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ATHARVA
COLLEGE OF ENGINEERING

ATHARVA ROBOTICS CENTER

A REPORT

(JANUARY 2019 - MARCH 2020)

- DR. BHAVIN SHAH

ATHARVA ROBOTICS CENTER

ATHARVA COLLEGE OF ENGINEERING, MALAD-MARVE ROAD, CHARKOP NAKA, MALAD (WEST), MUMBAI-400095

Atharva College of Engineering

INTRODUCTION

Atharva College of Engineering has set up **Industrial Robotics Training Center** for Educational Institutions at ACE, Malad (West), Mumbai. The first batch of Industrial Robotics Training Program was opened to students of ACE on 04/08/2014. ACE's Robotics Training Center is **India's Second & Maharashtra's First Industrial Training center** amongst Private Engineering Colleges in India, **implemented with "KUKA KR 16-2 C4 INDUSTRIAL ROBOT"** & can perform multitude of operations. Simulation Lab is also being established with latest industrial robotics simulation software's like Simpro & Officelite used to design, develop & simulate robotics operation for different manufacturing establishments. This highly equipped Industrial training cell will help students to gain industrial operations knowledge on handling & programming industrial robots for various tasks, wherein such Robots are widely used in different field of applications in India such as Automobile, Manufacturing, Production, etc… Till date 770 students have successfully completed training on Industrial Robot.

ACE's Robotics Center had an addition of **HUMANOID ROBOT.** ACE's Robotics Training Center is **INDIA'S FIRST HUMANOID ROBOTICS CENTER** amongst Private Engineering Colleges in India, **implemented with "ALDEBARAN NAO EVOLUTION HUMANOID ROBOT"** & can perform Multitude of operations. The first batch of Humanoid Robotics Training Program was opened to students of ACE on 17/07/2017. The Humanoid Robotic Platform is packed with CHOREGRAPHE & WEBOT SIMULATION SOFTWARE & can support multi language programming. This highly equipped Humanoid Robotics Center will help students to gain knowledge on multi language programming on Humanoid Robots & help them to explore Artificial Intelligence & various other domains to designs & develop Robots to behave as Humans, as the future of Robotics is Hospitality & Service Platform Robots on which wide research is carried globally. Till date 107 students have successfully completed training on Humanoid Robot.

Recently ACE's Robotics Center had an addition of **HOSPITALITY & SERVICE ROBOT.** ACE's Robotics Training Center is **INDIA'S FIRST HOSPITALITY & SERVICE ROBOTICS CENTER** amongst Private Engineering Colleges in India, **implemented with "SANBOT" Hospitality & Service Robot** & can perform Multitude of operations. The first batch of SANBOT Robotics Training Program was opened to students of ACE on 11/02/2019. The Hospitality & Service Robot Platform is packed with MPS SOFTWARE & can perform multitude of operations. This highly equipped Hospitality & Service Robotics Center will help students to gain knowledge on Artificial Intelligence & various other domains to designs & develop Robots to functions as Hospitality & Service Robot Platform. Till date 15 students have successfully completed training on Hospitality & Service Robot.

Apart from above mentioned, ACE's Robotics Center is equipped with **High End Drones** which gives exposure to students on **recent trends & technology in Robotics & Artificial Intelligence**.

Also, to an addition, ACE's Robotics Center have recently procured a 6 Feet Tall Humanoid Robot Sculpture made of Steel & can move it's Head around & installed with lights at various parts of the sculpture, demonstrating **Research, Technology & Innovation at Atharva.**

ACE's Robotics Center will be a milestone in the field of Research, Technology & Innovation & will boom the placement opportunities for students of ACE.

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ATHARVA ROBOTICS CENTER CORE TEAM MEMBERS

SR NO	NAME	DEPARTMENT
1.	DR. BHAVIN SHAH	EXTC
2.	PROF. PRAGYA JAIN	ELEC
3.	PROF. SUVARNA PANSAMBAL	CMPN
4.	PROF. APARNA KADAM	EXTC
5.	PROF. AMEYA JADHAV	ELEX
6.	MS. PRATIMA BABAR	ELEX

PROCEDURE

Sr. No	Procedure	Responsibility
1	Notice for Registration	Coordinator
2	Informing Eligible candidate about their scheduled Entrance Test batch respectively via email	Lab Assistant
3	Preparation of Entrance Test Time Table as per Registration	Lab Assistant & Coordinator
4	Informing Eligible candidate about their scheduled batch respectively via email	Lab Assistant
5	Distributing batches to Robotics Center team members as per availability	Lab Assistant & Coordinator
6	Conduction of respective batch by respective faculty member	Coordinator/Respective Faculty Member
8	Conduction of Exam on last day of training	Coordinator/Respective Faculty Member
9	Issuance of certificates to eligible candidates	Coordinator
10	Meeting of all Team members at end of semester to discuss on various issues/growth path.	Coordinator

COURSE CONTENTS
DAY-1 Monday 1PM to 5PM

1. Structure and function of a KUKA robot system (1PM to 3PM)

1.1 Introduction to robotics

1.2 Robot arm of a KUKA robot

1.3 KR C4 robot controller

1.4 The KUKA smart PAD

1.5 Overview of smart PAD

1.6 Robot programming

1.7 Robot safety

2. Moving the robot   (3PM to 5PM)

2.1 Reading and interpreting robot controller messages

2.2 Selecting and setting the operating mode

2.3 Moving individual robot axes

2.4 Coordinate systems in conjunction with robots

2.5 Moving the robot in the world coordinate system

2.6 Moving the robot in the tool coordinate system

2.7 Moving the robot in the base coordinate system

2.8 Exercise: Operator control and jogging

2.9 Jogging with a fixed tool

2.10 Exercise: Jogging with a fixed tool

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DAY-2 Tuesday 1PM to 5PM

3. Starting up the robot (1PM to 3PM-Explanation and 3PM to 5PM- Practical Session)

3.1 Mastering principle

3.2 Mastering the robot

3.3 Exercise: Robot mastering

3.4 Loads on the robot

3.4.1 Tool load data

3.4.2 Supplementary loads on the robot

3.5 Tool calibration

3.6 Exercise: Tool calibration, pen

3.7 Exercise: Tool calibration of gripper, 2-point method

3.8 Base calibration

3.9 Displaying the current robot position

3.10 Exercise: Base calibration of table, 3-point method

3.11 Calibration of a fixed tool

3.12 Calibration of a robot-guided work piece

3.13 Exercise: Calibrating an external tool and robot-guided work piece

3.14 Disconnecting the smart PAD

DAY-3 Wednesday 1PM to 5PM

4 Executing robot programs (1PM to 3PM-Explanation and 3PM to 5PM- Practical Session)

4.1 Performing an initialization run

4.2 Selecting and starting robot programs

4.3 Exercise: Executing robot programs

5 .Working with program files

5.1 Creating program modules

5.2 Editing program modules

5.3Archiving and restoring robot programs

5.4 Tracking program modifications and changes of state by means of the logbook

DAY-4 Thursday 1PM to 5PM

6. Hands on sessions & practicing on KUKA(1PM to 2PM)
7. Documentary Session (2PM to 3 PM)
8. Practical Exam(2PM to 4PM)
2 Batches (6 Students in Each Batch) (1 Hr Per Batch)

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DAY-5 Friday 1PM to 5PM

1.Introduction (1PM to 2PM)

1.1 Introduction to Humanoid Robotics

1.2 Introduction of NAO

2.Hardware Description of Nao Robot (2Pm to 3PM)

2.1 Sonars

2.2 Sensors

2.3 Microphones

2.4 Speakers

2.5 Battery

2.6 Camera

2.7 LED's

2.8 FSR

3.Features and Applications of NAO (3PM to 5PM)

3.1 Features

3.2 Advantages

3.3 Challenges & USP

3.4 Applications

4.How to operate

4.1 Connection using an Ethernet cable or Wi-Fi

4.2 IP address of NAO

5. Messages from NAO

5.1 Motor hot

5.2 Battery low

5.3 Head processor hot

5.4 Head processor overheating, shutdown

5.5 Meaning of the Chest button LEDs Color

    5.5.1. Chest button on boot time

    5.5.2. Chest button when NAO is on

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DAY-6 Monday 1PM to 5PM

6. Introduction of Software (1PM to 3PM)

6.1 Introduction to Choregraphe Software

6.2 Choregraphe Interface

    6.2.1 Menu Bar

    6.2.2 Edit

    6.2.3 View

    6.2.4 Connection Libraries Overview

6.3 Tool Bar

6.4 Box Library

    6.4.1 How To Open A Box Library

    6.4.2 How To Customize The Box Libraries

    6.4.3 How To Save A Box Library As A Cbl

    6.4.4 How To Save A Box Library As A Directory

    6.4.5 How To Save A Box Library As A Directory

7. Flow Diagram Panel

7.1 How to create flow diagram

7.2 Flow diagram input/outputs

7.3 Relevant commands

7.4 How to create flow diagram box

8. Box Structure (3PM to 5PM)

8.1 Parameter of a box

8.2 Types of parameters

8.3 Adding/Removing various parameters in box

8.4 Resource of a box

8.5 Box resource selector

8.6 Plug-in of a box

8.7 Commands to manage boxes

9. Multi level diagrams

9.1 Grouping several boxes into single one

9.2 Script Box

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9.3 Navigating 3D world

9.4 Activating Forward Kinematics on NAO

DAY-7 Tuesday 1PM to 5PM

10. Creating behavior for NAO

10.1 Connection of NAO

10.2 Conditions of the robot

10.3 Stiffening NAO

10.4 How to play & check behavior

10.5 How to make NAO Walk/Say

10.6 How to change language on NAO

11. Troubleshooting of NAO

11.1 Connection troubles & miscellaneous problems

12. Simulation output on Robot view on NAO

DAY-8 Wednesday 1PM to 5PM

13. Hands on sessions & practicing on NAO (1PM to 3PM)

Practical Exam (1PM to 3PM)

1.Introduction of SANBOT (3PM to 5PM)

DAY-9 Thursday 1PM to 5PM

SANBOT Hospitality and Service Robot (3PM to 5PM)

DAY-10 Friday 1PM to 5PM

MCQ type exam & feedback (1PM to 4PM)

Practicing (4PM to 5PM)

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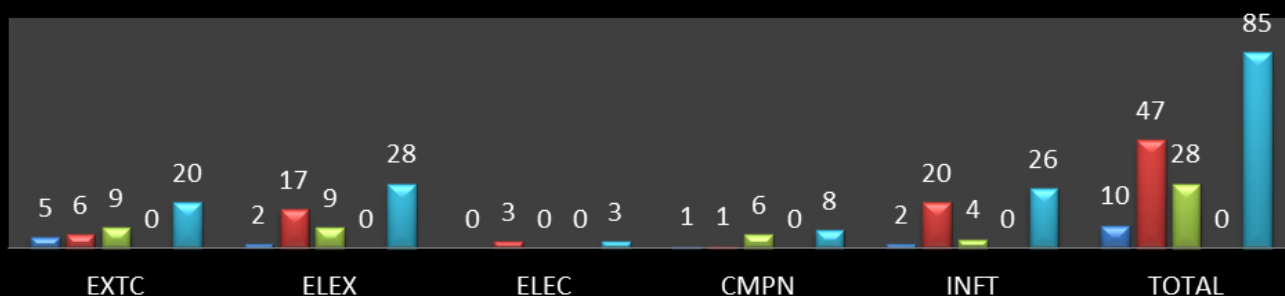
REGISTRATION

The registration for Composite Robotics training was opened on 10th July, 2018. The registration was done with the faculty in-charge in person. The details of the registration from 1st January 2019 to till date (13th March, 2020) are attached below:

DEPARTMENT	NUMBER OF STUDENT'S REGISTERED				
	B.E.	T.E	S.E.	F.E.	TOTAL
EXTC	5	6	9	0	20
ELEX	2	17	9	0	28
ELEC	0	3	0	0	3
CMPN	1	1	6	0	8
INFT	2	20	4	0	26
TOTAL	10	47	28	0	85

DEPARTMENT/YEAR WISE STUDENT'S REGISTRATION CHART

- NUMBER OF STUDENT'S REGISTERED B.E.
- NUMBER OF STUDENT'S REGISTERED T.E
- NUMBER OF STUDENT'S REGISTERED S.E.
- NUMBER OF STUDENT'S REGISTERED F.E.
- NUMBER OF STUDENT'S REGISTERED TOTAL

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COMMENCEMENT OF TRAINING

From 01/01/2019 to 13/03/2020, total 03 batches (23 Student's) have completed the 10 days training spanning all the departments. The details of students in each batch are as follows:

BATCH : 01 FACULTY INVOLVED: Dr. Bhavin Shah, Prof. Amruta Pokhare, Prof. Ameya Jadhav DATE: 11/02/2019 TO 22/02/2019					
SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
1.	Satish Singh Yadav	ARCCTP201902B0101	B.E.	EXTC 2	satishsinghyadav97@gmail.com
2.	Siddhika Arunachalam	ARCCTP201902B0102	B.E.	CMPN 1	siddhi97am@gmail.com
3.	Badsewal Pawan	ARCCTP201902B0103	T.E.	EXTC 1	badsewaldevan@icloud.com
4.	Mehul Soni	ARCCTP201902B0104	T.E.	EXTC 1	mehulsoni225@gmail.com
5.	Rahul Gupta	ARCCTP201902B0105	T.E.	CMPN 1	rahulgupta141998@gmail.com
6.	Madhav M Menon	ARCCTP201902B0106	T.E.	EXTC 1	menonmadhav98@gmail.com
7.	Vikrant Patankar	ARCCTP201902B0107	S.E.	EXTC 2	vikrantpatankar@outlook.com
8.	Kunj Kashyap Bhatt	ARCCTP201902B0108	T.E.	EXTC 1	kunj.bhatt198@gmail.com

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BATCH : 02
FACULTY INVOLVED: Dr. Bhavin Shah, Prof. Aparna Kadam
DATE: 18/03/2019 TO 05/04/2019

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
9.	Yash Gosalia	ARCCTP201903B0201	S.E.	INFT 1	yashgosalia555@gmail.com
10.	Jonas Robin	ARCCTP201903B0202	TE	EXTC1	jonas.rosal.joshni@gmail.com
11.	Tejvi Trivedi	ARCCTP201903B0203	TE	ETRX	tejvitrivedi@gmail.com
12.	Shrishti Hore	ARCCTP201903B0204	S.E.	ELEX	horeshrishti@gmail.com
13.	Akanksha Apte	ARCCTP201903B0205	T.E.	INFT 1	akankshaapte1998@gmail.com
14.	Rishabh Dubey	ARCCTP201903B0206	T.E.	EXTC 1	dubeyrishabh.rd@gmail.com
15.	Ruchi Bugul	ARCCTP201903B0207	TE	ETRX	bagulruchi19@gmail.com

BATCH : 03
FACULTY INVOLVED: Dr. Bhavin Shah, Prof. Aparna Kadam
DATE: 16/09/2019 TO 27/09/2019

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
1.	Patil Sayali M.	-	B.E.	ELEX	04sayali.patil@gmail.com
2.	Prashant Prakash Saundalkar	-	B.E.	ELEX	prashantsaundalkar81@gmail.com
3.	Rishabh Sanghai	-	B.E.	ELEX	rishabhsanghai@gmail.com
4.	Jasim mallick	-	B.E.	ELEX	mallickj53@gmail.com
5.	Shital Mahesh Patole	-	B.E.	ELEX	3shital1999@gmail.com
6.	Natasha Ambre	-	B.E.	INFT 1	natasha.ambre@gmail.com
7.	Astika Kudali	-	B.E.	INFT 1	astika.kudali13@gmail.com
8.	Mohit Jain	-	B.E.	INFT 1	mohitjain99872@gmail.com

BATCH : 04
FACULTY INVOLVED: Dr. Bhavin Shah
DATE: 27/01/2020 TO 07/02/2020

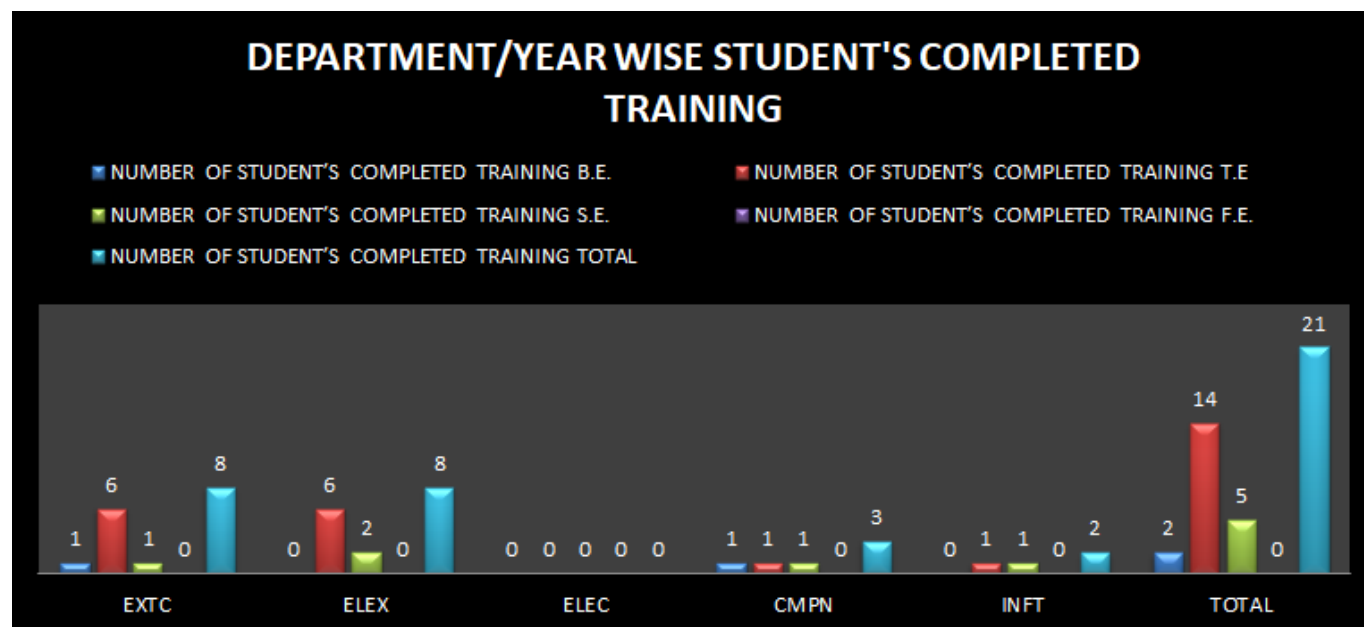| SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
1.	Brandon Saldanha	ARCCTP201903B0201	T.E.	ELEX	brandyshub@gmail.com
2.	Zaid khan	ARCCTP201903B0202	T.E.	ELEX	zaidkhan3112000@gmail.com
3.	Parth vibhandik	ARCCTP201903B0203	T.E.	ELEX	pvibhandik4@gmail.com
4.	Diwakar hem thakur	ARCCTP201903B0204	T.E.	ELEX	diwakarthakur22@gmail.com
5.	Aakash prajapati	-	T.E.	ELEX	a.k269491@gmail.com
6.	Karneshwar Shivayogi Sannamani	ARCCTP201903B0205	S.E.	ELEX	karneshwar25@gmail.com
7.	YADAV DEVENDRA PRABHU	ARCCTP201903B0206	S.E.	CMPN 2	devy2k87@gmail.com

ASSESSMENT

On the tenth day (last day) of the training, an assessment is done to evaluate the understanding of the students who underwent the training.

Question Format: 100 Multiple Choice Questions

Duration: 60 Minutes

Questions Pattern: Multiple Choice Questions covering entire syllabus.

DEPARTMENT	NUMBER OF STUDENT'S COMPLETED TRAINING				
	B.E.	T.E	S.E.	F.E.	TOTAL
EXTC	1	6	1	0	8
ELEX	0	6	2	0	8
ELEC	0	0	0	0	0
CMPN	1	1	1	0	3
INFT	0	1	1	0	2
TOTAL	2	14	5	0	21

DEPARTMENT/YEAR WISE STUDENT'S COMPLETED TRAINING

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ENROLMENT NUMBER

➢ Each student is assigned an Enrolment number in the format ARCCTP-<Year>/<Month>/B-<Batch Number>/ <Serial Number> (making it self-descriptive).

➢ It expands to Atharva Robotics Center Composite Training Program on Industrial, Humanoid, Hospitality & Service Robot Platform <Year>/<Month> Batch -<Batch Number> <Serial Number> For Eg., ARCCTP201902B0101 means year of Batch conduction is February 2019, the student is from Batch 1 and his/her serial number is 01

The certificates were decided to be given away as soft copy to those students who attended the training, provided they:

➢ Have 40 hours of attendance
➢ Have passed the final assessment with a minimum of 40% of total marks.

ATHARVA ROBOTICS CENTER

CERTIFICATE OF COMPLETION

THIS IS TO CERTIFY THAT Mr./Ms. XXXXXXXXXXXXXX
HAS SUCCESSFULLY COMPLETED

"COMPOSITE TRAINING PROGRAM ON INDUSTRIAL, HUMANOID, HOSPITALITY & SERVICE ROBOT PLATFORM"

PERIOD FROM XX/XX/XXX TO XX/XX/XXXX

HELD BY XXXXXXXXXXXXXXXXXXXXXXXXXXXX

ENROLLMENT NO: ARCCTPxxxxxxBxxxx

Dr. BHAVIN SHAH
CO-ORDINATOR

Dr. S.P.KALLURKAR
PRINCIPAL

ATHARVA COLLEGE OF ENGINEERING, MALAD - MARVE ROAD, CHARKOP NAKA, MALAD [WEST], MUMBAI-400095

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PRESS NOTE

ATHARVA ROBOTICS CENTER

- ACE's Robotics Training Center is India's First Humanoid Robotics Training Center amongst Private Engineering Colleges & India's Second & Maharashtra's First Industrial Robotics Training Center amongst Private Engineering Colleges in India.
- Students are explored to the state of art infrastructure consisting of "ALDEBARAN NAO EVOLUTION HUMANOID ROBOT", "KUKA KR 16-2 C4 INDUSTRIAL ROBOT" & "SANBOT HOSPITALITY AND SERVICE ROBOT" along with required auxiliary equipments and hi-tech simulation lab consisting of latest state of art 3D computers and necessary peripheries.
- Students are motivated to publish research papers in the field of robotics.
- Hands-on training sessions are provided to the students to explore them to practical industrial setup.

KEY FEATURES OF ATHARVA ROBOTICS CENTER

- The center is equipped with standard training cell comprising of KUKA KR 16-2 C4 Industrial Robot, ALDEBARAN NAO EVOLUTION Humanoid Robot, SANBOT Hospitality & Service Robot with required auxiliary equipments.
- The training cell is capable of performing multitude of operations used by the automobile, Humanoid Robots/Hospitality & Service Robot Platform manufacturing/production industries.
- Simulation Lab is also being established with latest industrial robotics simulation software's like Simpro & Officelite, Choregraphe, Webot and Monitor SDK software used to design, develop & simulate robotics operation for various tasks.
- Atharva Robotics center provides realistic, theoretical & practical training on KUKA KR 16-2 C4 Robot ALDEBARAN NAO EVOLUTION Humanoid Robot, SANBOT Hospitality & Service Robot.
- This highly equipped Robotics Center will be a Milestone in the field of education & will boom the placement opportunities for student's as well as industry trainers/technicians.

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FUTURE PLANS

- **Training**: The training program targets to <u>cover a minimum of 150 students</u> for course for year 2019.
- **Course**: The next stage is to Start <u>Advanced Training Program</u>, where students get an exploration to in depth programming <u>concepts on KRL Language and GPL programming</u> respectively. Also planning to enhance robotics center by introducing new accessories and peripheries to the current setup and plans to introduce automation lab equipped with industry 4.0/5.0 setup is proposed.
- **Projects:** Final Year B.E. Projects are focused on Robotics & Robotic Arm Prototype.
- **Industry/Education Sector:** Approach towards attraction of Industry Professionals & other education Sectors are targeted for training on Robotics subject to feasibility.

STUDENT UTILIZATION

- Students are explored to Industrial and Humanoid robotics training over and above their academic syllabus.
- Students are explored to the state of art lab equipped with Hi-Tech equipments and Simulation lab equipped with 3D computers and necessary peripheries.
- Students are motivated to publish research papers in the field of robotics.
- Hands-on training sessions are provided to the students to explore them to practical industrial setup.

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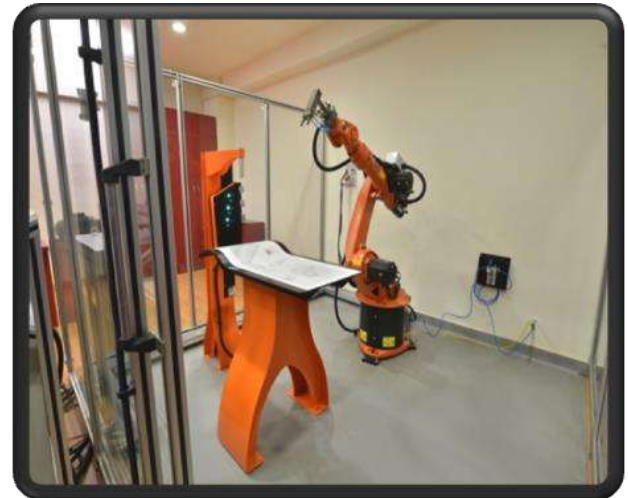**COLLEGE OF ENGINEERING**

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ACE's Robotics Center will be a milestone in the field of Research, Technology & Innovation & will boom the placement opportunities for students of ACE.

