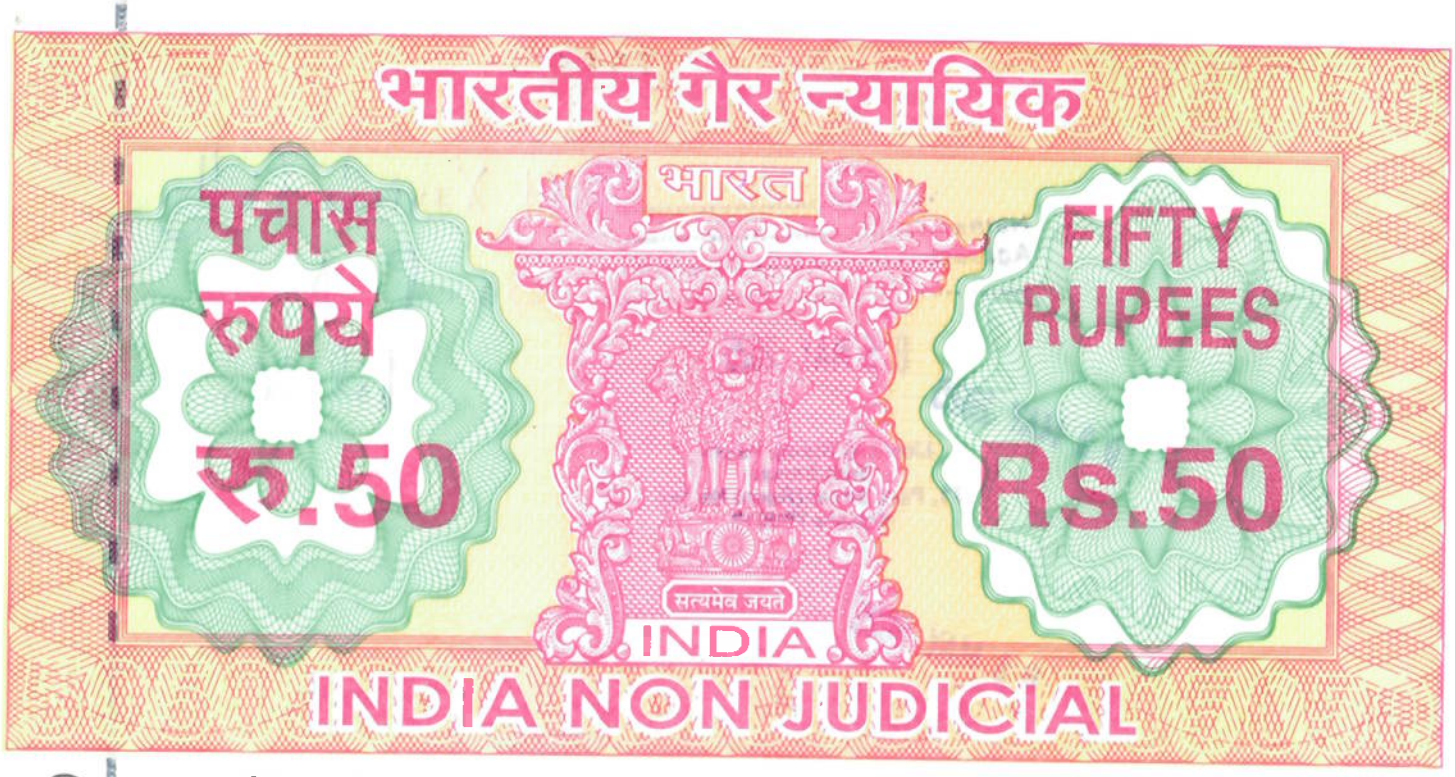

पश्चिमबङ्गा पश्चिम बंगाल WEST BENGAL AR 039475

MEMORANDUM OF UNDERSTANDING

Between

St. Xavier's College (Autonomous), Kolkata

And

Tata Medical Center, Kolkata

This Memorandum of Understanding ("MOU") is made and entered into as of the Effective Date by and between St. Xavier's College (Autonomous), Kolkata ("SXC"), and Tata Medical Center, Kolkata ("TMC"), collectively referred to as "the Parties."

1. Purpose

The purpose of this MOU is to establish a collaborative framework between SXC and TMC for conducting a (i) One-Year Post-Graduate Diploma Course in Medical Physics, followed by a One-Year Paid Internship at TMC (PGD.MP) (ii) One-Year Post-graduate Diploma Program in Molecular Medical Microbiology (PGD. MMM). The programs aim to provide students with theoretical and practical training in Medical Physics and Molecular Medical Microbiology, leveraging the academic expertise of SXC and the clinical infrastructure of

St. Xavier's College (Autonomous) 30, Mother Teresa Sarani Kolkata-16 KOLKATA

TATA MEDICAL CENTER KOLKATA

TMC. The MOU covers collaborative research involving faculty and students of the two courses that can lead to publications in peer reviewed journals, and Ph.D. degrees.

2. Roles and Responsibilities

2.1 St. Xavier's College (Autonomous), Kolkata:

- Conduct classroom-based theoretical sessions for the Diploma Courses.
- Facilitate practical training in Nuclear/Particle Physics and Computation in PGD.MP.
- Facilitate practical training in PGD. MMM.
- Provide library facilities with access to books, e-books and journals
- Provide qualified faculty members for academic instruction.
- Offer access to relevant laboratories, including the Central Research Facility, Ranjan Ray Computer Center, and Nuclear Physics Laboratory and the Microbiology Laboratory.
- Organize and conduct admission tests and/or interviews in consultation with TMC.
- Conduct theory and practical examinations and contribute to setting question papers.
- Issue Diploma Certificates jointly with TMC upon successful completion of the program.

2.2 Tata Medical Center, Kolkata:

- Conduct classroom-based theoretical sessions for the Diploma Courses.
- Facilitate practical training and hands-on experience in PGD. MP and PGD.MMM.
- Provide students with access to medical infrastructure and equipment for learning purposes.
- Provide library facilities with access to books, e-books and journals.
- Provide qualified faculty members for academic instruction.
- Conduct laboratory training sessions and clinical exposure.
- Supervise and evaluate students during the one-year paid internship for PGD. MP.
- Supervise and evaluate students for PGD. MMM.
- Assist in setting examination questions for relevant course components.
- Offer placement guidance to successful candidates.

