

RGPV (DIPLOMA WING) BHOPAL		OBE CURRICULUM FOR THE COURSE		FORMAT-3	Sheet No. 1/5
Branch	Information Technology			Semester	VI
Course Code		Course Name	IoT with Cloud Computing		
Course Outcome - 1	Make use of IoT Development tools			Teach Hrs	Mark s
Learning Outcome 1	Explain Internet of Things			8	10
Contents	<ul style="list-style-type: none"> IoT Definition, features & it's components, IoT Principles, Challenges & Applications Conceptual Framework & IoT Architecture IoT reference model 				
Method of Assessment	External: End semester theory examination (Pen paper test).				
Learning Outcome 2	Demonstrate IoT development tools and platform.			7	10
Contents	<ul style="list-style-type: none"> IoT development Tools: Arduino, arduino types like Uno / Nano / Mega, arduino fundamentals & it's configuration Raspberry Pi: Introduction, configuration, board setting 				
Method of Assessment	Internal: Mid semester theory examination (Pen paper test).				
Learning Outcome 3	Experiment with IoT IDE			6	10
Contents	<ul style="list-style-type: none"> Installing Arduino IDE, Perform running Sketches (blinking LED, blink without delay) Demonstration of Raspberry Pi 				
Method of Assessment	External: Laboratory observation and viva voce.				
RGPV (DIPLOMA WING) BHOPAL		OBE CURRICULUM FOR THE COURSE		FORMAT-3	Sheet No. 2/5

Branch	Information Technology			Semester	VI
Course Code		Course Name	IoT with Cloud Computing		
Course Outcome – 2	Construct IoT applications using IoT Components and protocols			Teach Hrs	Mark s
Learning Outcome 4	Explain sensors, actuator & protocols for IoT			10	10
Contents	<ul style="list-style-type: none"> IoT Sensors: Introduction, sensor types, features, basic components, working principles of different sensors Actuator and it's types Microcontroller for IoT Overview of IoT protocols: MQTT, COAP, SOAP, REST, HTTP, XMPP, WEBSOCKET 				
Method of Assessment	External: End semester theory examination (Pen paper test).				
Learning Outcome 5	Illustrate different smart real-time IoT applications			5	10
Contents	IoT Case Studies: Smart cities, smart health service, smart home, smart agriculture				
Method of Assessment	Internal: Mid semester theory examination (Pen paper test).				
Learning Outcome 6	Experiment with IoT components using Arduino			6	10
Contents	<ul style="list-style-type: none"> Perform interfacing of sensors with Arduino Perform interfacing of actuators with Arduino Perform interfacing of servomotor with Arduino 				
Method of Assessment	Internal: Lab Observation/Assignment				
RGPV (DIPLOMA WING) BHOPAL		OBE CURRICULUM FOR THE COURSE		FORMAT-3	Sheet No. 3/5
Branch	Information Technology			Semester	VI

Course Code		Course Name	IoT with Cloud Computing		
Course Outcome - 3	Apply different IoT technologies for designing simple IoT applications.			Teach Hrs	Marks
Learning Outcome 7	Explain technologies & Model for IoT			8	10
Contents	<ul style="list-style-type: none"> IoT Enabled Technologies Overview: RFID, NFC, 6LOWPAN, ZIGBEE, WIFI, WIMAX, Bluetooth, IPv4 & IPv6 IoT Communication Models (Publisher Subscriber, Request-Response, Push-Pull, Exclusive pair) IoT Gateways Privacy & security issues in IoT 				
Method of Assessment	External: End semester theory examination (Pen paper test).				
Learning Outcome 8	Compare machine to machine with IoT			7	10
Contents	<ul style="list-style-type: none"> M2M Overview , M2M value chains, IoT Value Chain, M2M Vs IoT Industry 4.0 standard Overview : Introduction, Software Defined network (SDN), Network Function Virtualization (NFV) 				
Method of Assessment	External: End semester theory examination (Pen paper test).				
Learning Outcome 9	Make use of IoT technologies			6	10
Contents	Perform experiment using Arduino with latest IoT Technologies for eg. Smoke detector, Temperature Monitoring, Garbage Collector				
Method of Assessment	External: Laboratory observation and viva voce.				
RGPV (DIPLOMA WING) BHOPAL		OBE CURRICULUM FOR THE COURSE		FORMAT-3	Sheet No. 4/5
Branch	Information Technology			Semester	VI
Course Code		Course Name	IoT with Cloud Computing		

