

**Program Name** : Diploma in Automation and Robotics  
**Program Code** : AO  
**Semester** : Sixth  
**Course Title** : Robotics Process Automation  
**Course Code** : 22682

### 1. RATIONALE

Robotic process automation (RPA) is a software technology that makes it easy to build, deploy, and manage software robots that emulate human actions interacting with digital systems and software. Robotic Process Automation ( RPA) as it is popularly called one of the fastest-growing domains in the world of Information Technology. This domain aims to automate a lot of manual processes and does it in a very efficient manner. The students will be able to learn basic of RPA on the basis of course content.

### 2. COMPETENCY

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

- Develop the simple automated process using RPA

### 3. COURSE OUTCOMES (COs)

The theory, practical experiences and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following industry oriented COs associated with the above mentioned competency:

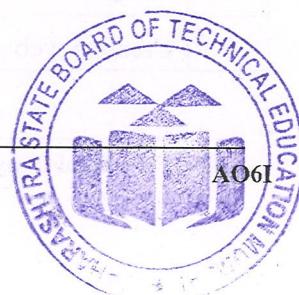
- a. Use Data models and languages to develop web page.
- b. Use Visual basic to design simple applications
- c. Use different object tools to develop simple GUI applications
- d. Describe the benefits of RPA and various platforms available on the market
- e. Identify Image, Text and Data Tables Automation by using variables and control flow techniques

### 4. TEACHING AND EXAMINATION SCHEME

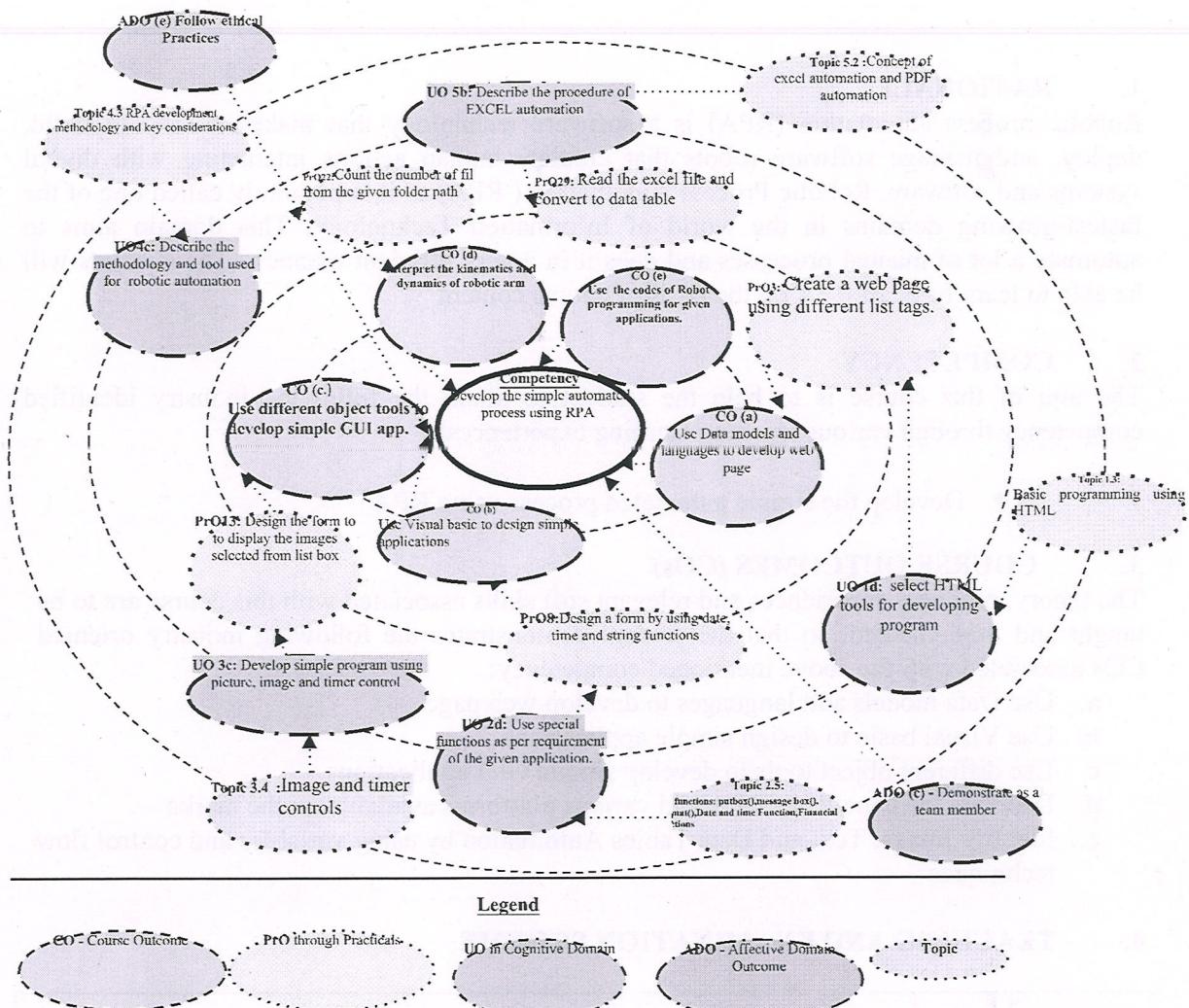
Teaching Scheme			Credit (L+T+P)	Examination Scheme															
L	T	P		Theory						Practical									
				Paper Hrs.	ESE		PA		Total		ESE		PA		Total				
					Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	
2	--	4	6	--	--	--	--	--	--	50#	20	50	20	100	40				

