	KLK	SSD	GKS	Practical
08.48 To 09.30	TCG	KLK	SSD	NAP	-	

Dr. Gaupale T.  
Ms. Patel N.A  
Dr. Desai S. S  
Ms. Kamble K.L  
Dr. Sontakke G.K

*G.K. Sontakke*  
(Dr. Sontakke G.K)  
Head  
Department of Zoology  
Vivekanand College,  
Kolhapur

**Vivekanand College, Kolhapur (Autonomous)**  
**Department of zoology**  
**COC - Biomedical instrumentation with disease diagnosis**  
**“Bioinstrumentation”**

**Course introduction:**

Biomedical instrumentation is the application of knowledge and technologies to solve problems related to living biological systems. It involves diagnosis, treatment and prevention of disease in human. As the medical field is emerging, the area of Biomedical instrumentation is an expanding field. We use the term “bio” to denote something related to life. In this course, student will learn key measurement principles of instruments found in health technologies, ranging from medical devices used in pathology labs to wearable’s for fitness monitoring. Students will learn how to build bio-potential amplifiers and record and interpret your own bioelectrical data (e.g. heart activity, muscle activity). Student will gain insight into the working principles underlying the instrumentation for measuring respiratory and cardiovascular function such as blood pressure, blood flow as well as biochemical sensors and analysing various biological specimens for disease diagnosis.

**Objectives:**

- To introduce students to clinical medicine by studying the pathophysiologic basis of symptoms and signs of various diseases.
- It is valuable to students along with their bachelor degree course by highlighting the clinical relevance of their basic sciences.
- To develop an interesting, practical and informative approach in various bioinstruments which are used in disease diagnosis
- To develop basic knowledge of cause, diagnosis, treatment of bacterial, viral disease.
- To develop awareness in health and hygiene practice.
- To provide job opportunity to the student in clinical, pathological laboratories as well as any research centre

**Course Outcomes:**

On successful completion of this course students will be able to:

1. Inspect common biomedical instruments and their working
2. Outline the design of different biomedical instruments
- 6 Explain and contrast measurement principles for blood flow, pressure and volume as well as respiratory variables
- 7 Define and discuss biochemical sensors; and
- 8 Identify, explain and judge patient safety issues related to biomedical instrumentation.
9. Brief study of different medical instrument and their use in physiological



- measurements
10. Familiarize with the analysis and design of different instrument to measure biosignals like ECG
  11. Explain information of tools and techniques used in disease diagnosis.

## SYLLABUS

Total lecture: 30

### UNIT - I

#### Study of biomedical instruments

15

- Introduction to biomedical instruments
- Study of the following bioinstruments with their instrumentation, working and applications
  - 1) Centrifuge - types of motor, different types of centrifugation
  - 2) Microscopy - Study of Compound microscope, Phase contrast microscope, electron microscope, fluorescent microscope
  - 3) Electro -cardiogram
  - 4) Sphygmomanometer
  - 5) Spectrophotometer
  - 6) Colorimeter
  - 7) Gel electrophoresis - Agarose gel electrophoresis, SDS- PAGE
  - 8) PCR, RT- PCR
  - 9) Chromatography - TLC and HPLC
  - 10) Microtome
  - 11) Biochemical sensors
  - 12) Haemoglobinometer, haemocytometer
  - 13) Autoanalyzer

### UNIT - II

#### Application of Biomedical instrument in Disease diagnosis

15

- Definition of disease, sources of disease, types of disease, mode of transmission of disease.
- Introduction to bacterial, viral, protozoan disease with respect to the cause, symptoms, diagnosis, treatment, prevention.
- Bacterial diseases- Typhoid, Pneumonia, Tuberculosis
- Viral disease-common cold, COVID19, Hanta virus, ebola virus, zika virus, HIV, Dengue, Chikungunya
- Protozoan diseases: Malaria, Leishmaniasis,
- Study of cancer - Types, Causes, Symptoms, Diagnosis and Preventive measures.

#### Practicals syllabus :

- Measurement of human blood pressure

- Interpretation of ECG
- To find absorption spectrum of solution (UV-visible)
- Separation of DNA/protein by Gel electrophoresis
- Analysis of DNA/protein bands obtained in gel electrophoresis by Gel documentation system
- Centrifugation- Isolation and Estimation of DNA/RNA
- Detection of amino acid by TLC
- Histological slide preparation-liver/testes/pancreas
- Estimation of haemoglobin
- ELISA
- Demonstration of PCR
- Differential WBC count
- Total RBC, WBC count
- Estimation of blood glucose, and abnormal urine constituent with autoanalyzer/spectrophotometer
- Any other practical set by Department



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 Department of Zoology  
 Academic Year-2020-21  
**Add On Course: 'Bioinstrumentation'**