Course Outcome - 4	Construct Cloud services, cloud platform & its applications for IoT			Teach Hrs	Mark s
Learning Outcome 10	Explain Cloud computing & its services			8	10
Contents	<ul style="list-style-type: none"> • Cloud computing definition, features, benefits & limitations, • Cloud services (SAAS, PAAS, IAAS), Cloud Architecture • Public, private & hybrid cloud, Cloud Virtualization 				
Method of Assessment	External: End semester theory examination (Pen paper test).				
Learning Outcome 11	Outline Cloud platform for IoT.			7	10
Contents	Case study on available IoT Cloud Platform like AWS IoT/ Azure IoT / ThingSpeak				
Method of Assessment	Internal–Mid semester/Quiz/Short Answer type questions (pen paper)				
Learning Outcome 12	Make use of IoT cloud platform.			6	10
Contents	Setup working environment for available IoT cloud platform (AWS/AZURE/ThingSpeak)				
Method of Assessment	External: Laboratory observation and viva voce.				
RGPV (DIPLOMA WING) BHOPAL		OBE CURRICULUM FOR THE COURSE		FORMAT-3	Sheet No. 5/5
Branch	Information Technology			Semester	VI
Course Code		Course Name	IoT with Cloud Computing		
Course Outcome - 5	Apply Cloud computing data services for IoT to develop real time application			Teach Hrs	Mark s
Learning Outcome 13	Explain cloud storage, virtualization & security			7	10

Contents	<ul style="list-style-type: none"> • Cloud Storage, High availability & disaster recovery, Cloud service requirement, Cloud adoption model • Cloud Virtualization Technologies, Cloud security & Vulnerability 		
Method of Assessment	External: End semester theory examination (Pen paper test).		
Learning Outcome 14	Demonstrate Lifecycle of Cloud data for IoT, IoT Levels and deployment templates	8	10
Contents	<ul style="list-style-type: none"> • IoT cloud-data Collection, IoT data analytics, IoT data life Cycle • Different IoT levels for real-time application deployment (level 1: Home Automation, Level-2: Smart Irrigation, Level-3: Package Tracking, Level-4: Noise Monitoring, Level-5: Forest Fire Detection, Level-6: Weather Monitoring System) 		
Method of Assessment	External: End semester theory examination (Pen paper test).		
Learning Outcome 15	Develop IoT applications using cloud computing approach	6	10
Contents	Develop small IoT real-time application based on cloud service		
Method of Assessment	Internal: Lab Observation/Assignment		

NOTE: *"available" means latest tools / technology, since tools name mentioned as per current industry trends that may get change over course of time hence faculties are not restricted to teach or follow tools as mentioned, faculties can have their option with change of tool technology.

REFERENCE BOOKS:

S No	Title & Publication	Author
1	Internet of things: Architecture and Design principles published by McGraw Hill.	Rajkamal
2.	Internet of things: A hands on approach	Arshdeep Bahga
3.	Internet of Things: Do it yourself projects with Arduino, RaspberryPi and BeagleBone black	Donald Norris
4.	Cloud Computing , published by Wiley publication	Dr. Kumar Sourabh
5.	https://nptel.ac.in/courses/106/105/106105166/	Video Lecture, IITKGP
6.	https://www.javatpoint.com/iot-internet-of-things	Web resource
7.	https://www.arduino.cc/	Web resource
8.	https://docs.arduino.cc/tutorials/	Web resource
9.	https://docs.aws.amazon.com/iot/latest/developerguide/iot-gs.html	Web resource
10.	E-books/E-tools/Relevant software to be used as recommended by AICTE/RGPV	

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME			Branch Code		Course Code		CO Code	LO Code	Format No. 4
					I	0	4		1	1	
Course Name	IoT with Cloud Computing										
CO Description	Make use of IoT Development tools										
LO Description	Explain Internet of Things										
SCHEME OF STUDY											
S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks				
1	<ul style="list-style-type: none"> IoT Definition, features & it's components, IoT Principles, Challenges & Applications Conceptual Framework & IoT Architecture IoT reference model 	Interactive classroom teaching, demonstration, quiz, assignments, tutorial	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/quiz/tutorial to make students practice their knowledge.	8	NIL	Handouts, chalk board, PPT, text book, charts, video film.					
SCHEME OF ASSESSMENT											
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required			External / Internal				
1	End semester theory examination	Pen Paper Test	10	Question paper + Rating scale			External				
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)											
Faculties must aware students with IoT Components, Framework & their real time applications											