**Legends:** L-Lecture; T – Tutorial/Teacher Guided Theory Practice; P - Practical; C – Credit, ESE - End Semester Examination; PA - Progressive Assessment

### 5. COURSE MAP (with sample COs, PrOs, UOs, ADOs and topics)



This course map illustrates an overview of the flow and linkages of the topics at various levels of outcomes (details in subsequent sections) to be attained by the student by the end of the course, in all domains of learning in terms of the industry/employer identified competency depicted at the center of this map..

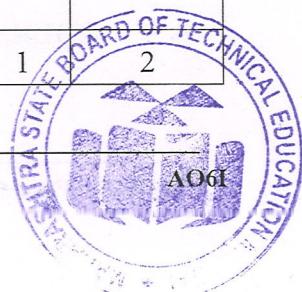


**Figure 1 - Course Map**

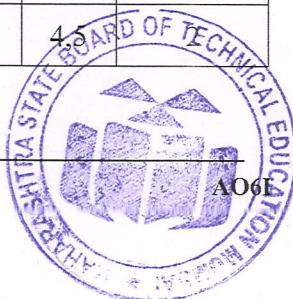
## 6. SUGGESTED PRACTICALS/ EXERCISES

The practicals in this section are PrOs (i.e. sub-components of the COs) to be developed and assessed in the student for the attainment of the competency.

Sr. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. Required
1	Create a web page to display sample message “ Web page designing using HTML”	1	2*
2	Create a web page using Basic HTML tags-I , Document Structure	1	2



	Tags and Text formatting tags		
3	Create a web page using different list tags.	1	2*
4	Create a web page to implement frame tags- image tags	1	2*
5	Create a web page to implement Table tags	1	2
6	Create a web page using form tag	1	2*
7	Design a web page to link a) a different web page on same site,b) a different location on the same web page	1	2*
8	Install Visual basic. net framework	1	2*
9	Study the Visual basic Integrated development environment	2	2*
10	Design a form to perform mathematical operations using input box and message box	2	2
11	Design a form by using date, time and string functions	2	2*
12	Design a form using picture box and timer control to rotate the picture after specific interval	3	2*
13	Design the form to display the images selected from list box	3	2*
14	Using image control and scroll bar, design form to change height, width of image, movement to image.	3	2
15	Design explorer using Directory, drive, file list box and common dialog controls.	3	2*
16	Design text editor with menu having copy, cut, paste, select, search, replace the text and load and save the file.	3	2*
17	Design a form to perform following operations on the file like create , open , read ,write , delete , search.	3	2*
18	Design student registration form to add, update,delete and save the record using data tools	3	2*
19	Install and Learn RPA packages - (automation anywhere/Ui path/blue prism)	4	2*
20	Understand the common data variables used in RPA	4	2*
22	Count the number of files from the given folder path	4	2
23	Find the entered number is even or odd using input dialog box and message box using if else condition	4,5	2*
24	Print Fibonacci series by creating variable of int 32[] using for activity	4,5	2*
25	Print count 1 to 10 using while activity		



26	Create a data table in RPA	5	2
27	Edit, add, delete the rows and column of data table	5	2*
28	Write the data table into excel file	5	2
29	Read the excel file and convert to data table	5	2
30	Read PDF text activity to read content in PDF	5	2*
31	Extract content from PDF	5	2
32	Read a PDF File using the Read PDF with OCR activity	5	2
<b>Total</b>		<b>64</b>	

**Note**

- i. A suggestive list of PrOs is given in the above table. More such PrOs can be added to attain the COs and competency. A judicial mix of minimum 24 or more practical need to be performed, out of which, the practicals marked as '\*' are compulsory, so that the student reaches the 'Precision Level' of Dave's 'Psychomotor Domain Taxonomy' as generally required by the industry.
- ii. The 'Process' and 'Product' related skills associated with each PrO is to be assessed according to a suggested sample given below:

S. No.	Performance Indicators	Weightage in %
1.	Preparation of experimental setup.	20
2.	Setting and operation.	20
3.	Safety measures.	10
4.	Observation and recording.	10
5.	Interpretation of result and conclusion.	20
6.	Answer to sample questions.	10
7.	Submission of report in time.	10
<b>Total</b>		<b>100</b>

The above PrOs also comprise of the following social skills/attitudes which are Affective Domain Outcomes (ADOs) that are best developed through the laboratory/field based experiences:

- Follow safety practices.
- Practice good housekeeping.
- Demonstrate working as a leader/a team member.
- Maintain tools and equipment.
- Follow ethical Practices.



