



GOVERNMENT OF WEST BENGAL  
OFFICE OF THE PRINCIPAL  
*Maulana Azad College*



8, RAFI AHMED KIDWAI ROAD, KOLKATA 700013, INDIA

Phone: 033 2249-3737/2226-7814 e-mail: [maulanaazadcollegekolkata@gmail.com](mailto:maulanaazadcollegekolkata@gmail.com)

Website: <https://maulanaazadcollegekolkata.ac.in>

Summary Report, Meeting Notice, Meeting Resolution, Course Brochure  
/Curriculum, Course outcomes, Evaluation procedure, Sample Certificate

## 12. Applications of Spectroscopy & Nanotechnology in Biological Research

### Summary Report

Course Name: **Applications of Spectroscopy & Nanotechnology in Biological Research**

Course Code: **AD-MCB-22-23-01**

Organizing Department: **Department of Microbiology**

Course Duration: **30 Hours (13.02.2023 – 28.02.2023)**

No. of Enrolled Students: 29

No. of student completed the course: 26

**Aim:** The add-on course on “Applications of Spectroscopy & Nanotechnology in Biological Research” aims to provide students with a comprehensive understanding of advanced spectroscopic techniques and applications of nanotechnology in biological systems. The course focuses on enhancing analytical skills for studying molecular interactions, structural biology, and the development of nano-materials for biomedical applications.

#### **Course Outcome:**

After completing the add-on course on “Applications of Spectroscopy & Nanotechnology in Biological Research”, students will be able

- To design experimental ideas independently and
- To implement novel solutions using nanomaterials for biomedical research,
- To utilize sophisticated spectroscopic techniques for experimental purposes
- To analyze molecular interactions in structural biology.



Principal  
Maulana Azad College  
Kolkata-13



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**Departmental Meeting Notification**

**Maulana Azad College**  
**Department of Microbiology**  
**Notice dated 3.11.2022**

A Departmental committee meeting will be held on Friday the 4th of November, 2022 at 12 noon in the staff-room of this department regarding the purchase of reagents/kits for conduction of odd semester practicals. All are requested to attend the meeting.

**Agenda**

- 1) Finalization of chemical list (minimal only) for immediate purchase
- 2) Industry visit of 5th Semester
- 3) Matters arising

In this respect all faculty members are also requested to make a draft list of chemicals/reagents/consumables/kits which are needed for conduction of practicals allotted to them according to lesson plan.

Head

Head  
Department of Microbiology  
Maulana Azad College  
8, Rafi Ahmed Kidwai Road  
Kolkata - 700013



Principal  
Maulana Azad College  
Kolkata-13



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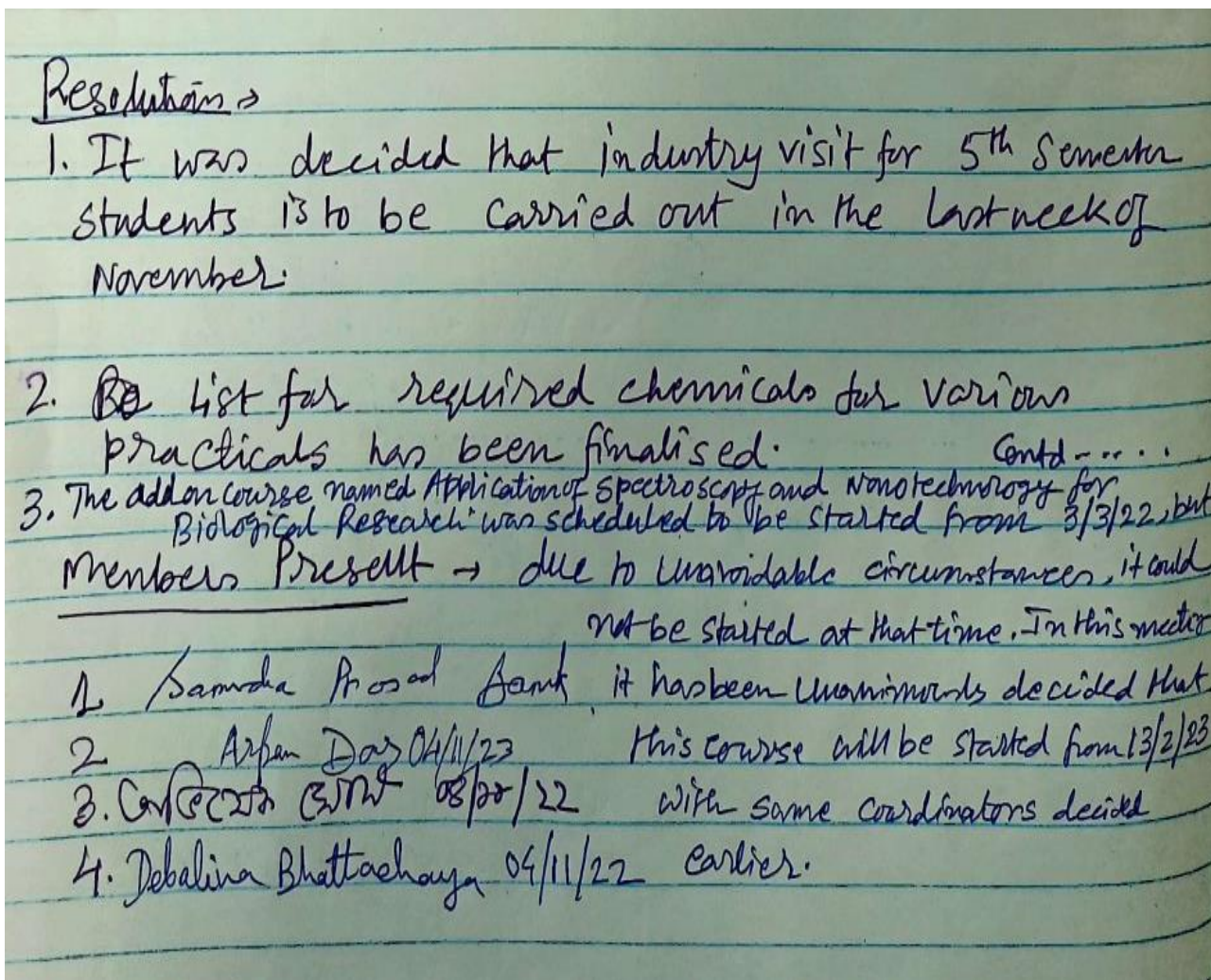


