



30 Hour Add On Course on Bio Instrumentation



Offered by the Department of Microbiology :

DINABANDHU ANDREWS COLLEGE

GARIA, KOLKATA

Joy Sarkar

Title:

Certificate Course on Bio Instrumentation

Course Overview: This certificate course is designed to produce graduates who are proficient in bioinstrumentation technologies, capable of contributing to advancements in healthcare technology and biomedical research. These courses are designed to provide both theoretical knowledge and practical skills necessary for working with instrumentation in biological and medical contexts.

Course Duration: 30 hours (6 hrs per week x 5weeks)

One Class (Theory): 1 Hour

Lab: 2 Hours

Final Assessment on the Last day

Course Fee: Free of Cost

Pedagogy: Lecture on theory and Practical

Course Coordinator: Dr. Ratna China & Dr. Tanmay Ghosh

SYLLABUS STRUCTURE OF THE ADD-ON COURSE

Module	UNIT TITLE	HOURS
Module -1	Introduction to Bioinstrumentation	1
Module -2	Microscopy	3
Module -3	Chromatography	9
Module -4	Electrophoresis	9
Module -5	Spectrophotometry	6
Module -6	Centrifugation	2
Total		30

Module 1: Introduction to Bioinstrumentation

Basic concepts and principles,

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Importance in biological and medical research

Module 2: Microscopy

Brightfield and darkfield microscopy, Fluorescence Microscopy, Phase contrast Microscopy, Confocal Microscopy, Electron Microscopy (Scanning and Transmission Electron Microscopy) and Micrometry.

Module 3: Chromatography

Principles and applications of paper chromatography (including Descending and 2-D), Thin layer chromatography. Column packing and fraction collection. Gel filtration chromatography, ion-Exchange chromatography and affinity chromatography, GLC, HPLC.

Module 4: Electrophoresis

Principle and applications of native polyacrylamide gel electrophoresis, SDS- polyacrylamide gel Electrophoresis, 2D gel electrophoresis, Isoelectric focusing, Zymogram preparation and Agarose gel Electrophoresis.

Module 5: Spectrophotometry

Principle and use of study of absorption spectra of biomolecules. Analysis of biomolecules using UV and visible range. Colorimetry and turbidometry.

Module 6: Centrifugation

Preparative and analytical centrifugation, fixed angle and swinging bucket rotors. RCF and Sedimentation coefficient, differential centrifugation, density gradient centrifugation and Ultracentrifugation.

Course Outcome :

1. Ability to apply bioinstrumentation techniques to healthcare scenarios, such as patient monitoring, diagnostic equipment, and therapeutic devices.

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2. Practical experience with bioinstrumentation equipment through lab sessions or projects, enhancing technical skills.
3. Capability to identify and solve challenges related to bioinstrumentation, including troubleshooting and optimizing instrument performance.
4. Awareness of current trends, emerging technologies, and advancements in bioinstrumentation research and development.

LEARNING RESOURCES

SL. NO.	TITLE OF THE BOOK	AUTHOR(S)	PUBLISHER
1	Bio instrumentation	John G. Webster	Wiley publishers
2	BIOINSTRUMENTATION	L Veerakumari	MJP Publishers
3	Textbook On Bioinstrumentation	Dr. Priyanka Pandey	Walnut Publication
4	Biological Instrumentation and Methodology	Dr. P. K. Bajpai	S. CHAND Publisher

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EVALUATION POLICY FOR THE ADD-ON COURSE

The basic philosophy behind the Evaluation policy for this 30 Hours Add-on course is to objectively judge the participants (students) whether the concepts were understandable to them or not and whether they could apply these concepts to solve numerical and conceptual problems. The Evaluation would be done through 2 components –

- i) C1 Course-end Assessments (Written Test) [Total Marks: 30]
- ii) C2 Practical /LAB [Total Marks: 20]

Total Marks of the Evaluation process would be – 50 Marks

TABLE FOR QUALIFICATION

TOTAL SCORE (OUT OF 50)	GRADE
45 – 50	O – OUTSTANDING
40 – 44	E – EXCELLENT
35 – 39	A – VERY GOOD
30 – 34	B – GOOD
25 -29	C – FAIR
BELOW 25	F – FAILED

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GENERAL RULES AND REGULATIONS

1. Students must attend and appear for all the Module-End Assessments. If any student fails to submit any of the Module-End Assignments or fails to attend any of the Module End Assessment examinations , the particular Student would NOT BE ELIGIBLE FOR CERTIFICATE.
2. Students must attend and appear for the Course-End Assessment Examination. If any student fails to submit the Course-End Assessment or fails to attend the Course-End Assessment Examination , the particular Student would NOT BE ELIGIBLE FOR CERTIFICATE.
3. Students must attend and appear for the Course-End Viva. If any student fails to fails to attend the Course-End Viva, the particular Student would NOT BE ELIGIBLE FOR CERTIFICATE.
4. Total Marks of Course Evaluation will be 50 Marks.
5. Minimum 50% Marks has to be scored to receive any Certificate. There will be only ONE Attempt allowed for each of the Module-End Assessments and the Course-End Assessment.
6. There will be NO PROVISION for Backlog Clearance.
7. General Rules and Regulations of the College must be followed without any exception.
8. **Minimum 75% attendance is required to receive the certificate of the course.**

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