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ATHARVA ROBOTICS CENTER CORE TEAM MEMBERS

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1.	DR. BHAVIN SHAH	EXTC
2.	PROF. SAMUEL JACOB	ELEX
3.	PROF. JYOTI KOLAP	EXTC
4.	PROF. PRAGYA JAIN	ELEC
5.	PROF. SACHIN GAVHANE	INFT
6.	PROF. SNIGDHA WASNIK	INFT
7.	PROF. SUVARNA PANSAMBAL	CMPN
8.	PROF. APARNA KADAM	EXTC
9.	PROF. JYOTHI ARUN	INFT
10.	PROF. CHANDA CHOHAN	INFT
11.	PROF. SUPRIYA MANDHARE	INFT
12.	PROF. AMRUTA POKHARE	INFT
13.	PROF. AMEYA JADHAV	ELEX
14.	MS. PRATIMA BABAR	EXTC

PROCEDURE

Sr. No	Procedure	Responsibility
1	Notice for Registration	Coordinator
2	Informing Eligible candidate about their scheduled Entrance Test batch respectively via email	Lab Assistant
3	Preparation of Entrance Test Time Table as per Registration	Lab Assistant & Coordinator
4	Informing Eligible candidate about their scheduled batch respectively via email	Lab Assistant
5	Distributing batches to Robotics Center team members as per availability	Lab Assistant & Coordinator
6	Conduction of respective batch by respective faculty member	Coordinator/Respective Faculty Member
8	Conduction of Exam on last day of training	Coordinator/Respective Faculty Member
9	Issuance of certificates to eligible candidates	Coordinator
10	Meeting of all Team members at end of semester to discuss on various issues/growth path.	Coordinator

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COURSE CONTENTS
DAY-1 Monday 1PM to 5PM

1. Structure and function of a KUKA robot system (1PM to 3PM)

1.1 Introduction to robotics

1.2 Robot arm of a KUKA robot

1.3 KR C4 robot controller

1.4 The KUKA smart PAD

1.5 Overview of smart PAD

1.6 Robot programming

1.7 Robot safety

2. Moving the robot   (3PM to 5PM)

2.1 Reading and interpreting robot controller messages

2.2 Selecting and setting the operating mode

2.3 Moving individual robot axes

2.4 Coordinate systems in conjunction with robots

2.5 Moving the robot in the world coordinate system

2.6 Moving the robot in the tool coordinate system

2.7 Moving the robot in the base coordinate system

2.8 Exercise: Operator control and jogging

2.9 Jogging with a fixed tool

2.10 Exercise: Jogging with a fixed tool

3. Starting up the robot (1PM to 3PM-Explanation and 3PM to 5PM- Practical Session)

3.1 Mastering principle

3.2 Mastering the robot

3.3 Exercise: Robot mastering

3.4 Loads on the robot

3.4.1 Tool load data

3.4.2 Supplementary loads on the robot

3.5 Tool calibration

3.6 Exercise: Tool calibration, pen

3.7 Exercise: Tool calibration of gripper, 2-point method

3.8 Base calibration

3.9 Displaying the current robot position

3.10 Exercise: Base calibration of table, 3-point method

3.11 Calibration of a fixed tool

3.12 Calibration of a robot-guided work piece

3.13 Exercise: Calibrating an external tool and robot-guided work piece

3.14 Disconnecting the smart PAD

DAY-3 Wednesday 1PM to 5PM

4 Executing robot programs (1PM to 3PM-Explanation and 3PM to 5PM- Practical Session)

4.1 Performing an initialization run

4.2 Selecting and starting robot programs

4.3 Exercise: Executing robot programs

5 .Working with program files

5.1 Creating program modules

5.2 Editing program modules

5.3Archiving and restoring robot programs

5.4 Tracking program modifications and changes of state by means of the logbook

DAY-4 Thursday 1PM to 5PM

6. Hands on sessions & practicing on KUKA(1PM to 2PM)
7. Documentary Session (2PM to 3 PM)
8. Practical Exam(2PM to 4PM)
2 Batches (6 Students in Each Batch) (1 Hr Per Batch)

DAY-5 Friday 1PM to 5PM

1.Introduction (1PM to 2PM)

1.1 Introduction to Humanoid Robotics

1.2 Introduction of NAO

2.Hardware Description of Nao Robot (2Pm to 3PM)

2.1 Sonars

2.2 Sensors

2.3 Microphones

2.4 Speakers

2.5 Battery

2.6 Camera

2.7 LED's

2.8 FSR

3.Features and Applications of NAO (3PM to 5PM)

3.1 Features

3.2 Advantages

3.3 Challenges & USP

3.4 Applications

4.How to operate

4.1 Connection using an Ethernet cable or Wi-Fi

4.2 IP address of NAO

5. Messages from NAO

5.1 Motor hot

5.2 Battery low

5.3 Head processor hot

5.4 Head processor overheating, shutdown

5.5 Meaning of the Chest button LEDs Color

    5.5.1. Chest button on boot time

    5.5.2. Chest button when NAO is on

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DAY-6 Monday 1PM to 5PM

6. Introduction of Software (1PM to 3PM)

6.1 Introduction to Choregraphe Software

6.2 Choregraphe Interface

     6.2.1 Menu Bar

     6.2.2 Edit

     6.2.3 View

     6.2.4 Connection Libraries Overview

6.3 Tool Bar

6.4 Box Library

     6.4.1 How To Open A Box Library

     6.4.2 How To Customize The Box Libraries

     6.4.3 How To Save A Box Library As A Cbl

     6.4.4 How To Save A Box Library As A Directory

     6.4.5 How To Save A Box Library As A Directory

7. Flow Diagram Panel

7.1 How to create flow diagram

7.2 Flow diagram input/outputs

7.3 Relevant commands

7.4 How to create flow diagram box

8. Box Structure (3PM to 5PM)

8.1 Parameter of a box

8.2 Types of parameters

8.3 Adding/Removing various parameters in box

8.4 Resource of a box

8.5 Box resource selector

8.6 Plug-in of a box

8.7 Commands to manage boxes

9. Multi level diagrams

9.1 Grouping several boxes into single one

9.2 Script Box

9.3 Navigating 3D world

9.4 Activating Forward Kinematics on NAO

DAY-7 Tuesday 1PM to 5PM

10. Creating behavior for NAO

10.1 Connection of NAO

10.2 Conditions of the robot

10.3 Stiffening NAO

10.4 How to play & check behavior

10.5 How to make NAO Walk/Say

10.6 How to change language on NAO

11. Troubleshooting of NAO

11.1 Connection troubles & miscellaneous problems

12. Simulation output on Robot view on NAO

DAY-8 Wednesday 1PM to 5PM

13. Hands on sessions & practicing on NAO (1PM to 3PM)

Practical Exam (1PM to 3PM)

1.Introduction of SANBOT (3PM to 5PM)

DAY-9 Thursday 1PM to 5PM

SANBOT Hospitality and Service Robot (3PM to 5PM)

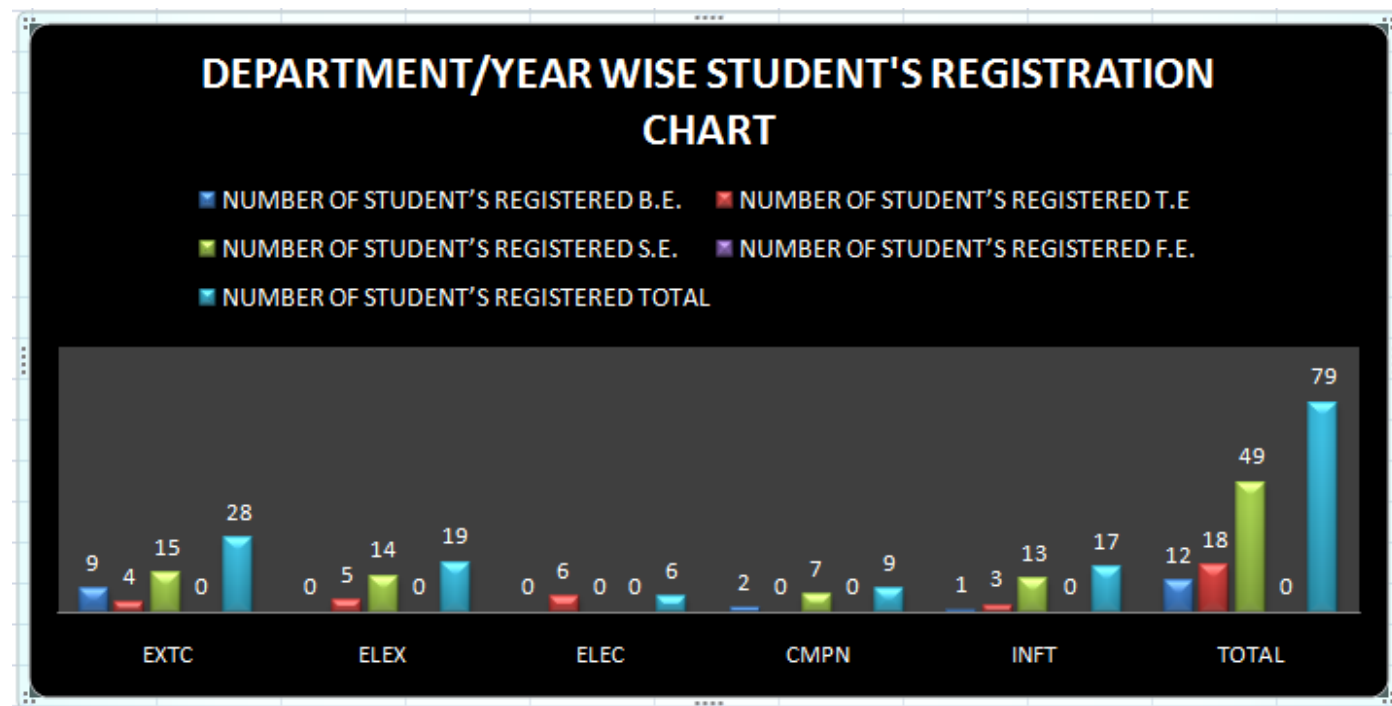## DAY-10 Friday 1PM to 5PM

MCQ type exam & feedback (1PM to 4PM)

Practicing (4PM to 5PM)

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REGISTRATION

The registration for Composite Robotics training was opened on 10th July, 2018. The registration was done with the faculty in-charge in person. The details of the registration till date (10th April, 2019) are attached below:

DEPARTMENT	NUMBER OF STUDENT'S REGISTERED				
	B.E.	T.E	S.E.	F.E.	TOTAL
EXTC	9	4	15	0	28
ELEX	0	5	14	0	19
ELEC	0	6	0	0	6
CMPN	2	0	7	0	9
INFT	1	3	13	0	17
TOTAL	12	18	49	0	79

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COMMENCEMENT OF TRAINING

From 10/07/2018 to 10/04/2019, total 02 batches (15 Student's) have completed the 10 days training spanning all the departments. The details of students in each batch are as follows:

BATCH : 01 FACULTY INVOLVED: Dr. Bhavin Shah, Prof. Amruta Pokhare, Prof. Ameya Jadhav DATE: 11/02/2019 TO 22/02/2019					
SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
1.	Satish Singh Yadav	ARCCTP201902B0101	B.E.	EXTC 2	satishsinghyadav97@gmail.com
2.	Siddhika Arunachalam	ARCCTP201902B0102	B.E.	CMPN 1	siddhi97am@gmail.com
3.	Badsewal Pawan	ARCCTP201902B0103	T.E.	EXTC 1	badsewaldevan@icloud.com
4.	Mehul Soni	ARCCTP201902B0104	T.E.	EXTC 1	mehulsoni225@gmail.com
5.	Rahul Gupta	ARCCTP201902B0105	T.E.	CMPN 1	rahulgupta141998@gmail.com
6.	Madhav M Menon	ARCCTP201902B0106	T.E.	EXTC 1	menonmadhav98@gmail.com
7.	Vikrant Patankar	ARCCTP201902B0107	S.E.	EXTC 2	vikrantpatankar@outlook.com
8.	Kunj Kashyap Bhatt	ARCCTP201902B0108	T.E.	EXTC 1	kunj.bhatt198@gmail.com

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BATCH : 02 **FACULTY INVOLVED: Dr. Bhavin Shah, Prof. Aparna Kadam** **DATE: 18/03/2019 TO 05/04/2019**					
SR. NO.	**NAME**	**ENROLLMENT NO.**	**CLASS**	**BRANCH**	**EMAIL ID**
9.	Yash Gosalia	ARCCTP201903B0201	S.E.	INFT 1	yashgosalia555@gmail.com
10.	Jonas Robin	ARCCTP201903B0202	TE	EXTC1	jonas.rosal.joshni@gmail.com
11.	Tejvi Trivedi	ARCCTP201903B0203	TE	ETRX	tejvitrivedi@gmail.com
12.	Shrishti Hore	ARCCTP201903B0204	S.E.	ELEX	horeshrishti@gmail.com
13.	Akanksha Apte	ARCCTP201903B0205	T.E.	INFT 1	akankshaapte1998@gmail.com
14.	Rishabh Dubey	ARCCTP201903B0206	T.E.	EXTC 1	dubeyrishabh.rd@gmail.com
15.	Ruchi Bugul	ARCCTP201903B0207	TE	ETRX	bagulruchi19@gmail.com

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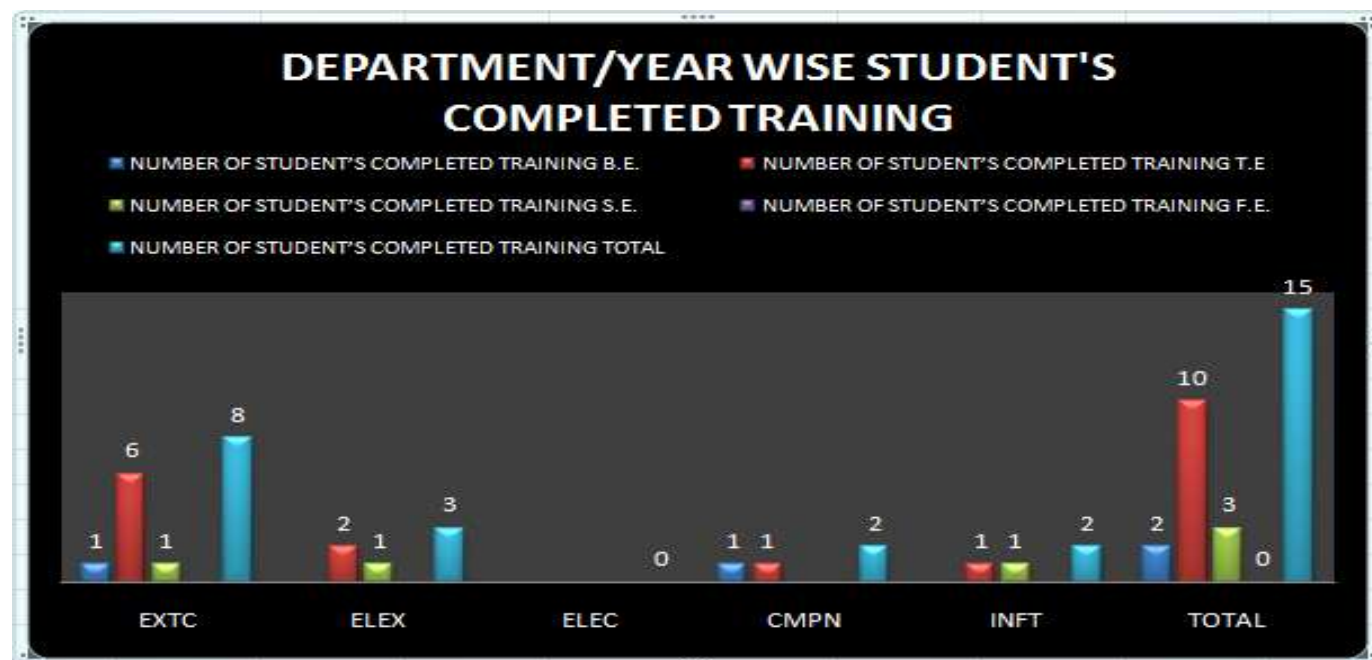COLLEGE OF ENGINEERING

ASSESSMENT

On the tenth day (last day) of the training, an assessment is done to evaluate the understanding of the students who underwent the training.

Question Format: 100 Multiple Choice Questions

Duration: 60 Minutes

Questions Pattern: Multiple Choice Questions covering entire syllabus.

DEPARTMENT	NUMBER OF STUDENT'S COMPLETED TRAINING				
	B.E.	T.E	S.E.	F.E.	TOTAL
EXTC	1	6	1	0	8
ELEX	0	2	1	0	3
ELEC	0	0	0	0	0
CMPN	1	1	0	0	2
INFT	0	1	1	0	2
TOTAL	2	10	3	0	15

DEPARTMENT/YEAR WISE STUDENT'S COMPLETED TRAINING

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ENROLMENT NUMBER

➢ Each student is assigned an Enrolment number in the format ARCCTP-<Year>/<Month>/B-<Batch Number>/ <Serial Number> (making it self-descriptive).

➢ It expands to Atharva Robotics Center Composite Training Program on Industrial, Humanoid, Hospitality & Service Robot Platform <Year>/<Month> Batch -<Batch Number> <Serial Number> For Eg., ARCCTP201902B0101 means year of Batch conduction is February 2019, the student is from Batch 1 and his/her serial number is 01

TRANSCRIPT OF MARKS & CERTIFICATE

The certificates were decided to be given away as soft copy to those students who attended the training, provided they:

➢ Have 40 hours of attendance
➢ Have passed the final assessment with a minimum of 40% of total marks.

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CERTIFICATE OF COMPLETION

THIS IS TO CERTIFY THAT Mr./Ms. XXXXXXXXXXXXXXX
HAS SUCCESSFULLY COMPLETED

"COMPOSITE TRAINING PROGRAM ON INDUSTRIAL, HUMANOID, HOSPITALITY & SERVICE ROBOT PLATFORM"

PERIOD FROM XX/XX/XXX TO XX/XX/XXXX

HELD BY XXXXXXXXXXXXXXXXXXXXXXXXXXXXX

ENROLLMENT NO: ARDCTPxxxxxBxxxx

Dr. BHAVIN SHAH
CO-ORDINATOR

Dr. S.P.KALLURKAR
PRINCIPAL

ATHARVA COLLEGE OF ENGINEERING, MALAD - MARVE ROAD, CHARKOP NAKA, MALAD [WEST], MUMBAI-400095

ATHARVA ROBOTICS CENTER
PRESS NOTE

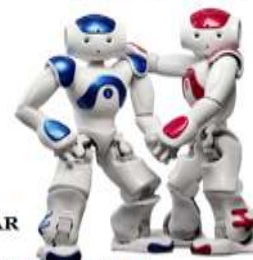## ATHARVA ROBOTICS CENTER

- ➢ ACE's Robotics Training Center is India's First Humanoid Robotics Training Center amongst Private Engineering Colleges & India's Second & Maharashtra's First Industrial Robotics Training Center amongst Private Engineering Colleges in India.
- ➢ Students are explored to the state of art infrastructure consisting of "ALDEBARAN NAO EVOLUTION HUMANOID ROBOT", "KUKA KR 16-2 C4 INDUSTRIAL ROBOT" & "SANBOT HOSPITALITY AND SERVICE ROBOT" along with required auxiliary equipments and hi-tech simulation lab consisting of latest state of art 3D computers and necessary peripheries.
- ➢ Students are motivated to publish research papers in the field of robotics.
- ➢ Hands-on training sessions are provided to the students to explore them to practical industrial setup.

KEY FEATURES OF ATHARVA ROBOTICS CENTER

- ➢ The center is equipped with standard training cell comprising of KUKA KR 16-2 C4 Industrial Robot, ALDEBARAN NAO EVOLUTION Humanoid Robot, SANBOT Hospitality & Service Robot with required auxiliary equipments.
- ➢ The training cell is capable of performing multitude of operations used by the automobile, Humanoid Robots/Hospitality & Service Robot Platform manufacturing/production industries.
- ➢ Simulation Lab is also being established with latest industrial robotics simulation software's like Simpro & Officelite, Choregraphe, Webot and Monitor SDK software used to design, develop & simulate robotics operation for various tasks.
- ➢ Atharva Robotics center provides realistic, theoretical & practical training on KUKA KR 16-2 C4 Robot ALDEBARAN NAO EVOLUTION Humanoid Robot, SANBOT Hospitality & Service Robot.
- ➢ This highly equipped Robotics Center will be a Milestone in the field of education & will boom the placement opportunities for student's as well as industry trainers/technicians.

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FUTURE PLANS

- **Training**: The training program targets to <u>cover a minimum of 150 students</u> for course for year 2019.
- **Course**: The next stage is to Start <u>Advanced Training Program</u>, where students get an exploration to in depth programming <u>concepts on KRL Language and GPL programming</u> respectively. Also planning to enhance robotics center by introducing new accessories and peripheries to the current setup and plans to introduce automation lab equipped with industry 4.0/5.0 setup is proposed.
- **Projects:** Final Year B.E. Projects are focused on Robotics & Robotic Arm Prototype.
- **Industry/Education Sector:** Approach towards attraction of Industry Professionals & other education Sectors are targeted for training on Robotics subject to feasibility.

STUDENT UTILIZATION

- Students are explored to Industrial and Humanoid robotics training over and above their academic syllabus.
- Students are explored to the state of art lab equipped with Hi-Tech equipments and Simulation lab equipped with 3D computers and necessary peripheries.
- Students are motivated to publish research papers in the field of robotics.
- Hands-on training sessions are provided to the students to explore them to practical industrial setup.

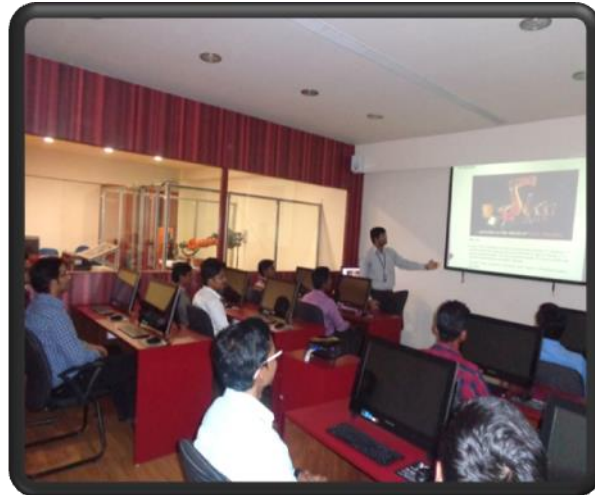# ATHARVA ROBOTICS CENTER

EXCELLENCE REDEFINED…

ATHARVA ROBOTICS CENTER

A REPORT

(JANUARY 2017 - DECEMBER 2017)

- DR. BHAVIN SHAH

ATHARVA ROBOTICS CENTER

ATHARVA COLLEGE OF ENGINEERING, MALAD-MARVE ROAD, CHARKOP NAKA, MALAD (WEST), MUMBAI-400095

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INTRODUCTION

ACE's Robotics Training Center is India's Second & Maharashtra's First Industrial Training Center in the Engineering colleges. ACE has set up Robotics Center in order to train students/industry professionals in Advanced Automated Manufacturing & produce highly skilled technical manpower in the field of Industrial Robotics. The trained manpower will help Indian manufacturing Industry to adopt latest technologies to improve quality & work. The center is equipped with standard training cell comprising of "KUKA KR 16-2 C4" Industrial Robot with required auxiliary equipments.

The training cell is capable of performing multitude of operations used by the automobile & other manufacturing/production industries. Simulation Lab is also being established with latest industrial robotics simulation software's like Simpro & Officelite used to design, develop & simulate robotics operation for different manufacturing establishments. Atharva Robotics center provides realistic, theoretical & practical training on KUKA KR 16-2 C4 Robot. This highly equipped Robotics Center will be a Milestone in the field of education & will boom the placement opportunities for student's as well as industry trainers/technicians.

On 14th July, 2014, a meeting was conducted for all Robotics Center Team Members along with faculty coordinators to plan and organize the weekly Robotics training program for the benefit of all the students of the college. Under the guidance of Dr. S.P. Kallurkar sir, plan was made to open the Robotics Center for a five day training program for all the students of the college, in batches based on the enrolment.

The training was decided to be of 5 days on "Basics Of Robot Programming On Kuka KR 16-2 C4 Robot". The five day program mainly concentrates on how to operate the robot & basic programming of robot. The Student's training is focused on practical real time application of the robot & giving an opportunity to the student's to make their program & run under the supervision of trainer. The training program was designed to boom the placement opportunities for the student's.

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ATHARVA ROBOTICS CENTER CORE TEAM MEMBERS

SR. No.	NAME	Department
1.	DR. BHAVIN SHAH	EXTC
2.	PROF. SAMUEL JACOB	ELEX
3.	PROF. JYOTI KOLAP	EXTC
4.	PROF. PRAGYA JAIN	ELEC
5.	PROF. SACHIN GAVHANE	INFT
6.	PROF. SNIGDHA WASNIK	INFT
7.	PROF. SUVARNA PANSAMBAL	CMPN
8.	PROF. APARNA KADAM	EXTC
9.	MR. MITHILESH THAKUR	EXTC
10.	PROF. JYOTHI ARUN	INFT
11.	PROF. CHANDA CHOHAN	INFT
12.	PROF. SUPRIYA MANDHARE	INFT
13.	PROF. AMRUTA POKHARE	INFT
14.	PROF. AMEYA JADHAV	ELEX
15.	MS. PRATIMA BABAR	EXTC

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COURSE CONTENTS

DAY-1

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1.3 KR C4 robot controller

1.4 The KUKA smart PAD

1.5 Overview of smart PAD

1.6 Robot programming

1.7 Robot safety

2. Moving the robot

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2.5 Moving the robot in the world coordinate system

2.6 Moving the robot in the tool coordinate system

2.7 Moving the robot in the base coordinate system

2.8 Exercise: Operator control and jogging

2.9 Jogging with a fixed tool

2.10 Exercise: Jogging with a fixed tool

DAY-2

5 .Working with program files

5.1 Creating program modules

5.2 Editing program modules

5.3 Archiving and restoring robot programs

5.4 Tracking program modifications and changes of state by means of the logbook.

6. Creating and modifying programmed motions

6.1 Creating new motion commands

6.2 Creating cycle-time optimized motion (axis motion)

6.3 Exercise: Dummy program — program handling and PTP motions

6.4 Creating CP motions

6.5 Modifying motion commands

6.6 Exercise: CP motion and approximate positioning

6.7 Motion programming with external TCP

6.8 Exercise: Motion programming with external TCP

7 Using logic functions in the robot program

7.1 Introduction to logic programming

7.2 Programming wait functions

7.3 Programming simple switching functions

7.4 Programming time-distance functions

7.5 Exercise: Logic statements and switching functions

8. Working with variables

8.1 Displaying and modifying variable values

8.2 Displaying robot states

8.3 Exercise: Displaying system variables

DAY-3

9. Using technology packages

9.1 Gripper operation with KUKA Gripper Tech

9.2 Gripper programming with KUKA Gripper Tech

9.3 KUKA Gripper Tech configuration

10. Successful programming in KRL

10.1 Structure and creation of robot programs

10.2 Structuring robot programs

10.3 Linking robot programs

10.4 Exercise: Programming in KRL

11. Working with a higher-level controller

11.1 Preparation for program start from PLC

11.2 Adapting the PLC interface (Cell.src)

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DAY-4

12. Structured programming

12.1 Objectives for consistent programming methodology

12.2 Tools for creating structured robot programs

12.3 Creating a program flowchart

13. Introduction to Expert level

13.1 Using Expert level

14. Variables and declarations

14.1 Data management in KRL

14.2 Working with simple data types

14.2.1 Declaration of variables

14.2.2 Initialization of variables with simple data types

14.2.3 Manipulation of variable values of simple data types with KRL

14.3 Arrays with KRL

14.4 Structures with KRL

14.5 The enumeration data type ENUM

15. Subprograms and functions

15.1 Working with local subprograms

15.2 Working with global subprograms

15.3 Transferring parameters to subprograms

15.4 Programming functions

15.5 Working with standard KUKA functions

DAY-5

16. Motion programming with KRL

16.1 Programming motions with KRL

16.2 Programming relative motions with KRL

16.3 Calculating or manipulating robot positions

16.4 Deliberate modification of Status and Turn bits

17. Working with system variables

17.1 Cycle time measurement by means of timers

18 Using program execution control functions

18.1 Programming conditional statements or branches

18.2 Programming a switch statement

18.3 Programming loops

18.3.1 Programming an endless loop

18.3.2 Programming a counting loop

18.3.3 Programming a rejecting loop

18.3.4 Programming a non-rejecting loop

18.4 Programming wait functions

18.4.1 Time-dependent wait function

18.4.2 Signal-dependent wait function

19. Switching functions with KRL

19.1 Programming simple switching functions

19.2 Programming path-related switching functions with TP

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REGISTRATION

The registration for Robotics training was opened on 7th July, 2014. The registration was done with the faculty in-charge in person. The details of the registration till date (October 2017) are attached below:

DEPARTMENT	NUMBER OF STUDENT'S REGISTERED				
	B.E.	**T.E**	**S.E.**	**F.E.**	**TOTAL**
EXTC	88	168	139	14	409
ELEX	94	58	127	15	294
ELEC	25	82	84	22	213
CMPN	63	87	51	24	225
INFT	50	133	28	06	217
TOTAL	320	528	429	81	1358
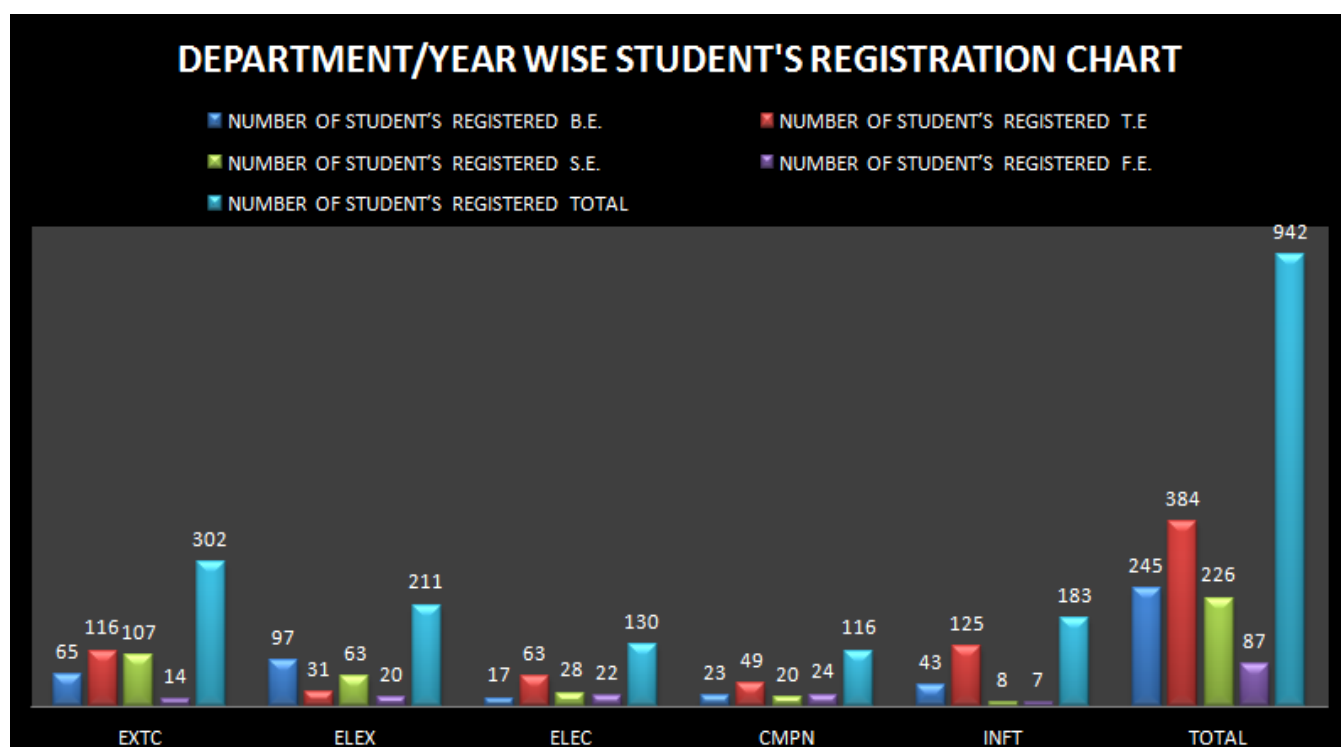
DEPARTMENT/YEAR WISE STUDENT'S REGISTRATION CHART

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COMMENCEMENT OF TRAINING

From 16/01/2017 to 06/10/2017, total 16 batches (181 Student's) have completed the 5 day training spanning all the departments. The details of students in each batch are as follows:

BATCH : 49 (3-5 pm)					
FACULTY INVOLVED: Prof.Bhavin Shah					
DATE: 16/01/2017 To 20/01/2017					
SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
1.	PRANAV JAIN	ARCB4901	TE16	CMPN	pranavj1001@gmail.com
2.	KEDAR KALE	ARCB4902	TE16	CMPN	kedar30092010@gmail.com
3.	KRISHNA GUPTA	ARCB4903	TE16	CMPN	krishnagupta8691@gmail.com
4.	GANESH D CHOUDHARY	ARCB4904	TE16	CMPN	ganeshmukesh111@gmail.com
5.	PARESH RAJU AHER	ARCB4905	TE16	CMPN	aher.paresh@hotmail.com
6.	ROHIT YADAV	ARCB4906	TE16	CMPN	yRohit933@gmail.com
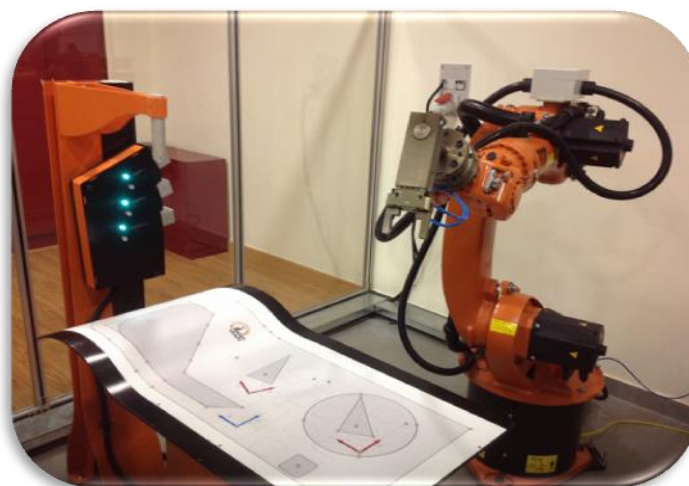
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ATHARVA COLLEGE OF ENGINEERING, MALAD-MARVE ROAD, CHARKOP NAKA, MALAD (WEST), MUMBAI-400095

BATCH : 50 (3-5 pm)

FACULTY INVOLVED: Prof. Supriya Mandhare, Prof. Chanda Chohan

DATE: 23/01/2017 To 27/01/2017

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
7.	RANNA SHETH	ARCB5001	SE16-17	ELEC	shethranna.15@gmail.com
8.	VAISHNAVI TRILOK HEJMADY	ARCB5002	SE16-17	ELEC	vaishnavihejmady@gmail.com
9.	DIPTI NAGARE	ARCB5003	SE16-17	ELEC	diptin.299@gmail.com
10.	MANASI BHALEKAR	ARCB5004	SE16-17	ELEC	manasibhalekar118@gmail.com
11.	MIHIR KOTHARI	ARCB5005	SE16-17	ELEC	mihir_1997@rediffmail.com
12.	BHUSHAN PANGAM	ARCB5006	SE16-17	ELEC	bhushanpangam46@gmail.com
13.	RUSHIKESH SONAWANE	ARCB5007	SE16-17	ELEC	rushikeshsonawane4@gmail.com
14.	SWAPNIL ACHAREKAR	ARCB5008	SE16-17	ELEC	achrekarswapnil125@gmail.com
15.	NEELAY SINHA	ARCB5009	SE16-17	ELEC	neelaykksinha@gmail.com
16.	NIVED BHOIR	ARCB5010	SE16-17	ELEC	nivedbh1797@gmail.com
17.	ANIKET PATIL	ARCB5011	SE16-17	ELEC	aniketpatilap245@gmail.com
18.	VEDANT DALVI	ARCB5012	SE16-17	ELEC	vedantgd12@gmail.com

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BATCH : 51 (3-5 pm)

FACULTY INVOLVED: Prof. Ameya Jadhav, Prof. Amruta Pokhare

DATE: 30/01/2017 To 03/02 /2017

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
19.	YOGESH SACHAN	ARCB5101	TE16	CMPN	yogesh.sachan96@gmail.com
20.	PRATIK BANSODE	ARCB5102	TE16-17	EXTC	bansode933@gmail.com
21.	MAYUR BANGAR	ARCB5103	TE 16-17	EXTC	mayur.bangar96@gmail.com
22.	RADHIKA REDKAR	ARCB5104	TE16	EXTC	redkardattatray15@gmail.com
23.	T ANAS AHMED	ARCB5105	TE16	EXTC	anasahmed716@gmail.com
24.	PRANITA PATIL	ARCB5106	TE	EXTC	pranitapatil8097@gmail.com
25.	MEGHANA VENGURLEKAR	ARCB5107	TE	EXTC	meghanav167@gmail.com
26.	YATHARTH MAHESH SANT	ARCB5108	TE16	CMPN	ysant77@gmail.com
27.	SRISHANTH SHETTY	ARCB5109	TE16	EXTC	srishanth.shetty@gmail.com
28.	PARTH SHAH	ARCB5110	TE16	EXTC	shahp5966@gmail.com
29.	PAWAN SHARMA	ARCB5111	TE16	EXTC	pawanpsharma123@gamil.com
30.	KAJAL PATIL	ARCB5112	TE	EXTC	kajalpatil291@gmail.com

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BATCH : 52 (3-5 pm)

FACULTY INVOLVED: PROF.BHAVIN SHAH,PROF.APARNA KADAM

DATE: 06/02/2017 To 10/02 /2017

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
31.	DHRUV ZANZRKIYA	ARCB5201	TE16	EXTC	dhruvzanzrkiya15@gmail.com
32.	ROHIT YADAV	ARCB5202	TE16	EXTC	rohityadav9769@gmail.com
33.	OMPRAKASH VERMA	ARCB5203	TE16	EXTC	opverma272@gmail.com
34.	AKASH NISHAD	ARCB5204	TE16	EXTC	akashnishad66@gmail.com
35.	AVINASH SHARMA	ARCB5205	TE16	EXTC	sharma.avinash206@gmail.com
36.	NARENDER SINGH	ARCB5206	TE16	EXTC	snarender1995@gmail.com
37.	MAHESH SAHANI	ARCB5207	TE16	EXTC	lavsahani.1989@gmail.com
38.	MANISH KUMAR	ARCB5208	TE16	EXTC	nishadmanish565@gmail.com
39.	JAY HEREKAR	ARCB5209	TE16	EXTC	herekarsaish@gmail.com
40.	MAURYA AVDHESH	ARCB5210	TE16	EXTC	mauryaavdhesh786@gmail.com
41.	KISHAN SHARMA	ARCB5211	TE16	EXTC	kishan0088sharma@gmail.com
42.	ASHISH NIKALJE	ARCB5212	BE16-17	ELEC	nikaljeashish@gmail.com

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BATCH : 53 (3-5 pm)

FACULTY INVOLVED: PROF.BHAVIN SHAH

DATE: 13/01/2017 To 17/02 /2017

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
43.	VAISHNAVI KHADE	ARCB5301	T.E.	EXTC 1	khadevaishnavi@gmail.com
44.	PRATIK GUPTA	ARCB5302	T.E.	EXTC 1	guptapratik999@gmail.com
45.	KARAN GORAKSH	ARCB5303	T.E.	EXTC 1	karan.h.goraksh@gmail.com
46.	VAISHNAVI BORADE	ARCB5304	T.E.	EXTC 1	vaishnavi.borade29@gmail.com
47.	GAUTAM PRINCE	ARCB5305	T.E.	EXTC 1	gautam02.prince96@gmail.com
48.	MAYUR KHATAVKAR	ARCB5306	T.E.	EXTC 1	mayurkhatavkar101@gmail.com
49.	KALPESH KOLI	ARCB5307	T.E.	EXTC 1	kalpeshkoli16@gmail.com
50.	VIJAY CHALKE	ARCB5308	T.E.	EXTC 1	chalke.vijay96@gmail.com
51.	DEVAVRAT GHAG	ARCB5309	T.E.	EXTC 1	devghag31@gmail.com
52.	BHAGYASHREE KOLI	ARCB5310	T.E.	EXTC 1	shreekoli20@gmail.com
53.	PRIYANKA GHANEKAR	ARCB5311	T.E.	EXTC 1	ghanekarpriyanka619@gmail.com
54.	AMITA BHANDARI	ARCB5312	T.E.	EXTC 1	bhandari.amita03@gmail.com

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BATCH : 54 (3-5 pm)

FACULTY INVOLVED: PROF. SUVARNA PANSAMBAL, PROF. APARNA KADAM

DATE: 27/02/2017 To 03/03/2017

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
55.	MOHAK GUPTA	ARCB5401	B.E.2016-2017	CMPN 1	mohakgupta53@gmail.com
56.	SHRADDHA NAYAK	ARCB5402	B.E.2016-2017	CMPN 1	bittu1609.sn@gmail.com
57.	VINIT JAIN	ARCB5403	B.E.2016-2017	CMPN 1	jainvinit7777@gmail.com
58.	AKASH JADHAV	ARCB5404	B.E.2016-2017	CMPN 1	jadhavakki62@gmail.com
59.	JENISH KEVADIA	ARCB5405	B.E.2016-2017	CMPN 1	kevadiajenish7@gmail.com
60.	PRANALI CHAUDHARI	ARCB5406	B.E.2016-2017	CMPN 1	pranalicute1@gmail.com
61.	RUTUJA JADHAV	ARCB5407	B.E.2016-2017	CMPN 1	rutujajad@gmail.com
62.	ROSHNI KATRODIA	ARCB5408	T.E.	CMPN 1	roshnikatrodia15@gmail.com
63.	DEEPALI KAWADE	ARCB5409	T.E.	CMPN 1	deepali21.kawade@gmail.com
64.	SIMRAN DESHMUKH	ARCB5410	T.E.	CMPN 1	simransdeshmukh@gmail.com
65.	VINAY MAHESHWAR	ARCB5411	T.E.2016-2017	CMPN 1	m.vinay15@gmail.com
66.	VINAY VAMAN BHAT	ARCB5412	T.E.2016-2017	CMPN 1	vinayvamanbhat@gmail.com

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BATCH : 55 (9-11 am)

FACULTY INVOLVED: PROF. BHAVIN SHAH

DATE: 06/03/2017 To 10/03/2017

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
67.	SACHIN GOWDA	ARCB5501	S.E.2016-2017	ELEX	sachin70992@gmail.com
68.	NIHAL S. JOSHI	ARCB5502	S.E.2016-2017	ELEX	nj111@live.com
69.	APAR P. MAYEKAR	ARCB5503	S.E.2016-2017	ELEX	aparmayekar.3@gmail.com
70.	AKSHAY A. GUPTA	ARCB5504	S.E.2016-2017	ELEX	akshayg925@gmail.com
71.	TANISHQ B PARALKAR	ARCB5505	S.E.2016-2017	ELEX	tanishq9897@gmail.com
72.	ASHISH M CHANDANSHIVE	ARCB5506	S.E.2016-2017	ELEX	ashishchandanshive97@gmail.com
73.	AASIF SAKUR SUDIWALA	ARCB5507	S.E.2016-2017	ELEX	a.sakur81@gmail.com
74.	ADITYA AHIRWAR	ARCB5508	S.E.2016-2017	ELEX	adiahi3105@gmail.com
75.	SATYENDRA MAURYA	ARCB5509	S.E.2016-2017	ELEX	msatyendra@gmail.com
76.	KAUSTUBH PORE	ARCB5510	S.E.2016-2017	ELEX	kaustubhpore@gmail.com
77.	SOMNATH SADAPHULE	ARCB5511	B.E.2016-2017	EXTC	sadaphulesomnath100@gmail.com

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BATCH : 56 (3-5 pm)

FACULTY INVOLVED: PROF.SUVARNA PANSAMBAL,PROF.AMRUTA POKHARE

DATE: 14/03/2017 To 17/03/2017

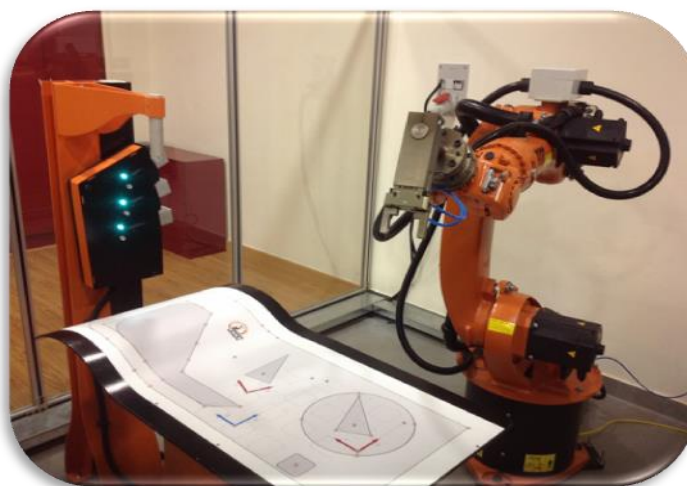| SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
78.	PRADEEPKUMAR	ARCB5601	B.E.2016-2017	EXTC 2	pradeepku275@gmail.com
79.	MITHILKUMAR	ARCB5602	B.E.2016-2017	EXTC 2	mithilrathod4@gmail.com
80.	PARAG P PARAB	ARCB5603	S.E.2016-2017	EXTC 1	paragparabp@gmail.com
81.	MAHESH LOKHANDE	ARCB5604	S.E.2016-2017	EXTC 1	maheshlokhande2013@gmail.com
82.	RITESH.B.PANDA	ARCB5605	S.E.2016-2017	EXTC 2	riteshpanda60@gmail.com
83.	RAHUL H PANCHAL	ARCB5606	S.E.2016-2017	EXTC 2	panchalrahul180@gmail.com
84.	DIPESH MANDEWALA	ARCB5607	S.E.2016-2017	EXTC 2	dipesh.mandewala48@gmail.com
85.	DARSHAN SAWANT	ARCB5608	S.E.2016-2017	EXTC 2	darshansawant08@gmail.com
86.	BHOLARAM MUNI	ARCB5609	S.E.2016-2017	EXTC 1	balrammuni97@gmail.com
87.	HIMANSHU SAKAT	ARCB5610	S.E.2016-2017	EXTC 2	himanshusakat99@gmail.com
88.	GAURAV SANCHETI	ARCB5611	S.E.2016-2017	EXTC 2	gauravsancheti10@gmail.com

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BATCH : 57 (3-5 pm)

FACULTY INVOLVED: PROF. SUPRIYA MANDHARE,PROF. CHANDA CHOHAN

DATE: 20/03/2017 To 24/03/2017

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
89.	MOHIT PATIL	ARCB5701	S.E.2016-2017	INFT 1	mohitpatil181@gmail.com
90.	AKASH TIWARI	ARCB5702	S.E.2016-2017	INFT 2	drakashti@gmail.com
91.	MAYURESH VARTAK	ARCB5703	S.E.2016-2017	INFT 2	mayureshvartak0000@gmail.com
92.	PRATISH CHAVAN	ARCB5704	S.E.2016-2017	INFT 1	chavanpratish@live.com
93.	RUPNARAYAN YADAV	ARCB5705	T.E.2016-2017	INFT 2	yadavrup2020@gmail.com
94.	DHIRAL SANKHE	ARCB5706	T.E.2016-2017	INFT 2	dhiralsankhe1997@gmail.com
95.	PUNEET VERMA	ARCB5707	S.E.	INFT 2	puneetverma359@gmail.com
96.	PRADEEP	ARCB5708	T.E.	INFT 2	yadavpradeep28051996@gmail.com
97.	ESHANT SAH	ARCB5709	T.E.	INFT 2	eshant.sah@gmail.com
98.	PATRAGANESH	ARCB5710	T.E.	INFT 2	gpatra1996@gmail.com
99.	HIMANSHU PATIL	ARCB5711	S.E.	INFT 1	himanshupatil744@gmail.com
100.	SANKET CHAVAN	ARCB5712	S.E.	INFT 1	sanketchavan1521997@gmail.com

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BATCH : 58 (3-5 pm)

FACULTY INVOLVED: PROF. AMEYA JADHAV, PROF. APARNA KADAM

DATE: 27/03/2017 To 31/03/2017

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
101.	POONAM SALUNKE	ARCB5801	T.E.2016-2017	EXTC 2	salunkepoonam123@gmail.com
102.	KAJAL PATIL	ARCB5802	T.E.2016-2017	EXTC 2	kajalpatil291@gmail.com
103.	SHUBHAM PADWANKAR	ARCB5803	T.E.2016-2017	EXTC 2	shubham0412@gmail.com
104.	SHREEDHAR DAWAR	ARCB5804	T.E.2016-2017	ELEC	dawar400@gmail.com
105.	PRASHANT PALKAR	ARCB5805	T.E.2016-2017	ELEC	prashantpalkar143pp@gmail.com
106.	VINIT HARSORA	ARCB5806	T.E.	EXTC 2	vinciharsora@gmail.com
107.	AFZAL SIDDIQUE	ARCB5807	T.E.	EXTC 2	afzalsiddique044@gmail.com
108.	VISHAL PRAJAPATI	ARCB5808	T.E.	INFT 2	vishprajapati1996@gmail.com
109.	PATEL AMAN	ARCB5809	T.E.	EXTC 2	amanpatel406@gmail.com
110.	CHAITALI BAGWE	ARCB5810	T.E.2016-2017	CMPN 1	cbagwe66@gmail.com
111.	DAMINI TEMBHURNE	ARCB5811	T.E.2016-2017	CMPN 2	daminitembhurne96.dt@gmail.com
112.	DARSHAN RAWAL	ARCB5812	T.E.	EXTC 2	darshanrawal.24.7@gmail.com

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BATCH : 59 (3-5 pm)

FACULTY INVOLVED: PROF. APARNA KADAM, PROF.SUVARNA PANSAMBAL

DATE: 17/07/2017 To 21/07/2017

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
113.	MANASI JADHAV	ARCB5901	T.E.2017-2018	ELEX	mansi.jadhav90@gmail.com
114.	CHETAN RANE	ARCB5902	T.E.2017-2018	ELEX	chetanrane091@gmail.com
115.	VIRAJ SAVTIRKAR	ARCB5903	T.E.2017-2018	ELEX	ssavtirkar1@gmail.com
116.	SNEHAL JAGDALE	ARCB5904	T.E.2017-2018	ELEX	snehaljagdale27@gmail.com
117.	AVINASH TRIPATHI	ARCB5905	T.E.2017-2018	ELEX	avibrajesh98@gmail.com
118.	SHUBHANKAR MESTRY	ARCB5906	T.E.2017-2018	ELEX	mshubh555@gmail.com
119.	KUPALE ANAND	ARCB5907	T.E.2017-2018	ELEX	kupalesuraj@gmail.com
120.	NIKITA PATKAR	ARCB5908	T.E.2017-2018	ELEX	nikitapatkar42@gmail.com
121.	AAKANSHA PACHANGE	ARCB5909	T.E.2017-2018	ELEX	aakankshapachange@gmail.com
122.	VRINDA PATEL	ARCB5910	T.E.2017-2018	ELEX	vrindaarvindpatel@gmail.com
123.	SAKSHI SHETTY	ARCB5911	T.E.2017-2018	ELEX	sakshishetty1231997@gmail.com
124.	MADHAV PAI	ARCB5912	T.E.2017-2018	ELEX	madhavspai@gmail.com

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BATCH : 60 (3-5 pm)

FACULTY INVOLVED: PROF. SUPRIYA MANDHARE,PROF. CHANDA CHOHAN

DATE: 24/07/2017 To 28/07/2017

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
125.	AKASH MISHRA	ARCB6001	S.E.2017-2018	CMPN 1	akashmishra.akm@gmail.com
126.	AKSHAY THOMBARE	ARCB6002	S.E.2016-2017	CMPN 1	emceeakki@gmail.com
127.	HARDIK JOSHI	ARCB6003	S.E.2016-2017	CMPN 1	slanish1996@gmail.com
128.	NIKHIL GOHIL	ARCB6004	S.E.2016-2017	CMPN 1	nikhilgohil007@gmail.com
129.	PAVANKUMAR KAMATH	ARCB6005	S.E.2016-2017	CMPN 1	pavan.g.kamath@gmail.com
130.	SHRUSTI TALATI	ARCB6006	S.E.2016-2017	CMPN 1	shrusti.talati@gmail.com
131.	ADITYA MOHITE	ARCB6007	T.E.2017-2018	CMPN 1	aditya.mohite96@gmail.com
132.	NILESH NARKAR	ARCB6008	B.E.2016-2017	CMPN 1	Nileshnarkar777@gmail.com
133.	SIRAJ ANSARI	ARCB6009	T.E.2017-2018	CMPN 1	sirajansari12342@gmail.com
134.	OMKAR DUKHANDE	ARCB6010	T.E.2017-2018	CMPN 1	17omkard@gmail.com
135.	HARSH KSHATRIYA	ARCB6011	T.E.2017-2018	CMPN 1	harshkshatriya@hotmail.com
136.	PAVAN DHAKE	ARCB6012	T.E.2017-2018	CMPN 1	pavandhake13@gmail.com

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BATCH : 61 (3-5 pm)

FACULTY INVOLVED: PROF. AMEYA JADHAV,PROF.AMRUTA POKHARE

DATE: 31/07/2017 To 04/08/2017

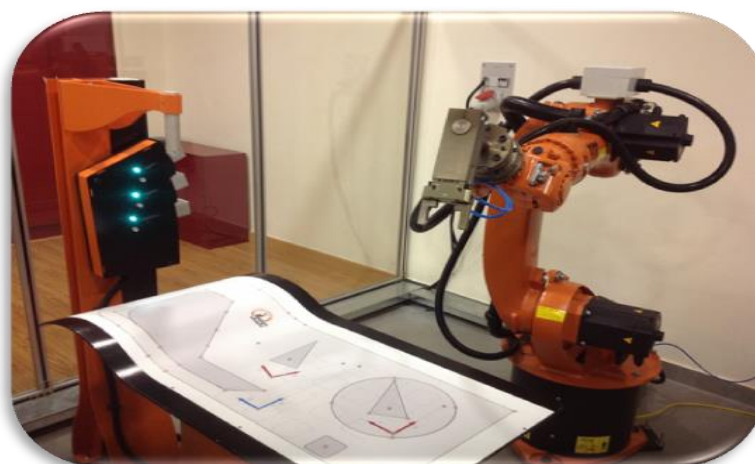| SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
137.	RUSHMITA PAUL	ARCB6101	T.E.2017-2018	ELEX	rush8897@gmail.com
138.	RUSHANK THAKUR	ARCB6102	T.E.2017-2018	ELEX	rushankt5@gmail.com
139.	PRASHANT DASHARATH SALUNKE	ARCB6103	T.E.2017-2018	ELEX	tech.prashant1@gmail.com
140.	PARAG N. LOKHANDE	ARCB6104	T.E.2017-2018	ELEX	paraglokhande108@gmail.com
141.	CHARMI GANDHI	ARCB6105	T.E.2017-2018	ELEX	charmigandhi99@gmail.com
142.	SHRADDHA HEGDE	ARCB6106	T.E.2017-2018	ELEX	shraddhahegde31@gmail.com
143.	ASHUTOSH HALDANKAR	ARCB6107	T.E.2017-2018	ELEX	ashuliveslong@gmail.com
144.	POONAM REVANKAR	ARCB6108	B.E.2017-2018	ELEX	rev.poonam@gmail.com
145.	GAURAV VALANJU	ARCB6109	B.E.2017-2018	ELEX	gauravvalanju07@gmail.com
146.	PRAVIN MISHRA	ARCB6110	S.E.2017-2018	ELEX	vspdp.pravin97@gmail.com
147.	ARNAV DESAI	ARCB6111	B.E.2017-2018	ELEX	arnavdesai018@gmail.com
148.	DEEPAL UDESHI	ARCB6112	B.E.2017-2018	ELEX	deepaludeshi321@gmail.com