**List of Students**

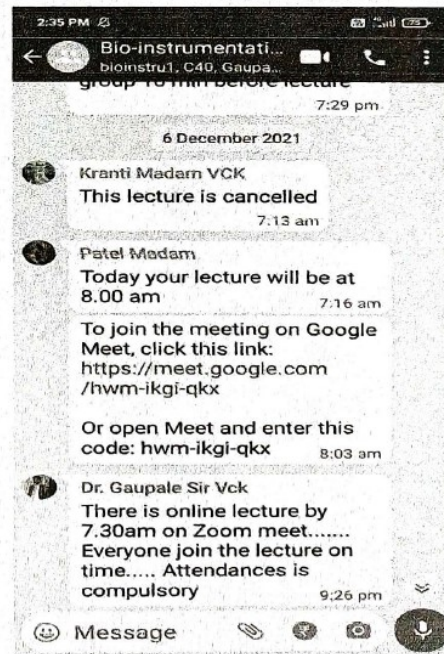
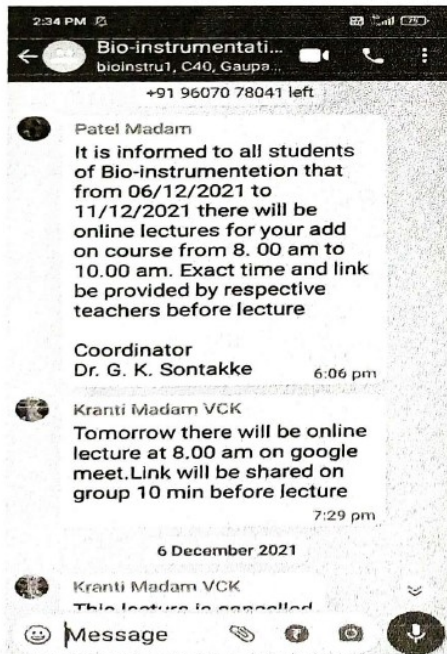
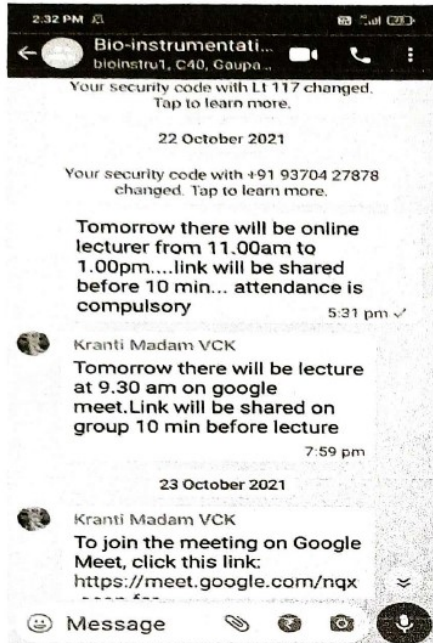
Sr. No.	Roll call	Name of the Student	Class	Mobile No.
1	BI0120	KOLI ABHISHEK VIJAYKUMAR	B.SC.I	8483868352
2	BI0220	MAGHDUT VISHNU DOBHOLKAO	S.SC.I	9939515757
3	BI0320	CHOUGULE SAHIL FIROJ	B.SC.I	9850057212
4	BI0420	PATIL ANIL DAKSHATA	B.SC.I	7588912708
5	BI0520	ANAGHA AVINASH BANAGE	B.SC.II	7350226611
6	BI0620	DHAVAL SHRADDHA VINOD	B.SC.I	9373664617
7	BI0720	DANGAT OMKAR GAJANAN	B.SC.I	7558253813
8	BI0820	PADWAL KISHARI NARAYAN	B.SC.I	8805427968
9	BI0920	ZUNAKE SAYESH DNYANDER	B.SC.I	9673665354
10	BI1020	KUMTHEKAR KRUSHAKANT SURRNDRA	B.SC.I	7558278217
11	BI1120	KAMBLE RUTUJA NETAJI	B.SC.I	9527429264
12	BI1220	GURAV VAISHANVI RAJESH	B.SC.I	7887579508
13	BI1320	DHISAL RENU BHARAT	B.SC.I	9370427878
14	BI1420	CHOUGLE SIDDHI YESHWANT	B.SC.I	9075078114
15	BI1520	BALUGADE SIDDHI ANANDA	B.SC.II	9373670433
16	BI1620	JAMBHALE PAYAL SAMPAT	B.SC.I	8308586446
17	BI1720	BHIUNGADE SWARUPA SANJAY	B,SC.I	8378988493
18	BI1820	DESAI OJASWITA RANJIT	BSC.I	9975979879
19	BI1920	SHINDE CHAITRALI VIDYADHAR	BSC.II	9922432265
20	BI2020	SANGAR SRUSHTI SANTOESH	BSC.II	9325122998
21	BI2120	MORE RUTH MADAN	BSC.II	7420032824
22	BI2220	KSHIRSAGAR ADITI VIJAY	BSC.II	9699575504
23	BI2320	KILLEDAR MANASI SHEKHAR	BSCII	8208893920
24	BI2420	GLASALKAR MANASI SURESH	BSC.II	9579021317
25	BI2520	BIRANJE SONALI UTTAM	BSC.II	7498429592
26	BI2620	SURYAWANSHI DIPALI KARBHARI	BSC.I	7775861910
27	BI2720	KADAM PRACHI RAJKUMAR	BSC.III	9130801436
28	BI2820	PATIL VAISHNAVI SURESH	BSC.III	9146029077
29	BI2920	RANAMALE POOJA BANDOPARST	BSC.III	7262934913
30	BI3020	SHINDE OMKAR DILIP	BSC.III	9075729776
31	BI3120	JUNJATE ATUL VASANT	BSC.II	8999426898

