



MAHISHADAL RAJ COLLEGE

(Govt. Sponsored)

NAAC Accredited 'A' Grade College

DST (FIST) Govt. Of India approved College, NSDC Training Partner

Estd. : 1946

Mahishadal : Purba Medinipur

Phone STD 03224 No. 240220

Ref. No.....

Date:

Online ADD ON COURSE 2020-21

Organised by Department Zoology

Topic: Microscopy

Add on course summary:

REPORT:

Name of the course- Microscopy

Course coordinator: *Dr. Shubhamoy Das*, (Associate Professor, HOD, Department of Zoology , Mahishadal Raj College)

Date of commencement: 10.12.2020

Date of completion: - 24.12.2020

Number of participant enrolled: 30

Total duration day: 15

Total duration hour: 30

Evaluation method:- Paper pen and practical work (Online)

RESULT DETAILS:-

Number of student participate in this program: 30

Number of student completes this program: 28

Number of student got certificate in this program: 28

Name of the course: Microscopy

Course coordinator: *Dr. Shubhamoy Das*, (Associate Professor, HOD, Department of Zoology , Mahishadal Raj College)



✚ **About the course:**

Light microscopy has become one of the most useful tools in the life sciences. Microscopes are very complex pieces of equipment, that have evolved to accommodate many different imaging techniques. Microscopy and its applications have promoted many key breakthroughs in life sciences. Its impact can be seen by the numerous Nobel prizes in Physics, Chemistry and Physiology and Medicine, that have been attributed to the development of new microscopy applications and techniques, or from discoveries that were possible due to microscopy breakthroughs. This course helps the basics of optics, proceeds through transmitted light microscopy, covers the various methods of imaging fluorescent samples, describes how cameras work and image processing, and concludes with some of the latest advances in light microscopy. In addition to lectures, we also provide labs, so as to cover pragmatics of how to use microscopes.

✚ **Learning outcomes:**

Completing a microscopy course can open up various job opportunities in fields related to microscopy and imaging. A microscopy course typically provides comprehensive training in the principles, techniques, and applications of microscopy. These courses are designed to equip students with the knowledge and skills needed to operate various types of microscopes, analyze microscopic samples, and understand the underlying principles of microscopy. Job opportunities in microscopy may be found in image specialist, research scientist, clinical laboratory technologist, pathologists assistant, quality control specialist, forensic scientist, biotechnologist, education and training, museum or conservation specialist.

✚ **Target audience:**

Students of science background (UG & PG), Researcher, and faculty members. Environmental Studies student may also participate.

✚ **Course content overview:**

At the completion of this course, participants should be able to:

- Identify the major components of the microscope and their function
- Identify how to maintain a microscope
- Discuss the role of fluorescent in microscopy
- Describe the process to correctly focus on the appropriate field of view
- Use the ocular micrometer to measure an object under the microscope
- Demonstrate the ability to troubleshoot encountered problems with the microscope



✚ **Schedule:** Total 30 hours

DAY	SCHEDULE
Day 1	Basics of Microscopy. History of microscope. (2 hours)
Day 2	Components of different microscope and how its work. (T + P) (2 hours)
Day 3	Resolution of Microscope (T + P) (2 hours)
Day 4	Different types of microscopes, including optical, electron, and scanning probe microscopes, and their applications. (T + P) (2 hours)
Day 5	Explore various microscopy techniques, such as brightfield microscopy, phase-contrast microscopy, fluorescence microscopy, and more. (T + P) (2 hours)
Day 6	Principles of Phase contrast. (T + P) (2 hours)
Day 7	Methods, cell, tissue sample preparation. (T + P) (2 hours)
Day 8	Phase contrast image analysis and interpretation. (T + P) (2 hours)
Day 9	Image acquisition and processing, emphasizing techniques to enhance image quality and clarity. (T + P) (2 hours)
Day 10	Principles of Fluorescence microscopy (Fluorescent dyes and proteins, and selection of Fluorescent Probes). (T + P) (2 hours)
Day 11	Tissue or cell preparation for fluorescence microscopy. (T + P) (2 hours)
Day 12	Fluorescence Microscopy based methods to study SF 1 protein in Tricogaster fish. (T + P) (2 hours)
Day 13	Image analysis and interpretation 1. (T) (2 hours)
Day 14	Basic of SEM and TEM. (2 hours)
Day 15	Overall discussion. Doubts clear and revision (2 hours)