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BATCH : 62 (3-5 pm)

FACULTY INVOLVED: PROF. CHANDA CHAUHAN,PROF.SUPRIYA MANDHARE

DATE: 21/08/2017 To 24/08/2017

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
149.	ANIKET PACHCHHAPUR	ARCB6201	B.E.2017-2018	EXTC 1	aniketpac@gmail.com
150.	MIHIR JOSHI	ARCB6202	B.E.2017-2018	EXTC 1	mvjoshi1990@gmail.com
151.	AMIT PADHY	ARCB6203	B.E.2017-2018	EXTC 2	padhyamit999@gmail.com

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BATCH : 63 (3-5 pm)

FACULTY INVOLVED: PROF. AMEYA JADHAV,PROF.AMRUTA POKHARE

DATE: 11/09/2017 To 15/09/2017

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
152.	SARAS WADHONKAR	ARCB6301	S.E.2017-2018	ELEX	saraswadhonkar88@gmail.com
153.	NIDHI SHETTY	ARCB6302	S.E.2017-2018	ELEX	nidhishetty279@gmail.com
154.	AJAYAN SAROJ	ARCB6303	S.E.2017-2018	ELEX	sarojajayan97@gmail.com
155.	RISHABH SANGHAI	ARCB6304	S.E.2017-2018	ELEX	rishabhsanghai@gmail.com
156.	RAHUL SHRIRANG BHATADE	ARCB6305	S.E.2017-2018	ELEX	rahulbhatade634@gmail.com
157.	HARSH NITIN SAPRA	ARCB6306	S.E.2017-2018	ELEX	Harshsapra87@gmail.com
158.	TEJAS PRASHANT SHETTY	ARCB6307	S.E.2017-2018	ELEX	tejasshettyolhs@gmail.com
159.	RAJ UMESH RAORANE	ARCB6308	S.E.2017-2018	ELEX	rajraorane576@gmail.com
160.	SAURAV SUNIL PANCHAL	ARCB6309	S.E.2017-2018	ELEX	sauravpanchal369@gmail.com

ATHARVA ROBOTICS CENTER

ATHARVA COLLEGE OF ENGINEERING, MALAD-MARVE ROAD, CHARKOP NAKA, MALAD (WEST), MUMBAI-400095

AET's

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ATHARVA
COLLEGE OF ENGINEERING

BATCH : 64 (3-5 pm)

FACULTY INVOLVED: PROF. APARNA KADAM

DATE: 18/09/2017 To 22/09/2017

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
161.	RACHANA UPADHAYA	ARCB6401	T.E.2017-2018	CMPN 1	upadhyarachu1997@gmail.com
162.	ANKIT KORE	ARCB6402	T.E.2017-2018	CMPN 2	ankitkore.ak12@gmail.com
163.	NIMISH SAWANT	ARCB6403	T.E.2017-2018	CMPN 2	nimishsawant.2k15@gmail.com
164.	MANASVI GANU	ARCB6404	T.E.2017-2018	CMPN 1	mganu96@gmail.com
165.	TUSHAR KAMBLE	ARCB6405	T.E.2017-2018	CMPN 1	tushark1996@gmail.com
166.	KRUTTIKA SAWANT	ARCB6406	T.E.2017-2018	CMPN 2	kruttikasawant1512@gmail.com
167.	YASH RAORANE	ARCB6407	T.E.2017-2018	CMPN 2	yashraorane25@gmail.com
168.	HRIDAYESH JADHAV	ARCB6408	T.E.2017-2018	CMPN 2	hmjadhav16@gmail.com
169.	OMKAR YASHWANT	ARCB6409	T.E.2017-2018	CMPN 2	osanap19@gmail.com
170.	RAJAS THAWAL	ARCB6410	T.E.2017-2018	CMPN 2	rajasthawal@gmail.com
171.	TANUJA SAKPAL	ARCB6411	T.E.2017-2018	CMPN 1	tanusakpal@gmail.com

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COLLEGE OF ENGINEERING

BATCH : 65 (3-5 pm)

FACULTY INVOLVED: DR.BHAVIN SHAH

DATE: 18/09/2017 To 22/09/2017

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
172.	SUPREETH UMESH KUNDER	ARCB6501	S.E.2016-2017	CMPN 1	kundersupreeth@gmail.com
173.	KASA KUNAL KAILASH	ARCB6502	S.E.2017-2018	CMPN 1	kunalkasa143@gmail.com
174.	KRUNAL GEDIYA	ARCB6503	S.E.2017-2018	CMPN 1	kgediya0898@gmail.com
175.	TRISHALA AHALPARA	ARCB6504	S.E.2017-2018	CMPN 1	trishahalpara@gmail.com
176.	SAYALI JAGDISH PATKAR	ARCB6505	S.E.2017-2018	CMPN 1	sayalijagdish29@gmail.com
177.	MRITYUNJAI MISHRA	ARCB6506	S.E.2017-2018	CMPN 1	mrityunjaimishra1402@gmail.com
178.	AJIT GOUD	ARCB6507	S.E.2017-2018	CMPN 1	ajitgoud87@gmail.com
179.	KALYANI DEORE	ARCB6508	S.E.2017-2018	CMPN 1	kalyanideore22@gmail.com
180.	PRATHAMESH DESAI	ARCB6509	S.E.2017-2018	CMPN 1	psdesai09@gmail.com
181.	SHEFALI MAHADIK	ARCB6510	S.E.2017-2018	CMPN 1	shefalimahadik007@gmail.com

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ASSESSMENT

On the fifth day (last day) of the training, an assessment is done to evaluate the understanding of the students who underwent the training.

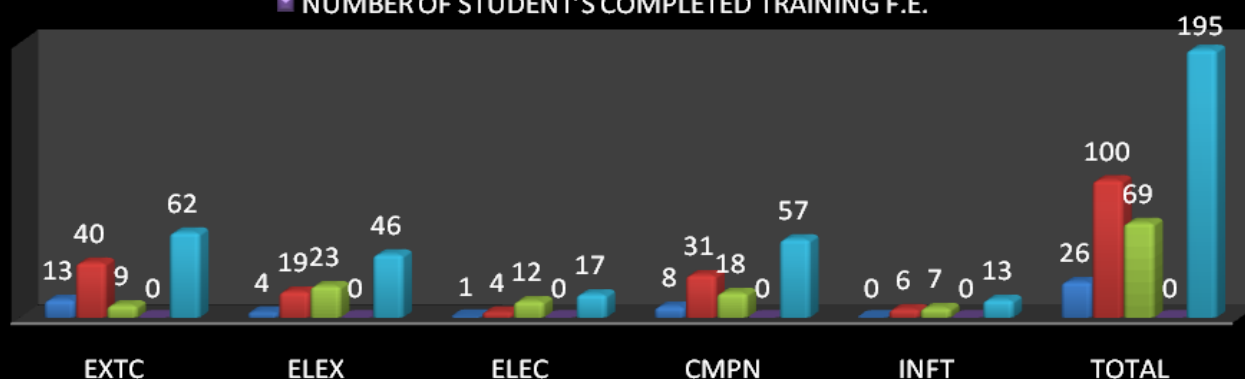**Question Format**: 25 Multiple Choice Questions

Duration: 30 Minutes

Questions Pattern: Multiple Choice Questions covering entire syllabus.

DEPARTMENT	NUMBER OF STUDENT'S COMPLETED TRAINING				
	B.E.	T.E	S.E.	F.E.	TOTAL
EXTC	13	40	09	00	62
ELEX	04	19	23	00	46
ELEC	01	04	12	00	17
CMPN	08	31	18	00	57
INFT	00	06	07	00	13
TOTAL	26	100	69	00	195

ASTESSMENT PAPER

Q.1 Which icon represents the base coordinate system?

a)   b)   c)   d)

Q.2) What is the name of the velocity setting for jog mode?

a) Jogging   b) velocity override   c) Jog override   d) Program override

Q.3) Assigning reference value to every axis is the process called-----

a) Positioning   b) Base calibration   c) Tool calibration   d) Mastering

Q.4) The robot model we are using is--------

a) KR 4   b) KR 6   c) KR 2   d) KR 16

Q.5) Default coordinate system of the robot is?

a) Flange   b) World   c) Base   d) Robroot

Q.6) Encoder data is stored at………

a) KRC box   b) White box   c) Robot box   d) Black box

Q.7)TCP indicates

a) Distance between flange and tool

b)Tool control point
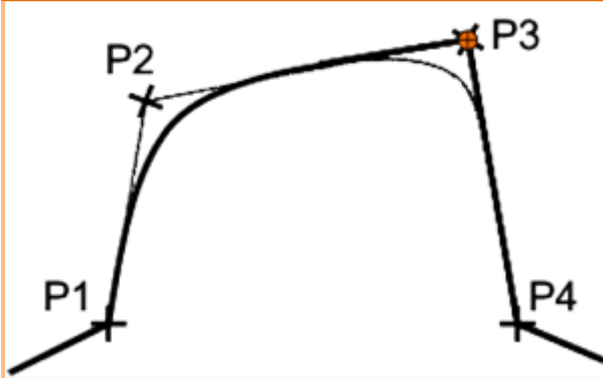
c) Tool calibration point

d) None of the above

Q.8) The leading axis takes………. Path.

a) Shortest   b) Longest   c) Fastest   d) Smallest

Q.9) Maximum speed of robot in T2 Mode is:

a) 250 mm/s   b) 280mm/s   c)2 m/s   d) None

Q.10) When is the out command executed?

LIN P1 CONT Vel=0.2 m/s CPDAT1
LIN P2 CONT Vel=0.2 m/s CPDAT2
LIN P3 CONT Vel=0.2 m/s CPDAT3
OUT 5 'rob_ready' State=TRUE CONT
LIN P4 Vel=0.2 m/s CPDAT4
a) after P1   b) after P2   c) after P3   d) after P4

Q.11) Tool calibration is carried out with respect to ………… co-ordinate system

a) BaTE   b) Tool   c) Flange   d) World

Q.12) The language uTEd to program the robot is:

a) KCL   b) KRL   c)C   d)KCP

Q.13) PTP motion gives

a) Shortest time   b) shortest path   c) Longest time   d) Can't say

Q.14) Payload of the robot is:

a) 16 kg   b) 32 kg   c) 38 kg   d) 49kg

Q.15) When A4 , A5 & A6 axis are in same line that is…………. Singularity

a) $\alpha1$ b) $\alpha2$ c)$\alpha4$ d) $\alpha5$

Q.16) The tool uTEd to rotate motors mechanically is called

a) EMD   b) Rachit   c) plier   d) All of the above

Q.17) Which are the emergency stops are available?

a) Smart pad   b) External Panel   c) fence door stop   d) All of the above

Q.18) Which are the different modes of running kuka robot?

a) TI   b) T2   c) AUT &EXT   d) All of the above

Q.19)What is EMD?

a) Electronic Mastering Device   b) Electro Mechanical Door   c) Electronic Measuring Device   d) None of the above

Q.20)What is KPP?

a) Kuka Power Point   b) Kuka Power Plug   c) Kuka Power Pack   d) All of the above

Q.21) In ……………… singularity, center point of A5 is located vertically above axis A1.

a) Extended position   b) Wrist axis   c) overhead   d) α2

Q.22) ……………… message provide information for correct operator control of the robot.

a) Status   b) Notification   c) Acknowledgement   d) wait

Q.23) ……………… means generation of coordinate system which has its origin in a reference point of the tool .

a) Tool coordinate   b) base calibraton   c) TCP   d) All of the above

Q.24) All motions are possible using space mouTE.

a) True   b) False   c) Not always d) can't say

Q.25) The motion of the robot is limited in axis-specific jogging by means of the maximum positive & negative values is called ………………..

a) Software limit switches   b) mechanical stoppers   c) axis boundaries   d) all

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FEEDBACK FORM

STUDENT FEEDBACK FORM
"BASICS OF ROBOT PROGRAMMING ON KUKA KR 16-2 C4 ROBOT"

TRAINER:_____BATCH:_____ DATE:_____

STUDENT NAME_____ YEAR _____ BRANCH _____ROLL NOS._____

SR. NOS.	CONTENTS	EXCELLENT	GOOD	SATISFACTORY	UNSATISFACTORY
1.	Lab Environment				
2.	Relevance Of Contents				
3.	Faculty Interaction				
4.	Presentation				
5.	Practical sessions				
6.	Programming Skills				
7.	Student's Practice session				
8.	Knowledge Gained				
9.	Industry Relevant Knowledge				
10.	How Was The Overall Training				
11.	Give your specific views on Robotics Training				
12.	What value addition you have achieved from this training				
13.	Specific suggestions you would like to implement by management				

_____
Student's Signature

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ENROLMENT NUMBER

➢ Each student is assigned an Enrolment number in the format ARC-<Batch Number>/ <Serial Number> (making it Self-descriptive).

➢ It expands to Atharva Robotics Center Batch -<Batch Number> <Serial Number> For Eg., ARCB0101 means the student is from Batch 1 and his/her Serial number is 01

CERTIFICATE

The certificates were decided to be given away as soft copy to those students who attended the training,

provided they:

➢ Have 10 hours of attendance
➢ Have passed the final assessment with a minimum of 40% of total marks.

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CERTIFICATE OF COMPLETION

THIS IS TO CERTIFY THAT **Mr./Ms.** XXXXXXXXXXX
HAS SUCCESSFULLY COMPLETED

"BASICS OF ROBOT PROGRAMMING ON

KUKA KR 16-2 C4 ROBOT"

PERIOD FROM XXXXXX TO XXXXXX

HELD BY PROF.XXXXXXXXXXXXX, PROF.XXXXXXXXXXXX

ENROLLMENT NO.: ARCBxxxxx

DR. BHAVIN SHAH   DR. S.P.KALLURKAR
CO-ORDINATOR   PRINCIPAL
ATHARVA COLLEGE OF ENGINEERING, MALAD - MARVE ROAD, CHARKOP NAKA, MALAD [WEST], MUMBAI-400095

CERTIFICATE SAMPLE COPY

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ATHARVA COLLEGE OF ENGINEERING, MALAD-MARVE ROAD, CHARKOP NAKA, MALAD (WEST), MUMBAI-400095

ARTICLE IN MAHARASHTRA TIMES SUPPLEMENT MUMBAI TIMES NEWSPAPER DATED 12ᵀᴴ AUGUST, 2015

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ATHARVA ROBOTICS CENTER PRESS NOTE

ATHARVA ROBOTICS CENTER

➢ Atharva College Of Engineering has set up Industrial Robotics Training Center for Educational Institutions at ACE, Malad(West), Mumbai.

➢ ACE's Robotics Training Center is India's Second & Maharashtra's First industrial Training center in the Engineering colleges.

➢ ACE has set up Robotics Center in order to train students/industry professionals in Advanced Automated Manufacturing & produce highly skilled technical manpower in the field of Industrial Robotics. The trained manpower will help Indian manufacturing Industry to adopt latest technologies to improve quality & work.

KEY FEATURES OF ATHARVA ROBOTICS CENTER

➢ The center is equipped with standard training cell comprising of KUKA KR 16-2 C4 Industrial Robot with required auxiliary equipments.

➢ The training cell is capable of performing multitude of operations used by the automobile & other manufacturing/production industries.

➢ Simulation Lab is also being established with latest industrial robotics simulation software's like Simpro & Officelite used to design, develop & simulate robotics operation for different manufacturing establishments.

➢ Atharva Robotics center provides realistic, theoretical & practical training on KUKA KR 16-2 C4 Robot.

➢ This highly equipped Robotics Center will be a Milestone in the field of education & will boom the placement opportunities for student's as well as industry trainers/technicians.

ATHARVA COLLEGE OF ENGINEERING, MALAD-MARVE ROAD, CHARKOP NAKA, MALAD[WEST], MUMBAI-400095

FUTURE PLANS

- **Training**: The training program targets to cover a minimum of 150 students for year 2017.

- **Course**: The next stage is to Start Advanced Training Program, where students get an exploration to in depth programming concepts on KRL Language. Also work on expanding robotics center towards service robot platform is in progress.

- **Projects:** Final Year B.E. Projects are focused on Robotics & Robotic Arm Prototype.

- **STTP:** An ISTE sponsored STTP shall be proposed.

- **Industry/Education Sector:** Approach towards attraction of Industry Professionals & other education Sectors are targeted for training on Robotics subject to feasibility.

ATHARVA ROBOTICS CENTER

EXCELLENCE REDEFINED…

ATHARVA ROBOTICS CENTER

A REPORT

(JANUARY 2016 - DECEMBER 2016)

- PROF. BHAVIN SHAH

ATHARVA ROBOTICS CENTER

ATHARVA COLLEGE OF ENGINEERING, MALAD-MARVE ROAD, CHARKOP NAKA, MALAD (WEST), MUMBAI-400095

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INTRODUCTION

ACE's Robotics Training Center is India's Second & Maharashtra's First Industrial Training Center in the Engineering colleges. ACE has set up Robotics Center in order to train students/industry professionals in Advanced Automated Manufacturing & produce highly skilled technical manpower in the field of Industrial Robotics. The trained manpower will help Indian manufacturing Industry to adopt latest technologies to improve quality & work. The center is equipped with standard training cell comprising of "KUKA KR 16-2 C4" Industrial Robot with required auxiliary equipments.

The training cell is capable of performing multitude of operations used by the automobile & other manufacturing/production industries. Simulation Lab is also being established with latest industrial robotics simulation software's like Simpro & Officelite used to design, develop & simulate robotics operation for different manufacturing establishments. Atharva Robotics center provides realistic, theoretical & practical training on KUKA KR 16-2 C4 Robot. This highly equipped Robotics Center will be a Milestone in the field of education & will boom the placement opportunities for student's as well as industry trainers/technicians.

On 14th July, 2014, a meeting was conducted for all Robotics Center Team Members along with faculty coordinators to plan and organize the weekly Robotics training program for the benefit of all the students of the college. Under the guidance of Dr. S.P. Kallurkar sir, plan was made to open the Robotics Center for a five day training program for all the students of the college, in batches based on the enrolment.

The training was decided to be of 5 days on "Basics Of Robot Programming On Kuka KR 16-2 C4 Robot". The five day program mainly concentrates on how to operate the robot & basic programming of robot. The Student's training is focused on practical real time application of the robot & giving an opportunity to the student's to make their program & run under the supervision of trainer. The training program was designed to boom the placement opportunities for the student's.

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ATHARVA ROBOTICS CENTER CORE TEAM MEMBERS

SR. No.	NAME	Department
1.	PROF. BHAVIN SHAH	EXTC
2.	PROF. SAMUEL JACOB	ELEX
3.	PROF. JYOTI KOLAP	EXTC
4.	PROF. PRAGYA JAIN	ELEC
5.	PROF. SACHIN GAVHANE	INFT
6.	PROF. SNIGDHA WASNIK	INFT
7.	PROF. SUVARNA PANSAMBAL	CMPN
8.	PROF. APARNA KADAM	EXTC
9.	MR. MITHILESH THAKUR	EXTC
10.	PROF. JYOTHI ARUN	INFT
11.	PROF. CHANDA CHOHAN	INFT
12.	PROF. SUPRIYA MANDHARE	INFT
13.	PROF. AMRUTA POKHARE	INFT
14.	PROF. AMEYA JADHAV	ELEX
15.	MS. PRATIMA BABAR	EXTC

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COURSE CONTENTS

DAY-1

1. Structure and function of a KUKA robot system

1.1 Introduction to robotics

1.2 Robot arm of a KUKA robot

1.3 KR C4 robot controller

1.4 The KUKA smart PAD

1.5 Overview of smart PAD

1.6 Robot programming

1.7 Robot safety

2. Moving the robot

2.1 Reading and interpreting robot controller messages

2.2 Selecting and setting the operating mode

2.3 Moving individual robot axes

2.4 Coordinate systems in conjunction with robots

2.5 Moving the robot in the world coordinate system

2.6 Moving the robot in the tool coordinate system

2.7 Moving the robot in the base coordinate system

2.8 Exercise: Operator control and jogging

2.9 Jogging with a fixed tool

2.10 Exercise: Jogging with a fixed tool

3. Starting up the robot

3.1 Mastering principle

3.2 Mastering the robot

3.3 Exercise: Robot mastering

3.4 Loads on the robot

3.4.1 Tool load data

3.4.2 Supplementary loads on the robot

3.5 Tool calibration

3.6 Exercise: Tool calibration, pen

3.7 Exercise: Tool calibration of gripper, 2-point method

3.8 Base calibration

3.9 Displaying the current robot position

3.10 Exercise: Base calibration of table, 3-point method

3.11 Calibration of a fixed tool

3.12 Calibration of a robot-guided work piece

3.13 Exercise: Calibrating an external tool and robot-guided work piece

3.14 Disconnecting the smart PAD

4 Executing robot programs

4.1 Performing an initialization run

4.2 Selecting and starting robot programs

4.3 Exercise: Executing robot programs

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DAY-2

5 .Working with program files

5.1 Creating program modules

5.2 Editing program modules

5.3 Archiving and restoring robot programs

5.4 Tracking program modifications and changes of state by means of the logbook.

6. Creating and modifying programmed motions

6.1 Creating new motion commands

6.2 Creating cycle-time optimized motion (axis motion)

6.3 Exercise: Dummy program — program handling and PTP motions

6.4 Creating CP motions

6.5 Modifying motion commands

6.6 Exercise: CP motion and approximate positioning

6.7 Motion programming with external TCP

6.8 Exercise: Motion programming with external TCP

7 Using logic functions in the robot program

7.1 Introduction to logic programming

7.2 Programming wait functions

7.3 Programming simple switching functions

7.4 Programming time-distance functions

7.5 Exercise: Logic statements and switching functions

8. Working with variables

8.1 Displaying and modifying variable values

8.2 Displaying robot states

8.3 Exercise: Displaying system variables

DAY-3

9. Using technology packages

9.1 Gripper operation with KUKA Gripper Tech

9.2 Gripper programming with KUKA Gripper Tech

9.3 KUKA Gripper Tech configuration

10. Successful programming in KRL

10.1 Structure and creation of robot programs

10.2 Structuring robot programs

10.3 Linking robot programs

10.4 Exercise: Programming in KRL

11. Working with a higher-level controller

11.1 Preparation for program start from PLC

11.2 Adapting the PLC interface (Cell.src)

DAY-4

12. Structured programming

12.1 Objectives for consistent programming methodology

12.2 Tools for creating structured robot programs

12.3 Creating a program flowchart

13. Introduction to Expert level

13.1 Using Expert level

14. Variables and declarations

14.1 Data management in KRL

14.2 Working with simple data types

14.2.1 Declaration of variables

14.2.2 Initialization of variables with simple data types

14.2.3 Manipulation of variable values of simple data types with KRL

14.3 Arrays with KRL

14.4 Structures with KRL

14.5 The enumeration data type ENUM

15. Subprograms and functions

15.1 Working with local subprograms

15.2 Working with global subprograms

15.3 Transferring parameters to subprograms

15.4 Programming functions

15.5 Working with standard KUKA functions

DAY-5

16. Motion programming with KRL

16.1 Programming motions with KRL

16.2 Programming relative motions with KRL

16.3 Calculating or manipulating robot positions

16.4 Deliberate modification of Status and Turn bits

17. Working with system variables

17.1 Cycle time measurement by means of timers

18 Using program execution control functions

18.1 Programming conditional statements or branches

18.2 Programming a switch statement

18.3 Programming loops

18.3.1 Programming an endless loop

18.3.2 Programming a counting loop

18.3.3 Programming a rejecting loop

18.3.4 Programming a non-rejecting loop

18.4 Programming wait functions

18.4.1 Time-dependent wait function

18.4.2 Signal-dependent wait function

19. Switching functions with KRL

19.1 Programming simple switching functions

19.2 Programming path-related switching functions with TP

REGISTRATION

The registration for Robotics training was opened on 7th July, 2014. The registration was done with the faculty in-charge in person. The details of the registration till date (October 2016) are attached below:

DEPARTMENT	NUMBER OF STUDENT'S REGISTERED				
	B.E.	T.E	S.E.	F.E.	TOTAL
EXTC	65	116	107	14	302
ELEX	97	31	63	20	211
ELEC	17	63	28	22	130
CMPN	23	49	20	24	116
INFT	43	125	08	07	183
TOTAL	245	384	226	87	942
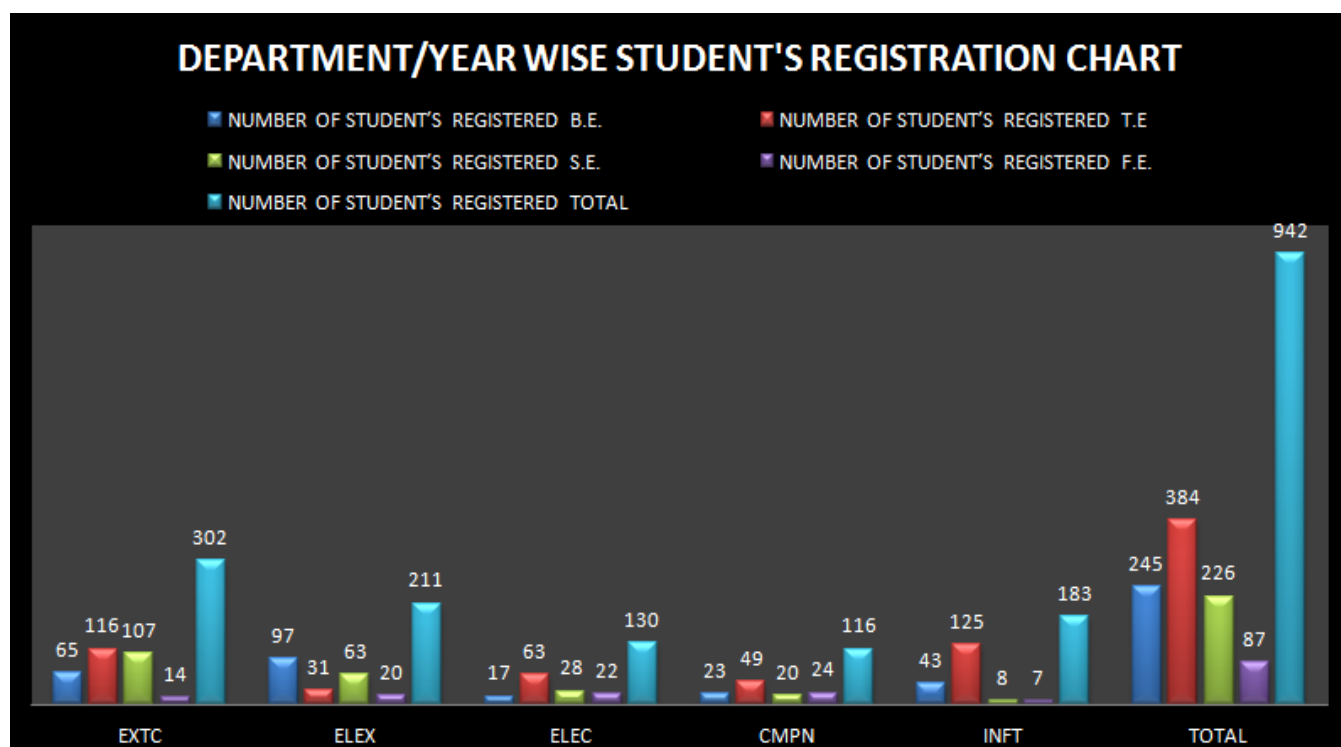
DEPARTMENT/YEAR WISE STUDENT'S REGISTRATION CHART

