

**Structure of 3-year 6-semester B.Tech. course in Optics & Optoelectronics  
in the Department of Applied Optics and Photonics, University of Calcutta**

<b>SEMESTER - B1</b>		L	T	P	Credit
B111	Engineering Mathematics	3	1	0	4
B112	Analog and Digital Electronics	3	0	0	3
B113	Foundations of Applied Optics and Photonics	3	1	0	4
B114	Computer Programming and Numerical Methods	3	1	0	4
B115	Electronic, Optical and Photonic Materials	3	0	0	3
B111P	Workshop Practice & Engineering Graphics	0	0	6	4
B112P	Radiometry, Photometry and Optical Recording Techniques	0	1	6	5
		<b>15</b>	<b>4</b>	<b>12</b>	<b>27</b>
<b>SEMESTER - B2</b>					
B121	Circuit Theory and Network Analysis	3	1	0	4
B122	Analog and Digital Communication	3	0	0	3
B123	Fourier Optics and Holography	3	1	0	4
B124	Electromagnetics	3	0	0	3
B125	Quantum Electronics and Quantum Optics	3	0	0	3
B121P	Applied Electronics	0	0	6	4
B122P	Computer Applications	0	0	9	6
B123P	Hands on Optical Modeling	0	0	3	2
		<b>15</b>	<b>2</b>	<b>18</b>	<b>29</b>
<b>SEMESTER - B3</b>					
B231	Instrumentation and Control	3	0	0	3
B232	Electronic and Photonic Devices	3	0	0	3
B233	Gaussian Beam Optics and Laser Applications	3	0	0	3
B234	Fiber Optics and Optical Waveguides	3	1	0	4
B235	Image Science	3	1	0	4
B231P	Optical Concept Practice	0	2	6	6
B232P	Circuits and Network	0	0	6	4
B233P	Laser, Coherent Optics and Holography	0	1	6	5
		<b>15</b>	<b>5</b>	<b>18</b>	<b>32</b>
<b>SEMESTER - B4</b>					
B241	Lighting Science and Illumination Engineering	3	0	0	3
B242	Lens Design	3	0	0	3
B243	Microprocessor and Microcontroller	3	0	0	3
B244	Optical System and Devices	3	0	0	3
B245	Fiber Optics Communication and Sensor Technology	3	0	0	3
B241P	Microprocessor and Microcontroller	0	1	3	3
B242P	Fiber Optics	0	0	6	4
B243P	Optical Communications	0	1	3	3
B241S	Seminar : Training and Presentation	0	0	X	2
		<b>15</b>	<b>2</b>	<b>12</b>	<b>27</b>
<b>SEMESTER - B5</b>					
B351	Management Science & Economics	3	0	0	3
B352	Crystal Optics and Nonlinear Optics	3	0	0	3
B353	Digital Signal and Image Processing	3	1	0	4
B354	Optics : Evaluation and Testing	3	0	0	3
B355	Thin Films Technology	3	0	0	3
B351D	Preliminary Project Work	0	0	X	2
B351P	Thin Film and Lens Design	0	1	6	5
B352P	Digital Signal Processing	0	0	3	2
B353P	Lighting Design	0	0	3	2
		<b>15</b>	<b>2</b>	<b>12</b>	<b>27</b>
<b>SEMESTER - B6</b>					
B361	Elective Paper Elective Subjects: E1.Integrated Optics E2.Nanophotonics E3.Optical System Design E4. Biomedical Optics E5. Computer Architecture & Data Structure	2	0	0	2
B36D	Project	0	0	X	12
B36V	Grand Viva	0	0	X	4
		<b>2</b>	<b>0</b>	<b>X</b>	<b>18</b>
<b>Total Credit</b>					<b>160</b>

**Structure of 2-year 4-semester M.Tech. Course in Astronomical Instrumentation  
in the Department of Applied Optics and Photonics, University of Calcutta**