The ADOs are not specific to any one PrO, but are embedded in many PrOs. Hence, the acquisition of the ADOs takes place gradually in the student when s/he undertakes a series of practical experiences over a period of time. Moreover, the level of achievement of the ADOs according to Krathwohl's 'Affective Domain Taxonomy' should gradually increase as planned below:

- 'Valuing Level' in 1<sup>st</sup> year
- 'Organizing Level' in 2<sup>nd</sup> year
- 'Characterizing Level' in 3<sup>rd</sup> year.

## 7. MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED

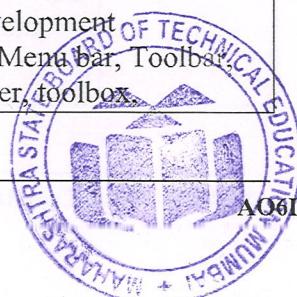
The major equipment with broad specification mentioned here will usher in uniformity in conduct of experiments, as well as aid to procure equipment by authorities concerned.

Sr. No.	Equipment Name	Pr.O. S. No.
1	A modern WINDOWS computer with Internet connection	ALL
2	PC with RAM 2GB, Hard disk 10 GB	ALL
3	Microsoft visual studio	ALL
4	RPA developer tool - UiPath, Blue prism, automation everywhere - any one	ALL

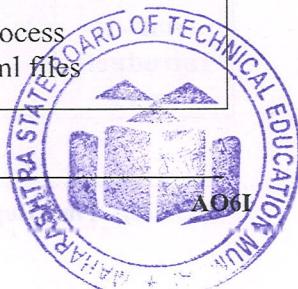
## 8. UNDERPINNING THEORY COMPONENTS

The following topics are to be taught and assessed in order to develop the sample UOs given below for achieving the COs to attain the identified competency. More UOs could be added.

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
Unit – I Introduction Data models and languages	1a. Describe relational models with diagrams 1b. Use query languages to create and modify the tools 1c. Use special functions of SQL 1d. Select HTML tools for developing program 1e. Apply relevant tools to develop program using HTML 1f. Write basic program using XML	1.1 Basics of relational models(overview, entity relation model, entity and entity set,E-R diagram) 1.2 Query languages - relational algebra , creating and altering tables 1.3 Handling data with SQL 1.4 Introduction to HTML and its basic tags 1.5 Basic programming using HTML 1.6 Basic of XML
Unit– II Introduction to	2a. Describe the the procedure to create menus for given application	2.1 Integrated development environment: Menu bar, Toolbar, Project explorer, toolbox



<b>Visual Integrated Environment IDE and programming fundamentals</b>	2b. Write the expressions using different events 2c. Select the relevant data types for given task 2d. Apply relevant control flow or loop statement to solve given problem 2e. Use special functions as per requirement of the given application.	properties window, form designer, form layout. 2.2 Drag and drop operations. 2.3 Data variables, data types, constants, arrays, collections. 2.4 Control flow statements-nested control structure and exit statement. 2.5 Special functions: Inputbox(), message box(), Format(), Date and time Function, Financial functions
<b>Unit : III Basic controls and event handling in VBN</b>	3a. Create GUI using basic control for given application 3b. Apply date time picker for given task 3c. Develop simple program using picture, image and timer control 3d. Create menus and dialogs for a given application.	3.1 Basic Control: Textbox, listbox, combobox, scroll bar, frame option button. 3.2 date time picker control and month view mode. 3.3 containers: picture box, frame 3.4 Image and timer controls 3.5 Displaying Dialogs 3.6 Menus: menu editor and popup menu.
<b>Unit– IV Introduction of RPA</b>	4a. Describe the use of RPA in Automation 4b. Describe the procedure to automate process 4c. Describe the methodology and tool used for robotic automation 4d. install the UiPath studio user interface	4.1 Emergence of Robotic Process Automation (RPA) • Evolution of RPA • Future of RPA • Differentiating RPA from Automation • Defining Robotic Process Automation & its benefits 4.2 How Robotic Process Automation works 4.3 RPA development methodology and key considerations • 4.4 List of Robotic Process Automation Tools 4.5 Introduction and installing Uilhath Studio 4.6 UiPath Studio User Interface
<b>Unit-V Designing the robotic process</b>	5a. Select the relevant data types, variables for managing the activities 5b. Describe the procedure of EXCEL automation 5c. Use different control loops to design robotic process 5d. Design robotic program to automate pdf files.	5.1 Data Types • Scalar • Arrays and Collections • User Defined, Libraries • Variables - Managing Variables • Activities 5.2 Concept of excel automation and PDF automation 5.3 Robot Process for Excel app: • Data capturing • Create a new process • Create new .xaml files



