Savitribai Phule Pune University

Board of Studies - Mechanical and Automobile Engineering

Undergraduate Program – Final Year Automation and Robotics (2019 pattern)

402542: Robotic Process Automation & Development					
Teaching Scheme		**Credits**		**Examination Scheme**	
Theory	03 Hrs/ Week	**Theory**	3	**In-Semester**	30 Marks
Practical	02 Hrs/ Week	**Practical**	1	**End-Semester**	70 Marks
				Term Work	25 Marks

Prerequisites:

Basic Programming Knowledge, Concepts of Modeling and Simulation.

Course Objectives:

1. To provide students with a comprehensive understanding of Robotic Process Automation (RPA) and its development.
2. To learn the concepts, tools, and techniques involved in automating business processes using RPA technology.
3. To design, develop, and deploy RPA bots to optimize and automate various business processes.

Course Outcomes:

On completion of the course the learner will be able to;

CO1: DESCRIBE RPA, where it can be applied and how it's implemented.

CO2: DESCRIBE the different types of variables, Control Flow and data manipulation techniques.

CO3: IDENTIFY and understand Image, Text and Data Tables Automation.

CO4: DESCRIBE how to handle the User Events and various types of Exceptions and strategies.

CO5: UNDERSTAND the Deployment of the Robot and maintain the connection.

CO6: UNDERSTAND need of deployment and maintenance of bots

Course Contents

Unit 1	**Introduction to Robotic Process Automation**

RPA BASICS: History of Automation - What is RPA - RPA vs Automation - Processes & Flowcharts - Programming Constructs in RPA - What Processes can be Automated - Types of Bots - Workloads which can be automated - RPA Advanced Concepts - Standardization of processes - RPA Development methodologies - Difference from SDLC - Robotic control flow architecture - RPA business case - RPA Team - Process Design Document/Solution Design Document - Industries best suited for RPA - Risks & Challenges with RPA - RPA and emerging ecosystem.

Unit 2	**RPA Tool Introduction and Basics**

Introduction to RPA Tool - The User Interface - Variables - Managing Variables - Naming Best Practices - The Variables Panel - Generic Value Variables - Text Variables - True or False Variables - Number Variables - Array Variables - Date and Time Variables - Data Table Variables - Managing Arguments - Naming Best Practices - The Arguments Panel - Using Arguments - About Imported Namespaces - Importing New Namespaces- Control Flow - Control Flow Introduction - If Else Statements - Loops - Advanced Control Flow - Sequences - Flowcharts - About Control Flow - Control Flow Activities - The Assign Activity - The Delay Activity - The Do While Activity - The If Activity - The Switch Activity - The While Activity - The For Each Activity - The Break Activity.

Unit3	Advanced Automation Concepts
Data Manipulation - Data Manipulation Introduction - Scalar variables, collections and Tables - Text Manipulation - Data Manipulation - Gathering and Assembling Data Scope and techniques of automation, Robotic process automation - What can RPA do? Benefits of RPA, Components of RPA, RPA platforms, The future of automation. Recording Introduction - Basic and Desktop Recording - Web Recording - Input/ Output Methods - Screen Scraping - Data Scraping - Scraping advanced techniques - Selectors - Defining and Assessing Selectors - Customization - Debugging - Dynamic Selectors - Partial Selectors	
Unit 4	**Advanced Automation Techniques**
RPA Challenge - Image, Text & Advanced Citrix Automation - Introduction to Image & Text Automation – Image-based automation - Keyboard based automation - Information Retrieval - Advanced Citrix Automation challenges - Best Practices - Using tab for Images - Starting Apps - Excel Data Tables & PDF - Data Tables in RPA - Excel and Data Table basics - Data Manipulation in excel – Extracting Data from PDF - Extracting a single piece of data - Anchors - Using anchors in PDF.	
Unit 5	**Handling User Events & Assistant Bots, Exception Handling**
What are assistant bots? - Monitoring system event triggers - Hotkey trigger - Mouse trigger - System trigger - Monitoring image and element triggers - An example of monitoring email - Example of monitoring a copying event and blocking it - Launching an assistant bot on a keyboard event. **EXCEPTION HANDLING:** Debugging and Exception Handling - Debugging Tools - Strategies for solving issues - Catching errors.	
Unit 6	**Deploying and Maintaining the Bot**
Publishing using publish utility - Creation of Server - Using Server to control the bots - Creating a provision Robot from the Server - Connecting a Robot to Server - Deploy the Robot to Server - Publishing and managing updates - Managing packages - Uploading packages - Deleting packages	

Books and Other Resources

Text Books:

1. Alok Mani Tripathi, "*Learning Robotic Process Automation*", Packt Publishing, 2018.

References Books:

1. Frank Casale, Rebecca Dilla, Heidi Jaynes, Lauren Livingston, "*Introduction to Robotic Process Automation: a Primer*", Institute of Robotic Process Automation, 1st Edition 2015.
2. Richard Murdoch, *Robotic Process Automation: Guide To Building Software Robots, Automate Repetitive Tasks & Become An RPA Consultant"*, Independently Published, 1st Edition 2018.
3. Srikanth Merianda," *Robotic Process Automation Tools, Process Automation and their benefits: Understanding RPA and Intelligent Automation"*, Consulting Opportunity Holdings LLC, 1st Edition 2018.
4. Lim Mei Ying, "*Robotic Process Automation with Blue Prism Quick Start Guide: Create software robots and automate business processes*", Packt Publishing, 1st Edition 2018.

Web References:

1. https://www.uipath.com/rpa/robotic-process-automation
2. https://www.academy.uipath.com

Term Work

The student shall complete the following activity as a Term Work (Any Eight):

1. Installing and configuring an RPA tool
2. Analyzing business processes for automation potential
3. Designing and documenting RPA workflows
4. Building and testing RPA bots using drag-and-drop interfaces
5. Integrating RPA bots with external systems and databases

6. Optimizing and improving RPA solutions
7. Exploring web automation and data extraction techniques
8. Implementing cognitive automation in RPA bots
9. Evaluating RPA performance and identifying optimization areas