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COMMENCEMENT OF TRAINING

From 12/01/2016 to 07/10/2016, total 16 batches (185 Student's) have completed the 5 day training spanning all the departments. The details of students in each batch are as follows:

BATCH : 33

FACULTY INVOLVED: Prof. Bhavin Shah

DATE: 11/01/2015 To 15/01/2016

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
1.	SUDHANSHU PARKHI	ARCB3301	BE	EXTC-2	sudhanshuparkhi@gmail.com
2.	SAYUJ NAIR	ARCB3302	BE	EXTC-2	nairsayuj@gmail.com
3.	SUVEENA VIRAJ SAVE	ARCB3303	BE	CMPN	suveenasave@gmail.com
4.	SAURABH SALUNKHE	ARCB3304	BE	EXTC-2	saurabh.salunkhe17@gmail.com
5.	SAIDEEP SHIRSAT	ARCB3305	BE	EXTC-2	saideepshirsat196@gmail.com
6.	VINOD VIJAY MANDAVKAR	ARCB306	BE	EXTC-2	vnod2805@gmail.com
7.	NITESH MAHESH HANKONKAR	ARCB3307	BE	EXTC-2	niteshhankonkar@yahoo.in
8.	VIDHI PRAFUL SUVARNA	ARCB3308	BE	EXTC-2	vidhisuvarna9@gmail.com
9.	DEVEDNYA VYAS	ARCB3309	SE	ELEX	devednyavyas@gmail.com
10.	OMKAR PHADKE	ARCB3310	TE15	ELEX	omkar_phadke@yahoo.in
11.	TANAY ASH	ARCB3311	SE15	EXTC	ashtanay4@gmail.com
12.	PATEL NIKHILKUMAR	ARCB3312	BE	EXTC -2	sudhanshuparkhi@gmail.com

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BATCH : 34

FACULTY INVOLVED: Prof. Bhavin Shah

DATE: 18/01/2016 To 22/01/2016

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
13.	RUDRA JATHAR	ARCB3401	SE16	ELEX	rudrajathar@yahoo.com
14.	PRIYANK NAIR	ARCB3402	SE16	ELEX	priyankshashinair@gmail.com
15.	VINAY KESHARWANI	ARCB3403	SE16	ELEX	vinaykesharwani47@gmail.com
16.	BOMDAR BAGRA	ARCB3404	SE16	ELEX	bomdarbagra41@gmail.com
17.	ROHEET J. KHAMBE	ARCB3405	SE16	ELEX	khamberohit@gmail.com
18.	NEERAJ SINGH	ARCB3406	SE16	ELEX	neerajsingh419242@gmail.com
19.	DIVYESH PARMAR	ARCB3407	SE16	ELEX	divyeshparmar036@gmail.com
20.	SHWETA DEODATTA SANE	ARCB3408	SE16	ELEX	shweta.buddies5@gmail.com
21.	MITALEE ANANT NAGVEKAR	ARCB3409	SE16	ELEX	mitaleenagvekar97@gmail.com
22.	MRUNAL NASARE	ARCB3410	SE16	ELEX	mrunalnasare@gmail.com
23.	AMIT UPADHYAY	ARCB3411	SE16	ELEX	u.amit@rocketmail.com
24.	OMKAR SUDHIR KALE	ARCB3412	SE16	CMPN	omkarkale441@gmail.com

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BATCH : 35

FACULTY INVOLVED: Prof. Supriya Solaskar, Prof. Amruta Pokhare

DATE: 01/02/2016 To 05/02/2016

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
25.	NEHA PITHADIYA	ARCB3501	TE 15	ELEX	niharika.pithadiya@gmail.com
26.	MANISH JAIN	ARCB3502	TE15	ELEX	jainmanish6695@gmail.com
27.	RAVI DUBEY	ARCB3503	TE15	ELEX	ravidubey646@gmail.com
28.	SHIVENDRA YADAV	ARCB3504	TE15	ELEX	shivendra977@gmail.com
29.	ASHUTOSH CHIPLUNKAR	ARCB3505	TE15	ELEX	ashutoshchiplunkar@gmail.com
30.	ASHISH RAUT	ARCB3506	TE 15	ELEX	ashishraut06@gmail.com
31.	SIDDHANT GAIKWAD	ARCB3507	TE15	ELEX	sid0795.sg@gmail.com
32.	ROHIT BHARGUDE	ARCB3508	TE15	ELEX	rohitbhargude@gmail.com
33.	CHAITANYA GANGADHAR	ARCB3509	TE15	ELEX	chaitanyagangadhar32@gmail.com
34.	AKSHAY GURAV	ARCB3510	TE15	ELEX	guravakshay74@gmail.com
35.	NAMRATA RASAL	ARCB3511	TE15	ELEX	namrata.rasal97@gmail.com
36.	AKSHAY PRABHU	ARCB3512	TE 15	ELEX	akshay.prabhu4@gmail.com

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BATCH : 36

FACULTY INVOLVED: Prof. Ameya Jadhav, Prof. Supriya Awasthi

DATE: 08/02/2016 To 12/02/2016

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
37.	AMEY NARVEKAR	ARCB3601	TE16	EXTC	ameynarvekar01@gmail.com
38.	SAURABH NENE	ARCB3602	TE16	EXTC	nenesaurabh4@gmail.com
39.	DARSHAN PARAB	ARCB3603	TE16	EXTC	darshanparab7@gmail.com
40.	AKSHAY MEHTA	ARCB3604	TE16	EXTC	amakshaymehta@gmail.com
41.	TEJAS MULYE	ARCB3605	TE16	EXTC	tejas.mulye01@gmail.com
42.	AJAY JADHAV	ARCB3606	TE15	EXTC	ajayjadhav22.95@gmail.com
43.	VISHAL GUPTA	ARCB3607	TE15	EXTC	guptavishal840@gmail.com
44.	NILESH KAMTEKAR	ARCB3608	TE15	EXTC	nileshkamtekar@gmail.com
45.	AJAY CHAUHAN	ARCB3609	TE	EXTC-1	ajayc546@gmail.com
46.	NEERAJ AJIT ABHYANKAR	ARCB3610	TE	EXTC-1	neerajajitabhyankar@gmail.com
47.	RUJUL SHRINGARPURE	ARCB3611	TE15	ELEX	rujulshringarpure@gmail.com
48.	PRATIK HAWARE	ARCB3612	TE	EXTC-1	pratik.haware@yahoo.com

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BATCH : 37

FACULTY INVOLVED: Prof. Bhavin Shah

DATE: 15/02/2016 To 18/02/2016

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
49.	KARAN MALI	ARCB3701	TE	EXTC	malikaran740@gmail.com
50.	SHRADDHA OJHA	ARCB3702	TE	EXTC-1	shraddhatojha8495@gmail.com
51.	SHIVANI KULAYE	ARCB3703	TE	EXTC-1	shivanikulaye3@gmail.com
52.	CHINMAY SANE	ARCB3704	BE16	EXTC	csane26@gmail.com
53.	PRATIK BHAGWAT	ARCB3705	TE16	EXTC	pratikbhagwat4@gmail.com
54.	YOGESHWARI GOWDA	ARCB3706	SE	EXTC-1	yogeshwarigowda22@gmail.com
55.	SHRUTI BORE	ARCB3707	SE	EXTC	shru95@hotmail.com
56.	PRATHAMESH LAKHAN	ARCB3708	TE	EXTC	prathameshlakhan@gmail.com
57.	JAY CHOKSI	ARCB3709	TE16	EXTC	jayc23495@gmail.com
58.	SHWETA PARAB	ARCB3710	TE16	EXTC	parabshweta60@gmail.com
59.	TANUJA PANDA	ARCB3711	TE16	EXTC	tanujapanda112@gmail.com
60.	AKULA VENKAT NARAYANA	ARCB3712	TE16	EXTC	avenket04@gmail.com
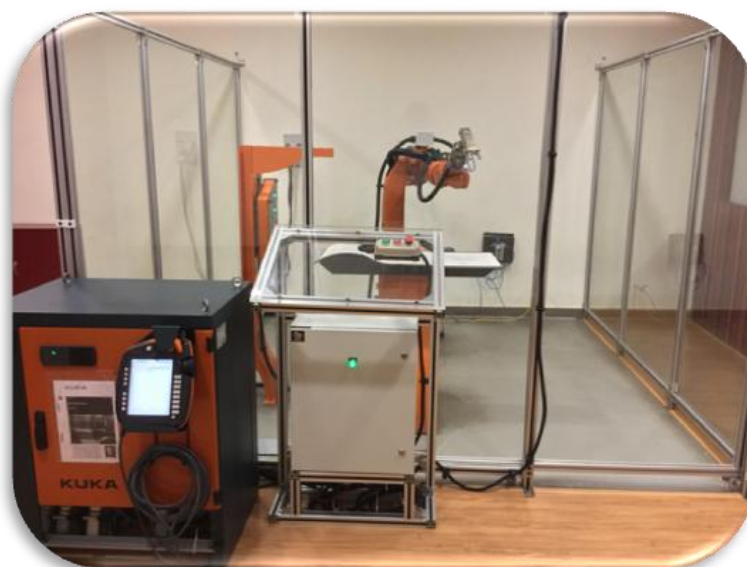
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BATCH : 38

FACULTY INVOLVED: Prof. Supriya Solaskar, Prof. Amruta Pokhare

DATE: 22/02/2016 To 26/02/2016

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
61.	MANISHA BORATE	ARCB3801	TE16	ELEC	snez.95sable@gmail.com
62.	SNEHA SABLE	ARCB3802	TE16	ELEC	rubinakhan101@ymail.com
63.	CHOUDHARY RUBINA MOBIN	ARCB3803	TE16	ELEC	kayesha.ak73@gmail.com
64.	CHOUDHARY TABASSUM MOBIN	ARCB3804	TE16	ELEC	tanikunjumon616@yahoo.com
65.	TANI KUNJUMON	ARCB3805	TE16	ELEC	namu.sankhe@gmail.com
66.	NAMRATA ASHOK SANKHE	ARCB3806	TE16	ELEC	shriyadubey2@gmail.com
67.	SHRIYA SUNIL DUBEY	ARCB3807	TE16	ELEC	minalbodke89@gmail.com
68.	MINAL BODKE	ARCB3808	TE16	ELEC	nikeetasangle987@gmail.com
69.	NIKEETA SANGLE	ARCB3809	TE16	ELEC	manishakhutade@gmail.com
70.	MANISHA KHUTADE	ARCB3810	TE16	ELEC	ishaa.doshi.7@gmail.com
71.	ISHA DOSHI	ARCB3811	TE16	ELEC	kosa.kapadia@gmail.com
72.	KOSA KAPADIA	ARCB3812	TE16	ELEC	snez.95sable@gmail.com

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BATCH : 39 (9-11am)

FACULTY INVOLVED: Prof. Supriya Mandhare, Prof. Chanda Chohan

DATE: 08/03/2016 To 11/03/2016

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
73.	SHRUTI JADHAV	ARCB3901	SE15	ELEC	shrutijadhav33322@gmail.com
74.	POOJA SAWANT	ARCB3902	SE15	ELEC	pjsawant1@gmail.com
75.	VIJETHA JOGU	ARCB3903	SE15	ELEC	vijetajogu@gmail.com
76.	SANIYA VICHARE	ARCB3904	SE15	ELEC	saniyavichare7@gmail.com
77.	SHIKHA SINGH	ARCB3905	SE15	ELEC	shikha19611@gmail.com
78.	PUJA NALAWADE	ARCB3906	SE15	ELEC	pujanalawade1996@gmail.com
79.	ISHANI ENGINEER	ARCB3907	SE15	ELEC	ishaengineer@yahoo.co.in
80.	ANKET NARKAR	ARCB3908	SE15	ELEC	anketnarkar33@gmail.com
81.	KARAN KANNUMAL	ARCB3909	SE15	ELEC	karankannumal1996@gmail.com
82.	VAIBHAV DABHOLKAR	ARCB3910	SE15	ELEC	vaibhavdabholkarv27@gmail.com
83.	SAGAR KANTELIYA	ARCB3911	SE16	ELEC	sagarkateliya@gmail.com
84.	JHA ABHAY	ARCB3912	SE15	ELEC	jhaabhay655@gmail.com

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BATCH : 40 (12-2 pm)

FACULTY INVOLVED: Prof. Bhavin Shah

DATE: 08/03/2016 To 11/03/2016

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
85.	ABHISHEK SINGH	ARCB4001	TE16	ELEX	SinghAbhi2495@gmail.com
86.	CHAYANGI SARANG	ARCB4002	TE16	ELEX	chayangiisarang@gmail.com
87.	AKSHAY BELOSE	ARCB4003	TE16	ELEX	akky201294belose@gmail.com
88.	ASEEM KARANDIKAR	ARCB4004	TE16	ELEX	karandikaraseem@gmail.com
89.	ROHIT PETKAR	ARCB4005	TE16	ELEX	rohitpetkar.r@gmail.com
90.	ROHIT JADHAV	ARCB4006	TE16	EXTC	rohit12ja@gmail.com
91.	VIRAJ KARALAY	ARCB4007	TE16	ELEX	karaleviraj18@gmail.com
92.	VIJIT BHOSLE	ARCB4008	TE16	ELEX	vijit13bhosle@gmail.com

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BATCH : 41 (3-5 pm)

FACULTY INVOLVED: Prof. Ameya Jadhav, Prof. Supriya Awasthi

DATE: 08/03/2016 To 11/03/2016

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
93.	NIKITA SINGH	ARCB4101	SE16	ELEX	nikitassingh110@gmail.com
94.	SHWETA JADHAV	ARCB4102	SE16	ELEX	shwetajadhav18496@gmail.com
95.	MEGHA MANE	ARCB4103	SE16	ELEX	meghamane4497@gmail.com
96.	SNEHA MUNDALE	ARCB4104	SE 16	ELEX	sneha.mundle@gmail.com
97.	BHUMIKA GOR	ARCB4105	SE16	ELEX	bhumika.gor95@gmail.com
98.	ANJALI LOKE	ARCB4106	SE16	ELEX	anjali.loke@yahoo.in
99.	LAXMI BAUDH	ARCB4107	SE16	ELEX	laxmibaudh93@gmail.com
100.	GAYATRI GUPTA	ARCB4108	SE16	ELEX	gayatrigupta672@gmail.com

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BATCH : 42 (1-3 pm)

FACULTY INVOLVED: Prof. Bhavin Shah

DATE: 18/07/2016 To 22/07/2016

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
101.	SUYOG BHANDARI	ARCB4201	TE15	ELEC	suyogbhandari16@yahoo.com
102.	SHOEB S SHAIKH	ARCB4202	TE15	ELEC	shoeb.shaikh000@yahoo.com
103.	ANMOL PADWAL	ARCB4203	TE15	ELEC	anmolpadwal24@gmail.com
104.	MOHIT FULPAGARE	ARCB4204	TE15	ELEC	mohitfulpagare@gmail.com
105.	JAI DAMANIA	ARCB4205	TE15	ELEC	jaidamania5@gmail.com
106.	GANESH VIDHATE	ARCB4206	TE15	ELEC	ganeshvidhate795@gmail.com
107.	VAIBHAV GAJBIYE	ARCB4207	TE16	ELEC	vaibspy@rediffmail.com
108.	BHAVESH SHINDE	ARCB4208	BE16	ELEC	bhaveshthecreator@gmail.com
109.	HARDIK SAVE	ARCB4209	BE16	ELEC	hardik.save786@gmail.com
110.	PRADIP YADAV	ARCB4210	TE15	ELEC	pradipnyadav@gmail.com
111.	RUSHIKESH AWAD	ARCB4211	TE15	ELEC	rushikeshawad504@gmail.com
112.	PRAMOD SHUKLA	ARCB4212	TE16	ELEC	pramodshukla136@gmail.com

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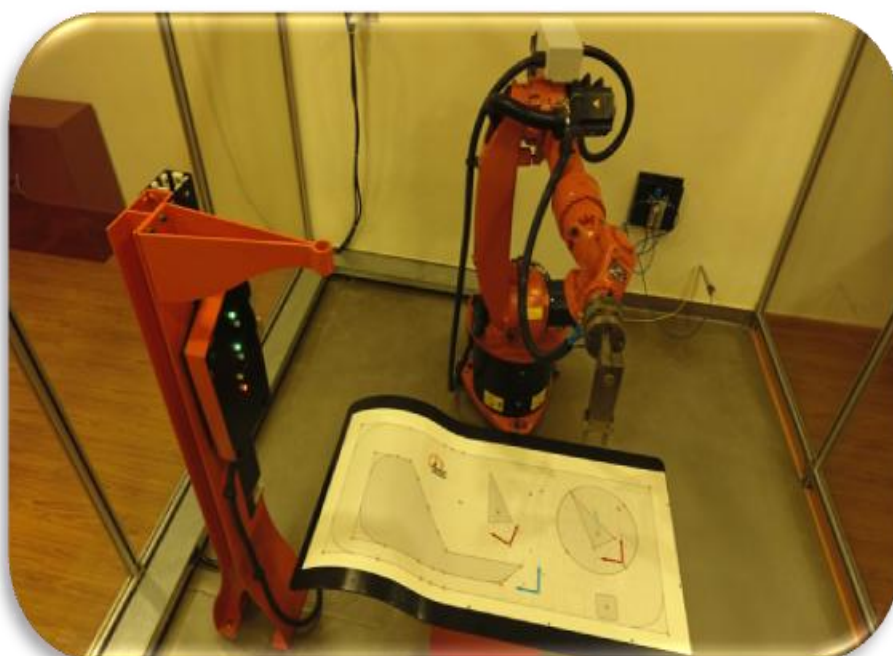
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BATCH : 43 (1-3 pm)

FACULTY INVOLVED: Prof. Ameya Jadhav, Prof. Amruta Pokhare

DATE: 25/07/2016 To 29/07/2016

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
113.	KIRAN KAMBLE	ARCB4301	BE16	ELEC	kikikamble@gmail.com
114.	PRIYANKA V RANE	ARCB4302	BE16	ELEC	priyankaranevjti@gmail.com
115.	AISHWARYA KHANDEKAR	ARCB4303	BE16	ELEC	aashukhandekar11@gmail.com
116.	MEENAKSHI BASVANKAR	ARCB4304	BE16	ELEC	basumeenakshi1994@gmail.com
117.	ALFARIN SAYED	ARCB4305	BE16	ELEC	farinsayed08@gmail.com
118.	MAYURI BHALERAO	ARCB4306	BE16	ELEC	mayuribhalerao789@gmail.com
119.	SHYAM MORZARIA	ARCB4307	BE16	ELEC	morzariashyam96@gmail.com
120.	AJINKYA MANDAVKAR	ARCB4308	BE16	ELEC	ajinkyamandavkar@gmail.com
121.	SHREYAS SURVE	ARCB4309	BE16	ELEC	surve_shreyas@yahoo.com
122.	GAURAV RASAL	ARCB4310	BE16	ELEC	gauravrasal436@gmail.com
123.	UTTEJ DEVADIGA	ARCB4311	BE16	ELEC	uttejdevadiga@gmail.com
124.	VIPULA TIPPA	ARCB4312	BE15	ELEC	vipula.tippa@gmail.com

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BATCH : 44 (3-5 pm)

FACULTY INVOLVED: Prof. Supriya Mandhare, Prof. Chanda Chohan

DATE: 01/08/2016 To 05/08/2016

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
125.	SUPRIYA CHETAN RATHOD	ARCB4401	TE16	EXTC	rathodsupriya20@gmail.com
126.	SWEETI DILIP RANE	ARCB4402	TE16	EXTC	ranesweeti2312@gmaail.com
127.	PRIYANKA POTE	ARCB4403	TE16	EXTC	priyap0808@gmail.com
128.	SHASHANK PARKAR	ARCB4404	TE16	EXTC	3sparkar@gmail.com
129.	VAIBHAV PARADKAR	ARCB4405	TE16	EXTC	vaibhavparadkar3@gmail.com
130.	ANKIT PATIL	ARCB4406	TE16	EXTC	ankitjai800@gmail.com
131.	DEEPAK THAMBI	ARCB4407	TE16	EXTC	deepakvinodthambi@gmail.com
132.	DEVASHISH PANCHAL	ARCB4408	TE16	EXTC	Panchal.devashish@gmail.com
133.	PRANAY SHAH	ARCB4409	TE16	EXTC	pranay121096@gmail.com
134.	OMKAR D. PATIL.	ARCB4410	TE16	EXTC	opatil06@gmail.com
135.	SANKET PANCHAL	ARCB4411	TE16	EXTC	sanketpanchal35@gmail.com
136.	AKSHAR PARMAR	ARCB4412	TE 16	EXTC	akshar9992@gmail.com

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BATCH : 45 (3-5 pm)

FACULTY INVOLVED: Prof. Bhavin Shah, Prof. Aparna Kadam

DATE: 08/08/2016 To 12/08/2016

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
137.	SANTOSH GAIKWAD	ARCB4501	TE16	EXTC	sg04051997@gmail.com
138.	DEVENDRASINGH JHALA	ARCB4502	TE16	EXTC	devendrajhala111@gmail.com
139.	ABHISHEK KANERKAR	ARCB4503	TE16	EXTC	abhikanerkar@gmail.com
140.	ARUNKUMAR DUBEY	ARCB4504	TE16	EXTC	dubeyarunkumar24@gmail.com
141.	NIYAZ JAMADAR	ARCB4505	TE16	EXTC	niyazjamadar786@gmail.com
142.	GEET JAGUSTE	ARCB4506	TE16	EXTC	geet.jaguste15@gmail.com
143.	TEJAS ABHANGE	ARCB4507	TE16	EXTC	tejas_abhange@yahoo.com
144.	YOGESH MERGU	ARCB4508	TE16	EXTC	yogeshmergu@gmail.com
145.	VINAYAK .R. KANADE	ARCB4509	TE16	EXTC	vinayakkanade852@gmail.com
146.	NIRAJ GUPTA PHULCHAND	ARCB4510	TE16	EXTC	nirajjguptaa753@gmail.com
147.	NIKHIL S. AHIRE	ARCB4511	TE16	EXTC	ahire.rnikhil04@gmail.com
148.	ADITYA R. DEVASKAR	ARCB4512	TE16	EXTC	adidevaskar26@gmail.com

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BATCH : 46 (3-5 pm)

FACULTY INVOLVED: Prof. Bhavin Shah

DATE: 29/08/2016 To 02/09/2016

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
149.	PAWAN RATHOD	ARCB4601	BE16	CMPN	pawanrathod519@gmail.com
150.	ANKIT VARTAK	ARCB4602	BE16	CMPN	ankitvartak317@gmail.com
151.	SAYALI WADE	ARCB4603	BE16	CMPN	sayali1157@gmail.com
152.	APURVA PARULEKAR	ARCB4604	TE16	CMPN	parulekarapu@gmail.com
153.	VIDYA GHADI	ARCB4605	TE16	CMPN	vidyaghadi10@gmail.com
154.	VINAYSHRI NAIK	ARCB4606	TE16	CMPN	vinny20.naik@gmail.com
155.	BABLU PATEL	ARCB4607	TE16	CMPN	pbablu.patel@gmail.com
156.	KARISHMA CHOGALE	ARCB4608	TE16	CMPN	karishmachogale15@gmail.com
157.	PRATHAMESH JADHAV	ARCB4609	TE16	CMPN	prathameshjadhav1522@gmail.com
158.	NAYAN NAIK	ARCB4610	TE16	CMPN	naiknayan1296@gmail.com
159.	CHANDRASHEKHR BHOSALE	ARCB4611	TE16	CMPN	srksmith60@gmail.com
160.	PRADEEP MAURYA	ARCB4612	SE16	CMPN	pradeepmaurya2210@gmail.com

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BATCH : 47 (3-5 pm)

FACULTY INVOLVED: Prof. Bhavin Shah

DATE: 19/09/2016 To 23/09/2016

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
161.	ROHAN AHIRE	ARCB4701	BE16	EXTC	rohanahire786@gmail.com
162.	KOMAL SALGAONKAR	ARCB4702	BE16-17	EXTC	ksalgaonkar11@gmail.com
163.	AMRUTA TARAL	ARCB4703	BE16-17	EXTC	taral.amruta612@gmail.com
164.	KEDAR CHITRAKATHI	ARCB4704	BE16-17	EXTC	kedarchitrakathi290@gmail.com
165.	PRASHANT TIRLOTKAR	ARCB4705	BE16-17	EXTC	pptpptms@gmail.com
166.	SONAL DIVEKAR	ARCB4706	BE16-17	EXTC	sonaldivekar4@gmail.com
167.	SNEHAL AKHADE	ARCB4707	BE16-17	EXTC	akhadesnehal08@gmail.com
168.	MAYURI NIKALJE	ARCB4708	BE16-17	EXTC	mayurinikalje@yahoo.com
169.	ADITYA DIVEKAR	ARCB4709	TE 16	EXTC	adityadivekar786@gmail.com
170.	MAHESH JALA	ARCB4710	TE16-17	EXTC	mahesh2661@gmail.com
171.	SHUBHAM KAPATE	ARCB4711	BE16-17	EXTC	shubhamkapate@gmail.com
172.	ANIKET KHAMKAR	ARCB4712	TE16	EXTC	a.khamkar26@gmail.com

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BATCH : 48 (3-5 pm)

FACULTY INVOLVED: Prof. Supriya Mandhare, Prof. Chanda Chohan, Prof. Suvarna Pansambal

DATE: 03/10/2016 To 07/10/2016

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
173.	RANI R. ROKADE	ARCB4801	TE 16-17	EXTC	rokaderani12@gmail.com
174.	SWETA TANDEL	ARCB4802	TE 16-17	EXTC	swetatandel291996@gmail.com
175.	PRIYANKA SALE	ARCB4803	TE 16-17	EXTC	priyankasalee@gmail.com
176.	AISHWARYA NEMADE	ARCB4804	TE 16-17	EXTC	aishwaryanemade9@gmail.com
177.	SHREYASH NAIK	ARCB4805	TE 16-17	EXTC	shreyashnaik53@gmail.com
178.	SURAJ MHASKE	ARCB4806	TE 16-17	EXTC	smhaske02@gmail.com
179.	SHUBHAM SHINDE	ARCB4807	TE 16-17	EXTC	shubham.shinde321@gmail.com
180.	SUYOG TALEKAR	ARCB4808	TE 16-17	EXTC	suyogtalekar09@gmail.com
181.	VAISHNAVI HAJARE	ARCB4809	TE16	EXTC	vaishnavihajare96@gmail.com
182.	SNEHAL GAWDE	ARCB4810	TE16	EXTC	snehalgawde1997@gmail.com
183.	ANJALI BAGDE	ARCB4811	TE16	EXTC	anjalibagade11@yahoo.com
184.	DHANASHREE HIRAVE	ARCB4812	TE16	EXTC	hiravedhanashree04@gmail.com
185.	EKTA PATEL	ARCB4813	BE16-17	INFT	epatel98.ep@gmail.com

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ASSESSMENT

On the fifth day (last day) of the training, an assessment is done to evaluate the understanding of the students who underwent the training.

Question Format: 25 Multiple Choice Questions

Duration: 30 Minutes

Questions Pattern: Multiple Choice Questions covering entire syllabus.