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3. Course Structure

PGD. MP.

- **First Year:**
  - Semester 1: July - December
  - Semester 2: January - June
  - Classes to be conducted at both SXC and TMC campuses every week
  - SXC class hours: 10:10 A.M. to 4:00 P.M., three days a week, in a smart classroom.
  - TMC class hours: To be announced at the beginning of each semester.
  - Lab sessions to be held at the respective institutions based on the subject requirement.
- **Second Year:**
  - Semester 3 & 4: July - December / January - June
  - Upon clearance of all papers of semesters 1 &2, paid internship at TMC culminating in the submission of a project/dissertation.
  - Internship may require working during odd hours as per institutional requirements.

PGD.MMM

- Semester 1: July - December
- Semester 2: January - June
- Classes to be conducted at both SXC and TMC campuses every week
- SXC class hours: 10:10 A.M. to 4:00 P.M., three days a week, in a smart classroom.
- TMC class hours: To be announced at the beginning of each semester.
- Lab sessions to be held at the respective institutions based on the subject requirement.

4. Credits and Evaluation

PGD. MP

- Total Credits: 48 (First Year) + 48 (Internship)
- Arrear/Supplementary examinations will be conducted in the forthcoming appropriate end semester

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- Internship program will commence only after successful completion of Semesters 1 and 2.

PGD.MMM

- Total Credits: 40
- Arrear/Supplementary examinations will be conducted in the forthcoming appropriate end semester

Credit Structure and Total Marks (PGD. MP & PGD. MMM):

  - 1 Theory credit = 1 period
  - 1 Practical credit = 2 periods
- Total Marks: 10 papers × 100 = 1000 marks
- Passing Criteria: Minimum 40% required.

5. Admission Process

- Minimum qualification: M.Sc. in Physics for PGD. MP.

  M.Sc. in Microbiology/Physiology/ Zoology/Biotechnology/ Botany/ Biochemistry for PGD. MMM.
- Admission test (MCQ) conducted by SXC with inputs from TMC.
- Interview to be taken jointly by SXC and TMC teams.
- Total number of seats: 10 (PGD. MP); 8 (PGD. MMM)

6. Examination and Evaluation

- Theory examinations to be held at SXC.
- Laboratory evaluations to be conducted at respective institutions in a continuous assessment format.

7. Diploma Certification

- The Diploma Certificate will be jointly issued by SXC and TMC upon successful completion of both academic and internship components.
- Mark-sheets will be issued upon successful completion of Semesters 1 and 2.

8. Registration Validity

- Registration of candidates will be valid for two years, excluding the year of admission.

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9. Placement Assistance

- Placement support will be provided through SXC Placement Cell and guidance from TMC.

10. Duration and Renewal

- The initial term of this MOU is three years from the Effective Date.
- The MOU will be reviewed and renewed every three years as per mutual agreement.

11. Termination

Either party may terminate this MOU by providing a 60-day written notice to the other party. Termination will not affect ongoing students enrolled in the course at the time of termination.

12. General Provisions

- This MOU is a statement of intent and does not create any legally binding obligations.
- Any disputes arising out of this MOU will be resolved through mutual discussion.

13. Financial Agreement:

- For both the Medical Physics and Molecular Medical Microbiology programs, the course fees will be shared equally on a 50:50 basis between St. Xavier's College (Autonomous), Kolkata (SXC), and Tata Medical Center, Kolkata (TMC).
- Operational and institutional expenses beyond the shared course fees shall be borne by the respective institution as applicable. The specific heads and details of these expenses are outlined in Annexure II.
- The stipend and expenses related to the one-year paid internship for the Medical Physics program will be fully borne by TMC.
- Mode of transaction: Through Bank Transfer.

14. Signatures

St. Xavier's College (Autonomous) 30, Mother Teresa Sarani Kolkata-16 KOLKATA

TATA MEDICAL CENTER KOLKATA

- IN WITNESS WHEREOF, the authorized representatives of the Parties have signed this MOU as of the Effective Date

For St. Xavier's College (Autonomous), Kolkata.

.....

Rev. Dr. Dominic Savio, SJ
Principal

Principal
St. Xavier's College
(Autonomous)
Kolkata

Date: 10-05-'25

Witness:

.....

Professor Bertram da Silva
Vice Principal, Arts and Science Department

Address:

.....

.....

St. Xavier's College (Autonomous)
30, Mother Teresa Sarani
Kolkata-16
KOLKATA

For Tata Medical Center, Kolkata.

.....

Dr. Pattatheyil Arun
CEO Tata Medical Center

Dr. P. Arun
Chief Executive Officer
Tata Medical Center
Kolkata

Date:

Witness:

For TATA MEDICAL CENTER

CA. Sanjeev Kumar Agarwal
Director Finance

10/05/25

.....

Shri. Sanjeev Kumar Agarwal
Director Finance

Address:

.....

.....

Contract of Agreement

Annexure I to the MOU document

ONE-YEAR DIPLOMA COURSE ON MOLECULAR MEDICAL MICROBIOLOGY.

Offered by St. Xavier's College (Autonomous), Kolkata and Tata Medical Center, Kolkata

2-SEMESTER COURSE

A) YEAR 1:
SEMESTER 1: JULY-DECEMBER
SEMESTER 2: JANUARY-JUNE

TOTAL CREDITS: 40 (1st year)
1 Theory credit = 1 period
1 Practical credit = 2 periods

COURSE STRUCTURE:

Semester I

Paper code	Title of the Paper
MMM11T	Basics of Microbiology and Infectious Diseases (Theory)
MMM12T	Applied Laboratory Techniques in Microbiology(Theory)
MMM13T	Bio-Statistics (Theory)
MMM11P	Basic Laboratory Techniques (Practical Paper)
MMMCA	RESEARCH METHODOLOGY(Critical Review of Research Paper)

Semester II

MMM21T	Advanced Molecular Microbiology(Theory)
MMM22T	Bioinformatics and Automation in a Molecular Microbiology lab(Theory)
MMM23T	Oncogenic Microbes and QMS (Theory)
MMM21P	Analytical and Research Methods in Medical Microbiology (Practical Paper)
MMMD	Project Work and Dissertation