  
 Dr G. K. Sontakke  
 Head  
 Department of Zoology  
 Vivekanand College,  
 Kolhapur



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**VIVEKANANDA COLLEGE, KOLHAPUR (AUTONOMOUS)**  
DEPARTMENT OF ZOOLOGY  
Academic Year 2021-2022

**Add on Course - Bioinstrumentation**



*G.K.S.*

**Dr. G. K. Sontakke**  
**HEAD**  
**DEPARTMENT OF ZOOLOGY**  
**VIVEKANAND COLLEGE, KOLHAPUR**  
**(AUTONOMOUS)**



Shri Swami Vivekanand Shikshan Sanstha's  
**Vivekanand College, Kolhapur (Autonomous)**  
**DEPARTMENT OF ZOOLOGY**  
Academic year 2020-2021

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Date : 10/10/2021

**NOTICE**

All the students are hereby informed that Examination of Add on course on "Bioinstrumentation" will be held on 16/10/2021 at 10.00 am by online mode on Google form platform. Attendance of all students is compulsory.

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**DEPARTMENT OF ZOOLOGY**  
 Academic year 2020-2021  
**Add on Course: Bioinstrumentation**

**Result**

Sr. No.	Roll call	Name of the student	Class	Grade
1	BI0120	Koli Abhishek Vijaykumar	B. Sc. I	A+
2	BI0220	Dabholkar Vishnu Meghdut	B. Sc. I	A+
3	BI0320	Chougule Sahil Firoj	B. Sc. I	A+
4	BI0420	Patil Dakshata Anil	B. Sc. I	A+
5	BI0520	Banage Anagha Avinash	B. Sc. II	A+
6	BI0620	Dhavale Shraddha Vinod	B. Sc. I	A+
7	BI0720	Dangat Omkar Gajanan	B. Sc. I	A+
8	BI0820	Padwal Kishori Narayan	B. Sc. I	A+
9	BI0920	Zunake Suyash Dyandev	B. Sc. I	A+
10	BI1020	Kumathekar Krushnkant Surendra	B. Sc. I	A+
11	BI1120	Kamble Rutuja Netaji	B. Sc. I	A+
12	BI1220	Gurav Vaishnavi Rajesh	B. Sc. I	A+
13	BI1320	Dhisal Renu Bharat	B. Sc. I	A+
14	BI1420	Chougule Siddhi Yashwant	B. Sc. I	A+
15	BI1520	Balugade Siddhi Ananda	B. Sc. II	A+
16	BI1620	Jambhale Payal Sampat	B. Sc. I	A+
17	BI1720	Bhiungade Swaroopa Sanjay	B. Sc. I	A+
18	BI1820	Desai Ojaswita Ranjeet	B. Sc. I	A+
19	BI1920	Shinde Chaitrali Vidyadhar	B. Sc. II	A+
20	BI2020	Sangar Shrushti Santosh	B. Sc. II	A+
21	BI2120	More Ruth Madan	B. Sc. II	A+
22	BI2220	Kshirsagar Aditi Vijay	B. Sc. II	A+
23	BI2320	Killedar Manasi Shekhar	B. Sc. II	A+
24	BI2420	Ghosalkar Manasi Suresh	B. Sc. II	A+
25	BI2520	Biranje Sonali Uttam	B. Sc. III	A+
26	BI2620	Suryawanshi Dipali Karbhari	B. Sc. I	A+
27	BI2720	Kadam Prachi Rajkumar	B. Sc. III	A+
28	BI2820	Patil Vaishnavi Suresh	B. Sc. III	A+
29	BI2920	Ranmale Pooja Bandopant	B. Sc. III	A+
30	BI3020	Shinde Omkar Dilip	B. Sc. III	A+
31	BI3120	Junjate Atul Vasant	B. Sc. II	A+



**Dr.G. K. Sontakke**  
Head,

Department of Zoology  
Vivekanand College,  
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SHRI SWAMI VIVEKANAND SHIKSHAN SANSTHA'S

Vivekanand College, Kolhapur (Autonomous)

[Affiliated to Shivaji University, Kolhapur]

**DEPARTMENT OF ZOOLOGY**

CERTIFICATE

This is to certify that Mr/Ms Mansi Suresh.....of B.Sc. I/II/III Roll No 2422 has successfully completed the Add on Course 'Bioinstrumentation' carried out in the Department of Zoology, Vivekanand College, Kolhapur [Autonomous] during academic year 2020-21. This certificate is awarded to him/her after passing theory and practical examination.

Dr.G.K.Sontakke

Head,  
Department of Zoology,  
Vivekanand College,  
Kolhapur (Autonomous)

Dr.R.R.Kumbhar

Head,  
Department of Zoology,  
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