✚ Detail Work Schedule

Date	Day	Contents	Time	Duration	Experts	Designation
10.12.20	1	Basics of Microscopy. History of microscope	12 to 2pm	2	Dr.Subhamoy Das	HOD, Zoology, MRC
11.12.20	2	Components of different microscope and how its work. (T + P)	1 to 3 pm	2	Dr.Subhamoy Das	HOD, Zoology, MRC
12.12.20	3	Resolution of Microscope (T + P)	3 to 5pm	2	Dr.Subhamoy Das	HOD, Zoology, MRC
13.12.20	4	Different types of microscopes, including optical, electron, and scanning probe microscopes, and their applications. (T + P)	03 to 05pm	2	Prof.Manik Das	SACT Mahishadal Raj College
14.12.20	5	Explore various microscopy techniques, such as brightfield microscopy, phase-contrast microscopy, fluorescence microscopy, and more. (T + P)	02 to 04pm	2	Prof.Manik Das	SACT Mahishadal Raj College
15.12.20	6	Principles of Phase contrast. (T + P)	01 to 03pm	2	Prof.Saheli Maiti	SACT Mahishadal Raj College
16.12.20	7	Methods, cell, tissue sample preparation. (T + P)	03 to 05pm	2	Prof. Saheli Maiti	SACT Mahishadal Raj College
17.12.20	8	Phase contrast image analysis and interpretation. (T + P)	02 to 04pm	2	Prof. Saheli Maiti and Prof. Sagnik Mondal	SACT Mahishadal Raj College
18.12.20	9	Image acquisition and processing, emphasizing techniques to enhance image quality and clarity. (T + P)	02 to 04pm	2	Prof. Moumita Jana	SACT Mahishadal Raj College
19.12.20	10	Principles of Fluorescence microscopy (Fluorescent dyes and proteins, and selection of	01 to 03pm	2	Prof.Rajkumar Guchhait	SACT Mahishadal Raj College



		Fluorescent Probes) (T + P)				
20.12.20	11	Tissue or cell preparation for fluorescence microscopy. (T + P)	02 to 04pm	2	Dr. Rajkumar Guchhait and Prof. Sagnik Mandal	SACT Mahishadal Raj College
21.12.20	12	Fluorescence Microscopy based methods to study SF 1 protein in Tricogaster fish. (T + P)	01 to 03pm	2	Dr. Rajkumar Guchhait and Prof. Sagnik Mandal	SACT Mahishadal Raj College
22.12.20	13	Image analysis and interpretation 1. (T+P)	01 to 03pm	2	Dr. Rajkumar Guchhait	SACT Mahishadal Raj College
23.12.20	14	Basic of SEM and TEM.	01 to 03pm	2	Dr.Subhamoy Das,	HOD, Zoology, MRC,
24.12.20	15	Evaluation, valediction, feedback Overall discussion.	12 to 2 pm	2	Dr. Subhamoy Day, Dr. Rajkumar Guchhait, Prof. Sagnik Mandal, Prof. Manik Das and Prof. Moumita Jana. DR.Asim Kr Bera	HOD & SACT., Zoology; Principal, MRC
				30 hours		

✚ Course structure and examination scheme:

Course name	Theory classes (hr.)	Practical classes (hr.)	Theory marks	Practical marks	Total marks
Microscopy	15	15	40	10	50

✚ Participant's Details and attendance:

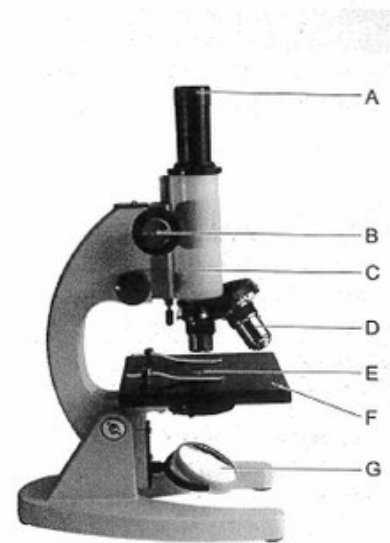


Enrolment Details of Students

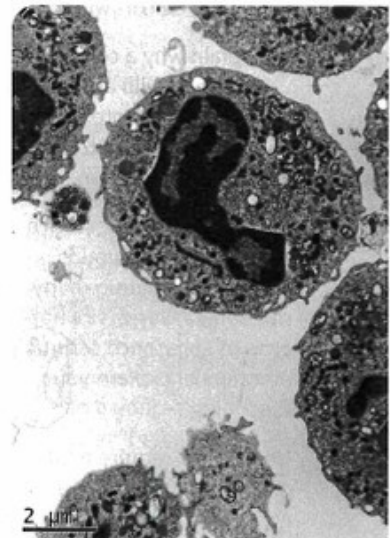
Sl. No.	Student ID	Roll No.	Name
1.	B.Sc/19/0032	2190032	SUBHAJIT HAIT
2.	B.Sc/19/0033	2190033	SUTANU DAS
3.	B.Sc/19/0034	2190034	ABHIJIT MURMU
4.	B.Sc/19/0035	2190035	HASANUR KHAN
5.	B.Sc/19/0076	2190076	ABHINABA MANNA
6.	B.Sc/19/0077	2190077	SK MAHIBUL
7.	B.Sc/19/0126	2190126	DEBABRATA MONDAL
8.	B.Sc/19/0127	2190127	SRILEKHA MONDAL
9.	B.Sc/19/0129	2190129	SK ARIF MOHAMMAD
10.	B.Sc/19/0134	2190134	SAMRAT DHARA
11.	B.Sc/19/0136	2190136	BAKUL MAJI
12.	B.Sc/19/0137	2190137	SK MAHAMMAD RIJUAN
13.	B.Sc/19/0139	2190139	APARNA MALLIK
14.	B.Sc/19/0141	2190141	SOMNATH JANA
15.	B.Sc/19/0173	2190173	SAIKAT MONDAL
16.	B.Sc/19/0175	2190175	SUJAY PATRA
17.	B.Sc/19/0208	2190208	PRALAY MIDYA
18.	B.Sc/19/0209	2190209	JAYDIP KALSA
19.	B.Sc/19/0210	2190210	SAJAL DAS
20.	B.Sc/19/0211	2190211	AMIYA PATRA
21.	B.Sc/19/0212	2190212	DEBALINA SINHA
22.	B.Sc/19/0213	2190213	SENJUTI GHORAI
23.	B.Sc/19/0216	2190216	PRITAM GUCHHAIT
24.	B.Sc/19/0219	2190219	ABHIJIT JANA
25.	B.Sc/19/0220	2190220	DIP KUMAR BERA
26.	B.Sc/19/0263	2190263	AYAN SAMANTA
27.	B.Sc/19/0321	2190321	KRISHNENDU HALDER
28.	B.Sc/19/0322	2190322	PURBITA MAJI
29.	B.Sc/19/0324	2190324	ANINDYA KHATUA
30.	B.Sc/19/0325	2190325	AYANTIK BERA

Sample Question of Examination

- 1 State the name of the part of a microscope where you would place the slide. (1 mark)
- 2 Photo C shows a light microscope.
 - a Give the letter of the part that is an objective lens. (1 mark)
 - b Give the letter of a part that is used to focus an image. (1 mark)
- 3 State why the lowest power magnification is used when first examining a specimen. (1 mark)
- 4 A microscope is fitted with three objective lenses (of $\times 2$, $\times 5$ and $\times 10$).
 - a State what $\times 2$ on a lens means. (1 mark)
 - b The microscope has a $\times 7$ eyepiece lens. Calculate the possible total magnifications. Show your working. (3 marks)
- 5 Luka has made a slide of some onion tissue. When he examines the specimen with a light microscope, he sees large, thick-walled circles that make it difficult to observe the cells.
 - a Give the reason for Luka's observation. (1 mark)
 - b State how he could prepare a better slide. (1 mark)
- 6 When looking at plant root tissue under a microscope, Jenna notices that about 10 cells fit across the field of view. She calculates the diameter of the field of view as 0.2 mm. Estimate the diameter of one cell. Show your working. (2 marks)
- 7 Photo D shows a certain type of white blood cell called a neutrophil. The image was taken using an electron microscope.
 - a State one advantage of using an electron microscope rather than a light microscope. (1 mark)
 - b Calculate the diameter of the cell to the nearest whole micrometre using the scale bar. (1 mark)
 - c Give your answer to part b in mm. (1 mark)
 - d Draw the cell and label the nucleus, cell membrane and cytoplasm. (2 marks)
- 8 Sasha draws a palisade cell from a star anise plant. The cell has a length of 0.45 mm.
 - a Sasha's drawing is magnified $\times 500$. Calculate the length of the cell in Sasha's drawing. (1 mark)
 - b Sasha adds a scale bar to show 0.1 mm. Calculate the length of the scale bar. (1 mark)
- 9 A heart muscle cell is $20\ \mu\text{m}$ wide. It has been drawn 1 cm wide. Calculate the magnification of the drawing. (2 marks)



C a light microscope



D human neutrophils

AMPLE CERTIFICATE OF COURSE COMPLETION



CERTIFICATE OF COURSE COMPLETION

THIS IS TO CERTIFY THAT

SUBHAJIT HAIT

has successfully completed the **Add-on Course** on **Microscopy**
held during **2020-21** academic year at Mahishadal Raj College.

Subhamoy Das.

Course Co-ordinator

S. Monkerjee

IQAC Co-ordinator

[Signature]

Principal



CERTIFICATE OF COURSE COMPLETION

THIS IS TO CERTIFY THAT

PRITAM GUCHHAIT

has successfully completed the **Add-on Course** on **Microscopy**
held during **2020-21** academic year at Mahishadal Raj College.

Subhamoy Das.

Course Co-ordinator

S. Monkerjee

IQAC Co-ordinator

[Signature]

Principal