



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Diploma Engineering

Level: Diploma

Branch: Information & Communication Technology

Subject Code : DI04032051

Subject Name : Mobile Application

w. e. f. Academic Year:	2025-26
Semester:	4 th
Category of the Course:	Professional Elective - II

Prerequisite:	-
Rationale:	<p>This course is indispensable in today's mobile app development landscape as it empowers students with the knowledge and hands-on skills to craft innovative and user-friendly Android applications using MIT App Inventor. Serving as a gateway to mobile app development, the course not only delves into the intricacies of building Android apps but also introduces students to fundamental principles of app design and usability. MIT App Inventor provides a user-friendly, visual programming environment, making it accessible for beginners while offering robust capabilities for creating feature-rich applications. The inclusion of MIT App Inventor in the curriculum caters to the growing demand for skilled Android app developers and individual's adept at translating creative ideas into functional and visually appealing mobile experiences. Moreover, the course places emphasis on collaborative development practices by introducing students to version control and teamwork, fostering skills essential for success in the dynamic field of mobile app development.</p>

Course Outcome:

After Completion of the Course, Student will be able to develop interactive and user-friendly Android applications with proficiency in utilizing MIT App Inventor's visual programming environment.

No	Course Outcomes	RBT Level
01	Design basic applications as sets of event handlers, synthesizing effective responses to user-initiated, timer, and external events.	R,U,A
02	Use component properties, variables, control blocks and logic blocks in app designing.	R,U,A
03	Design animations with Timer Events and plot various types of charts such as Line charts, Pie charts, and Column charts.	R,U,A
04	Develop android app by using list, dictionaries and procedures concepts.	R,U,A
05	Develop android app using location, Bluetooth, Map and web component.	R,U,A

*Revised Bloom's Taxonomy (RBT)



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Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+ (PR/2)	Assessment Pattern and Marks				Total Marks
L	T	PR		C	Theory		Tutorial / Practical	
			ESE (E)		PA(M)	PA(I)	ESE(V)	
0	2	4	4	0	0	20	30	50

Course Content:

Unit No.	Content	No. of Hours	% of Weightage
Unit-1 Introduction to MIT App inventor and an App's Architecture	1.1 The App Inventor Environment: Component designer, Blocks editor 1.2 App Architecture: Components, Behavior 1.3 An App as a set of event handlers 1.4 Event types: User initiated events, Timer events, Animation events, external events 1.5 Event Handlers response: Repeat block, interact with web, remember things, ask questions	5	18%
Unit-2 Properties, Variables and Decision making	2.1 Properties of component 2.2 Defining variables, Setting and getting variables, local and global variables 2.3 Setting and Displaying variable using an expression, Building complex expressions 2.4 Testing Conditions with control blocks 2.5 Programming Conditions Within Conditions 2.6 Programming Complex conditions	7	21%
Unit-3 Creating animated apps and charts	3.1 Adding a Canvas Component to Your App 3.2 The Canvas Coordinate System 3.3 Animating Objects with Timer Events 3.4 Creating Movement: Speed, collision detection, EdgeReached, CollidingWith, NoLongerCollidingWith 3.5 Plot charts: Line chart, Pie chart, Column chart	5	18%
Unit-4 Lists, Dictionaries, Procedures and Reusing Blocks	4.1 Creating a List Variable 4.2 Selecting an Item in a List, Using an Index to Traverse a List 4.3 Defining a Dynamic List, Adding an Item, displaying a List, Removing an Item from a List 4.4 Dictionaries 4.5 Defining a Procedure, Calling a Procedure 4.6 Adding Parameters to Your Procedure, Returning Values from a Procedure 4.7 Reusing Blocks Among Apps	5	18%



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Unit-V Communicating with the Sensors and Web	5.1 Sensing Location and displaying it with App Inventor	8	25%
	5.2 Using the Accelerometer		
	5.3 Using Bluetooth		
	5.4 The Web Component		
Total		30	100

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks (in %)					
R Level	U Level	A Level	N Level	E Level	C Level
NA					

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

References/Suggested Learning Resources:

(a) Books:

Sr. No.	Title of Book	Author	Publication with place, year and ISBN
1	App Inventor 2: Create your own android apps	David Wolber, Hal Abelson, Allen Spertus, Liz Looney	O'Reilly, 2015, 9781491906842
2	Learn to Program with App Inventor	Lyra Blizzard Logan	No Starch Press, 2020, 978-1-59327-968-4
3	Building a mobile app: design and program your own app	Sarah Guthals	John Wiley & Sons, Inc., 2017, 978-1-119-37642-2
4	MIT App Inventor Projects 50+ Android and iOS Apps with Rasberry Pi, ESP32 and Arduino	Dogan Ibrahim	Elektor Publication, 2020, 978-1-907920-89-9
5	App Inventor 2 Essentials	Felicia Kamriani, Krishnendu Roy	Packt Publishing, 2016, 978-1-78528-110-5

(b) Open source software and website:

1. <https://appinventor.mit.edu/>
2. <https://www.youtube.com/user/MITAppInventor>
3. <https://appinventor.mit.edu/explore/ai2/tutorials>



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SUGGESTED PRACTICAL EXERCISES:

Sr.No	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. Required
1	Create a basic app with a button and a label using the Component, Designer and also implement functionality to display a message on label when the button is clicked.	I	2
2	Define a set of components for a drawing app, including buttons for different colors and shapes. Implement behavior to draw on the screen based on user interactions.	I	2
3	Implement an app where shaking the device triggers an event. Use this event to change the background color of the app.	I	2
4	Create “Hello World” application to “Hello World” in the middle of the screen in the red color with white background.	I	2
5	Create an app with a moving object (e.g., a sprite) that changes its position every second using Timer events. Experiment with different speeds and directions.	II	2
6.	Create an app where a pet animal(e.g., a sprite) that moves with sound effect.	II	2
7.	Build a translator app where user can enter text in textbox and clicking button gets translated output. Use List picker to select source and target language.	II	2
8.	Develop an app to calculate area of Square, rectangle and triangle.	II	2
9.	Create an app to display multiplication table of entered number in textbox.	II	2
10.	Create a basic calculator app that display result of arithmetic operations like addition, subtraction, multiplication, division and square root as well as power of the given number.	II	2
11.	Create bouncing ball app where ball bounce back if edge is detected.	III	2
12.	Change the color of the ball based on how fast it is moving in Bouncing ball App.	III	2
13.	Create an app to plot bar, line and pie charts.	III	4
14.	Create an app to plot graph from given .csv file.	III	2
15.	Create a to-do list app with a dynamic list. Allow users to add, remove, and mark tasks as completed.	IV	2
16.	Create Resistor color coding app which output resistance in ohm according to selected color bands.	IV	4
17.	Implement a procedure for a common action in your app, such as displaying a message. Call this procedure from different parts of your app.Modify the procedure to accept parameters, such as the message to be displayed. Demonstrate use of parameterized Procedures.	IV	4
18	Create an application a) To call a phone number entered by the user. b) To send a text message to phone number entered by user.	V	4



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19.	Create an app to transfer message using Bluetooth between two mobile phones.	V	4
20.	Develop an app to control LED connected with NodeMCU using Bluetooth.	V	2
21.	Create an app that uses the Web component to send and Receive data from any IoT cloud server.	V	4
22.	Develop an app to monitor the Temperature using NodeMCU and temperature sensor.	V	2
23.	Create an app that simplify your own daily work or college routine work.	V	4
Total			60

List of Laboratory/Learning Resources Required:

Sr.No.	Equipment Name with Broad Specifications	PrO. No.
1.	Computer system with internet connectivity: Windows 10 or higher Version with minimum 4GB or higher RAM	All

Suggested Project List:

1. Mini App Challenge: Each student creates a simple but unique app (e.g., quiz app, expense tracker, daily planner). Best apps can be showcased in the classroom.
2. Peer-to-Peer Teaching: Students explain an app feature (like Bluetooth, Maps, Web API) to classmates through a short presentation.
3. App Innovation Contest: Organize a small hackathon where students develop an app for solving a real-life college or community problem.
4. Code Reuse Activity: Students find ways to reuse blocks and procedures in multiple apps and present their efficiency improvement.
5. App Review & Improvement: Students pick an existing mobile app (popular or local) and suggest improvements in UI, usability, or features.
6. IoT Integration Task: Students develop a simple IoT-connected app (e.g., controlling appliances, monitoring temperature) using NodeMCU + MIT App Inventor.
7. Industry Connect Activity: Students interact with a local startup/IT professional and prepare a report on mobile app development trends.
8. Poster / Video Presentation: Create posters or short demo videos explaining their project app to a non-technical audience.



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9. Team Collaboration Task (Version Control): Practice using GitHub or any collaborative tool while building an app in a team.

Suggested Activities for Students: If any

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 perform following activities in group and prepare reports of about 5 pages for each activity. They should also collect/record physical evidences for their (student's) portfolio which may be useful for their placement interviews:

- a) Explore App Inventor Extensions:
- b) Develop a Collaborative Mobile App
- c) Contribute to the App Inventor Community:
- d) Undertake course "Developing Android Apps with App Inventor" available on coursera platform. (<https://www.coursera.org/learn/app-inventor-android>)

PO-COMPETENCY-CO MAPPING

Program Outcomes (POs):

1. **Basic & Discipline specific knowledge:** An apply knowledge of basic mathematics, science and engineering fundamentals and engineering specialization to solve the engineering problems.
2. **Problem Analysis:** Identify and analyze well defined engineering problems using codified standard methods.
3. **Design/ Development of Solution:** Design solutions for well-defined technical problems and assist with the design of systems, components or processes to meet specified needs.
4. **Engineering Tools, Experimentation and Testing:** Apply modern engineering tools and relevant technique to conduct standard tests and measurements.
5. **Engineering practices for Society, Environment and sustainability:** Apply relevant technology in context of Society, sustainability, environment and ethical practices.
6. **Project Management:** Use engineering management principles individually, as a team member or a leader to manage projects and effectively communicate about well-defined engineering activities.
7. **Life-long learning:** Ability to analyze individual needs and engage in updating in the context of context of technological changes.

Program Specific Outcomes (PSOs):

1. Develop proficiency in Installation, maintenance and troubleshooting of electronics and communication systems.
2. Create customized solution of real-life problems using hardware and software.

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