

**MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WB**  
(Formerly West Bengal University of Technology)

**Syllabus for B. Sc. In Robotics & 3D Printing (In-house)**  
(Effective for Students Admitted in Academic Session 2020-2021)  
In CBCS Format

**Programme Outcomes (POs):**

The graduates of Robotics & 3D Printing will be able to:

**PO – 1: Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

**PO – 2: Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

**PO – 3: Design/development of solutions:** Design solutions for complex engineering problems and design system component or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

**PO – 4: Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

**PO – 5: Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

**PO – 6: The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

**PO – 7: Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

**PO – 8: Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

**PO – 9: Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**PO – 10: Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**PO – 11: Project management and finance:** Demonstrate knowledge and understanding of the engineering management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

**PO – 12: Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

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**CURRICULUM STRUCTURE**

**1st Semester**

Subject Type		Course Code	Course Name	Credit Points	Credit Distribution			Mode of Delivery			
					Th	P r	Tu	Offline	Online	Blended	
Core course	CC1	CC 1.1	RBEE101	Basic Electrical Engineering	4	4	0	0	✓	✓	✓
		CC1.2	RBEE191	Basic Electrical Engineering Lab	2	0	2	0	✓	✓	✓
	CC2	CC2.1	RBMS101	Engineering Mechanics	4	4	0	0	✓	✓	✓
		CC2.2	RBMS191	Engineering Graphics	2	0	2	0	✓	✓	✓
GE	GE1.1	RBM101	Engineering Mathematics I	4	4	0	0	✓	✓	✓	
	GE1.2	RBMT101	Engineering Mathematics I Tutorial	2	0	0	2	✓	✓	✓	
AECC	AECC 1	RBHS101	Communicative English	2	2	0	0	✓	✓	✓	
Semester Credits				<b>20</b>							

**2<sup>nd</sup> Semester**

Subject Type		Course Code	Course Name	Credit Points	Credit Distribution			Mode of Delivery			
					Th	p r	Tu	Offline	Online	Blended	
CC	CC3	CC 3.1	RBEC201	Analog & Digital Electronics	4	4	0	0	✓	✓	✓
		CC 3.2	RBEC291	Analog & Digital Electronics lab	2	0	2	0	✓	✓	✓
	CC4	CC 4.1	RBMS201	Strength of Materials for Mechanical Engineers	4	4	0	0	✓	✓	✓
		CC 4.2	RBMS291	Strength of Materials for Mechanical Engineers lab	2	0	2	0	✓	✓	✓
GE	GE2 .1	RBM201	Engineering Mathematics II	4	4	0	0	✓	✓	✓	

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	GE2 .2	RBMT2 01	Engineering Mathematics II Tutorial	2	0	0	2	✓	✓	✓
AE CC	AE CC 2	RBPR20 1	Environmental Science	2	2	0	0	✓	✓	✓
Semester Credits				<b>20</b>						

**3<sup>rd</sup> Semester**

Subject Type	Course Code	Course Name	Credit Points	Credit Distribution			Mode of Delivery				
				Th	P r	Tu	Offli ne	Onli ne	Blend ed		
CC	CC5 CC5. 1	RBEC30 1	Electrical Machines	4	4	0	0	✓	✓	✓	
	CC5. 2	RBEC39 1	Electrical Machines Lab	2	0	2	0	✓	✓	✓	
	CC6 CC6. 1	RBEC30 2	Microprocessors, Embedded Controllers and Real time Operating Systems	4	4	0	0	✓	✓	✓	
	CC6. 2	RBEC39 2	Microprocessors, Embedded Controllers and Real time Operating Systems lab	2	0	2	0	✓	✓	✓	
	CC7 CC7. 1	RBMS30 1	Kinematics & Dynamics of Machines	4	4	0	0	✓	✓	✓	
	CC7. 2	RBMS39 1	Kinematics & Dynamics of Machines lab	2	0	2	0	✓	✓	✓	
	GE	GE 3.1	RBPH30 1	Digital signal processing (DSP)	4	4	0	0	✓	✓	✓
	GE	GE 3.2	RBPH30 01	Digital signal processing (DSP) Lab	2	0	0	2	✓	✓	✓
SEC	SEC1 .1	RBCS301	Introduction to python *	2	2	0	0	✓	✓	✓	
Semester Credits				<b>26</b>							

