Robotic Process Automation (Industry Supported)

Course Code 22CS544 Course type PEC Credits L-T-P 2-0-1

Hours/week: L - T- P 2 - 0 – 2 Total credits 3

Total Contact Hours L = 20 Hrs; T = 0 Hrs; P = 20 Hrs CIE Marks 100

Total = 40 Hrs

Flipped Classes content 10 Hours SEE Marks 100

Course learning objectives

1. To Describe Robotic Process Automation (RPA) and its benefits

2. To understand and use sequences / flowcharts to build automation

3. To Explain and apply data manipulation

4. To utilize the concept of selectors, descriptors to build ui automation

5. To Describe version control system and orchestrator functionalities.

Required Knowledge of : Basics of logical reasoning and programming

Unit – I Contact Hours = 8 Hours

Introduction to Robotic Process Automation (RPA) concepts, tools and fundamentals of

implementation: Robotic Process Automation (RPA) and its benefits, UiPath Business Automation

Platform, the UiPath core RPA components (Studio, Orchestrator and Robot with Assistant), two types

of UiPath robots—attended and unattended, the key components of the UiPath Studio user interface,

modern vs classic design, variables in an automation project , common data types used in UiPath Studio

and conversion methods, arguments in an automation project, Invoke Workflow File Activity to chain

workflow execution and pass data through arguments, Automation best practices, global constants and

global variables in your automation projects

Unit – II Contact Hours = 8 Hours

Control flow, common RPA implementations, Exception handling and Debugging : Sequences and

Flowcharts, control flow statements for decisions and iterations, Excel and Workbook activities,

different types of exceptions, best practices for error and exception handling , file and folder activities

- selecting, creating, deleting, moving and renaming files and folders, UiPath Studio integration

capabilities - Gmail account, retrieve, work with emails, Microsoft Office 365 activities, working with

PDF files, debugging actions

Unit – III Contact Hours = 8 Hours

Data Manipulation: Explain and apply data manipulation: VB.NET methods to manipulate string

variables, RegEx builder in UiPath Studio, string activities in Studio, Lists and data manipulation on Lists,

Invoke and String Conversion methods, Arrays and Lists, dictionary variables and data manipulation,

Working with Datatable variable in Studio, comparison of worksheet and a data table

Unit – IV Contact Hours = 8 Hours

UI Automation, Descriptors and Selectors

Synchronizing activities in automation workflows, Check App State activity and Verify Execution feature,

Pick Branch activity, Targeting methods used in UI automation and characteristics ,Validate target

elements, Fine-tune descriptors using the 'Dynamic Text Target' option, wildcards, variables, and

making adjustments to enhance image accuracy, the structure and type of selectors in the context of

web development, the functionality and purpose of the Property Explorer tool during editing selectors

Unit – V Contact Hours = 8 Hours

Version Control System, Orchestrator resources and Project organization:

Orchestrator capabilities and entities, tenant context and the folder context, Orchestrators resources,

Benefits and challenges of using version control systems, basic GIT features for version control, project

layout for an automation process, split complex automation project into functional workflows that can

be developed separately, benefits of utilizing best practices for project organization

Flipped Classroom Details

Unit No. I II III IV V

No. for Flipped 2 2 2 2 2

Classroom Sessions

List of Experiments

Unit No. No. of Topic(s) related to Experiment

Experiments

I 4 Basic automation Example

II 3 Web automation and Conditional Statements

III 2 Data Table and Data manipulation

IV 2 Screen Scraping , Data Scraping and PDF automation

V 1 Email Automation & Exception Handling

Unit No. Self-Study Topics

I Programming fundamentals

III Practical exercises on conditional statements and loops

V Exercises on exception handling

Books

Text Books:

1. Alok Mani Tripathi, Learning Robotic Process Automation, Publisher: Packt Publishing

Release Date: March 2018ISBN: 9781788470940

Reference Books:

1. Frank Casale (Author), Rebecca Dilla (Author), Heidi Jaynes (Author), Lauren Livingston

(Author), Introduction to Robotic Process Automation: a Primer, Institute of Robotic Process

Automation.

2. Richard Murdoch, Robotic Process Automation: Guide To Building Software Robots,

Automate Repetitive Tasks & Become An RPA Consultant

3 Srikanth Merianda, Robotic Process Automation Tools, Process Automation and their

benefits: Understanding RPA and Intelligent Automation

E-resources (NPTEL/SWAYAM. Any Other)- mention links

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

Course delivery methods Assessment methods

1. Chalk and Talk 1. IA tests- Theory & Lab based

2. PPT and Videos 2. Project phase 1 & 2

3. Flipped Classes 3. SEE- Project evaluation

4. Practice session/Demonstrations in Labs 4. SEE- Solving an Open ended problem

5. Virtual Labs ( if present)

Course Outcome (COs)

Learning Levels:

Re - Remember; Un - Understand; Ap - Apply; An - Analysis; Ev - Evaluate; Cr - Create

At the end of the course, the student will be able to Learning PO(s) PSO(s)

Level

1. Explain and utilize the fundamentals of Robotic Process Un 1 1

Automation

2. Develop familiarity and deep understanding of UiPath tools Ap 3 1

3. Develop the ability to independently design and create robots Ap 3 1

for business processes

Prepare for UiPath Certified Professional Automation 1,2,3,5,9,10,11,12 1,2,3

4 Developer Associate exam by further learning Ap

Scheme of Continuous Internal Evaluation (CIE):

For integrated courses, a lab test also will be conducted at the end of the semester. The lab test

(COMPULSORY) will be part of the CIE. No SEE for Lab.

