

**Programme Name/s** : Automation and Robotics  
**Programme Code** : AO  
**Semester** : Fourth  
**Course Title** : BASICS OF ROBOTIC PROCESS AUTOMATION  
**Course Code** : 314011

### I. RATIONALE

Robotic Process Automation (RPA) is one of the fastest-growing domains in the world that responds to the demands of various sectors to meet current workforce needs especially in IT with ease of work and quality. RPA, also known as Software Robotic, eliminates the need of human intervention in performing repetitive less complex task just by dragging and dropping techniques. This course aims to develop in students, the basic skills related to RPA.

### II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

The aim of this course is to help the student to attain the following industry/employer expected outcomes through various teaching learning experiences:

Develop a basic Robotic Process Automation (RPA) workflow.

### III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Design Graphical User Interface (GUI) using simple VB.
- CO2 - Identify the commands and tags of HTML, JavaScript to automate the robotic process.
- CO3 - Use appropriate tools and platforms of Robotic Process Automation (RPA).
- CO4 - Identify image, text by using data types and user events in RPA.
- CO5 - Describe the techniques used for office tool automation like Excel and PDF using UiPath .

### IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme						Credits	Paper Duration	Assessment Scheme										Total Marks
				Actual Contact Hrs./ Week			SLH	NLH	Theory			Based on LL & TL				Based on SL						
				CL	TL	LL						Practical										
							FA-TH	SA-TH				Total		FA-PR			SA-PR		SLA			
Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min											
314011	BASICS OF ROBOTIC PROCESS AUTOMATION	RPA	DSC	-	-	4	-	4	2	-	-	-	-	-	25	10	50@	20	-	-	75	

**Total IKS Hrs for Sem. : 0 Hrs**

Abbreviations: CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, \*# On Line Examination , @\$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.\* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.

6. \* Self learning hours shall not be reflected in the Time Table.  
7. \* Self learning includes micro project / assignment / other activities.

#### V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	TLO 1.1 Explore the basics of RPA. TLO 1.2 Develop simple program using menus and dialogs box. TLO 1.3 Apply relevant control flow and loop statements for a given problem. TLO 1.4 Design GUI using special functions.	<b>Unit - I Fundamentals of VB.net used in RPA</b> 1.1 Robotic Process Automation(RPA) - Concepts, Differentiating RPA from automation, Languages used for RPA, Basics of VB used in RPA 1.2 Menus-menu editor and popup menu 1.3 Control flow statement if- else, do-while Select Case statement 1.4 Special functions and tools -inputbox(), message box(), format(), date and time functions	Video Demonstrations Hands-on Collaborative learning
2	TLO 2.1 Use syntax of HTML in development of UiPath application. TLO 2.2 Use query language as a tool to create and modify table. TLO 2.3 Apply relevant HTML tools and functions of Cascading Style Sheets (CSS) and JavaScript in the given application.	<b>Unit - II Concept of HTML in RPA</b> 2.1 Use of HTML in User Interfaces designed in UiPath - concept 2.2 Basics of query language and relational algebra in creating and altering table contents 2.3 Programming using basic tags in HTML	Video Demonstrations Hands-on Collaborative learning
3	TLO 3.1 Describe the methodology and tools used for robotic process automation. TLO 3.2 Describe the procedure to install robotic automation tools. TLO 3.3 Design user interface using robotic automation tools.	<b>Unit - III RPA Platform</b> 3.1 Emergence of RPA - evolution, future of RPA, benefits of RPA 3.2 Working of RPA - methodology and key consideration 3.3 List the steps required to install the design user interface	Video Demonstrations Hands-on Collaborative learning
4	TLO 4.1 Select the relevant data types, variables for managing activities. TLO 4.2 Use Element triggers, Image trigger as user events to automizer activities. TLO 4.3 Design activities based on control flow techniques if-else, do-while, for loop.	<b>Unit - IV Designing the RPA using Events and Data Elements</b> 4.1 Data types-scalar, variables-managing variables for automizing process flow 4.2 Usage of user events -Element triggers, Image trigger 4.3 Simplified activities based on control flows statements using if-else, do-while, for loop	Video Demonstrations Hands-on Collaborative learning
5	TLO 5.1 Describe the scope of Excel automation in UiPath. TLO 5.2 Design robotic program for PDF automation in UiPath.	<b>Unit - V Applications of UiPath in Office Automation</b> 5.1 Excel automation- Concept in RPA tool, key benefits, Data Table Activities, new excel file generation. 5.2 PDF automation- Concept in RPA tool, key objectives, Extracting data from PDF, Optical Character Recognition (OCR), PDF generation from OCR	Video Demonstrations Hands-on Collaborative learning

#### VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.

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<b>Practical / Tutorial / Laboratory Learning Outcome (LLO)</b>	<b>Sr No</b>	<b>Laboratory Experiment / Practical Titles / Tutorial Titles</b>	<b>Number of hrs.</b>	<b>Relevant COs</b>
LLO 1.1 Install the RPA tool. LLO 1.2 Explore the features of the given RPA tool.	1	* Identification of features for the given RPA Tool (UiPath/ Blue Prism/ Automation Anywhere) with 'Welcome' message display.	2	CO1 CO3
LLO 2.1 Install visual studio. LLO 2.2 Use variable constant and the arithmetic operators for developing given program. LLO 2.3 Use 'Textbox' control and 'Button' control to design the given application.	2	* GUI design for arithmetic operation using VB.net	2	CO1
LLO 3.1 Use date, time and string function to develop the given application. LLO 3.2 Use 'DateTimePicker' control to design current time and date display.	3	Date and Time indicator using VB.net	2	CO1
LLO 4.1 Use the 'PictureBox' control and 'Listbox' control to design the problem statement. LLO 4.2 Use 'Timer' function in the given application. LLO 4.3 Execute the syntax for 'Switch' function statement to solve the given problem.	4	Rotation of 'PictureBox' on windows form using VB.net	2	CO1
LLO 5.1 Use 'Common Dialog' control to design various office tools. LLO 5.2 Use different special controls - 'FileListbox', 'Directory' and 'Drive' control.	5	* Explorer design using a directory, drive, FileListbox, and Common Dialog control	2	CO1
LLO 6.1 Use Multiple Document Interface (MDI) form concept to design given text editors.	6	* Notepad design with cut, copy, paste, file new, open, save functions using MDI form in VB.net	2	CO1
LLO 7.1 Use 'Data' control to add, delete, update the data through GUI. LLO 7.2 Write syntax of if-else statements.	7	* Generation of student score-card to manage the database using data tool in VB.net	2	CO1
LLO 8.1 Identify the logical steps for given document flow in HTML. LLO 8.2 Use CSS syntax for formatting the document. LLO 8.3 Use different tags to design the document.	8	* Pictorial document design a using HTML	2	CO2
LLO 9.1 Use different HTML List Tags	9	Selection of the various courses from the courses list given in the document using HTML	2	CO2
LLO 10.1 Use CSS syntax to represent the data. LLO 10.2 Design tabular format by using 'Table tag'.	10	* Student admission record in the form of table	2	CO2
LLO 11.1 Use radio button, checkbox tags to design survey form.	11	* Survey form designing using HTML	2	CO2

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LLO 11.2 Use form tag in HTML.				
LLO 12.1 Use frame Tag to link website.	12	* Development of a webpage to display various food corners available using frame tag in HTML/ JAVA scripting	4	CO2
LLO 13.1 Explore the features of dialog box in the given RPA tool (UiPath Studio).	13	* Activity to display the entered number using UiPath	2	CO3
LLO 14.1 Identify common data variables used in UiPath.	14	Analysis of basic mathematical functions using arguments and data variable in UiPath	2	CO4
LLO 15.1 Identify the types of variables and workflow in the RPA tools.	15	* Determination the number of files from the given folder path using different types of variables in UiPath	2	CO4
LLO 16.1 Assign data variables and activities for designing given application.	16	* Creation a Fibonacci series using data variables	2	CO4
LLO 17.1 Use data variable, arguments and different workflows.	17	Create a sequence that asks the user for first and last name, and gives choices to order from favourite snacks, and then displays the answers in UiPath	2	CO4
LLO 18.1 Use data variable, arguments and different workflow for given application.	18	Development of the current age calculation program using workflow technique in UiPath	2	CO4
LLO 19.1 Use control flow techniques to develop the activity.	19	Print 1 to 10 numbers using while control flow activity in UiPath	2	CO4
LLO 20.1 Use the basic control flow techniques to design the application. LLO 20.2 Design the given application using inputbox (), message box().	20	Odd and Even number identification using control flow techniques in UiPath	2	CO4
LLO 21.1 Use variables and control flow techniques for office tool automation.	21	* Data table creation in RPA using office tool automation in UiPath	2	CO5
LLO 22.1 Use variables and control flow techniques for Excel automation.	22	* Edit, Add, Delete the rows and columns in the data table in Excel file in UiPath	2	CO5
LLO 23.1 Use variables and control flow techniques to generate data table.	23	Conversion of Excel data from the file into the data table using UiPath	2	CO5
LLO 24.1 Use variables and control flow techniques to generate result sheet in Excel automation.	24	* Preparation of result sheet of an examination conducted for a student using UiPath	4	CO5
LLO 25.1 Use parameters of automation for PDF file.	25	Procedure of PDF text identification using PDF automation in UiPath	2	CO5
LLO 26.1 Use 'Select Extraction' type syntax for PDF file.	26	Extraction of PDF content and display it in textbox in UiPath	2	CO5
LLO 27.1 Use 'Read PDF Text' activity for PDF file.	27	* Read a PDF file using the Read PDF with OCR activity in UiPath	2	CO5
LLO 28.1 Use 'Read Range' and 'Write Range' functions to merge excel files in Excel Automation	28	Merge two Excel sheets and write to a new sheet in UiPath	2	CO5