DEPARTMENT	NUMBER OF STUDENT'S COMPLETED TRAINING				
	B.E.	T.E	S.E.	F.E.	TOTAL
EXTC	18	60	3	0	81
ELEX	0	19	20	0	39
ELEC	14	21	12	0	47
CMPN	4	8	2	0	14
INFT	1	0	0	0	1
TOTAL	37	108	37	0	182

DEPARTMENT/YEAR WISE STUDENT'S COMPLETED TRAINING CHART

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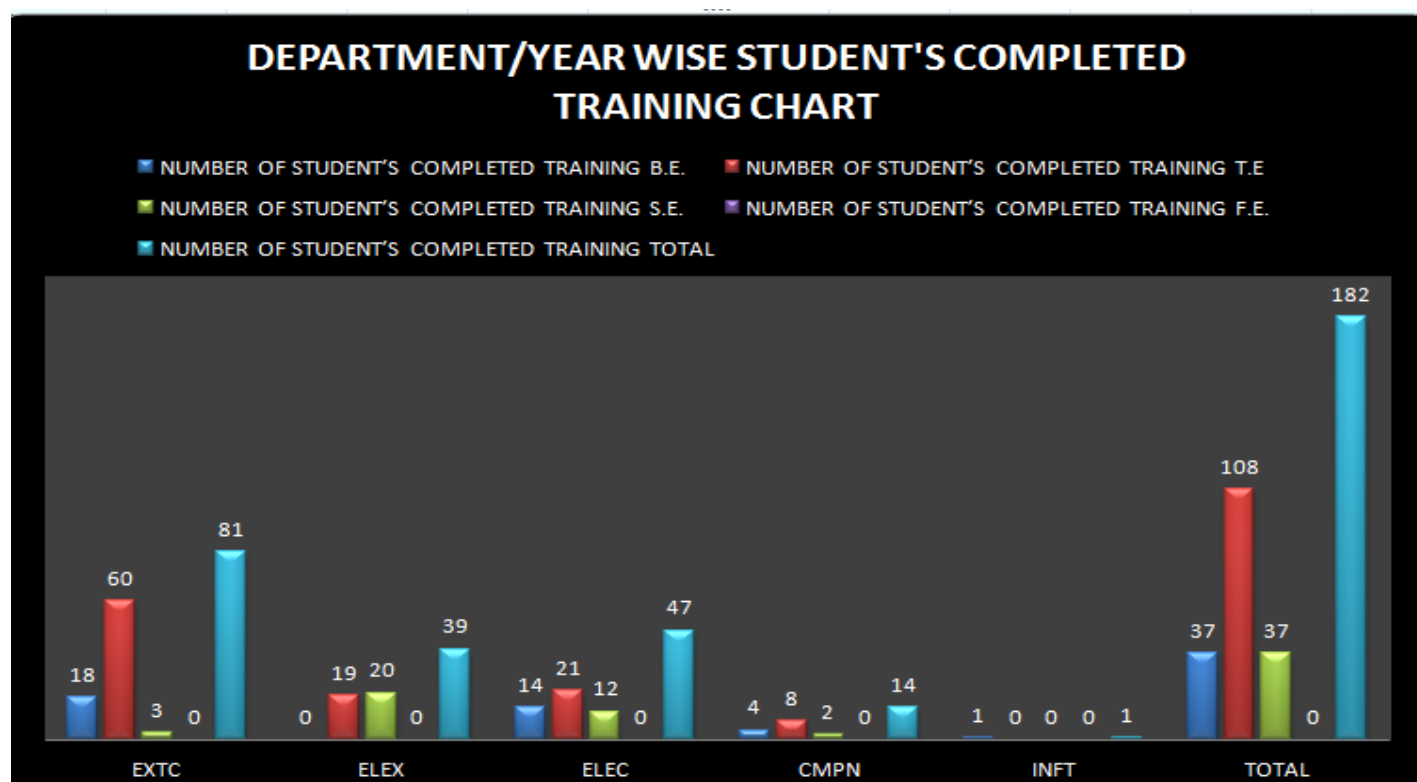
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ASTESSMENT PAPER

Q.1 Which icon represents the base coordinate system?

a)   b)   c)   d)

Q.2) What is the name of the velocity setting for jog mode?

a) Jogging   b) velocity override   c) Jog override   d) Program override

Q.3) Assigning reference value to every axis is the process called-----

a) Positioning   b) Base calibration   c) Tool calibration   d) Mastering

Q.4) The robot model we are using is--------

a) KR 4   b) KR 6   c) KR 2   d) KR 16

Q.5) Default coordinate system of the robot is?

a) Flange   b) World   c) Base   d) Robroot

Q.6) Encoder data is stored at………

a) KRC box   b) White box   c) Robot box   d) Black box

Q.7)TCP indicates

a) Distance between flange and tool

b)Tool control point
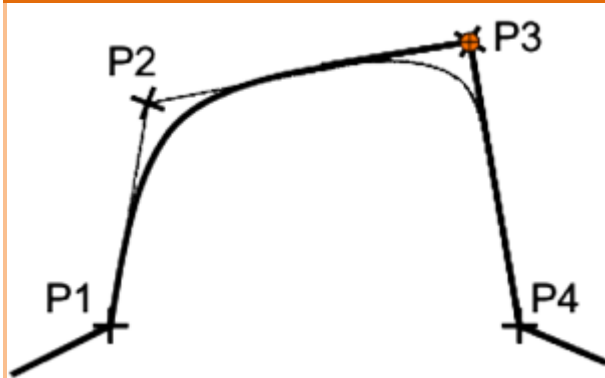
c) Tool calibration point

d) None of the above

Q.8) The leading axis takes………. Path.

a) Shortest   b) Longest   c) Fastest   d) Smallest

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Q.9) Maximum speed of robot in T2 Mode is:

a) 250 mm/s   b) 280mm/s   c)2 m/s   d) None

Q.10) When is the out command executed?

LIN P1 CONT Vel=0.2 m/s CPDAT1
LIN P2 CONT Vel=0.2 m/s CPDAT2
LIN P3 CONT Vel=0.2 m/s CPDAT3
OUT 5 'rob_ready' State=TRUE CONT
LIN P4 Vel=0.2 m/s CPDAT4

a) after P1   b) after P2   c) after P3   d) after P4

Q.11) Tool calibration is carried out with respect to ………… co-ordinate system

a) BaTE   b) Tool   c) Flange   d) World

Q.12) The language uTEd to program the robot is:

a) KCL   b) KRL   c)C   d)KCP

Q.13) PTP motion gives

a) Shortest time   b) shortest path   c) Longest time   d) Can't say

Q.14) Payload of the robot is:

a) 16 kg   b) 32 kg   c) 38 kg   d) 49kg

Q.15) When A4 , A5 & A6 axis are in same line that is………… Singularity

a) α1   b) α2   c)α4   d) α5

Q.16) The tool uTEd to rotate motors mechanically is called

a) EMD   b) Rachit   c) plier   d) All of the above

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Q.17) Which are the emergency stops are available?

a) Smart pad   b) External Panel   c) fence door stop   d) All of the above

Q.18) Which are the different modes of running kuka robot?

a) TI   b) T2   c) AUT &EXT   d) All of the above

Q.19)What is EMD?

a) Electronic Mastering Device   b) Electro Mechanical Door   c) Electronic Measuring Device   d) None of the above

Q.20)What is KPP?

a) Kuka Power Point b) Kuka Power Plug   c) Kuka Power Pack   d) All of the above

Q.21) In ……………… singularity, center point of A5 is located vertically above axis A1.

a) Extended position   b) Wrist axis   c) overhead   d) α2

Q.22) ……………… message provide information for correct operator control of the robot.

a) Status   b) Notification   c) Acknowledgement   d) wait

Q.23) ……………… means generation of coordinate system which has its origin in a reference point of the tool .

a) Tool coordinate   b) base calibraton   c) TCP   d) All of the above

Q.24) All motions are possible using space mouTE.

a) True   b) False   c) Not always d) can't say

Q.25) The motion of the robot is limited in axis-specific jogging by means of the maximum positive & negative values is called ………………..

a) Software limit switches   b) mechanical stoppers   c) axis boundaries   d) all

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FEEDBACK FORM

STUDENT FEEDBACK FORM
"BASICS OF ROBOT PROGRAMMING ON KUKA KR 16-2 C4 ROBOT"

TRAINER:_____BATCH:_____ DATE:_____

STUDENT NAME_____ YEAR _____ BRANCH _____ROLL NOS._____

SR. NOS.	CONTENTS	EXCELLENT	GOOD	SATISFACTORY	UNSATISFACTORY
1.	Lab Environment				
2.	Relevance Of Contents				
3.	Faculty Interaction				
4.	Presentation				
5.	Practical sessions				
6.	Programming Skills				
7.	Student's Practice session				
8.	Knowledge Gained				
9.	Industry Relevant Knowledge				
10.	How Was The Overall Training				
11.	Give your specific views on Robotics Training				
12.	What value addition you have achieved from this training				
13.	Specific suggestions you would like to implement by management				

_____
Student's Signature

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ENROLMENT NUMBER

➢ Each student is assigned an Enrolment number in the format ARC-<Batch Number>/ <Serial Number> (making it Self-descriptive).

➢ It expands to Atharva Robotics Center Batch -<Batch Number> <Serial Number> For Eg., ARCB0101 means the student is from Batch 1 and his/her Serial number is 01

CERTIFICATE

The certificates were decided to be given away as soft copy to those students who attended the training,

provided they:

➢ Have 10 hours of attendance
➢ Have passed the final assessment with a minimum of 40% of total marks.

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CERTIFICATE OF COMPLETION

THIS IS TO CERTIFY THAT Mr./Ms. XXXXXXXXXXX
HAS SUCCESSFULLY COMPLETED

"BASICS OF ROBOT PROGRAMMING ON

KUKA KR 16-2 C4 ROBOT"

PERIOD FROM XXXXXX TO XXXXXX

HELD BY PROF.XXXXXXXXXXXX, PROF.XXXXXXXXXXXX

ENROLLMENT NO.: ARCBxxxxx

PROF. BHAVIN SHAH   DR. S.P.KALLURKAR
CO-ORDINATOR   PRINCIPAL
ATHARVA COLLEGE OF ENGINEERING, MALAD - MARVE ROAD, CHARKOP NAKA, MALAD [WEST], MUMBAI-400095

CERTIFICATE SAMPLE COPY

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ATHARVA ROBOTICS CENTER NEWSPAPER ARTICLES

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MUMBAI, WEDNESDAY, JUNE 17, 2015. 04 PAGES www.hindustantimes.com

IDC DESIGN SHOW >P02   MOOC: SONG-WRITING >P04   APPLY A FIV

Innovations in technology at Atharva

GOING DIGITAL The Atharva College of Engineering houses a fully functional robot and an iMac lab, with plans for an IT park

Founded in 1998, by educationist and social entrepreneur Sunil Rane, the Atharva Group of Institutes was set up to fulfill a vision of creating a world-class educational environment that allows students to develop their professional abilities and foster a strong sense of responsibility and ethics.

Today, Atharva is established among Mumbai's leading institutes of higher education. Located in the northern suburbs, at the Atharva Education Complex in Malad, the Group stands among the preferred institutes in the fields of engineering, IT, hospitality, fashion and business management and offers a range of graduate and post-graduate programmes. The Atharva College of Engineering is the second centre in India and the first in Maharashtra to offer technical education in robotics

The hallmark traits of an Atharva student are balancing skill sets with key strengths and doing it with a winner's attitude, which makes all the difference.

The Atharva College of Engineering is AICTE-approved, affiliated to the University of Mumbai and to the state's Directorate of Technical Education.

It is also ISO 9001 certified, focusing on promoting innovation in technology.

The Atharva College of Engineering was established in 1999 and houses a fully operational factory-capacity Kuka robot within its premises to train the students on advanced factory automation technology.

The Atharva robotics centre provides realistic, theoretical and practical training on KUKA KR 16-2 C4 robots.

> THE ATHARVA INSTITUTE IS IN TALKS WITH NASA AND ISRO TO PROVIDE SATELLITE TRACKING SUPPORT FROM INDIA. WE ALSO HAVE ADVANCED GROUND AND TRACKING SYSTEM FOR SATELLITES.
> SUNIL RANE, executive president, Atharva Group of Institutes

TECH TONIC

- The institute facility also has an advanced ground station and tracking system for satellites, which currently tracks the Indian Institute of Technology (IIT) satellite. The Institute is in talks with NASA and ISRO to provide satellite tracking support from India.

- Besides this, the institute offers polycom systems for virtual class room facilities via optical fibers along with wi-fi connectivity supported by a 30 Mbps leased line, which is the highest bandwidth connectivity. IUCEE (Indo US Collaboration for Engineering Education), a pool of the world's 100 top professors and scientists connect with Atharva for virtual activities

- An upcoming Atharva IT Park will be dedicated exclusively to final-year BE students carrying out IT research and development projects with international IT giants. It is expected to be ready by the end of 2015.

www.atharvaeducation.com
ww.atharvamumbai.com

A state-of the-art iMac laboratory at Atharva consists of iMacs, an iPad and an Apple TV device, and aims to equip young graduates in various domains that drive the innovative digital world, including mobile computing, multimedia, cloud computing etc. This laboratory enables students to become accustomed to various versatile applications of Mac and iOS, important to know to meet industry standards.

- The Atharva Educational Complex building.
- The robotics centre provides realistic training.
- The iMac lab equips graduates to experiment with applications.

ARTICLE IN HINDUSTAN TIMES NEWSPAPER DATED 17TH JUNE,2015

ATHARVA ROBOTICS CENTER

ATHARVA COLLEGE OF ENGINEERING, MALAD-MARVE ROAD, CHARKOP NAKA, MALAD (WEST), MUMBAI-400095

अथर्व कॉलेज ऑफ इंजिनीअरिंगमध्ये अत्याधुनिक साहित्यासह सुसज्जित असं इंडस्ट्रिअल रोबोटिक्स सेंटर उभारलं आहे. अशाप्रकारचं ट्रेनिंग सेंटर उभारणारं हे महाराष्ट्रातलं एक महत्त्वाचं कॉलेज ठरलंय. या ट्रेनिंग सेंटरमध्ये भारतातील इंडस्ट्रिअल रोबोटिक्समधील अॅडव्हान्स ऑटोमेटेड मॅन्युफॅक्चरिंग शिकण्यासाठी विद्यार्थ्यांना प्रोत्साहन दिलं जातं.

रोबोटिक्स सेंटरचे दोन भाग केले आहेत. एका भागात प्रत्यक्ष रोबोटवर ट्रेनिंग दिलं जातं. तर दुसऱ्या भागात सिम्युलेटर लॅब आहे. कॉलेजच्या वेळातच विद्यार्थ्यांना इथं ट्रेनिंग दिलं जातं. ते पूर्ण झाल्यानंतर त्यावर परीक्षाही घेतली जाते. या परीक्षेसाठी सेंटरकडूनच साहित्य पुरवलं जातं. आतापर्यंत जवळपास ३०० विद्यार्थ्यांनी इथे प्रशिक्षण घेतलं आहे.

रोबोटिक्स ट्रेनिंग सेंटरची वैशिष्ट्यं ट्रेनिंगसाठी शुल्क आकारलं जात नाही. शिवाय सेंटरने घेतलेल्या परीक्षेत पास झाल्यावर रोबोटिक्स सेंटरतर्फे सर्टिफिकेटही दिलं जातं.

कुकाकेआर १६-२-सी४ हा रोबो इथे सुसज्जित उपकरणांसह वापरायला मिळतो.

सिम्युलेटर लॅबमध्ये रोबोटिक्स इंडस्ट्रीतल्या नवनवीन आणि अपडेटेड सॉफ्टवेअरसंचा, सिम्प्रो आणि ऑफिस लाइटचा वापर होतो.

या ट्रेनिंग सेंटरमध्ये विद्यार्थ्यांना व्यावहारिक आणि प्रात्यक्षिक ज्ञान दिलं जातं.

▶ मयूर परदेशी,
कॉलेज क्लब रिपोर्टर

अथर्व कॉलेजमध्ये रोबोटिक्सची धम्माल

ARTICLE IN MAHARASHTRA TIMES SUPPLEMENT MUMBAI TIMES NEWSPAPER DATED 12TH AUGUST, 2015

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ATHARVA ROBOTICS CENTER PRESS NOTE

ATHARVA ROBOTICS CENTER

➢ Atharva College Of Engineering has set up Industrial Robotics Training Center for Educational Institutions at ACE, Malad(West), Mumbai.

➢ ACE's Robotics Training Center is India's Second & Maharashtra's First industrial Training center in the Engineering colleges.

➢ ACE has set up Robotics Center in order to train students/industry professionals in Advanced Automated Manufacturing & produce highly skilled technical manpower in the field of Industrial Robotics. The trained manpower will help Indian manufacturing Industry to adopt latest technologies to improve quality & work.

KEY FEATURES OF ATHARVA ROBOTICS CENTER

➢ The center is equipped with standard training cell comprising of KUKA KR 16-2 C4 Industrial Robot with required auxiliary equipments.

➢ The training cell is capable of performing multitude of operations used by the automobile & other manufacturing/production industries.

➢ Simulation Lab is also being established with latest industrial robotics simulation software's like Simpro & Officelite used to design, develop & simulate robotics operation for different manufacturing establishments.

➢ Atharva Robotics center provides realistic, theoretical & practical training on KUKA KR 16-2 C4 Robot.

➢ This highly equipped Robotics Center will be a Milestone in the field of education & will boom the placement opportunities for student's as well as industry trainers/technicians.

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FUTURE PLANS

- **Training**: The training program targets to <u>cover a minimum of 150 students</u> for year 2017.
- **Course**: The next stage is to Start <u>Advanced Training Program</u>, where students get an exploration to in depth programming <u>concepts on KRL Language</u>. Also work on expanding robotics center towards service robot platform is in progress.
- **Projects:** Final Year B.E. Projects are focused on Robotics & Robotic Arm Prototype.
- **STTP:** An ISTE sponsored STTP shall be proposed.
- **Industry/Education Sector:** Approach towards attraction of Industry Professionals & other education Sectors are targeted for training on Robotics subject to feasibility.

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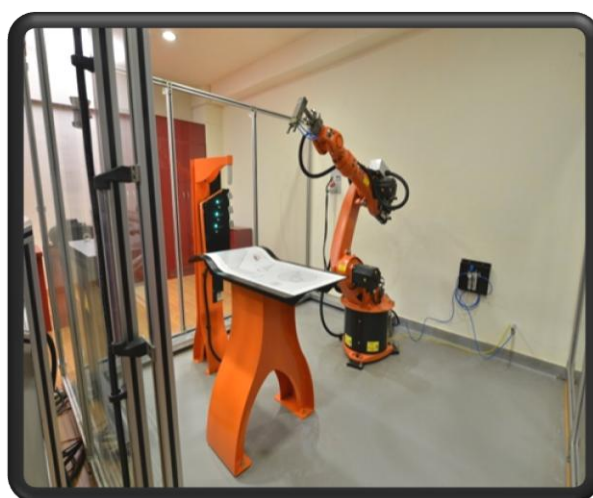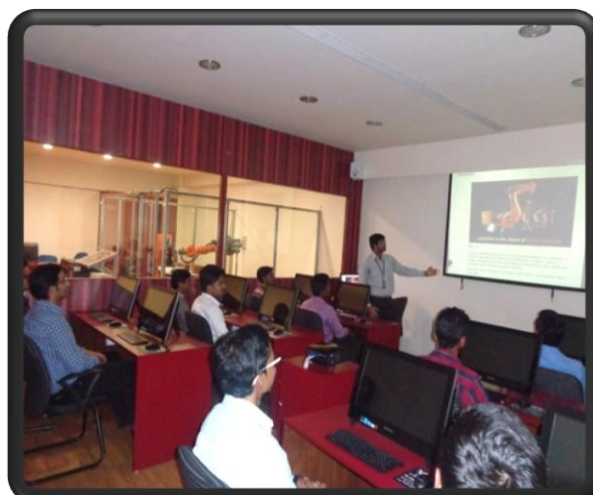### EXCELLENCE REDEFINED…

ATHARVA ROBOTICS CENTER

A REPORT

(JANUARY 2015 - DECEMBER 2015)

- PROF. BHAVIN SHAH

ATHARVA ROBOTICS CENTER

ATHARVA COLLEGE OF ENGINEERING, MALAD-MARVE ROAD, CHARKOP NAKA, MALAD (WEST), MUMBAI-400095

INTRODUCTION

ACE's Robotics Training Center is India's Second & Maharashtra's First Industrial Training Center in the Engineering colleges. ACE has set up Robotics Center in order to train students/industry professionals in Advanced Automated Manufacturing & produce highly skilled technical manpower in the field of Industrial Robotics. The trained manpower will help Indian manufacturing Industry to adopt latest technologies to improve quality & work. The center is equipped with standard training cell comprising of "KUKA KR 16-2 C4" Industrial Robot with required auxiliary equipments.

The training cell is capable of performing multitude of operations used by the automobile & other manufacturing/production industries. Simulation Lab is also being established with latest industrial robotics simulation software's like Simpro & Officelite used to design, develop & simulate robotics operation for different manufacturing establishments. Atharva Robotics center provides realistic, theoretical & practical training on KUKA KR 16-2 C4 Robot. This highly equipped Robotics Center will be a Milestone in the field of education & will boom the placement opportunities for student's as well as industry trainers/technicians.

On 14ᵗʰ July, 2014, a meeting was conducted for all Robotics Center Team Members along with faculty coordinators to plan and organize the weekly Robotics training program for the benefit of all the students of the college. Under the guidance of Dr. S.P. Kallurkar sir, plan was made to open the Robotics Center for a five day training program for all the students of the college, in batches based on the enrolment.

The training was decided to be of 5 days on "Basics Of Robot Programming On Kuka KR 16-2 C4 Robot". The five day program mainly concentrates on how to operate the robot & basic programming of robot. The Student's training is focused on practical real time application of the robot & giving an opportunity to the student's to make their program & run under the supervision of trainer. The training program was designed to boom the placement opportunities for the student's.

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ATHARVA ROBOTICS CENTER CORE TEAM MEMBERS

SR. No.	NAME	Department
1.	PROF. BHAVIN SHAH	EXTC
2.	PROF. SAMUEL JACOB	ELEX
3.	PROF. JYOTI KOLAP	EXTC
4.	PROF. PRAGYA JAIN	ELEC
5.	PROF. SACHIN GAVHANE	INFT
6.	PROF. SNIGDHA WASNIK	INFT
7.	PROF. SUVARNA PANSAMBAL	CMPN
8.	PROF. APARNA KADAM	EXTC
9.	MR. MITHILESH THAKUR	EXTC
10.	PROF. JYOTHI ARUN	INFT
11.	PROF. SWATI SISHUPAL*	INFT
12.	PROF. KUNDAN NEVE*	ELEC
13.	PROF. CHANDA CHOHAN	INFT
14.	PROF. SUPRIYA SOLASKAR	INFT
15.	PROF. SUPRIYA MANDHARE	INFT
16.	PROF. SUPRIYA AWASTHI	ELEC
17.	PROF. PRIYANKA SHARMA	ELEC
18.	PROF. AMRUTA POKHARE	INFT
19.	PROF. AMEYA JADHAV	ELEX
20.	PROF. AMRUTA GULALKARI*	ELEX

Note: (*) Left the college.

(13-20) New Team Members.

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COURSE CONTENTS

DAY-1

1. Structure and function of a KUKA robot system

1.1 Introduction to robotics

1.2 Robot arm of a KUKA robot

1.3 KR C4 robot controller

1.4 The KUKA smart PAD

1.5 Overview of smart PAD

1.6 Robot programming

1.7 Robot safety

2. Moving the robot

2.1 Reading and interpreting robot controller messages

2.2 Selecting and setting the operating mode

2.3 Moving individual robot axes

2.4 Coordinate systems in conjunction with robots

2.5 Moving the robot in the world coordinate system

2.6 Moving the robot in the tool coordinate system

2.7 Moving the robot in the base coordinate system

2.8 Exercise: Operator control and jogging

2.9 Jogging with a fixed tool

2.10 Exercise: Jogging with a fixed tool

3. Starting up the robot

3.1 Mastering principle

3.2 Mastering the robot

3.3 Exercise: Robot mastering

3.4 Loads on the robot

3.4.1 Tool load data

3.4.2 Supplementary loads on the robot

3.5 Tool calibration

3.6 Exercise: Tool calibration, pen

3.7 Exercise: Tool calibration of gripper, 2-point method

3.8 Base calibration

3.9 Displaying the current robot position

3.10 Exercise: Base calibration of table, 3-point method

3.11 Calibration of a fixed tool

3.12 Calibration of a robot-guided work piece

3.13 Exercise: Calibrating an external tool and robot-guided work piece

3.14 Disconnecting the smart PAD

4 Executing robot programs

4.1 Performing an initialization run

4.2 Selecting and starting robot programs

4.3 Exercise: Executing robot programs

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DAY-2

5 .Working with program files

5.1 Creating program modules

5.2 Editing program modules

5.3 Archiving and restoring robot programs

5.4 Tracking program modifications and changes of state by means of the logbook.

6. Creating and modifying programmed motions

6.1 Creating new motion commands

6.2 Creating cycle-time optimized motion (axis motion)

6.3 Exercise: Dummy program — program handling and PTP motions

6.4 Creating CP motions

6.5 Modifying motion commands

6.6 Exercise: CP motion and approximate positioning

6.7 Motion programming with external TCP

6.8 Exercise: Motion programming with external TCP

7 Using logic functions in the robot program

7.1 Introduction to logic programming

7.2 Programming wait functions

7.3 Programming simple switching functions

7.4 Programming time-distance functions

7.5 Exercise: Logic statements and switching functions

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8. Working with variables

8.1 Displaying and modifying variable values

8.2 Displaying robot states

8.3 Exercise: Displaying system variables

DAY-3

9. Using technology packages

9.1 Gripper operation with KUKA Gripper Tech

9.2 Gripper programming with KUKA Gripper Tech

9.3 KUKA Gripper Tech configuration

10. Successful programming in KRL

10.1 Structure and creation of robot programs

10.2 Structuring robot programs

10.3 Linking robot programs

10.4 Exercise: Programming in KRL

11. Working with a higher-level controller

11.1 Preparation for program start from PLC

11.2 Adapting the PLC interface (Cell.src)

DAY-4

12. Structured programming

12.1 Objectives for consistent programming methodology

12.2 Tools for creating structured robot programs

12.3 Creating a program flowchart

13. Introduction to Expert level

13.1 Using Expert level

14. Variables and declarations

14.1 Data management in KRL

14.2 Working with simple data types

14.2.1 Declaration of variables

14.2.2 Initialization of variables with simple data types

14.2.3 Manipulation of variable values of simple data types with KRL

14.3 Arrays with KRL

14.4 Structures with KRL

14.5 The enumeration data type ENUM

15. Subprograms and functions

15.1 Working with local subprograms

15.2 Working with global subprograms

15.3 Transferring parameters to subprograms

15.4 Programming functions

15.5 Working with standard KUKA functions

16. Motion programming with KRL

16.1 Programming motions with KRL

16.2 Programming relative motions with KRL

16.3 Calculating or manipulating robot positions

16.4 Deliberate modification of Status and Turn bits

17. Working with system variables

17.1 Cycle time measurement by means of timers

18 Using program execution control functions

18.1 Programming conditional statements or branches

18.2 Programming a switch statement

18.3 Programming loops

18.3.1 Programming an endless loop

18.3.2 Programming a counting loop

18.3.3 Programming a rejecting loop

18.3.4 Programming a non-rejecting loop

18.4 Programming wait functions

18.4.1 Time-dependent wait function

18.4.2 Signal-dependent wait function

19. Switching functions with KRL

19.1 Programming simple switching functions

19.2 Programming path-related switching functions with TP

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REGISTRATION

The registration for Robotics training was opened on 7th July, 2014. The registration was done with the faculty in-charge in person. The details of the registration till date (December, 2015) are attached below:

DEPARTMENT	NUMBER OF STUDENT'S REGISTERED				
	B.E.	T.E	S.E.	F.E.	TOTAL
EXTC	53	96	50	10	209
ELEX	92	27	58	19	196
ELEC	10	48	27	16	101
CMPN	17	40	12	15	84
INFT	42	124	3	7	176
TOTAL	214	335	150	67	766

DEPARTMENT/YEAR WISE STUDENT'S REGISTRATION CHART

- NUMBER OF STUDENT'S REGISTERED B.E.
- NUMBER OF STUDENT'S REGISTERED T.E
- NUMBER OF STUDENT'S REGISTERED S.E.
- NUMBER OF STUDENT'S REGISTERED F.E.
- NUMBER OF STUDENT'S REGISTERED TOTAL

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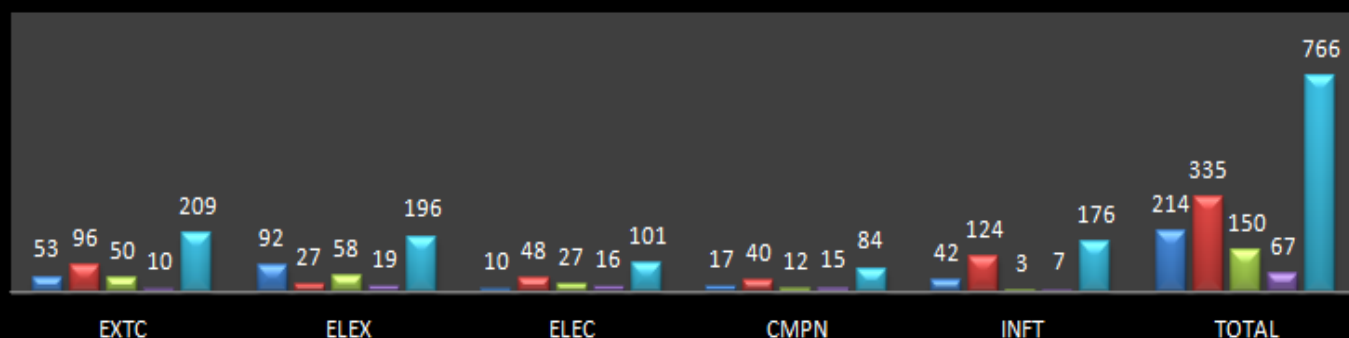
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COLLEGE OF ENGINEERING

COMMENCEMENT OF TRAINING

From 12/01/2015 to 16/10/2015, total 22 batches (258 Student's) have completed the 5 day training spanning all the departments. The details of students in each batch are as follows:

BATCH : 11

FACULTY INVOLVED: Prof. Bhavin Shah, Prof. Samuel Jacob

DATE: 12/01/2015 To 16/01/2015

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
1.	AKSHEN DOKE	ARCB1101	TE	CMPN	doke.akshen@gmail.com
2.	ASHISH GAIKWAD	ARCB1102	TE	CMPN	ash.gkwd@gmail.com
3.	VISHMITA SHETTY	ARCB1103	TE	CMPN	vishmitashetty94@gmail.com
4.	TEJAL AGRAWAL	ARCB1104	TE	CMPN	tejalagrawal1995@gmail.com
5.	SHRUSTI SHAH	ARCB1105	SE	EXTC	shrustishah1395@gmail.com
6.	VAISHNAVI SHINDE	ARCB1106	SE	EXTC	vaishnavishinde96@gmail.com
7.	HARSHITA SINGH	ARCB1107	SE	EXTC	harshitasingh60213@gmail.com
8.	SAYALI SALVE	ARCB1108	SE	EXTC	salvesayali23@gmail.com
9.	DONA SAHA	ARCB1109	SE	EXTC	donasaha00@gmail.com
10.	PRIYANKA BEDEKAR	ARCB1110	SE	CMPN	pri.7.380@gmail.com
11.	CHAANCHAL AGRAWAL	ARCB1111	SE	CMPN	sweetcimy@gmail.com

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BATCH : 12

FACULTY INVOLVED: Prof. Bhavin Shah, Prof. Samuel Jacob

DATE: 19/01/2015 To 24/01/2015

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
12.	KARISHMA PANDEY	ARCB1201	BE	CMPN	pandeykarishma5@gmail.com
13.	MADHURA NAIK	ARCB1202	BE	CMPN	madhura264@gmail.com
14.	RAJENDRA DAVE	ARCB1203	BE	CMPN	rajendradave20@gmail.com
15.	VIRAL GOHIL	ARCB1204	BE	CMPN	vrlgohil4@gmail.com
16.	SHARAD JAIN	ARCB1205	BE	CMPN	jainsharad.be@gmail.com
17.	MAHESH GAWADE	ARCB1206	BE	CMPN	gawademahesh99@gmail.com
18.	VINIT SINKAR	ARCB1207	BE	CMPN	vinitsinkar123@gmail.com
19.	ABHIJIT GURAV	ARCB1208	BE	CMPN	abhijitgurav7@gmail.com
20.	VIKRANT JETHVA	ARCB1209	BE	CMPN	vikrantjethva08@gmail.com
21.	VARSHINI RAMARAJ	ARCB1210	BE	CMPN	varshiniramaraj@gmail.com
22.	DIPALI PENDHARI	ARCB1211	BE	CMPN	dipali.pendhari@yahoo.com
23.	RIDHIMA SAWANT	ARCB1212	BE	CMPN	ridhima_sawant@yahoo.co.in
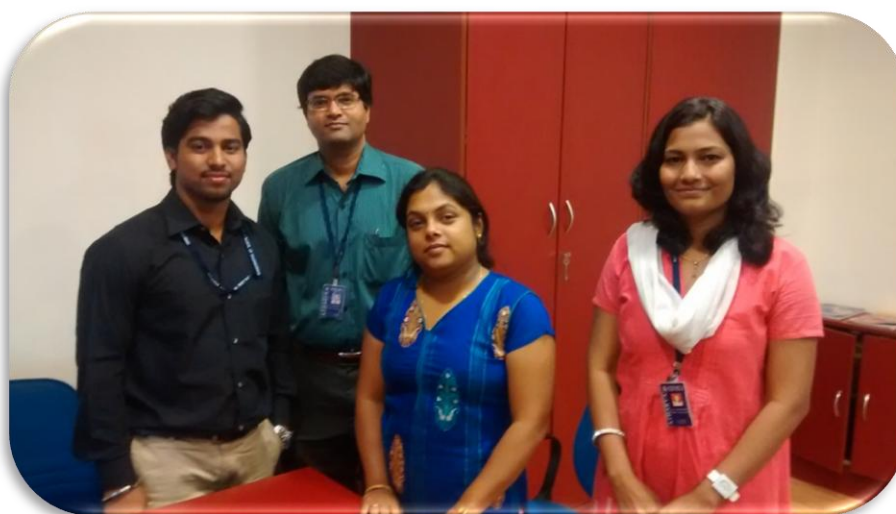
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BATCH : 13

FACULTY INVOLVED: Prof. Bhavin Shah, Prof. Samuel Jacob

DATE: 27/01/2015 To 30/01/2015

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
24.	AMITKUMAR SHINDE	ARCB1301	BE	ELEX	amit.shinde180@gmail.com
25.	RAHUL MARATHE	ARCB1302	BE	ELEX	rahulmarathe46@gmail.com
26.	MAHESH KOKARE	ARCB1303	BE	ELEX	maheshkokare17@gmail.com
27.	ALTAMASH KHAN	ARCB1304	BE	ELEX	altamashkhan.adam@gmail.com
28.	AKSHAYKUMAR GUPTA	ARCB1305	BE	ELEX	guptaakshay75@gmail.com
29.	ABHIJEET WAREKAR	ARCB1306	BE	ELEX	warekar.abhijeet@gmail.com
30.	TANMAY CHIDRE	ARCB1307	BE	ELEX	chidre.tanmaysj71@gmail.com
31.	AMIT GUPTA	ARCB1308	BE	ELEX	amitgupta28121992@gmail.com
32.	SAGAR YARAVALKAR	ARCB1309	BE	ELEX	sagaryaravalkar2193@gmail.com

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BATCH : 14

FACULTY INVOLVED: Prof. Bhavin Shah, Prof. Sachin Gavhane

DATE: 02/02/2015 To 06/02/2015

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
33.	TEJAS BANGERA	ARCB1401	TE	EXTC	sunsignlibra.tejas@gmail.com
34.	TIWAD SAURABH	ARCB1402	TE	EXTC	saurabhtiwad@gmail.com
35.	HARSH PRAJAPATI	ARCB1403	TE	EXTC	harshprajapati02@gmail.com
36.	MAHENDRA PRAJAPATI	ARCB1404	TE	EXTC	mahendraprajapati175@gmail.com
37.	MAYUR ZANZANE	ARCB1405	TE	EXTC	mayurzazane@gmail.com
38.	NIKUNJ SONDAGAR	ARCB1406	TE	EXTC	sondagar_nikunj27494@yahoo.com
39.	AKHILESH CHAWLA	ARCB1407	TE	EXTC	chawla94akhilesh@gmail.com
40.	PRATIK KEDAR	ARCB1408	TE	EXTC	pratikkedar25@gmail.com
41.	RAHUL CHUDASAMA	ARCB1409	TE	EXTC	rchudasama2@gmail.com
42.	RATHOD PRATIK	ARCB1410	TE	EXTC	pratikrathod4@gmail.com
43.	RUSHABH BARI	ARCB1411	TE	EXTC	bari.rushabh@gmail.com

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BATCH : 15

FACULTY INVOLVED: Prof. Bhavin Shah, Prof. Snigdha Wasnik, Prof. Jyothi Arun

DATE: 09/02/2015 To 13/02/2015

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
44.	SAKSHAT BHOIR	ARCB1501	TE	EXTC	sakshatbhoir3@gmail.com
45.	TUSHAR SANAP	ARCB1502	TE	EXTC	tusharsanap1994@gmail.com
46.	AVINASH PANICKAR	ARCB1503	TE	EXTC	avinashpanicker25@yahoo.com
47.	AJINKYA DATALKAR	ARCB1504	TE	EXTC	ajinkya.dbz.1994@gmail.com
48.	BINNY PATEL	ARCB1505	TE	EXTC	patelbinny@rocketmail.com
49.	KHUSHAL SINGH	ARCB1506	TE	EXTC	rathore87pcm@gmail.com
50.	MANDAR HANCHTE	ARCB1507	TE	EXTC	Hanchatemandar@gmail.com
51.	BHAVESH CHAVAN	ARCB1508	TE	EXTC	bschavan55@gmail.com
52.	ASHA WASKAR	ARCB1509	TE	EXTC	waskar.asha@gmail.com
53.	MADHULIKA PATOLE	ARCB1510	TE	EXTC	patolemadhulika@gmail.com
54.	PRASAD BHAVSAR	ARCB1511	TE	EXTC	prasad073@gmail.com
55.	NAMRATA SHIVSHARAN	ARCB1512	TE	EXTC	shivsharan.namrata8@gmail.com

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BATCH : 16

FACULTY INVOLVED: Prof. Bhavin Shah, Prof. Suvarna Pansambal, Prof. Pragya Jain

DATE: 02/03/2015 To 05/03/2015

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
56.	YADNESH MARDE	ARCB1601	TE	ELEC	yadneshmarde01994@gmail.com
57.	VIKRAM BHAVAR	ARCB1602	TE	ELEC	bhavar1993.vik@gmail.com
58.	ABHISHEK DANDALE	ARCB1603	TE	ELEC	abhishekdandale2@gmail.com
59.	SWAPNIL SHIRSAT	ARCB1604	TE	ELEC	shirsatswapnil02@gmail.com
60.	PRATIK PANDIT	ARCB1605	TE	ELEC	ppandit1431994@gmail.com
61.	PANKAJ PATIL	ARCB1606	TE	ELEC	pankajme.31@rediffmail.com
62.	PRAGNESH PANCHAL	ARCB1607	TE	ELEC	pragneshpanchal@live.com
63.	HITESH PANCHAL	ARCB1608	TE	ELEC	hitesh.hitesh.panchal@gmail.com
64.	CHINTAN THAKKAR	ARCB1609	TE	ELEC	thakkarchintan20@gmail.com
65.	JIVITESH CHAVAN	ARCB1610	TE	ELEC	jcjivi@gmail.com
66.	VIJAY YADAV	ARCB1611	TE	ELEC	viju567@gmail.com
67.	PRADEEPKUMAR YADAV	ARCB1612	TE	ELEC	pradisky024@gmail.com

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BATCH : 17

FACULTY INVOLVED: Prof. Bhavin Shah

DATE: 09/03/2015 To 13/03/2015

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
68.	TAKI KUNJUMON	ARCB1701	SE	EXTC	takikunjumon@gmail.com
69.	ANURAG SHARMA	ARCB1702	SE	EXTC	sharmaanurag639@gmail.com
70.	DURGESH PATHAK	ARCB1703	SE	EXTC	durgesh.s.pathak@gmail.com
71.	GANESH CHAVHAN	ARCB1704	SE	EXTC	ganeshchavhan61@gmail.com
72.	HARINDAR MAURYA	ARCB1705	SE	EXTC	harindarmaurya1995@gmail.com
73.	REVATHY PILLAI	ARCB1706	SE	EXTC	revuaquarius1995@gmail.com
74.	JIDNYASA SANE	ARCB1707	SE	EXTC	jidnyasa.sane@yahoo.com
75.	JUILI KOLAPTE	ARCB1708	SE	EXTC	juilikolapte1995@gmail.com
76.	PRIYANKA SAMANT	ARCB1709	SE	EXTC	priyankasamant18@yahoo.com
77.	AKASHKUMAR PRAJAPATI	ARCB1710	SE	EXTC	akashprajapati184@gmail.com
78.	SONALI SAKHARE	ARCB1711	SE	EXTC	sonalisakhare7@gmail.com
79.	NEELAM VARTEKAR	ARCB1712	SE	EXTC	nilamvartekar@gmail.com

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BATCH : 18

FACULTY INVOLVED: Prof. Bhavin Shah

DATE: 16/03/2015 To 20/03/2015

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
80.	PARAG WARUNGASE	ARCB1801	SE	EXTC-2	paragwarungase@gmail.com
81.	ABHISHEK SHARMA	ARCB1802	SE	EXTC-2	billusharma4@gmail.com
82.	SAMEER MOHADIKAR	ARCB1803	SE	EXTC-1	sameer.mohadikar@gmail.com
83.	RISHAB PUGALIA	ARCB1804	SE	EXTC-2	rishabpugalia85@gmail.com
84.	SHRADDHA SLGAONKAR	ARCB1805	SE	EXTC2	shaddu716@gmail.com
85.	RUCHITA GADEKAR	ARCB1806	SE	EXTC1	ruchitagadekar@gmail.com
86.	KUNAL PATIL	ARCB1807	SE	EXTC-2	kunalpatil78640@gmail.com
87.	PALLAVI SHINDE	ARCB1808	SE	EXTC1	pallavi1711995@gmail.com
88.	NIKHIL BADGUJAR	ARCB1809	SE	EXTC-1	nikbad36@gmail.com
89.	SUSHANT CHAUGULE	ARCB1810	SE	EXTC-1	rocksumit56@gmail.com
90.	SUSHANT MAHADIK	ARCB1811	SE	EXTC-1	sushantmahadik79@gmail.com
91.	SURAJ MENE	ARCB1812	SE	EXTC-1	surajmene@gmail.com

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BATCH : 19

FACULTY INVOLVED: Prof. Bhavin Shah

DATE: 23/03/2015 To 27/03/2015

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
92.	RIDDHI JOGLE	ARCB1901	SE	ELEX	ruchi.jo1996@gmail.com
93.	PADIA ISHA	ARCB1902	SE	ELEX	ishapadia@gmail.com
94.	PURNIMA HEBBAGIL	ARCB1903	SE	ELEX	purnima.hebbagil@gmail.com
95.	DAKSHATA PATIL	ARCB1904	SE	ELEX	dakshuu.patil.148@gmail.com
96.	DHRUVI H BHADIYADRA	ARCB1905	SE	ELEX	dhruvidgr8@gmail.com
97.	HIMANSHU MONGA	ARCB1906	SE	ELEX	himanshu201995@live.com
98.	VIRAJ KADAM	ARCB1907	SE	ELEX	virajkadam12@gmail.com
99.	JIGAR V FARIA	ARCB1908	SE	ELEX	jigarfaria1995@gmail.com
100.	SUMIT M JHA	ARCB1909	SE	ELEX	sum2151993@gmail.com
101.	SAPANA RATHOD	ARCB1910	SE	ELEX	sapanarathod01@gmail.com
102.	ADARSH CHATURVEDI	ARCB1911	SE	ELEX	adarsh0602@otmail.com
103.	ADVAITA KHARAT	ARCB1912	SE	ELEX	princessadvaita@gmail.com

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BATCH : 20

FACULTY INVOLVED: Prof. Bhavin Shah, Prof. Samuel Jacob

DATE: 14/07/2015 To 17/07/2015

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
104.	AADITYA JHAVERI	ARCB2001	TE	ELEX	aadityajhaveri@yahoo.in
105.	JANISHA KUMAR	ARCB2002	TE	ELEX	janishakumar1620@gmail.com
106.	DHRUV GHADIA	ARCB2003	TE	ELEX	dhruv29494@gmail.com
107.	PALLAVI MAYEKAR	ARCB2004	TE	ELEX	pallavi04mayekar@gmail.com
108.	AJITHA NAIR	ARCB2005	TE	ELEX	nairajitha2012@gmail.com
109.	MANOJ K JHA	ARCB2006	TE	ELEX	manojjha0786@gmail.com
110.	SHRADDHA MHAPRALKAR	ARCB2007	TE	ELEX	shraddha.mhapralkar91@gmail.com
111.	DIVYA POOJARI	ARCB2008	TE	ELEX	poojaridivya1994@gmail.com
112.	ASHWINI PANDE	ARCB2009	TE	ELEX	ashwinipande94@gmail.com
113.	DIVYA VAGHELA	ARCB2010	TE	ELEX	dv5959@gmail.com
114.	VAIBHAVI SHIRSAT	ARCB2011	TE	ELEX	vaibhavi6081@gmail.com
115.	SONALI PAWASKAR	ARCB2012	TE	ELEX	pawaskarsonali95@gmail.com

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BATCH : 21

FACULTY INVOLVED: Prof. Bhavin Shah, Prof. Samuel Jacob

DATE: 20/07/2015 To 24/07/2015

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
116.	AISHWARYA SANSARE	ARCB2101	TE	EXTC	aishwaryasansare@gmail.com
117.	KETKEE KAMBLI	ARCB2102	TE	EXTC	ketkee_k@yahoo.com
118.	LORRAINE LOBO	ARCB2103	BE	ELEX	lorrainelobo290@gmail.com
119.	ANKITA KARANDE	ARCB2104	BE	ELEX	ankitakarande207@gmail.com
120.	PRAKASH PATEL	ARCB2105	BE	ELEX	prkpatel49@gmail.com
121.	ADITYA TRIVEDI	ARCB2106	BE	ELEX	aditya.trivedi94@gmail.com
122.	VIKAS ANAOKAR	ARCB2107	BE	ELEX	anaokarvikas@gmail.com
123.	AISHWARYA WAHANE	ARCB2108	BE	ELEX	aishwarya.wahane@gmail.com
124.	AKSHAY PATIL	ARCB2109	BE	EXTC	patilakshay1070@gmail.com
125.	SANDIPAN DAS	ARCB2110	BE	CMPN	sandy.26804270@gmail.com
126.	NIKHIL KUMAR SINGH	ARCB2111	BE	ELEX	nikhil_singh@outlook.com
127.	SHAIL LALAJI	ARCB2112	BE	ELEX	shaillalaji@yahoo.com

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FACULTY INVOLVED: Prof. Bhavin Shah

DATE: 27/07/2015 To 31/07/2015

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
128.	DAULAT YADAV	ARCB2201	BE	ELEX	daulatyadav1@gmail.com
129.	RAVIKIRAN SHETTY	ARCB2202	BE	ELEX	ravikiranshetty12@yahoo.com
130.	DARSHAN SAGWEKAR	ARCB2203	BE	ELEX	darshansagwekar59@gmail.com
131.	VIPIN ONGALATHE	ARCB2204	BE	ELEX	vipintherocker@yahoo.com
132.	RAJU KOLEKAR	ARCB2205	BE	ELEX	rajuman.rk@gmail.com
133.	ABHISHEK TIWARI	ARCB2206	BE	ELEX	tabhishek608@gmail.com
134.	VICKY KALE	ARCB2207	BE	ELEX	niwarasadan@gmail.com
135.	MUKESH NISHAD	ARCB2208	BE	ELEX	mukeshnishad49@gmail.com
136.	MOHAMMED SHAQIB SHAIKH	ARCB2209	BE	ELEX	mohd.shaqib21@gmail.com
137.	PANKAJ LADE	ARCB2210	BE	ELEX	pankajlade110@gmail.com
138.	LAXMAN CHAUDHARY	ARCB2211	BE	ELEX	chaudharilaxman1@gmail.com
139.	PRANAV CHIPLUNKAR	ARCB2212	BE	ELEX	pranavchiplunkar1993@gmail.com

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BATCH : 23

FACULTY INVOLVED: Prof. Bhavin Shah

DATE: 03/08/2015 To 07/08/2015

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
140.	RAJESH JHA	ARCB2301	BE15	ELEX	rajeshjha9211@gmail.com
141.	ALPESH GURAV	ARCB2302	BE15	ELEX	alpeshgurav266@gmail.com
142.	SAIRAJ AMBERKAR	ARCB2303	BE15	ELEX	amberkarsairaj@gmail.com
143.	PANKAJ GOSAI	ARCB2304	BE15	ELEX	gosaipankaj123@gmail.com
144.	OMKAR DIXIT	ARCB2305	BE15	ELEX	omkar.dixit94@rediffmail.com
145.	SUMANKUMAR JHA	ARCB2306	BE15	ELEX	jha.suman97@yahoo.in
146.	SURAJKUMAR GUPTA	ARCB2307	BE15	ELEX	guptasuraj908@gmail.com
147.	GANESH BOBA	ARCB2308	BE15	ELEX	ganeshboba1995@gmail.com
148.	RAHUL CHAVAN	ARCB2309	BE15	ELEX	chavan.rahul70595@gmail.com
149.	DHRUTI MUNI	ARCB2310	BE15	ELEX	dhrutimuni@gmail.com
150.	PRIYANTA MORE	ARCB2311	BE15	ELEX	morepriyanta@gmail.com
151.	MANASI SANKHE	ARCB2312	BE15	ELEX	manasisankhe19@gmail.com

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SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
	BATCH : 24				
	FACULTY INVOLVED: Prof. Sachin Gavhane, Prof. Snigdha Wasnik				
	DATE: 10/08/2015 To 14/08/2015				
152.	RUCHI TIWARI	ARCB2401	TE15	INFT	ruchitiwari400@gmail.com
153.	MAYURI PATIL	ARCB2402	TE15	INFT	patilmayuri619@gmail.com
154.	BHAKTI PATIL	ARCB2403	TE15	INFT	patilbhakti66@gmail.com
155.	KOMAL PAREEK	ARCB2404	TE15	INFT	komalpareek365@gmail.com
156.	ALI MANESIYA	ARCB2405	TE15	INFT	Amanesiya@gmail.com
157.	KINJAL DATTANI	ARCB2406	TE15	INFT	dattanikinjal@gmail.com
158.	DASHESH VORA	ARCB2407	TE15	INFT	dashvora115@gmail.com
159.	RINKLE ANUWADIA	ARCB2408	SE15	INFT	rinkleanuwadia@gmail.com
160.	JYOTSNA PADHIYAR	ARCB2409	TE15	INFT	jvp.20feb@gmail.com
161.	DURGESH PANDEY	ARCB2410	TE15	INFT	durgeshpandey365@gmail.com
162.	ANUSHKA PATIL	ARCB2411	TE15	INFT	ahp2096@gmail.com
163.	TANVI SAMEL	ARCB2412	TE15	INFT	sameltanvi@gmail.com

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BATCH : 25

FACULTY INVOLVED: Prof. Bhavin Shah

DATE: 24/08/2015 To 28/08/2015

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
164.	POOJA SAWANT	ARCB2501	TE15	INFT	pooja.sawant3004@gmail.com
165.	SHWETA THUMMAR	ARCB2502	TE15	INFT	shwetathummar1.st@gmail.com
166.	PRANITI THANVI	ARCB2503	TE15	INFT	praniti.thanvi@gmail.com
167.	NIKHITA SONTAKKE	ARCB2504	TE15	INFT	sontakke.nikita@gmail.com
168.	SHASHWATI WAGHMARE	ARCB2505	TE15	INFT	wshashwati@gmail.com
169.	URVI PARMAR	ARCB2506	TE15	INFT	parmarurvi095@gmail.com
170.	BINAL SONDAGAR	ARCB2507	TE15	INFT	sondagarbini@gmail.com
171.	GOURAVI TANDEL	ARCB2508	TE15	INFT	gouravitandel1945@gmail.com
172.	PRANALI SAWANT	ARCB2509	TE15	INFT	panusawant6@gmail.com
173.	KOMAL PRABHE	ARCB2510	TE15	INFT	komalprabhe@gmail.com
174.	LAVANYA REGUNTA	ARCB2511	TE15	INFT	lavanyaregunta123@gmaill.com
175.	ZANKHANA PATEL	ARCB2512	TE15	INFT	zankhanapatel096@gmail.com

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BATCH : 26

FACULTY INVOLVED: Prof. Bhavin Shah

DATE: 31/08/2015 To 04/09/2015

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
176.	AKSHAY DULAM	ARCB2601	TE15	INFT	akshaydulam96@gmail.com
177.	MAYUR PARDESHI	ARCB2602	TE15	INFT	mayur.pardeshi96@gmail.com
178.	TUSHAR SHINDE	ARCB2603	TE15	INFT	shindetushar260@gmail.com
179.	HARSHAL PORE	ARCB2604	TE15	INFT	harshalpore2020@gmail.com
180.	MAHESH PAWAR	ARCB2605	TE15	INFT	maheshpawar765@gmail.com
181.	ADITYA SANKHE	ARCB2606	TE15	INFT	adityasankhe73@gmail.com
182.	RUPAK JAVKAR	ARCB2607	TE15	INFT	rupakjavkar@gmail.com
183.	ARPIT SHAH	ARCB2608	TEI5	INFT	arpitshah844@gmail.com
184.	PRANAV RANA	ARCB2609	TEI5	INFT	pranavrana786@gmail.com
185.	TUSHAR RANA	ARCB2610	TEI5	INFT	tusharrana035@gmail.com
186.	SAHIL SONI	ARCB2611	TEI5	INFT	sahil.soni0003@gmail.com
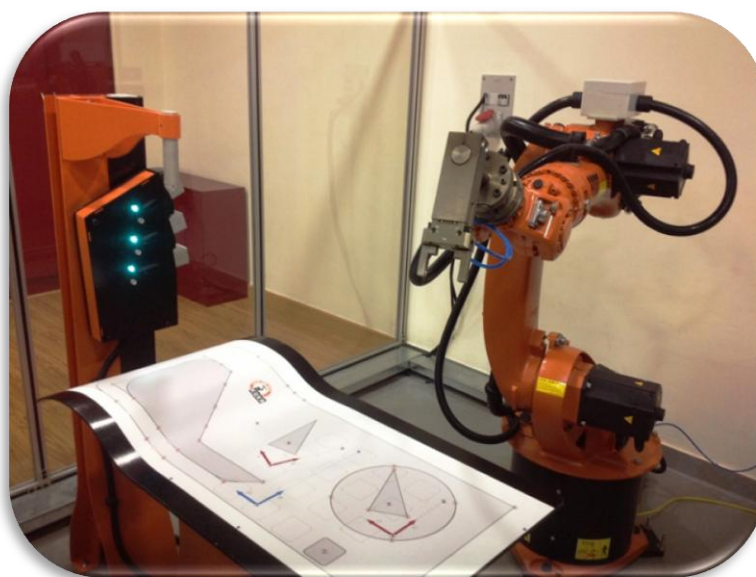
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BATCH : 27