THEORY (40 marks) PROJECT (60 marks)

IA test IA test Total

(Theory) (Lab) Project Phase 1 Project Phase 2 Project report

25 marks 15 marks 25 marks 25 marks 10 marks 100 marks

-Theory IA test should be of one-hour duration.

-Lab IA test should be of two/three-hour duration.

-Project batch will ideally consist of 2 students (maximum of 3).

-Project Phase 1 presentation will be conducted after 6 weeks and Project Phase 2 presentation will be

conducted after 13 weeks from the start of the semester.

-Submission of Project report is compulsory.

Eligibility for SEE:

1. 40% and above (16 marks and above) in theory component

2. 40% and above (24 marks and above) in project component

3. Not eligible in any one of the two components will make the student Not Eligible for SEE

Semester End Examination (SEE):

1. It will be conducted for 100 marks having 3 hours duration.

Lab Open ended program/problem/experiment

Write-up & execution (1 open ended expt)- (20 marks write-up + 50 marks

20 marks algorithm/flowchart + 10 marks execution)

Project evaluation

a. Initial write up stating the objectives, methodology and the 10 marks

2. outcome 100 marks

b. Hardware project: Exhibiting and demonstration of working

of project.

Software project: Demonstration of the programming 30 marks

capabilities by writing flowchart, algorithm and codes

related to a section of the project.

c. Viva-voce 10 marks

3. Minimum marks required in SEE to pass: Score should be > 35%, however overall score of

CIE + SEE should be > 40%.

4. SEE will be conducted in project batches by Internal & External examiners together.

CO-PO Mapping (planned) CO-PSO Mapping

(planned)

CO PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO 12 PSO1 PSO2 PSO3

1   

2  

3  

4           

Tick mark the CO, PO and PSO mapping

Sl No Skill & competence enhanced Applicable Industry Job roles students can take up

after undergoing the course Sectors & domains after undergoing the course

1 Robotic Process Automation HealthCare, Finance, RPA solution architect, RPA

with UiPath Banking, Education etc developer, RPA Evangelist, RPA

Subject Matter Expert etc

Robotic Process Automation (Industry Supported)

Course Code 22CS544 Course type PEC Credits L-T-P 2-0-1

Hours/week: L - T- P 2 - 0 – 2 Total credits 3

Total Contact Hours L = 20 Hrs; T = 0 Hrs; P = 20 Hrs CIE Marks 100

Total = 40 Hrs

Flipped Classes content 10 Hours SEE Marks 100

Course learning objectives

1. To Describe Robotic Process Automation (RPA) and its benefits

2. To understand and use sequences / flowcharts to build automation

3. To Explain and apply data manipulation

4. To utilize the concept of selectors, descriptors to build ui automation

5. To Describe version control system and orchestrator functionalities.

Required Knowledge of : Basics of logical reasoning and programming

Unit – I Contact Hours = 8 Hours

Introduction to Robotic Process Automation (RPA) concepts, tools and fundamentals of

implementation: Robotic Process Automation (RPA) and its benefits, UiPath Business Automation

Platform, the UiPath core RPA components (Studio, Orchestrator and Robot with Assistant), two types

of UiPath robots—attended and unattended, the key components of the UiPath Studio user interface,

modern vs classic design, variables in an automation project , common data types used in UiPath Studio

and conversion methods, arguments in an automation project, Invoke Workflow File Activity to chain

workflow execution and pass data through arguments, Automation best practices, global constants and

global variables in your automation projects

Unit – II Contact Hours = 8 Hours

Control flow, common RPA implementations, Exception handling and Debugging : Sequences and

Flowcharts, control flow statements for decisions and iterations, Excel and Workbook activities,

different types of exceptions, best practices for error and exception handling , file and folder activities

- selecting, creating, deleting, moving and renaming files and folders, UiPath Studio integration

capabilities - Gmail account, retrieve, work with emails, Microsoft Office 365 activities, working with

PDF files, debugging actions

Unit – III Contact Hours = 8 Hours

Data Manipulation: Explain and apply data manipulation: VB.NET methods to manipulate string

variables, RegEx builder in UiPath Studio, string activities in Studio, Lists and data manipulation on Lists,

Invoke and String Conversion methods, Arrays and Lists, dictionary variables and data manipulation,

Working with Datatable variable in Studio, comparison of worksheet and a data table

Unit – IV Contact Hours = 8 Hours

UI Automation, Descriptors and Selectors

Synchronizing activities in automation workflows, Check App State activity and Verify Execution feature,