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME			Branch Code			Course Code			CO Code	LO Code	Format No. 4
					I	0	4				1	2	
Course Name		IoT with Cloud Computing											
CO Description		Make use of IoT Development tools											
LO Description		Demonstrate IoT development tools and platform.											
SCHEME OF STUDY													
S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks						
1	<ul style="list-style-type: none"> IoT development Tools: Arduino, arduino types like Uno / Nano / Mega, arduino fundamentals & it's configuration Raspberry Pi: Introduction, configuration, board setting 	Interactive classroom teaching, demonstration, quiz, assignments, tutorial	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	7	NIL	Handouts, chalk board, PPT, text book, charts, video film.							
SCHEME OF ASSESSMENT													
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required			External / Internal						
1	Mid semester theory examination (Pen paper test).	Pen Paper / Quiz / Short Answer	10	Test Paper + rating scale			Internal						
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)													
<ul style="list-style-type: none"> Instructor explains the basic fundamental of Arduino & Raspberry Pi with their Pin Configuration Instructor & Students can use the online browser Simulator “Wokwi” for simulate Arduino projects without any hardware. The can be able to download their sketch from it. 													

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME			Branch Code			Course Code			CO Code	LO Code	Format No. 4
					I	0	4				1	3	
Course Name	IoT with Cloud Computing												
CO Description	Make use of IoT Development tools												
LO Description	Experiment with IoT IDE												
SCHEME OF STUDY													
S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks						
1	<ul style="list-style-type: none"> Installing Arduino IDE, Perform running Sketches (blinking LED, blink without delay) Demonstration of Raspberry Pi 	Interactive lab classroom teaching, demonstration, quiz, assignments, tutorial	Teacher will demonstrate major components inside the lab to students, students will practice, provide quiz, assignment etc., teacher will conduct remedial and tutorials.	NIL	6	Handouts, chalk board, PPT, text book, charts, Computers IDE							
SCHEME OF ASSESSMENT													
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal								
1	Laboratory observation and viva voce.	Student will be asked to installation procedure of Arduino IDE & perform small practical / Laboratory observation Viva	10	Observation schedule/check-list /rating scales /rubrics	External								
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)													
Faculty can be refer the official site (https://www.arduino.cc/en/software) for downloading the Arduino software & it's learning document. After Installing the IDE, open the IDE & go to file menu , there are many Built in Examples which can be performed by faculty & students.													

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME			Branch Code			Course Code			CO Code	LO Code	Format No. 4
					I	0	4				2	4	
Course Name		IoT with Cloud Computing											
CO Description		Construct IoT applications using IoT Components and protocols											
LO Description		Explain sensors, actuator & protocols for IoT											
SCHEME OF STUDY													
S. No.	Learning Content			Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required			Remarks		
1	<ul style="list-style-type: none"> IoT Sensors: Introduction, sensor types, features, basic components, working principles of different sensors Actuator and it's types Microcontroller for IoT Overview of IoT protocols: MQTT, COAP, SOAP, REST, HTTP, XMPP, WEBSOCKET 			Interactive classroom teaching, demonstration, quiz, assignments, tutorial	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	10	NIL	Handouts, chalk board, PPT, text book, charts, video film.					
SCHEME OF ASSESSMENT													
S. No.	Method of Assessment	Description of Assessment			Maximum Marks	Resources Required			External / Internal				
1	End semester theory examination	Pen Paper Test			10	Question paper + rating scale			External				
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)													
NIL													

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME			Branch Code			Course Code			CO Code	LO Code	Format No. 4
					I	0	4				2	5	
Course Name		IoT with Cloud Computing											
CO Description		Construct IoT applications using IoT Components and protocols											
LO Description		Illustrate different smart real-time IoT applications											
SCHEME OF STUDY													
S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks						
1	IoT Case Studies: Smart cities, smart health service, smart home, smart agriculture	Interactive classroom teaching, demonstration, quiz, assignments, tutorial	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	5	NIL	Handouts, chalk board, PPT, text book, charts, video film.							
SCHEME OF ASSESSMENT													
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required			External / Internal						
1	Mid semester theory examination	Pen Paper / Quiz / Short answer	10	Test paper + Rating scale			Internal						
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)													
Students must be visit various website or web resources for IoT Case Studies like https://www.iotone.com/case-studies													