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**Departmental Meeting Resolution**



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## Brochure/Curriculum/Syllabus

Maulana Azad College

Department of Microbiology

**ADD-ON COURSE ON “Applications of Spectroscopy and Nanotechnology in Biological research)**

**Total Course Hours : 30**

**Module 1: Applications of Spectroscopy in Biological research (5 hrs)**

Fundamentals of Absorption and Emission spectroscopy, Spectrofluorimetry as a tool for structural and functional studies of biomolecules: FRET, FRAP, Quenching studies, Stern-Volmer plots, Fundamentals of Infra-red Spectroscopy, Basis of IR activity, types of vibrational modes, applications of IR to study conformation of biological macromolecules, challenges in obtaining IR spectra of biomolecules

**Module 2: Fundamentals of Nanotechnology (5 hours)**

Concept of Nanotechnology, Types of Nanomaterials: Nanoparticles (Metal, Nonmetal and Polymeric), Nanocomposites, Nano shell, Nanodevice, Dendrimers, Applications of Nanomaterials in various fields.

**Module 3 Characterisation of nanomaterials (5 hours)**

Characterisation of nanomaterials by biophysical techniques, Conjugation of nanomaterials by various surfactants for stability, how various properties of nanomaterials change with their sizes and shape, concept of four generation nanotechnology.

**Practical (15 hrs)**

- Green synthesis of metal nanoparticles
- One pot synthesis of double layered metal nanocomposite
- Determination of absorption spectra of bare and coated nanomaterial
- Determination of changes in vibrational bands of bare and coated nano-material through FT-IR spectroscopy.
- Antibacterial activity assay by cup plate method
- Determination of melting temperature of DNA by UV absorption Spectroscopy
- Study of a typical FT-IR spectra of a protein by its amide I, amide II and amide III vibration bands

@hosh

Biswajit Das

Head

Department of Microbiology  
Maulana Azad College  
8, Rafi Ahmed Kidwai Road  
Kolkata - 700013

Debalina Bhattacharya

Arpan Das

Bipasha Ray

Suchitra Sarkar



Principal  
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**Sample Certificate**

	<b>MAULANA AZAD COLLEGE</b> 8, Rafi Ahmed Kidwai Road, Taltala, Kolkata 700013.	
No. MCBA/-----	<b>Completion Certificate</b>	
	<b>Session: 2022-23</b>	
<p>This is to certify that ----- (Enrollment No. -----) has participated and successfully completed 30 hours ADD-ON course on '<b>Applications of Spectroscopy &amp; Nanotechnology in Biological Research</b>' (Course Code: AD-MCB-22-23-01), organized by the Department of Microbiology in association with IQAC, in the period 13-02-2023 to 28.02.2023, and secured Grade -----.</p>		
 Head/Course Coordinator	 IQAC Coordinator	 Principal



Principal  
Maulana Azad College  
Kolkata-13