TOTAL MARKS: 10 (Number of papers) X 100 = 1000

Passing criteria: 40%

TATA MEDICAL CENTER KOLKATA

St. Xavier's College (Autonomous) 30, Mother Teresa Sarani Kolkata-16 KOLKATA

1. List of faculty members

Sl. No.	Name	Designation	Qualification & Experience/ Background	Field of Research	Year of Experience	Affiliation
1	Arup Kumar Mitra	Associate Professor	Ph.D. Botany	Bio & phytoremediation	30	SXC
2	Kasturi Sarkar	Assistant Professor	Ph.D. Biochemistry	Probiotics	19	SXC
3	Sudeshna Shyam Choudhury	Associate Professor	Ph.D. Life Sciences	Tea biochemistry,UV Stress biology	18	SXC
4.	Debjani Dutta	Assistant Professor	Ph.D. Microbiology	Spice microbiobiology	23	SXC
5	Mahashweta Mitra Ghosh	Associate Professor	Ph.D. Life Sciences	Mycobacteriophages, host metal microbe interaction,antibiotic resistance profiling	20	SXC
6	Madhumita Maitra	Assistant Professor	Ph.D. Life Sciences	Medical Microbiology	20	SXC
7	Riddhi Majumder	Assistant Professor	Ph.D Biological Sciences	Animal cell biology	15	SXC
8	Jaydip Ghosh	Assistant Professor	Ph.D. Biochemistry	Persistor cells	15	SXC
9	Anindita Banerjee	Assistant Professor	Ph.D. Life Sciences	Plant Biotechnology, plant derived antimicrobial compounds	15	SXC
10	Durba Bhattacharya	Assistant Professor	Ph.D Statistics			SXC
11	Sanjay Bhattacharya	Microbiology consultant				TMC
12	Gaurav Goel	Microbiology consultant				TMC
13	Soumyadip Chatterji	Infectious Disease consultant				TMC
14	Parijat Das	Scientific Officer				TMC
15	Druti Hazra	Scientific Officer				TMC
16	Soumik Pal	Scientific Officer				TMC

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TATA MEDICAL CENTER KOLKATA

Sl. No.	Name	Designation	Qualification & Experience/ Background	Field of Research	Year of Experience	Affiliation
17	Suchandrima Biswas	Scientific officer				TMC
18	Sukhdev Mukherjee	Lab technologists				TMC
19.	Krishnendu Das	Lab technologist				TMC
20.	Rajkumar	Lab technologist				TMC
21.	Srabanti Bose	Lab technologist				TMC

2. List of Infrastructural involvements:

(a) Labs: Central Research Facility, Microbiology Laboratory

(b) Library Facility: books, e-books and journals

(c) List of instruments: (TMC Facilities)

- Biosafety level- 2 and 2+ laboratory facilities
- Type IIA2 Biosafety cabinets
- Air Particle Counter
- Water quality monitoring systems: TDS meter, chlorine meter, membrane filtration system for water microbiology
- Automated blood culture system
- Automated mycobacterial culture system
- Automated bacteria and yeast identification and antimicrobial susceptibility testing system
- Light microscope and fluorescence microscope
- Lyophiliser
- Deep freezers (minus 30, minus 80 Celsius) and walk in coolers
- Carbon dioxide and other incubators
- Real-time PCR systems
- Cartridge based nucleic acid amplification systems
- Automated nucleic acid extraction system
- Sanger sequencing system and next generation sequencing systems
- Automated serology systems
- Future plans: MALDI-TOF
- Laboratory Information System and Hospital Information System
- Beta D Glucan assay system

Instruments facility at SXC

St. Xavier's College (Autonomous) 30, Mother Teresa Sarani Kolkata-16 KOLKATA

TATA MEDICAL CENTER KOLKATA

Sr No.	Instrument Name
1.	BOD INCUBATOR SHAKER
2.	REFRIGERATOR
3.	HOT AIR OVEN
4.	WATER BATH
5.	DIGITAL COLONY COUNTER
6.	WEIGHING BALANCE
7.	WATER BATH
8.	MICROWAVE OVEN
9.	WEIGHING BALANCE
10.	THERMAL CYCLER (PCR)
11.	LAF - 1
12.	LAF - 2
13.	COLD CENTRIFUGE
14.	UV SPECTRO PHOTOMETER
15.	TRANSILLUMINATOR
16.	BIO - REACTOR
17.	INCUBATOR (2)
18.	REFRIGERATOR
19.	REFRIGERATOR
20.	ROCKER SHAKER
21.	HORIZONTAL GEL APERATUS
22.	HORIZONTAL GEL APERATUS
23.	CYCLO MIXER (VORTEX)
24.	COLORI METER
25.	CENTRIFUGE (5000 RPM)
26.	DIGITAL pH METER (1)
27.	DIGITAL Ph METER (2)
28.	DRY BATH
29.	MAGNETIC STIRRER
30.	MONOCULAR MICROSCOPE
31.	TRINOCULAR MICROSCOPE
32.	INVERTED TRINOCULAR MICROSCOPE
33.	LAF - 3
34.	WEIGHING BALANCE
35.	IMMUNO ELECTROPHORESIS TEACHING KIT
36.	IMMUNO ELECTROPHORESIS TEACHING KIT
37.	VERTICAL MINI GEL SYSTEM
38.	SUBMARINE MINI GEL SYSTEM
39.	GENESIS 50 UV-VIS SPECTROPHOTOMETER
40.	TRINOCULAR MICROSCOPE
41.	TRINOCULAR MICROSCOPE
42.	MINI PROTEIN TETRA CELL VERTICAL ELECTROPHORESIS SYSTEM
43.	TARSON SPINWIN
44.	SPINWIN MC 01 MICRO CENTRIFUGE
45.	CENTRIFUGE (5000)

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46.	GEL IMAGING SYSTEM (GEL DOC)
47.	HOT PLATE
48.	INDUCTION COOKER
49.	INCUBATOR (FUNGAL)
50.	WEIGHING BALANCE
51.	TISSUE HOMOGENIZER
52.	pH METER
53.	BOD INCUBATOR
54	MINI PROTEIN TETRA CELL VERTICAL ELECTROPHORESIS SYSTEM
55.	TARSON SPINWIN
56.	PROBE SONICATOR
57.	TARSON STARTER KIT (SET OF 6)
58.	TARSON STARTER KIT (SET OF 6)
59.	AUTOCLAVE
60.	AUTOCLAVE
61.	AUTOCLAVE
62.	AUTOCLAVE

(d) Consumables:

3. **Classrooms:**

Classes to be held at both campuses in the first year with days dedicated to each campus.