FACULTY INVOLVED: Prof. Bhavin Shah, Prof. Aparna Kadam, Prof. Samuel Jacob

DATE: 07/09/2015 To 11/09/2015

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
187.	RANJANA SHUKLA	ARCB2701	BE15	ELEX	beauty21102@gmail.com
188.	YASIKA GHOGARE	ARCB2702	BE15	ELEX	yasikaghogare@gmail.com
189.	SHRADDHA BABAN GONDHALI	ARCB2703	BE15	ELEX	shraddhagondhali16@gmail.com
190.	JUILEE RAMAKANT MHATRE	ARCB2704	BE15	ELEX	mhtrejuilee1994@gmil.com
191.	VAISHALI VILAS CHOUGALE	ARCB2705	BE15	ELEX	vaishalisay@gmail.com
192.	RUSHALI TAKU	ARCB2706	BE15	ELEX	catchricha79@gmail.com
193.	JAY CHAUHAN	ARCB2707	BE15	ELEX	jaychauhan385@gmail.com
194.	KIRAN ABGUL	ARCB2708	BE15	ELEX	kiranabgul318@gmail.com
195.	UTKARSHA SAVE	ARCB2709	BE15	ELEX	reshmafsathe@gmail.com
196.	CHINMAY SHINDE	ARCB2710	BE15	ELEX	tilakvala@gmail.com
197.	MUBARAK ALI	ARCB2711	BE15	ELEX	msmubbo99@gmail.com
198.	TILAK VALA	ARCB2712	BE15	ELEX	tilakvala@gmail.com

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BATCH : 28

FACULTY INVOLVED: Prof. Bhavin Shah, Prof. Aparna Kadam

DATE: 14/09/2015 To 18/09/2015

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
199.	VISHRUT SHENOY	ARCB2801	FE	ELEC	vishrutshenoy23@gmail.com
200.	AKASH UBALE	ARCB2802	FE	ELEC	aubale195@gmail.com
201.	SAURAV SHAMA	ARCB2803	FE	ELEC	sauravshama23@gmail.com
202.	MOHAMMAD SALMAN AEJAZ	ARCB2804	SE15	ELEC	aejaz.salman@gmail.com
203.	ABHISHEK MAHADIK	ARCB2805	FE	ELEC	abhishekmahadik29@gmail.com
204.	VIVEK GHADGE	ARCB27806	FE	ELEC	vsghadge20@gmail.com
205.	HARSH AYER	ARCB2807	SE15	ELEC	harshayer@gmail.com
206.	CHARCHIT VATSA	ARCB2808	FE	ELEC	charchitvatsa@gmail.com
207.	AKSHAY PENTA	ARCB2809	SE15	ELEC	akshaykumarpenta@gmail.com
208.	DIBYANSHU PANDEY	ARCB2810	SE15	ELEC	dibyanshupandey97@gmail.com
209.	VARAD BAGWE	ARCB2811	SE15	ELEC	varadvbagwe8985@gmail.com
210.	KETAN TEKE	ARCB2812	FE	ELEC	teke.ketan@yahoo.com

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FACULTY INVOLVED: Prof. Bhavin Shah, Prof. Aparna Kadam

DATE: 21/09/2015 To 25/09/2015

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
211.	DARSHAN VIRA	ARCB2901	TEI5	INFT	darshanvira17@gmail.com
212.	SHREYASH SHENOY	ARCB2902	TE15	INFT	shenoyshreyash95@gmail.com
213.	MAYANK UKARDE	ARCB2903	TEI5	INFT	ukarde12@gmail.com
214.	YASH VELASKAR	ARCB2904	TE15	INFT	yashvelu@gmail.com
215.	SHUBHAM JAIN	ARCB2905	TE15	INFT	shubham.shubham.jain3@gmail.com
216.	MANDAR GHADI	ARCB2906	TE15	INFT	mandarghadi00@gmail.com
217.	HARDIK SHAH	ARCB2907	TE15	INFT	hardikshah017@gmail.com
218.	ABHISHEK SINHA	ARCB2908	TE15	INFT	sinhaabhi58@gmail.com
219.	AKASH AGIVALE	ARCB2909	TE15	INFT	akashagivale16@gmail.com
220.	PHALESHA RAWAL	ARCB2910	TE15	INFT	phalesharawal25@gmail.com
221.	RISHABH SINGH	ARCB2911	TE15	INFT	1995rishabh.singh1012@gmail.com
222.	SAGAR SURELIYA	ARCB2911	TE15	INFT	sagar.y.sureliya@gmail.com

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BATCH : 30

FACULTY INVOLVED: Prof. Snigdha Wasnik, Prof. Sachin Gavhane

DATE: 28/09/2015 To 01/10/2015

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
223.	RIYA KAMBLE	ARCB3001	TEI5	INFT	riyakamble55@gmail.com
224.	ADARSH PATIL	ARCB3002	TE15	INFT	patiladarsh65@gmail.com
225.	SNEHA PRABHU	ARCB3003	TEI5	INFT	sneusneu22@gmail.com
226.	VAIBHAV CHAUHAN	ARCB3004	TE15	INFT	vamb.c95@gmail.com
227.	BHAVIN OZA	ARCB3005	TE15	INFT	bhavin.oza49@gmail.com
228.	AKHIL PENTA	ARCB3006	TE15	INFT	penta.akhil69@gmail.com
229.	RISHIKESH SALUNKHE	ARCB3007	TE15	INFT	rishisunny095@gmail.com
230.	RHEA SHETTY	ARCB3008	TE15	INFT	rhshetty89@gmail.com
231.	VIVEK PANCHAL	ARCB3009	TE15	INFT	vicky.vivek14@gmail.com
232.	MAHESH MANE	ARCB3010	TE15	INFT	manemahesh016@gmail.com
233.	ZAINEB PENWALA	ARCB3011	TE15	INFT	zenp1520@gmail.com
234.	RIYA KAMBLE	ARCB3012	TE15	INFT	riyakamble55@gmail.com
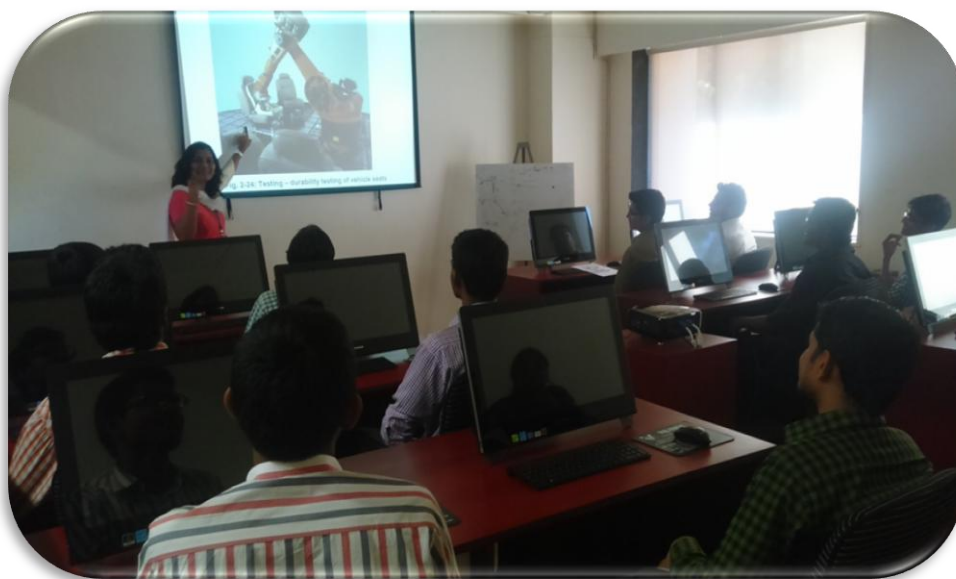
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BATCH : 31

FACULTY INVOLVED: Prof. Pragya Jain, Prof. Suvarna Pansambal, Prof. Bhavin Shah

DATE: 05/10/2015 To 09/10/2015

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
235.	ABHISHEK JAIN	ARCB3101	TEI5	CMPN	ajj_2396@yahoo.com
236.	MIHIR PITRODA	ARCB3102	TE15	CMPN	mihir.pitroda@gmail.com
237.	SHREYA SATAM	ARCB3103	TEI5	CMPN	shreyasatam@gmail.com
238.	RUCHI RATHOD	ARCB3004	TE15	CMPN	ruchisrathod13@gmail.com
239.	PRATIK DESHPANDE	ARCB3105	TE15	CMPN	deshpandepratikr@gmail.com
240.	RAVI CHANDAK	ARCB3106	TE15	CMPN	chandakravi627@gmail.com
241.	ABHISHEK JHA	ARCB3107	TE15	CMPN	ajha025@gmail.com
242.	ANURAG MAYEKAR	ARCB3108	TE15	CMPN	amayekar82@gmail.com
243.	MRUNAL MERULINGKAR	ARCB3109	TE15	INFT	mrunalkm@gmail.com
244.	JIGAR PAREKH	ARCB3110	TE15	CMPN	jigarparekh002@gmail.com
245.	MOHD AMIR FAIZAN	ARCB3111	TE15	ELEC	faizan.amir88@gmail.com
246.	AMEY GHODKE	ARCB3112	TE15	CMPN	ameyg1@gmail.com
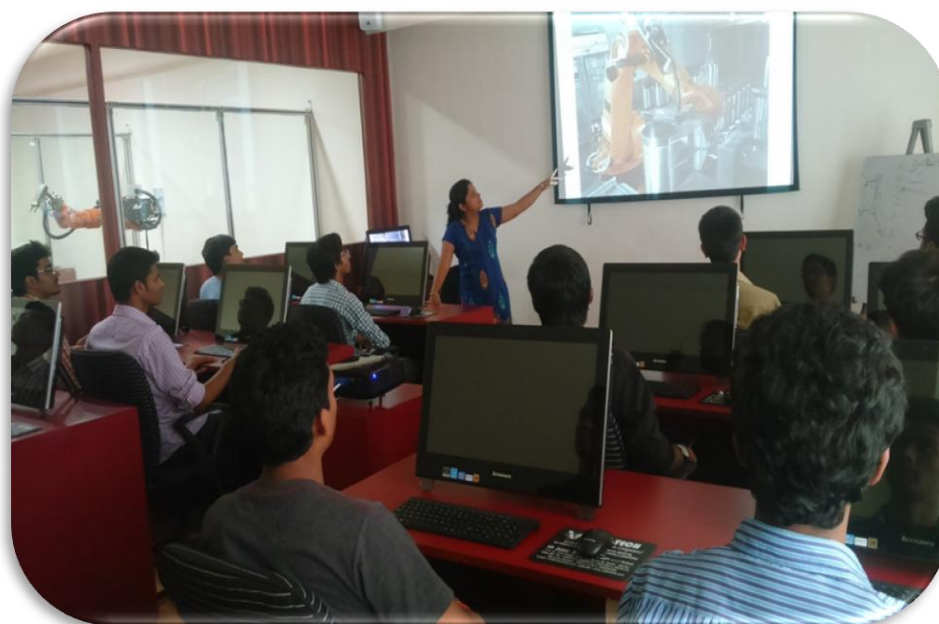
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BATCH : 32

FACULTY INVOLVED: Prof. Bhavin Shah

DATE: 12/10/2015 To 16/10/2015

SR. NO.	NAME	ENROLLMENT NO.	CLASS	BRANCH	EMAIL ID
247.	YADNESH ZAGADE	ARCB3201	BE	EXTC-2	zagade.yadnesh4@gmail.com
248.	AKASH SINGH	ARCB3202	BE	EXTC-2	akash31.singh1994@gmail.com
249.	SIDDHESH VARTAK	ARCB3203	BE	CMPN	vsid55@yahoo.com
250.	MEET PATEL	ARCB3204	BE	EXTC-2	meet1369@yahoo.in
251.	PARTH DESAI	ARCB3205	BE	EXTC-2	desaiparth107@yahoo.in
252.	OMKAR SANKHE	ARCB3206	BE	EXTC-2	sankheomkar@gmail.com
253.	BHAVESH REWALE	ARCB3207	BE	EXTC-2	rewale.bhavesh@gmail.com
254.	LOKESH HOUSNOOR	ARCB3208	BE	EXTC-2	iamlokyy@gmail.com
255.	MANAS NIKAM	ARCB3209	SE	ELEX	manasnikam24@gmail.com
256.	KARAN KANTHARIA	ARCB3210	TE15	ELEX	karankantharia@gmail.com
257.	ABHISHEK RATHOD	ARCB3211	SE15	EXTC	beasthunter07@gmail.com
258.	GAURANG VISHWASRAO	ARCB3212	BE	EXTC -2	govishwasrao99@gmail.com

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ASSESSMENT

On the fifth day (last day) of the training, an assessment is done to evaluate the understanding of the students who underwent the training.

Question Format: 25 Multiple Choice Questions

Duration: 30 Minutes

Questions Pattern: Multiple Choice Questions covering entire syllabus.

DEPARTMENT	NUMBER OF STUDENT'S COMPLETED TRAINING				
	B.E.	T.E	S.E.	F.E.	TOTAL
EXTC	8	21	24	0	53
ELEX	48	13	13	6	80
ELEC	0	13	4	0	17
CMPN	13	14	1	0	28
INFT	0	58	1	0	59
TOTAL	69	119	43	6	237

DEPARTMENT/YEAR WISE STUDENT'S COMPLETED TRAINING CHART

■ NUMBER OF STUDENT'S COMPLETED TRAINING B.E.   ■ NUMBER OF STUDENT'S COMPLETED TRAINING T.E

■ NUMBER OF STUDENT'S COMPLETED TRAINING S.E.   ■ NUMBER OF STUDENT'S COMPLETED TRAINING F.E.

■ NUMBER OF STUDENT'S COMPLETED TRAINING TOTAL
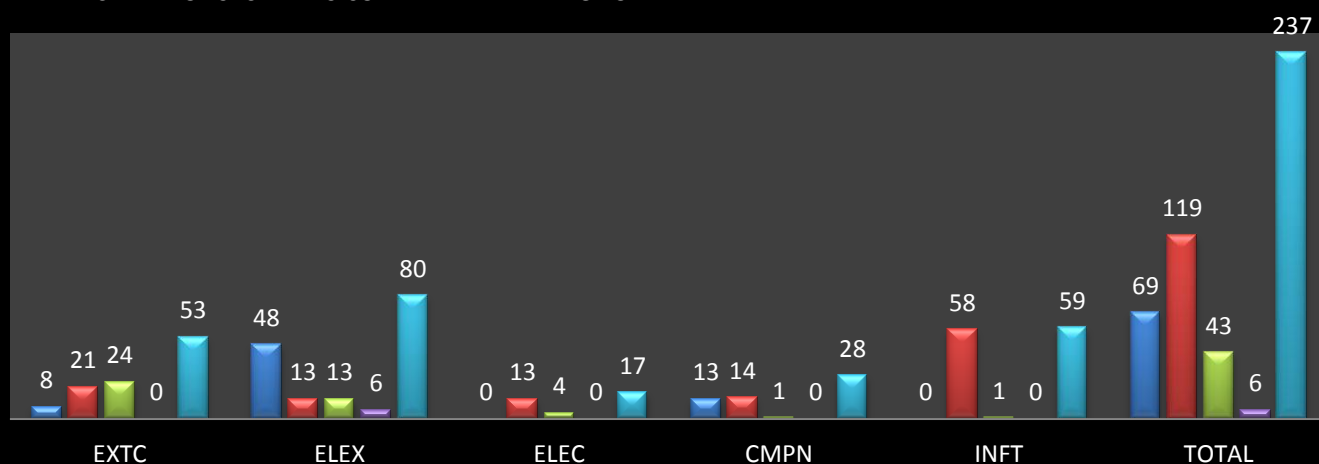
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ASSESSMENT PAPER

Q.1 Which icon represents the base coordinate system?

a)   b)   c)   d)

Q.2) What is the name of the velocity setting for jog mode?

a) Jogging   b) velocity override   c) Jog override   d) Program override

Q.3) Assigning reference value to every axis is the process called-----

a) Positioning   b) Base calibration   c) Tool calibration   d) Mastering

Q.4) The robot model we are using is--------

a) KR 4   b) KR 6   c) KR 2   d) KR 16

Q.5) Default coordinate system of the robot is?

a) Flange   b) World   c) Base   d) Robroot

Q.6) Encoder data is stored at………

a) KRC box   b) White box   c) Robot box   d) Black box

Q.7)TCP indicates

a) Distance between flange and tool

b)Tool control point

c) Tool calibration point

d) None of the above

Q.8) The leading axis takes………. Path.

a) Shortest   b) Longest   c) Fastest   d) Smallest

Q.9) Maximum speed of robot in T2 Mode is:

a) 250 mm/s   b) 280mm/s   c)2 m/s   d) None

Q.10) When is the out command executed?

LIN P1 CONT Vel=0.2 m/s CPDAT1
LIN P2 CONT Vel=0.2 m/s CPDAT2
LIN P3 CONT Vel=0.2 m/s CPDAT3
OUT 5 'rob_ready' State=TRUE CONT
LIN P4 Vel=0.2 m/s CPDAT4

a) after P1   b) after P2   c) after P3   d) after P4

Q.11) Tool calibration is carried out with respect to ………… co-ordinate system

a) Base   b) Tool   c) Flange   d) World

Q.12) The language used to program the robot is:

a) KCL   b) KRL   c)C   d)KCP

Q.13) PTP motion gives

a) Shortest time   b) shortest path   c) Longest time   d) Can't say

Q.14) Payload of the robot is:

a) 16 kg   b) 32 kg   c) 38 kg   d) 49kg

Q.15) When A4 , A5 & A6 axis are in same line that is…………. singularity

a) α1   b) α2   c)α4   d) α5

Q.16) The tool used to rotate motors mechanically is called

a) EMD   b) Rachit   c) plier   d) All of the above

Q.17) Which are the emergency stops are available?

a) Smart pad   b) External Panel   c) fence door stop   d) All of the above

Q.18) Which are the different modes of running kuka robot?

a) TI   b) T2   c) AUT &EXT   d) All of the above

Q.19)What is EMD?

a) Electronic Mastering Device   b) Electro Mechanical Door   c) Electronic Measuring Device   d) None of the above

Q.20)What is KPP?

a) Kuka Power Point   b) Kuka Power Plug   c) Kuka Power Pack   d) All of the above

Q.21) In ……………… singularity, center point of A5 is located vertically above axis A1.

a) Extended position   b) Wrist axis   c) overhead   d) α2

Q.22) ……………… message provide information for correct operator control of the robot.

a) Status   b) Notification   c) Acknowledgement   d) wait

Q.23) ……………… means generation of coordinate system which has its origin in a reference point of the tool .

a) Tool coordinate   b) base calibraton   c) TCP   d) All of the above

Q.24) All motions are possible using space mouse.

a) True   b) False   c) Not always   d) can't say

Q.25) The motion of the robot is limited in axis-specific jogging by means of the maximum positive & negative values is called ………………..

a) Software limit switches   b) mechanical stoppers   c) axis boundaries   d) all

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FEEDBACK FORM

STUDENT FEEDBACK FORM
"BASICS OF ROBOT PROGRAMMING ON KUKA KR 16-2 C4 ROBOT"

TRAINER:_____BATCH:_____ DATE:_____

STUDENT NAME_____ YEAR _____ BRANCH _____ROLL NOS._____

SR. NOS.	CONTENTS	EXCELLENT	GOOD	SATISFACTORY	UNSATISFACTORY
1.	Lab Environment				
2.	Relevance Of Contents				
3.	Faculty Interaction				
4.	Presentation				
5.	Practical Sessions				
6.	Programming Skills				
7.	Student's Practice Session				
8.	Knowledge Gained				
9.	Industry Relevant Knowledge				
10.	How Was The Overall Training				
11.	Give your specific views on Robotics Training				
12.	What value addition you have achieved from this training				
13.	Specific suggestions you would like to implement by management				

_____

Student's Signature

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ENROLMENT NUMBER

➢ Each student is assigned an Enrolment number in the format ARC-<Batch Number>/ <Serial Number> (making it self-descriptive).

➢ It expands to Atharva Robotics Center Batch -<Batch Number> <Serial Number> For Eg., ARCB0101 means the student is from Batch 1 and his/her serial number is 01

CERTIFICATE

The certificates were decided to be given away as soft copy to those students who attended the training,

provided they:

➢ Have 10 hours of attendance
➢ Have passed the final assessment with a minimum of 40% of total marks.

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CERTIFICATE OF COMPLETION

THIS IS TO CERTIFY THAT Mr./Ms. XXXXXXXXXXX
HAS SUCCESSFULLY COMPLETED

"BASICS OF ROBOT PROGRAMMING ON

KUKA KR 16-2 C4 ROBOT"

PERIOD FROM XXXXXX TO XXXXXX

HELD BY PROF.XXXXXXXXXXXXX, PROF.XXXXXXXXXXXX

ENROLLMENT NO.: ARCBxxxxx

PROF. BHAVIN SHAH   DR. S.P.KALLURKAR
CO-ORDINATOR   PRINCIPAL
ATHARVA COLLEGE OF ENGINEERING, MALAD - MARVE ROAD, CHARKOP NAKA, MALAD [WEST], MUMBAI-400095

CERTIFICATE SAMPLE COPY

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ATHARVA ROBOTICS CENTER NEWSPAPER ARTICLES

ARTICLE IN HINDUSTAN TIMES NEWSPAPER DATED 17TH JUNE,2015

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महाराष्ट्र टाइम्स

मुंबई टाइम्स

अथर्व कॉलेज ऑफ इंजिनीअरिंगमध्ये अत्याधुनिक साहित्यासह सुसज्जित असं इंडस्ट्रिअल रोबोटिक्स सेंटर उभारलं आहे. अशाप्रकारचं ट्रेनिंग सेंटर उभारणारं हे महाराष्ट्रातलं एक महत्त्वाचं कॉलेज ठरलंय. या ट्रेनिंग सेंटरमध्ये भारतातील इंडस्ट्रिअल रोबोटिक्समधील अॅडव्हान्स ऑटोमेटेड मॅन्युफॅक्चरिंग शिकण्यासाठी विद्यार्थ्यांना प्रोत्साहन दिलं जातं.

रोबोटिक्स सेंटरचे दोन भाग केले आहेत. एका भागात प्रत्यक्ष रोबोटवर ट्रेनिंग दिलं जातं. तर दुसऱ्या भागात सिम्युलेटर लॅब आहे. कॉलेजच्या वेळातच विद्यार्थ्यांना इथं ट्रेनिंग दिलं जातं. ते पूर्ण झाल्यानंतर त्यावर परीक्षाही घेतली जाते. या परीक्षेसाठी सेंटरकडूनच साहित्य पुरवलं जातं. आतापर्यंत जवळपास ३०० विद्यार्थ्यांनी इथे प्रशिक्षण घेतलं आहे. रोबोटिक्स ट्रेनिंग सेंटरची वैशिष्ट्यं ट्रेनिंगसाठी शुल्क आकारलं जात नाही. शिवाय सेंटरने घेतलेल्या परीक्षेत पास झाल्यावर रोबोटिक्स

सेंटरतर्फे सर्टिफिकेटही दिलं जातं.

कुकाकेआर १६-२-सी४ हा रोबो इथे सुसज्जित उपकरणांसह वापरायला मिळतो.

सिम्युलेटर लॅबमध्ये रोबोटिक्स इंडस्ट्रीतल्या नवनवीन आणि अपडेटेड सॉफ्टवेअर्सचा, सिम्प्रो आणि ऑफिस लाइटचा वापर होतो.

या ट्रेनिंग सेंटरमध्ये विद्यार्थ्यांना व्यावहारिक आणि प्रात्यक्षिक ज्ञान दिलं जातं.

▶▶ मयूर परदेशी,
कॉलेज क्लब रिपोर्टर

अथर्व कॉलेजमध्ये रोबोटिक्सची धम्माल

ARTICLE IN MAHARASHTRA TIMES SUPPLEMENT MUMBAI TIMES NEWSPAPER DATED 12TH AUGUST, 2015

ATHARVA ROBOTICS CENTER

ATHARVA COLLEGE OF ENGINEERING, MALAD-MARVE ROAD, CHARKOP NAKA, MALAD (WEST), MUMBAI-400095

ATHARVA ROBOTICS CENTER
PRESS NOTE

ATHARVA ROBOTICS CENTER

➢ Atharva College Of Engineering has set up Industrial Robotics Training Center for Educational Institutions at ACE, Malad(West), Mumbai.

➢ ACE's Robotics Training Center is India's Second & Maharashtra's First industrial Training center in the Engineering colleges.

➢ ACE has set up Robotics Center in order to train students/industry professionals in Advanced Automated Manufacturing & produce highly skilled technical manpower in the field of Industrial Robotics. The trained manpower will help Indian manufacturing Industry to adopt latest technologies to improve quality & work.

KEY FEATURES OF ATHARVA ROBOTICS CENTER

➢ The center is equipped with standard training cell comprising of KUKA KR 16-2 C4 Industrial Robot with required auxiliary equipments.

➢ The training cell is capable of performing multitude of operations used by the automobile & other manufacturing/production industries.

➢ Simulation Lab is also being established with latest industrial robotics simulation software's like Simpro & Officelite used to design, develop & simulate robotics operation for different manufacturing establishments.

➢ Atharva Robotics center provides realistic, theoretical & practical training on KUKA KR 16-2 C4 Robot.

➢ This highly equipped Robotics Center will be a Milestone in the field of education & will boom the placement opportunities for student's as well as industry trainers/technicians.

ATHARVA COLLEGE OF ENGINEERING, MALAD-MARVE ROAD, CHARKOP NAKA, MALAD[WEST], MUMBAI-400095

FUTURE PLANS

- **Training**: The training program targets to <u>cover a minimum of 150 students</u> for next year 2016.
- **Course**: The next stage is to Start <u>Advanced Training Program</u>, where students get an exploration to in depth programming <u>concepts on KRL Language</u>.
- **Projects:** Final Year B.E. Projects are focused on Robotics & Robotic Arm Prototype.
- **STTP:** An ISTE sponsored STTP shall be proposed.
- **Industry/Education Sector:** Approach towards attraction of Industry Professionals & other education sectors are targeted for training on Robotics subject to feasibility.

ATHARVA ROBOTICS CENTER

EXCELLENCE REDEFINED...