		<ul style="list-style-type: none"> <li>• Read data from Excel</li> <li>• Excel Application Scope properties</li> <li>• While loop and counter</li> <li>• Typing Into input fields</li> </ul> <p>5.4 Robot Process for PDF:</p> <ul style="list-style-type: none"> <li>• Optical Character Recognition</li> <li>• Optical Character Recognition</li> <li>• Assign file paths</li> <li>• Read PDF with OCR</li> </ul>
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**Note:** To attain the COs and competency, above listed UOs need to be undertaken to achieve the 'Application Level' and above of Bloom's 'Cognitive Domain Taxonomy'

## 9. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

- Not applicable -

## 10. SUGGESTED STUDENT ACTIVITIES

Other than the classroom and laboratory learning, following are the suggested student-related *co-curricular* activities which can be undertaken to accelerate the attainment of the various outcomes in this course: Students should conduct following activities in group and prepare reports of about 5 pages for each activity, also collect/record physical evidences for their (student's) portfolio which will be useful for their placement interviews:

- a. Prepare journal based on practical performed in laboratory
- b. Compare different RPA software available in market
- c. Automate 3 real-world business processes from scratch.

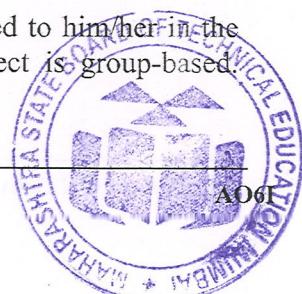
## 11. SUGGESTED SPECIAL INSTRUCTIONAL STRATEGIES (if any)

These are sample strategies, which the teacher can use to accelerate the attainment of the various learning outcomes in this course:

- a. Massive open online courses (*MOOCs*) may be used to teach various topics/subtopics.
- b. '*L*' in item No. 4 does not mean only the traditional lecture method, but different types of teaching methods and media that are to be employed to develop the outcomes.
- c. About *15-20% of the topics/subtopics* which are relatively simpler or descriptive in nature is to be given to the students for *self-directed learning* and assess the development of the COs through classroom presentations (see implementation guideline for details).
- d. With respect to item No.10, teachers need to ensure to create opportunities and provisions for *co-curricular activities*.
- e. Video programs/YouTube may be used to teach various topics and sub topics.
- f. Demonstrate students thoroughly before they start doing the practice.
- g. Encourage students to refer to different books and websites to have a deeper understanding of the subject.
- h. Observe continuously and monitor the performance of students in the Lab
- i. Use proper equivalent analogy to explain different concepts.
- j. Use Flash/Animations to explain various Robotic actions

## 12. SUGGESTED MICRO-PROJECTS

*Only one micro-project* is planned to be undertaken by a student assigned to him/her in the beginning of the semester. In the first four semesters, the micro-project is group-based.



However, in the fifth and sixth semesters, it should preferably be *individually* undertaken to build up the skill and confidence in every student to become a problem solver so that s/he contributes to the projects of the industry. In special situations where groups have to be formed for micro-projects, the number of students in the group should *not exceed three*.

The micro-project could be industry application based, internet-based, workshop-based, laboratory-based or field-based. Each micro-project should encompass two or more COs which are in fact, an integration of PrOs, UOs and ADOs. Each student will have to maintain a dated work diary consisting of individual contributions in the project work and give a seminar presentation of it before submission. The total duration of the micro-project should not be less than **16 (sixteen) student engagement hours** during the course. The student ought to submit a micro-project by the end of the semester to develop the industry oriented COs.

A suggestive list of micro-projects are given here. Similar micro-projects could be added by the concerned faculty:

- Build an automated system for Invoice verification System using RPA
- Develop an automated system for resume processing with RPA
- Develop Excel Sheet using RPA
- Develop pdf automation using RPA
- Automate any one real-time process of generating bill using RPA

### 13. SUGGESTED LEARNING RESOURCES

S. No.	Title of Book	Author	Publication
1	Learning Robotic Process Automation	Alok Mani Tripathi	Packt publishing ltd,28th march 2018
2	The Robotic Process Automation Handbook	Tom Taulli	Apress, 1st edition,(February 29,2020)

### 14. SUGGESTED SOFTWARE / LEARNING WEBSITES:

- <https://youtu.be/3zXb8H3odek>
- <https://youtu.be/G0gVfi7ri7w>
- Courses available on UiPath, udemy