SXC class hours will be between 10.10 A.M. to 4P.M.

SXC: Needed on 3 days a week: smart classroom

TMC class hours will be announced at the start of each semester

4. Payment to faculty members per class of SXC

Faculties to be paid an approx. Rs. 900/- per class

Laboratory staff to be paid approx. Rs 500/- per class

Coordinator fees: Rs. 30000 per year

5. Admission Test and/or Interview

Application criteria: M. Sc. in
Microbiology/Physiology/Zoology/Botany/Biotechnology/Biochemistry
Admission test will be conducted by St. Xavier's College (Autonomous), Kolkata with inputs from Tata Medical Centre, Kolkata
Admission test (MCQ) followed by interview

6. Total number of seats: 8 (Eight)

7. Examinations:

Theory examinations will be held at St. Xavier's College (Autonomous), Kolkata with Question papers being set by both SXC and TMC faculty members, depending on who the course taker is.

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Lab exams will be conducted at respective institutes, depending on where the lab is being held.
Laboratory evaluation will be in the continuous mode through short exams and/or assignments

8. Arrear/ supplementary examinations will be held to enable students to clear arrears.

9. Diploma Certificate will be issued jointly by St. Xavier's College (Autonomous), Kolkata and Tata Medical Centre, Kolkata

10. Placement :
Placement of successful candidates will be facilitated through SXC Placement Cell and guidance from TMC.

11. Fee structure:

- Monthly tuition and other applicable fees of approximately Rs.15,000/- per month for Semesters 1 and 2, which may be subject to revision as required.

12. Registration of candidates will be valid for two years, not including the year of admission.

13. Initial **MOU** is for three years, which will be re-visited every three years thereafter.

Dr. Sanjay Bhattacharya
MD, DNB, Dip RC Path, FRC Path
Consultant Microbiologist
Tata Medical Center
14, Major Arterial Road (E-W)
New Town, Kolkata-700160, India

For TATA MEDICAL CENTER
CA. Sanjeev Kumar Agarwal 10/05/25
Director Finance

St. Xavier's College (Autonomous)
30, Mother Teresa Sarani
Kolkata-16
KOLKATA

Contract of Agreement

Annexure II to the MOU document

ONE-YEAR DIPLOMA COURSE ON MEDICAL PHYSICS, FOLLOWED BY ONE YEAR PAID INTERNSHIP AT TMC

Offered by St. Xavier's College (Autonomous), Kolkata and Tata Medical Center, Kolkata

2-SEMESTER COURSE FOLLOWED BY 1 YEAR (2 SEMESTER) INTERNSHIP

A) YEAR 1:
SEMESTER 1: JULY-DECEMBER
SEMESTER 2: JANUARY-JUNE

B) YEAR 2:
SEMESTER 3 AND 4: JULY-DECEMBER/ JANUARY-JUNE: INTERNSHIP (CULMINATING IN THE SUBMISSION OF A PROJECT/ DISSERTATION)

COURSE STRUCTURE:

Semester I

Paper Code	Paper Title
MEDPHY11T	Applied Mathematics
MEDPHY12T	RADIATION PHYSICS & RADIATION GENERATORS
MEDPHY13T	Radiation Dosimetry and Standardization
MEDPHY14T	RADIATION DETECTION, MEASUREMENT AND NUCLEAR ELECTRONICS
MEDPHY15P	COMPUTATIONAL METHODS AND MACHINE LEARNING & RADIATION LAB

Semester II

Paper Code	Paper Title
MEDPHY26T	Medical Imaging
MEDPHY27T	CLINICAL AND RADIATION BIOLOGY
MEDPHY28T	Radiation Safety
MEDPHY29T	Radiation therapy
MEDPHY210P	Radiation Physics Lab. & Quality Assurance & Radiation Protection Lab.

TOTAL CREDITS: 48 (1st year) + 48 (internship)
1 Theory credit = 1 period
1 Practical credit = 2 periods
TOTAL MARKS: 10 (Number of papers) X 100 = 1000
Passing criteria: 40%

TATA MEDICAL CENTER KOLKATA

St. Xavier's College (Autonomous) 30, Mother Teresa Sarani Kolkata-16 KOLKATA

1. List of faculty members of SXC

Sl. No.	Name	Designation	Qualification & Experience/ Background	Field of Research	Year of Experience	Affiliation
1	Suparna Roychowdhury	Assistant Professor	Ph.D. Physics	Astrophysics	19	SXC
2	Shibaji Banerjee	Assistant Professor	Ph.D. Physics	Cosmology and Astroparticle Physics		SXC
3	Saunak Palit	Associate Professor	Ph.D.Physics	High Energy Physics		SXC
4.	Kolahal Bhattacharya	Assistant Professor	Ph.D. Physics	Nuclear Physics		SXC
5	Tapati Dutta	Associate Professor	Ph.D. Physics	Condensed Matter Physics, Statistical Mechanics	35	SXC
6	Aditi Ghosh	Assistant Professor	Ph.D. Physics	Non- Linear Optics		SXC
7	Gayatri Banerjee	Assistant Professor (contractual)	M.Sc. Physics	Radio Physics		SXC
8	Ashadul Haldar		Ph.D. Physics	Astroparticle Physics		SXC
9	Jhimli Dasgupta	Associate Professor	Ph.D. Biotechnology	Structural Biology		SXC
10	Arindam Bakshi	Assistant Professor	Ph.D. Biotechnology	Molecular Virology, Plant Biotechnology, Genetic engineering		SXC
11	Anirudhha Banerjee	Associate Professor	Ph.D.(Life Sciences/ Zoology	Cancer Biology, Biotechnology	Teaching & Research: 24 years	SXC
12	Priyanka De	Assistant Professor	Ph.D. Biotechnology			SXC
13	Ronita Nag Choudhury	Associate Professor	Ph.D. Biotechnology	Molecular Biology	Research and teaching 25 years	SXC
14.	Souvik Roy	Assistant Professor Grade III	Ph.D. Biotechnology	Medical Microbiology; Food Microbiology	21 years	SXC
15	Sayak Ganguly	Assistant Professor	Ph.D. Biotechnology	Plant Biology, Bioinformatics, Genomics, Cytogenetics and Ethnomedicine		SXC