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**4<sup>th</sup> Semester**

Subject Type		Course Code	Course Name	Credit Points	Credit Distribution			Mode of Delivery			
					Th	P r	Tu	Offli ne	Onl ine	Blen ded	
CC	CC 8	CC8.1	RBEE401	Power Electronics and Drives	4	4	0	0	✓	✓	✓
		CC8.2	RBEE491	Power Electronics and Drives Lab	2	0	2	0	✓	✓	✓
	CC9	CC9.1	RBEC401	Sensors and Instrumentation	4	4	0	0	✓	✓	✓
		CC9.2	RBEC491	Sensors and Instrumentation Lab	2	0	2	0	✓	✓	✓
	CC 10	CC10.1	RBPR401	Principles of Robotics I	4	4	0	0	✓	✓	✓
		CC10.2	RBPR491	Principle Robotics Lab I	2	0	2	0	✓	✓	✓
GE	GE 4.1	RBHU401	Values & Ethics*	4	4	0	0	✓	✓	✓	
	GE 4.2	RBHUT401	Values & Ethics Tutorial *	2	0	0	2	✓	✓	✓	
SE C	SEC1.1	RBCS401	Machine Learning,*	2	2	0	0	✓	✓	✓	
Semester Credits				<b>26</b>							

\*Course to be completed from MOOCs Platform.

**5<sup>th</sup> Semester**

Subject Type		Course Code	Course Name	Credit Points	Credit Distribution			Mode of Delivery			
					Th	P r	Tu	Offli ne	Onl ine	Blen ded	
CC	CC1 1	CC11.1	RBEE501	Control System	4	4	0	0	✓	✓	✓
		CC 11.2	RBEE591	Control System Lab	2	0	2	0	✓	✓	✓
	CC1 2	CC12.1	RBPR501	Introduction to Robotics II	4	4	0	0	✓	✓	✓
		CC12.2	RBPR592	Robotics II Lab	2	0	2	0	✓	✓	✓

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DSE	DSE 1.1	RBPR50 2	Industrial Design And Applied Ergonomics	4	4	0	0		✓	✓	✓
	DSE1.2	RBPR59 2	Industrial Design And Applied Ergonomics lab	2	0	2	0		✓	✓	✓
DSE	DSE 2.1	RBMS50 1	Mechanical design	4	4	0	0		✓	✓	✓
	DSE2.2	RBMS59 1	Mechanical Design lab	2	0	2	0		✓	✓	✓
Semester Credits				<b>24</b>							

**\*Course to be completed from MOOCs Platform.**

**6<sup>th</sup> Semester**

Subject Type		Course Code	Course Name	Credit Points	Credit Distribution			Mode of Delivery			
					Th	P	Tu	Offline	Online	Blended	
CC	CC1 3	CC13.1	RBPR60 1	3D Printing	4	4	0	0	✓	✓	✓
		CC 13.2	RBPR69 1	3D Printing Lab	2	0	2	0	✓	✓	✓
	CC1 4	CC14.1	RBCS60 1	Machine Vision	4	4	0	0	✓	✓	✓
		CC14.2	RBCS69 1	Machine Vision Lab	2	0	2	0	✓	✓	✓
DSE	DSE 3.1	RBCS60 2	Internet of things*	4	4	0	0	✓	✓	✓	
	DSE3.2	RBCS69 2	Internet of things Lab *	2	0	2	0	✓	✓	✓	
DSE	DSE 4.1	RBPR69 2	Project	6	4	0	0	✓	✓	✓	
Semester Credits				<b>24</b>							
GRAND TOTAL Credits				<b>140</b>							

**\*Course to be completed from MOOCs Platform.**