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using UiPath.				
<b>Note : Out of above suggestive LLOs -</b> <ul style="list-style-type: none"> <li>• '*1 Marked Practicals (LLOs) Are mandatory.</li> <li>• Minimum 80% of above list of lab experiment are to be performed.</li> <li>• Judicial mix of LLOs are to be performed to achieve desired outcomes.</li> </ul>				

**VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)****Micro project**

- NA

<b>Note :</b>
<ul style="list-style-type: none"> <li>• Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.</li> <li>• The faculty must allocate judicial mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills.</li> <li>• If a microproject is assigned, it is expected to be completed as a group activity.</li> <li>• SLA marks shall be awarded as per the continuous assessment record.</li> <li>• For courses with no SLA component the list of suggestive microprojects / assignments/ activities are optional, faculty may encourage students to perform these tasks for enhanced learning experiences.</li> <li>• If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and maybe considered for FA-PR evaluations.</li> </ul>

**VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED**

<b>Sr.No</b>	<b>Equipment Name with Broad Specifications</b>	<b>Relevant LLO Number</b>
1	Personal Computers 8GB RAM,500GB HDD, i3 or higher processor	All
2	Software required: Visual Studio, Web browser, UiPath	All

**IX. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table) : NOT APPLICABLE****X. ASSESSMENT METHODOLOGIES/TOOLS****Formative assessment (Assessment for Learning)**

- For formative assessment of laboratory learning 25 marks.
- Each practical will be assessed considering 60% weightage to process, 40% weightage to product.

**Summative Assessment (Assessment of Learning)**

- End semester summative assessment is of 50 marks for laboratory learning.

**XI. SUGGESTED COS - POS MATRIX FORM**

<b>Course Outcomes (COs)</b>	<b>Programme Outcomes (POs)</b>	<b>Programme Specific Outcomes* (PSOs)</b>

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	<b>PO-1 Basic and Discipline Specific Knowledge</b>	<b>PO-2 Problem Analysis</b>	<b>PO-3 Design/ Development of Solutions</b>	<b>PO-4 Engineering Tools</b>	<b>PO-5 Engineering Practices for Society, Sustainability and Environment</b>	<b>PO-6 Project Management</b>	<b>PO-7 Life Long Learning</b>	<b>PSO-1</b>	<b>PSO-2</b>	<b>PSO-3</b>
CO1	2	2	2	2	-	-	1			
CO2	2	2	2	2	-	-	1			
CO3	2	2	2	2	-	-	2			
CO4	2	2	2	2	-	-	2			
CO5	2	2	2	2	-	-	2			

Legends :- High:03, Medium:02,Low:01, No Mapping: -

\*PSOs are to be formulated at institute level

**XII. SUGGESTED LEARNING MATERIALS / BOOKS**

<b>Sr.No</b>	<b>Author</b>	<b>Title</b>	<b>Publisher with ISBN Number</b>
1	Tripathi, Alok Mani	Learning Robotic Process Automation	Packt Publishing Ltd, 2018 ISBN: 978-1788470940
2	Taulli, Tom	The Robotic Process Automation Handbook	Apress,1st Edition, 2020 ISBN: 978-1484257296
3	Mullakara, Nandan; Asokan, Arun Kumar	Robotics Process Automation Projects	Packt Publishing Ltd, 2020 ISBN: 978-1839217357
4	Ying, Lim Mei	Robotic Process Automation with Blue Prism Quick Start Guide	Packt Publishing Ltd, 2018 ISBN: 978-1789610444
5	Javed, Adeel	Robotic Process Automation Using Uiopath Studiox	Springer India, 2022 ISBN: 978-1484278765

**XIII . LEARNING WEBSITES & PORTALS**

<b>Sr.No</b>	<b>Link / Portal</b>	<b>Description</b>
1	<a href="https://www.youtube.com/watch?v=8hH7B2CZwUc">https://www.youtube.com/watch?v=8hH7B2CZwUc</a>	About RPA Tool-BluePrism
2	<a href="https://www.youtube.com/watch?v=rVd66AFAeHs">https://www.youtube.com/watch?v=rVd66AFAeHs</a>	About RPA WorkFusion
3	<a href="https://www.youtube.com/watch?v=f4bRC3_b8to">https://www.youtube.com/watch?v=f4bRC3_b8to</a>	About KOFAX
4	<a href="https://www.uipath.com/learning/video-tutorials">https://www.uipath.com/learning/video-tutorials</a>	RPA tutorials
5	<a href="http://www.w3schools.com">www.w3schools.com</a>	HTML tutorials

**Note :**

- Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students