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16	Arup Kumar Mitra	Associate Professor	Ph.D. Microbiology	Human Physiology, functioning of different systems and different diseases, environmental biology		SXC
17	Ayan Chandra	Assistant Professor	Ph.D. Statistics			SXC
18	Madhura Dasgupta	Assistant Professor	M.Sc.; ongoing Ph.D.			SXC
19	Rahul Roy	Assistant Professor	M.Sc., ongoing Ph.D.			SXC

Faculty list can change as the course runs in future cycles

2. List of Infrastructural involvements:

(a) Labs: Central Research Facility, Nuclear Physics Lab in the department of Physics, RR Computer Centre

(b) Library Facility: books, e-books and journals

(c) List of Instruments:

Nuclear Lab:

1) Ionization Chamber

2) Geiger Muller Counters

Spectroscopy:

1) U-2900 UV/VIS Spectrophotometer

Optical system : Double Beam

Wavelength range : 190 to 1100 nm

Spectral bandpass : 1.5 nm

Wavelength accuracy : ±0.3 nm (at 656.1, 486.0 nm)

2) F-7000 Fluorimeter

Sensitivity: S/N 800 or better (RMS) using Raman band of water

Minimum sample volume: 0.6ml (with standard 10mm rectangular cell)

Photometric Principle : Monochromatic light monitoring ratio calculation

Light source : 150W Xenon lamp, self-deozonating lamp house

Brazed wavelength : Excitation side 300nm, emission side 400nm

Measuring wavelength range(on both EX and EM): 200 to 750nm and zero order light(expandable up to 900nm with optional detector)

Bandpass : Excitation side: 1,2.5,5,10,20nm
Emission side: 1,2.5,5,10,20nm

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Resolution : 1.0 nm
Wavelength Accuracy : ±1.0 nm

3) Fourier Transform Infrared Spectrophotometer- FTIR

Make: Bruker Optics GmbH & Co. KG., Germany

Model: ALPHA II

Key Features:

A A4 size, 7 Kg weight FTIR having specialized patented permanently aligned Interferometer with Gold coated mirrors for long life and better reflective quality.

The specialized ZnSe Beam splitter and ZnSe windows assure immunity to environmental conditions as such almost zero maintenance in long run.

Performance Guard system diagnostics: Continuous electronic monitoring of all spectrometer components, performance, humidity, and temperature

4) Atomic Absorption Spectrophotometer (PinAacle-500)

Monochromator

- Littrow design with motorized drive for
- automatic wavelength selection and peaking.
- Wavelength range: 180 - 900 nm.
- Diffraction grating: 1800 lines/mm blazed at 236 nm and 597nm

Background Correction

Flame Atomizer

Description Gas Controls: Fully computer-controlled with oxidant and fuel monitoring.

The Ignitor Assembly

The Gas Controls

The gas controls provide control of the flow rates of the fuel gas (acetylene) and the oxidant (air or nitrous oxide).

The Drain System

During flame operation, measurement solution that condenses out in the spray chamber runs to waste through the siphon interlock drain trap and is collected in the drain vessel.

Burner Head Options:

All the burner heads are made from titanium. The 10 cm, air-acetylene burner head is standard with the PinAAcle 500 instrument. All the available burner heads arelisted next in numerical order.

• N0400100: 5 cm, single-slot burner head (for nitrous oxide-acetylene operation only).

• N0400101: 5 cm, single-slot burner head (for air-acetylene operation). It features a wider slot than the nitrous oxide burner head. Used to extend linear and working range.

• N0400102: 10 cm, single-slot burner head (for air-acetylene operation - Standard for all PinAAcle instruments.).

• N0400103: 10 cm, three-slot burner head (for analysis of high dissolved solids content solutions with air-acetylene flames).

• N3161240: burner head adjustment tool. Insert the adjustment tool into the burner head and adjust the angle to extend the linear range. This tool allows you to do adjustments while the burner is hot.

The Gas Connectors

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- Burner Gases
- 3 N_2O Fitting for connection of the nitrous oxide supply to the burner.
- 2 C_2H_2 Fitting for connection of the acetylene supply to the burner.

The Optical System: A common feature of the PinAAcle 500 compared to previous atomic absorption models is the change from free space optics to fiber optics. The lamp compartment has positions for up to four spectral sources: HCL and/or EDLs. The radiation from the requested source lamp is collected by a movable mirror and coupled into the source fiber.

- The flame can generate temperatures of up to 2800°C

Chromatography:

1) HPLCWaters Advance HPLC System

Make: Waters

Model: 1525 Binary Gradient HPLC Pump, 2489 UV/Visible Detector

Key Features:

1525 Binary Gradient HPLC Pump with Gradient mixer

- Flow calibration: Programmable
- Operating pressure limits: Programmable high and low pressure limits, user selectable in psi, bar, kPa.
- In build gradient mixer
- System has the capability to operate in at least 11 various gradient curve mode including Liner, Step, concave, convex. Exponential etc.

2489 UV/VISIBLE DETECTOR

- Wavelength range: 190 to 700nm
- Bandwidth: 5 nm
- Wavelength Accuracy: 1nm (via patented Erbium filter)
- Light Source: Deuterium arc lamp, warranty: 2000 hours or 1 year warranty (whichever comes first)
- Operating temperature: 4-40°C (39-104°F)
- Operating humidity: <95%. non-condensing
- **Can also be used as Bench-Top UV Spectrophotometer**

PCR and Proteomic set up :

RT- PCR available

ITC (TA Instruments)

FPLC (Cytiva).

Cell Culture Facility

1) Animal Tissue Culture

a) CO_2 Incubator ((Heraeus & Biobase):Air jacketed. 80 litre, double door, P.I.D temperature control, UV lamp for sterilization
b) Inverted Microscope: (Magnus INVI): With phase contrast, trinocular head, 10x, 20x and 40x objectives
c) Biological Safety Cabinet (Microflow), Class II Type A, HEPA filtered downflow air
d) Water bath
e) Refrigerator

2) Plant Tissue Culture

a) Laminar air flow unit : Cabinet containing HEPA filter for plant tissue culturing

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b) Growth rack: 3 racks each contain 3 light sources of 15W and connected to a timer for maintenance of day/night control. c) Plant Growth Chamber: Incubator containing light sources and regulator for day/night control. Temperature is controlled between 22-28°C.
Animal House: Not Applicable **Murine species: Not Applicable**
Bio-material set ups:
Computers :Available

(d) Consumables: Nuclear sources

3. **Classrooms:**

Classes to be held at both campuses in the first year with days dedicated to each campus.