<b>SEMESTER – 1</b>		L	T	P	Credit
MAI T11	Mathematical Techniques	3	1	0	4
MAI T12	Fundamentals of wave optics	3	1	0	4
MAI T13	Image Science	3	0	0	3
MAI T14	Astrophysical Concepts	3	0	0	3
MAI P11	Optical Testing and Metrology	0	0	6	6
MAI P12	Sensors (include lab-view, detectors, CCD characterization)	0	0	6	6
MAI S1	Seminar I	0	0	2	2
	<b>Total</b>	<b>12</b>	<b>2</b>	<b>14</b>	<b>28</b>
<b>SEMESTER - 2</b>					
MAI T21	<b>Optical and Photonic Systems, Components and Devices</b>	3	1	0	4
MAI T22	Lasers, Optical Fiber and thin film technology	3	0	0	3
MAI T23	Digital Image Processing and Numerical analysis	3	0	0	3
MAI T24	Optical Instrumentation	3	1	0	4
MAI P21	Lens Design and Thin film	0	0	6	6
MAI P22	Analog & Digital Image Processing, Digital holography	0	0	6	6
MAI S2	Seminar II	0	0	2	2
	<b>Total</b>	<b>12</b>	<b>2</b>	<b>14</b>	<b>28</b>
<b>SEMESTER - 3</b>					
MAI T31	Optional paper 12. Stellar interferometry 13. Radio Interferometry 14. Photon-detection techniques in Radio, X-ray and $\gamma$ -ray astronomy. 15. Adaptive Optics and Polarimetry 16. Embedded Systems, FPGAs, Digital I/O cards and PCB designing 17. Spectrographs	0	5	0	5
MAI INT	Internship at Indian Institute of Astrophysics	0	0	10	10
MAI DP	Dissertation (Preliminary)	0	0	5	5
	<b>Total</b>	<b>0</b>	<b>0</b>	<b>20</b>	<b>20</b>
<b>SEMESTER – 4</b>					
MAI DF	Dissertation (Final)	0	0	20	20
MAI GV	General Viva Voce	0	0	4	4
	<b>Total</b>	<b>0</b>	<b>0</b>	<b>24</b>	<b>24</b>
	<b>GRAND TOTAL</b>	<b>24</b>	<b>4</b>	<b>72</b>	<b>100</b>

**Structure of 2-year 4-semester M.Tech. Course in Astronomical Instrumentation  
in the Department of Applied Optics and Photonics, University of Calcutta**

		Marks	L	P	Credits
<b>SEMESTER - 1</b>					
MTBMI-11	Mathematical and statistical methods in Instrumentation	50	3	0	3
MTBMI-12	Essentials of Anatomy and Physiology (for non medical students) Applied Electronics (for medical doctors)	50	3	0	3
MTBMI-13	Automation and control in Instrumentation	50	3	0	3
MTBMI-14	Optics and imaging techniques	50	3	0	3
MTBMI-15	Sensors & Transducers for biomedical instrumentation	50	3	0	3
MTBMI-16	Biochemistry & Biomaterials	50	3	0	3
<b>PRACTICAL</b>					
MTBMI P-I	Applied Electronics, sensors and transducers ( for Doctors) Mini project based on analog electronic circuits ( for non-doctors)	50	0	6	4
MTBMI P-II	Digital Electronics and microprocessor ( for doctors) Mini project based logic microprocessor ( for non-doctors)	50	0	6	4
		<b>400</b>	<b>18</b>	<b>12</b>	<b>26</b>
<b>SEMESTER II</b>					
MTBMI-21	Digital image processing	50	3	0	3
MTBMI-22	Advanced Signal Processing	50	3	0	3
MTBMI-23	Fundamentals of Lasers and Fiber optics	50	3	0	3
MTBMI-24	Controller and Communication protocols for Instrumentation	50	3	0	3
MTBMI-25	Analytical instruments	50	3	0	3

MTBMI-26	Clinical Laboratory Instruments	50	3	0	3
	PRACTICAL				
MTBMI P-III	Optical instruments and lasers	50	0	6	4
MTBMI P-IV	Clinical Laboratory Instruments	50	0	6	4
		<b>400</b>	<b>18</b>	<b>12</b>	<b>26</b>
<b>SEMESTER – III</b>					
MTBMI-31	Medical imaging systems	50	3	0	3
MTBMI-32	Optical and laser based instrumentation for biomedical applications	50	3	0	3
MTBMI-33	.Cardio vascular and Pulmonary Instruments	50	3	0	3
MTBMI-34	Urological and Renal Instrumentation	50	3	0	3
MTBMI-35	Radioisotopes and Nuclear Medicine	50	3	0	3
	PRACTICAL				
MTBMI P-V	Hospital Training	50	0	6	4
MTBMI P-VI	Patient Monitoring and Life Support System	50	0	6	4
MTBMI PJ-I	Project –preliminary	50	0	0	5
		<b>400</b>	<b>15</b>	<b>12</b>	<b>28</b>
<b>SEMESTER IV</b>					
MTBMI-41	1. Medical Ethics and good laboratory practice 2. Hospital management, Telemetry and Telemedicine	50	3	0	3
	<b>Elective Paper (Select any One)</b>	50	3	0	3
MTBMI-42	1. Ophthalmological Instruments and advanced microscopy 2. Pollution Control and Hospital waste management 3. Implants and artificial organs 4. Forensic science				
MTBMI-43	Comprehensive VIVA	50	3	0	4
MTBMI PJ-II	Project Final: Thesis presentation	150	0	0	10
		<b>300</b>	<b>6</b>	<b>0</b>	<b>20</b>
Total		<b>1500</b>			<b>100</b>