Pick Branch activity, Targeting methods used in UI automation and characteristics ,Validate target

elements, Fine-tune descriptors using the 'Dynamic Text Target' option, wildcards, variables, and

making adjustments to enhance image accuracy, the structure and type of selectors in the context of

web development, the functionality and purpose of the Property Explorer tool during editing selectors

Unit – V Contact Hours = 8 Hours

Version Control System, Orchestrator resources and Project organization:

Orchestrator capabilities and entities, tenant context and the folder context, Orchestrators resources,

Benefits and challenges of using version control systems, basic GIT features for version control, project

layout for an automation process, split complex automation project into functional workflows that can

be developed separately, benefits of utilizing best practices for project organization

Flipped Classroom Details

Unit No. I II III IV V

No. for Flipped 2 2 2 2 2

Classroom Sessions

List of Experiments

Unit No. No. of Topic(s) related to Experiment

Experiments

I 4 Basic automation Example

II 3 Web automation and Conditional Statements

III 2 Data Table and Data manipulation

IV 2 Screen Scraping , Data Scraping and PDF automation

V 1 Email Automation & Exception Handling

Unit No. Self-Study Topics

I Programming fundamentals

III Practical exercises on conditional statements and loops

V Exercises on exception handling

Books

Text Books:

1. Alok Mani Tripathi, Learning Robotic Process Automation, Publisher: Packt Publishing

Release Date: March 2018ISBN: 9781788470940

Reference Books:

1. Frank Casale (Author), Rebecca Dilla (Author), Heidi Jaynes (Author), Lauren Livingston

(Author), Introduction to Robotic Process Automation: a Primer, Institute of Robotic Process

Automation.

2. Richard Murdoch, Robotic Process Automation: Guide To Building Software Robots,

Automate Repetitive Tasks & Become An RPA Consultant

3 Srikanth Merianda, Robotic Process Automation Tools, Process Automation and their

benefits: Understanding RPA and Intelligent Automation

E-resources (NPTEL/SWAYAM. Any Other)- mention links

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

Course delivery methods Assessment methods

1. Chalk and Talk 1. IA tests- Theory & Lab based

2. PPT and Videos 2. Project phase 1 & 2

3. Flipped Classes 3. SEE- Project evaluation

4. Practice session/Demonstrations in Labs 4. SEE- Solving an Open ended problem

5. Virtual Labs ( if present)

Course Outcome (COs)

Learning Levels:

Re - Remember; Un - Understand; Ap - Apply; An - Analysis; Ev - Evaluate; Cr - Create

At the end of the course, the student will be able to Learning PO(s) PSO(s)

Level

1. Explain and utilize the fundamentals of Robotic Process Un 1 1

Automation

2. Develop familiarity and deep understanding of UiPath tools Ap 3 1

3. Develop the ability to independently design and create robots Ap 3 1

for business processes

Prepare for UiPath Certified Professional Automation 1,2,3,5,9,10,11,12 1,2,3

4 Developer Associate exam by further learning Ap

Scheme of Continuous Internal Evaluation (CIE):

For integrated courses, a lab test also will be conducted at the end of the semester. The lab test

(COMPULSORY) will be part of the CIE. No SEE for Lab.

THEORY (40 marks) PROJECT (60 marks)

IA test IA test Total

(Theory) (Lab) Project Phase 1 Project Phase 2 Project report

25 marks 15 marks 25 marks 25 marks 10 marks 100 marks

-Theory IA test should be of one-hour duration.

-Lab IA test should be of two/three-hour duration.

-Project batch will ideally consist of 2 students (maximum of 3).

-Project Phase 1 presentation will be conducted after 6 weeks and Project Phase 2 presentation will be

conducted after 13 weeks from the start of the semester.

-Submission of Project report is compulsory.

Eligibility for SEE:

1. 40% and above (16 marks and above) in theory component

2. 40% and above (24 marks and above) in project component

3. Not eligible in any one of the two components will make the student Not Eligible for SEE

Semester End Examination (SEE):

1. It will be conducted for 100 marks having 3 hours duration.

Lab Open ended program/problem/experiment

Write-up & execution (1 open ended expt)- (20 marks write-up + 50 marks

20 marks algorithm/flowchart + 10 marks execution)

Project evaluation

a. Initial write up stating the objectives, methodology and the 10 marks

2. outcome 100 marks

b. Hardware project: Exhibiting and demonstration of working

of project.

Software project: Demonstration of the programming 30 marks

capabilities by writing flowchart, algorithm and codes

related to a section of the project.

c. Viva-voce 10 marks

3. Minimum marks required in SEE to pass: Score should be > 35%, however overall score of

CIE + SEE should be > 40%.

4. SEE will be conducted in project batches by Internal & External examiners together.

CO-PO Mapping (planned) CO-PSO Mapping

(planned)

CO PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO 12 PSO1 PSO2 PSO3

1   

2  

3  

4           

Tick mark the CO, PO and PSO mapping

Sl No Skill & competence enhanced Applicable Industry Job roles students can take up

after undergoing the course Sectors & domains after undergoing the course

1 Robotic Process Automation HealthCare, Finance, RPA solution architect, RPA

with UiPath Banking, Education etc developer, RPA Evangelist, RPA

Subject Matter Expert etc