SXC class hours will be between 10.10 A.M. to 4P.M.

SXC: Needed on 3 days a week: smart classroom

TMC class hours will be announced at the start of each semester

Payment to faculty members per class of SXC: Rs.900/-
Payment to Laboratory attendant per class of SXC: Rs.500/-
Payment of Course Coordinator of SXC 30,000/

For details of income-expenditure, refer to Annexure V
For description of the Role of Course Coordinator, refer to Annexure IV

5. Admission Test and/or Interview

Application criteria. M. Sc. in Physics

Admission test will be conducted by St. Xavier's College (Autonomous), Kolkata with inputs from Tata Medical Centre, Kolkata

Admission test (MCQ) followed by interview

TMC FACILITIES

Sl. No.	Name	Designation	Qualification & Experience/Background	Field of Research	Year of Experience	Affiliation
1	Dr Arun singh Moses	Senior Consultant Dept. Of Radiotherapy, Tata Medical Center, kolkata	MBBS, MD, FRCR	Lung Cancer GI Cancer	11 yrs	TMC
2	Dr Tapesh Bhattacharya	Senior Consultant Dept. Of Radiotherapy, Tata Medical Center, Kolkata	M.D. DNB, FRCR	Gynae Cancer G I Cancer Lung Cancer	16 yrs	TMC
3	Mr Samar Mandal	Medical Physicist	B.Sc (Physics) M.Sc (Physics)	Radiation Safety	10 yrs	TMC

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		, Dept of Radiotherapy, Tata Medical Center, Kolkata	Post M.Sc Diploma in Medical Physics(JU)	And Physics Commissioning		
4	Ms Smita Jagadish Kalita	Medical Physicist cum RSO, Dept of Radiotherapy, Tata Medical Center, Kolkata	B.Sc (Physics) M.Sc (Radiological Physics)		7 yrs	TMC
5	Mr Sriram Prasath	Medical Physicist, Dept of Radiotherapy, Tata Medical Center, Kolkata	B.Sc (Physics) M.Sc (Medical Physics)	Dosimetry and Treatment Planning in Arc/Rotational Therapy in Flattened and Unflattened Beams	23 yrs	TMC
6	Mr B Arun	Medical Physicist, Dept of Radiotherapy, Tata Medical Center, Kolkata	B.Sc (Physics) M.Sc (Medical Physics)	'Clinical dosimetric analysis on motion management and high precision radiation therapy using 4DCT Imaging	23 yrs	TMC
7	Ms Anurupa Mahata	Medical Physicist, Dept of Radiotherapy, Tata Medical Center, Kolkata	BSc (Physics), M.Sc (Physics). Diploma in Radiological Physics (BARC)	Medical Imaging	20 Years	TMC
8	Dr. Santam Chakraborthy	Associate Consultant Radiation Oncology, Tata Medical Center, Kolkata	MBBS, MD	Clinical Radiation Oncology and Health Economics	18 Years	TMC
9	Dr Indranil Mallick	Senior Consultant, Radiation Oncology	MBBS, MD, DNB	Advance Technology in Radiation Oncology and Image guidance	20 yrs	TMC
10	Dr Sanjoy Chattopadhay	Senior Consultant, Radiation Oncology	MBBS, MRCP,FRCR,FRCP	Clinical Radiation Fractionation Strategies. Clinical Oncology	23 yrs	TMC
11	Dr Rimpa Achari	Head of Radiation Oncology Dept, Senior Consultant, Radiation Oncology	MBBS, MD	Multimodality image registration for radiation oncology	24 yrs	TMC

List of Machines in Tata Medical Center		
Sl.no	**Type of instruments**	**Make and Model**
1	Medical Accelerator	Varian Novalis Tx, Truebeam TX 3191, Truebeam TX 6374
2	Tomotherapy	Hi ART System,

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		Radixact X9
3	Remote afterloading Brachytherapy	Varian Vari source ix
4	Computed Tomography	WIPRO GE HEALTHCARE PVT LTD
5	PET-CT	WIPRO GE HEALTHCARE PVT LTD
6	SPECT-CT	WIPRO GE HEALTHCARE PVT LTD
7	PET-CT	SIEMENS HEALTHCARE PVT LTD
8	X-Ray Equipment, Radiography	M/s. Siemens AG ICONS R-200
9	X-Ray Equipment, Radiography	M/s. Siemens AG Axiom Aristos MX
10	X-Ray Equipment, Mammography	WIPRO GE MEDICAL SYSTEMS LTD
11	Gamma Irradiation Chamber	Board of Radiation and isotope Technology BI-2000
12	X-Ray Equipment	M/s. Philips Medical systems Allura XPER FD 20
13	C-Arm	M/s. Siemens limited
14	X-Ray Equipment	M/s. Siemens limited Multimobil 2.5

16	KV Imaging	Varian Radiation generator
18	On Board Imager	Varian Radiation generator

6. Total number of seats: 10

7. Examinations:

Theory examinations will be held at St. Xavier's College (Autonomous), Kolkata with Question papers being set by both SXC and TMC faculty members, depending on who the course taker is.
Lab exams will be conducted at respective institutes, depending on where the lab is being held.
Laboratory evaluation will be in the continuous mode through short exams and/or assignments
Arrear/ supplementary examinations will be held to enable students to clear arrears.
Mark-sheet will be issued upon successful completion of semesters 1&2 papers

8. Internship:
On successful completion of first year, students will do a compulsory paid internship at TMC.
Internship may involve odd hours.

9. Diploma Certificate will be issued jointly by St. Xavier's College (Autonomous), Kolkata and Tata Medical Centre, Kolkata upon successful completion of the entire course.

10. Placement :
Placement of successful candidates will be facilitated through SXC Placement Cell and guidance from TMC.

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11. Fee structure:

- Monthly tuition and other applicable fees of approximately Rs. 15,000/- per month for Semesters 1 and 2, which may be subject to revision as required.
- Second-year fees for Dip. MP include a one-time enrolment fee (Rs. 15,000/-) for the internship.

