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| Regulation  GRBT-20 | GODAVARI INSTITUTE OF ENGINEERING & TECHNOLOGY (Autonomous) | IV B.Tech  I Semester | | | |
| Course Code  201AI762A | **ROBOTIC PROCESS AUTOMATION**  **CSE(AI &ML)** |
| Teaching | Total contact hours:48 | L | T | P | C |
| Prerequisite(s): Basics of Programming Language | | 3 | 0 | 0 | 3 |

**Course Objective(s):**

1. To introduce students to the concept of Robotic Process Automation (RPA) and its use cases.
2. To provide an understanding of Automation Anywhere Enterprise Platform and its advanced features and capabilities.
3. To teach ways of creating bots using various recorders and commands.
4. To introduce the Web Control Room and Client features, including Activity, Devices, Workload, Audit Log, and Administration.
5. To demonstrate the use of APIs in RPA and client introduction.
6. To teach how to manage errors and control workflow using error handling and workflow designer.

**Course Outcome(s):**

After successful completion of this course, a student will be able to-

1. Comprehend RPA and its applications in various industries.
2. Create bots for automating various tasks. Describe how to handle the User Events and various types of Exceptions and strategies.
3. Familiar with various recorders and commands for creating bots.
4. Navigate through the Web Control Room and use its features.
5. Use APIs for RPA and manage errors and workflow using error handling and workflow designer.

**UNIT-I**

**Introduction to Robotic Process Automation**: Scope and techniques of automation, Robotic process automation - What can RPA do?, Benefits of RPA, Components of RPA, RPA platforms, The future of 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-II**

**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 - Data Manipulation - Data Manipulation Introduction - Scalar variables, collections and Tables - Text Manipulation - Data Manipulation - Gathering and Assembling Data

**UNIT-III**

**Advanced automation concepts & techniques**: 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 - 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-IV**

**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-V**

**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

**Text Book**

1. Alok Mani Tripathi, "Learning Robotic Process Automation: Create Software robots and automate business processes with the leading RPA tool - UiPath" Packt Publishing, 2017.

**Reference Books**

1. Robotic Process Automation A Complete Guide - 2020 Edition Kindle Edition.
2. Frank Casale , Rebecca Dilla, Heidi Jaynes , Lauren Livingston, “Introduction to Robotic Process Automation: a Primer”, Institute of Robotic Process Automation,1st Edition 2015.
3. Richard Murdoch, Robotic Process Automation: Guide To Building Software Robots, Automate Repetitive Tasks & Become An RPA Consultant”, Independently Published, 1st Edition 2018.
4. Srikanth Merianda,”Robotic Process Automation Tools, Process Automation and their benefits: Understanding RPA and Intelligent Automation”, Consulting Opportunity Holdings LLC, 1st Edition 2018.
5. 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 Resources:**

1. <https://nptel.ac.in/courses/112101099>
2. https://www.uipath.com/rpa/robotic-process-automation
3. https://www.academy.uipath.com

**CO-PO Mapping:**

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High]; '-' : No Correlation)

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|  | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** |
| **CO1** | 3 | - | - | 2 | 2 | - | 2 | - | - | - | 2 | - | 2 | 1 |
| **CO2** | 2 | 2 | 3 | 1 | 2 | - | 1 | - | - | - | 1 | - | 1 | - |
| **CO3** | 1 | 2 | 1 | 2 | 1 | - | 2 | - | - | - | 2 | - | 2 | - |
| **CO4** | 2 | 1 | - | 3 | 2 | - | - | - | - | - | 2 | - | - | 1 |
| **CO5** | 3 | 2 | - | - | 2 | 1 | - | - | - | - | 1 | - | - | 1 |

Assignment :

**UNIT-I**

**Introduction to Robotic Process Automation**:

* 1. Scope and techniques of automation,
  2. Robotic process automation - What can RPA do?,
  3. Benefits of RPA,
  4. Components of RPA,
  5. RPA platforms,
  6. The future of automation.
  7. RPA BASICS: History of Automation - What is RPA –
  8. RPA vs Automation –
  9. Processes & Flowcharts –
  10. Programming Constructs in RPA –
  11. What Processes can be Automated –
  12. Types of Bots - Workloads which can be automated –
  13. RPA Advanced Concepts - Standardization of processes –
  14. RPA Development methodologies –
  15. Difference from SDLC –
  16. Robotic control flow architecture –
  17. RPA business case –
  18. RPA Team - Process Design Document/Solution Design
  19. Document - Industries best suited for RPA –
  20. Risks & Challenges with RPA –
  21. RPA and emerging ecosystem.

**UNIT-II**

**RPA tool introduction and basics**:

2.1 Introduction to RPA Tool –

2.2 The User Interface - Variables - Managing Variables –

2.3 Naming Best Practices - The Variables Panel - Generic Value Variables - Text Variables – 2.4 True or False Variables – Number Variables - Array Variables - Date and Time Variables - Data Table Variables –

2.5 Managing Arguments –

2.6 Naming Best Practices - The Arguments Panel - Using Arguments –

2.7 About Imported Namespaces - Importing New Namespaces-

2.8 Control Flow - Control Flow Introduction - If Else Statements - Loops - Advanced Control Flow - Sequences - Flowcharts –

2.9 About Control Flow - Control Flow Activities –

2.10 The Assign Activity - The Delay Activity –

2.11 The Do While Activity - The If Activity - The Switch Activity –

2.12 The While Activity –

2.13 The For Each Activity –

2.14 The Break Activity –

2.15Data Manipulation - Data Manipulation

2.16 Introduction - Scalar variables,

2.17 collections and Tables –

2.18 Text Manipulation –

2.19 Data Manipulation –

2.20 Gathering and Assembling Data

**UNIT-III**

**Advanced automation concepts & techniques**:

* 1. Recording Introduction - Basic and Desktop Recording –
  2. Web Recording - Input/output Methods –
  3. Screen Scraping –
  4. Data Scraping –
  5. Scraping advanced techniques - Selectors –
  6. Defining and Assessing Selectors –
  7. Customization - Debugging –
  8. Dynamic Selectors - Partial Selectors –
  9. RPA Challenge - Image, Text & Advanced Citrix Automation –
  10. Introduction to Image & Text Automation - Image based automation - Keyboard based automation –
  11. Information Retrieval - Advanced Citrix Automation challenges - Best Practices - Using tab for Images –
  12. Starting Apps - Excel Data Tables & PDF - Data Tables in RPA - Excel and Data Table basics –
  13. Data Manipulation in excel – Extracting Data from PDF - Extracting a single piece of data - Anchors - Using anchors in PDF.

**UNIT-IV**

**Handling user events & assistant bots, exception handling:**

4.1 What are assistant bots? –

4.2 Monitoring system event triggers –

4.3 Hotkey trigger –

4.4 Mouse trigger –

4.5 System trigger –

4.6 Monitoring image and element triggers –

4.7 An example of monitoring email –

4.8 Example of monitoring a copying event and blocking it –

4.9 Launching an assistant bot on a keyboard event.

**Exception handling:**

4.10 Debugging and Exception Handling –

4.11 Debugging Tools –

4.12 Strategies for solving issues - Catching errors.

**UNIT-V**

**Deploying and maintaining the bot:**

* 1. Publishing using publish utility –
  2. Creation of Server –
  3. Using Server to control the bots –
  4. Creating a provision Robot from the Server –
  5. Connecting a Robot to Server –
  6. Deploy the Robot to Server –
  7. Publishing and managing updates –
  8. Managing packages –
  9. Uploading packages –
  10. Deleting packages