12. Registration of candidates will be valid for two years, not including the year of admission.

13. The initial **MOU** is for three years, which will be re-visited every three years thereafter.

For TATA MEDICAL CENTER

10/05/25

CA. Sanjeev Kumar Agarwal
Director Finance

St. Xavier's College (Autonomous)
30, Mother Teresa Sarani
Kolkata-16
KOLKATA

Annexure III to the MOU document

Roles and Responsibilities of Coordinators for the Post Graduate Diploma in Molecular Medical Microbiology between **St. Xavier's College (Autonomous), Kolkata & Tata Medical Center, Kolkata**

The **Post Graduate Diploma in Molecular Medical Microbiology**, collaboratively offered by **St. Xavier's College (Autonomous), Kolkata (SXC)** and **Tata Medical Center, Kolkata (TMC)**, is designed to provide students with both theoretical knowledge and hands-on clinical laboratory experience. To ensure the smooth functioning of this course, coordinators from both institutions play a crucial role in managing academic and administrative tasks. Their responsibilities encompass curriculum development, scheduling, assessments, evaluation, and overall program coordination.

1. Curriculum Development and Integration

- **Collaborative Syllabus Design:** Coordinators from both institutions work together to develop a curriculum that integrates theoretical instruction at SXC with practical training at TMC.
- **Regular Curriculum Updates:** The curriculum is periodically reviewed every 3 years and updated to incorporate the latest advancements in medical physics and clinical practices.

2. Scheduling and Timetable Management

- **Class Scheduling:** In collaboration with SXC Arts and Science office, Coordinators jointly plan and schedule lectures laboratory sessions, and clinical rotations, ensuring a well-balanced academic calendar.
- **Resource Allocation:** Coordinators manage classroom and laboratory resources efficiently, ensuring students have access to essential equipment and materials.

3. Examination and Evaluation Process

Assessment and Marking System

The evaluation system is structured to comprehensively assess students' theoretical knowledge and practical skills. The key components of assessment include:

1. **Continuous Internal Assessment (CIA):**
    - Periodic evaluations through **class tests, assignments, quizzes, presentations, and viva-voce**.
    - Faculty members compile CIA marks and share them with the SXC coordinator for processing.
2. **End Semester Examinations (ESE) – Format of Theory Papers:**
    - Conducted at the end of each semester for theoretical subjects in coordination with COE office at SXC
    - Jointly structured by faculty from SXC and TMC to maintain academic consistency.
    - A standardized marking scheme is followed to ensure fairness.

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3. **Laboratory/Practical Evaluations:**
    - Conducted at TMC under the supervision of designated faculty.
    - Includes **experiments, demonstrations, viva-voce, and hands-on clinical training**.
    - Marks are compiled at TMC and submitted to the SXC coordinator.
4. **Dissertation Assessment:**
    - Deciding on a format of assessment of Dissertation/ Project as finalised by TMC and SXC faculty
        1. **The project may be done during semester and must be completed before a given date.**
        2. **The project might be based on wet lab practical work or clinical/ laboratory data capture and data analysis**
        3. **Projects to be selected by educational supervisors**
    - Dissertation is assessed based on **research quality, methodology, implementation, and final presentation**.
    - External and internal examiners may be involved in dissertation assessment.
        1. External examiners for dissertation assessment is desirable but not essential

Role of the Coordinators in Assessment and Result Compilation

The **SXC coordinator** will:

- **Coordinate with the TMC coordinator** to collect marks for all types of evaluations, including CIA, End Semester Examinations, theory papers, and lab-based assessments.
- Ensure that all evaluation components align with SXC's academic regulations.
- Compile and verify marks before submitting them to the **Controller of Examinations (CoE) at SXC**.
- Work closely with the CoE (Controller of Examination) to facilitate **result publication**, ensuring accuracy and timely dissemination.
- Address discrepancies by **liaising with faculty members from both institutions**.
- Arrange for feedback from students at the end of year.
- Liaison with Placement Cell at SXC for jobs for final year students.

The **TMC coordinator** will:

- Ensure all **practical and clinical assessments** are conducted as per academic standards.

- Provide consolidated marks for **practical exams and dissertation work** to the SXC coordinator.
- Assist in resolving any queries related to student performance in clinical training.
- Arrange for feedback experience from students at the end.
- Liaison with mentors at TMC for placement guidance for jobs for final year students
    - TMC does not have placement cell. However, TMC would provide students with an orientation of the various career options so that they could get future placements

Result Compilation and Publication

- Once all marks are received from both institutions, the **SXC Coordinator forwards them to the Controller of Examinations at SXC for processing**.
- The CoE at SXC compiles the results and ensures **timely publication**
- Final grades are assigned based on the **weightage of different evaluation components**, adhering to the grading policy of SXC

4. Continuous Monitoring and Quality Assurance

- **Regular Meetings:** Scheduled meetings between coordinators help track program progress and address any issues.
- **Student Support Services:** Coordinators monitor student welfare, providing academic advising and support.

5. Liaison and Communication

- **Inter-Institutional Communication:** Coordinators facilitate effective communication between SXC and TMC regarding program developments and student performance.
- **Stakeholder Engagement:** Coordinators engage with accrediting bodies, industry partners, and potential employers to enhance the program's credibility and employability.

6. Maintain the webpage of the course (details of curriculum, collaborations, seminars/workshops, student placements etc)

Through these collaborative efforts, coordinators from both St. Xavier's College and Tata Medical Center ensure the **Molecular Medical Microbiology Diploma Course** operates efficiently, providing students with a robust and integrated educational experience that prepares them for successful careers in medical physics.

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Consultant Microbiologist
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For TATA MEDICAL CENTER

CA. Sanjeev Kumar Agarwal
Director Finance

Annexure IV to the MOU document

Roles and Responsibilities of Coordinators for the Post Graduate Diploma in Medical Physics between **St. Xavier's College (Autonomous), Kolkata & Tata Medical Center, Kolkata**

The **Post Graduate Diploma in Medical Physics**, collaboratively offered by **St. Xavier's College (Autonomous), Kolkata (SXC)** and **Tata Medical Center, Kolkata (TMC)**, is designed to provide students with both theoretical knowledge and hands-on clinical experience. To ensure the smooth functioning of this course, coordinators from both institutions play a crucial role in managing academic and administrative tasks. Their responsibilities encompass curriculum development, scheduling, assessments, evaluation, and overall program coordination.

1. Curriculum Development and Integration

- **Collaborative Syllabus Design:** Coordinators from both institutions work together to develop a curriculum that integrates theoretical instruction at SXC with practical training at TMC.
- **Regular Curriculum Updates:** The curriculum is periodically reviewed every 3 years and updated to incorporate the latest advancements in medical physics and clinical practices.

2. Scheduling and Timetable Management

- **Class Scheduling:** In collaboration with SXC Arts and Science office, Coordinators jointly plan and schedule lectures laboratory sessions, and clinical rotations, ensuring a well-balanced academic calendar.
- **Resource Allocation:** Coordinators manage classroom and laboratory resources efficiently, ensuring students have access to essential equipment and materials.

3. Examination and Evaluation Process

Assessment and Marking System

The evaluation system is structured to comprehensively assess students' theoretical knowledge and practical skills. The key components of assessment include:

1. **Continuous Internal Assessment (CIA):**
   - Periodic evaluations through **class tests, assignments, quizzes, presentations, and viva-voce**.
   - Faculty members compile CIA marks and share them with the SXC coordinator for processing.
2. **End Semester Examinations (ESE) – Format of Theory Papers:**
   - Conducted at the end of each semester for theoretical subjects in coordination with COE office at SXC
   - Jointly structured by faculty from SXC and TMC to maintain academic consistency.
   - A standardized marking scheme is followed to ensure fairness.

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3. **Laboratory/Practical Evaluations:**
    - Conducted at TMC under the supervision of designated faculty.
    - Includes **experiments, demonstrations, viva-voce, and hands-on clinical training**.
    - Marks are compiled at TMC and submitted to the SXC coordinator.

4. **Internship & Dissertation Assessment:**
    - Monitoring student's internships at TMC.
    - Deciding on a format of assessment of Dissertation/ Project as finalised by TMC and SXC faculty
    - Dissertation is assessed based on **research quality, methodology, implementation, and final presentation**.
    - External and internal examiners may be involved in dissertation assessment. **Any external examiner, as felt fit following joint discussions between TMC and SXC may also be included, if necessary**

Role of the Coordinators in Assessment and Result Compilation

The **SXC coordinator** will:

- **Coordinate with the TMC coordinator** to collect marks for all types of evaluations, including CIA, End Semester Examinations, theory papers, and lab-based assessments.
- Ensure that all evaluation components align with SXC's academic regulations.
- Compile and verify marks before submitting them to the **Controller of Examinations (CoE) at SXC**.
- Work closely with the CoE to facilitate **result publication**, ensuring accuracy and timely dissemination.
- Address discrepancies by **liaising with faculty members from both institutions**.
- Arrange for feedback from students at the end of (first year/ end of second year?)
- Liaison with Placement Cell at SXC **for internships** at the end of first year, and jobs for final year students

The **TMC coordinator** will:

- Ensure all **practical and clinical assessments** are conducted as per academic standards.
- Provide consolidated marks for **practical exams, internships, and dissertation work** to the SXC coordinator.
- Assist in resolving any queries related to student performance in clinical training.

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- Arrange for feedback on internship experience from students at the end second year?
- Liaison with Placement facilities at TMC **for internships** at the end of first year, **Result Compilation and Publication**
- Once all marks are received from both institutions, the **SXC Coordinator forwards them to the Controller of Examinations at SXC for processing**.
- The CoE at SXC compiles the results and ensures **timely publication**.
- Final grades are assigned based on the **weightage of different evaluation components**, adhering to the grading policy of SXC.

4. Continuous Monitoring and Quality Assurance

- **Regular Meetings:** Scheduled meetings between coordinators help track program progress and address any issues.
- **Student Support Services:** Coordinators monitor student welfare, providing academic advising and support.

5. Liaison and Communication

- **Inter-Institutional Communication:** Coordinators facilitate effective communication between SXC and TMC regarding program developments and student performance.
- **Stakeholder Engagement:** Coordinators engage with accrediting bodies, industry partners, and potential employers to enhance the program's credibility and employability.

6. Maintain the webpage of the course (details of curriculum, collaborations, seminars/workshops, student placements etc.)

Through these collaborative efforts, coordinators from both St. Xavier's College and Tata Medical Center ensure the **Medical Physics Diploma Course** operates efficiently, providing students with a robust and integrated educational experience that prepares them for successful careers in medical physics.

For TATA MEDICAL CENTER

CA. Sanjeev Kumar Agarwal
Director Finance

10/05/25

St. Xavier's College (Autonomous)
30, Mother Teresa Sarani
Kolkata-16
KOLKATA

Annexure V – Financial Agreement

Principal
St. Xavier's College
(Autonomous)
Kolkata

1. Medical Physics

- **TMC Costs and Remuneration:**
  - Operational expenditure: ₹20 lakhs per annum.
  - Faculty will not be paid for classes.
- **SXC Expenditure:**
  - Payment to faculty members at approximately ₹900 per class.
  - Payment to laboratory staff at approximately ₹500 per class.
  - Coordinator's honorarium of ₹30,000 per annum.
  - Estimated investment by SXC
    - Ion Chamber – ₹5 lakhs
    - GM counter – ₹1 lakh

2. Molecular Medical Microbiology

- **TMC Costs and Remuneration:**
  - Recurring and maintenance of instruments: ₹4.5 lakhs per annum
  - Consumables: ₹3.5 lakhs per annum.
  - Faculty will not be paid for classes.
- **SXC Expenditure:**
  - Payment to faculty members at approximately ₹900 per class.
  - Payment to laboratory staff at approximately ₹500 per class
  - Recurring expenditure for lab practicals - ₹1.5 lakhs per annum.
  - Coordinator's honorarium of ₹30,000 per annum.

3. Shared Financial Terms

- For both the **Medical Physics** and **Molecular Medical Microbiology** programs, the **course fees will be shared equally on a 50:50 basis between St. Xavier's College (Autonomous), Kolkata (SXC), and Tata Medical Center, Kolkata (TMC).**
- **Operational and institutional expenses including taxes beyond the shared course fees shall be borne by the respective institution as applicable.**
- The **stipend and expenses related to the one-year paid internship for the Medical Physics program will be fully borne by TMC.**
- **Mode of transaction:** Through Bank Transfer.

For TATA MEDICAL CENTER

CA. Sanjeev Kumar Agarwal
Director Finance

10/05/25

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