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME			Branch Code			Course Code			CO Code	LO Code	Format No. 4
					I	0	4				2	6	
Course Name		IoT with Cloud Computing											
CO Description		Construct IoT applications using IoT Components and protocols											
LO Description		Experiment with IoT components using Arduino											
SCHEME OF STUDY													
S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks						
1	<ul style="list-style-type: none"> Perform interfacing of sensors with Arduino Perform interfacing of actuators with Arduino Perform interfacing of servomotor with Arduino 	Interactive lab classroom teaching, demonstration, quiz, assignments, tutorial	Teacher will demonstrate major components inside the lab to students, students will practice, provide quiz, assignment etc., teacher will conduct remedial and tutorials.	NIL	6	Handouts, chalk board, PPT, text book, charts, video film.							
SCHEME OF ASSESSMENT													
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required			External / Internal						
1	Lab Observation/Assignment	Student will be asked to perform Arduino Interfacing with different IoT components via Lab Observation	10	Observation schedule/check-list /rating scales /rubrics			Internal						
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)													
Faculty must be visit official arduino website for perform the interfacing of sensors, actuators & servomotors with Arduino. There are various small projects which will be done using it. Visit web resource like https://create.arduino.cc/projecthub/JANAK13/using-sensors-with-arduino-eab1ec													

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME			Branch Code			Course Code			CO Code	LO Code	Format No. 4
					I	0	4				3	7	
Course Name		IoT with Cloud Computing											
CO Description		Apply different IoT technologies for designing simple IoT applications.											
LO Description		Explain technologies & Model for IoT											
SCHEME OF STUDY													
S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks						
1	<ul style="list-style-type: none"> IoT Enabled Technologies Overview: RFID, NFC, 6LOWPAN, ZIGBEE, WIFI, WIMAX, Bluetooth, IPv4 & IPv6 IoT Communication Models (Publisher Subscriber, RequestResponse, Push-Pull, Exclusive pair) IoT Gateways Privacy & security issues in IoT 	Interactive classroom teaching, demonstration , quiz, assignments, tutorial	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	8	NIL	Handouts, chalk board, PPT, text book, charts, video film.							
SCHEME OF ASSESSMENT													
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required			External / Internal						
1	End semester theory examination	Pen Paper Test	10	Question paper + rating scale			External						
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)													
Faculty must be given the overview & working principle of different IoT Enabled Technologies and necessity of IoT communication models.													

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME			Branch Code			Course Code			CO Code	LO Code	Format No. 4
					I	0	4				3	8	
Course Name	IoT with Cloud Computing												
CO Description	Apply different IoT technologies for designing simple IoT applications.												
LO Description	Compare machine to machine with IoT												
SCHEME OF STUDY													
S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks						
1	<ul style="list-style-type: none"> M2M Overview , M2M value chains, IoT Value Chain, M2M Vs IoT Industry 4.0 standard Overview : Introduction, Software Defined network (SDN), Network Function Virtualization (NFV) 	Interactive classroom teaching, demonstration, quiz, assignments, tutorial	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	7	NIL	Handouts, chalk board, PPT, text book, charts, video film.							
SCHEME OF ASSESSMENT													
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required			External / Internal						
1	End semester theory examination	Pen Paper Test	10	Question paper + rating scale			External						
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)													
NIL													

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME			Branch Code			Course Code			CO Code	LO Code	Format No. 4
					I	0	4				3	9	
Course Name	IoT with Cloud Computing												
CO Description	Apply different IoT technologies for designing simple IoT applications.												
LO Description	Make use of IoT technologies												
SCHEME OF STUDY													
S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required						Remarks	
1	Perform experiment using Arduino with latest IoT Technologies for eg. Smoke detector, Temperature Monitoring, Garbage Collector	Interactive lab classroom teaching, demonstration, quiz, assignments, tutorial	Teacher will demonstrate major components inside the lab to students, students will practice, provide quiz, assignment etc., teacher will conduct remedial and tutorials.	NIL	6	Handouts, chalk board, PPT, text book, charts, video film.							
SCHEME OF ASSESSMENT													
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required			External / Internal						
1	Laboratory test by observation	Student will be asked to develop a simple IoT based application	10	Observation schedule/check-list /rating scales /rubrics			External						
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)													
Faculty visit Arduino official website (https://create.arduino.cc/projecthub) for performing IoT projects based on different technologies.													

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME			Branch Code			Course Code			CO Code	LO Code	Format No. 4
					I	0	4				4	10	
Course Name		IoT with Cloud Computing											
CO Description		Construct Cloud services, cloud platform & its applications for IoT											
LO Description		Explain Cloud computing & its services											
SCHEME OF STUDY													
S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks						
1	<ul style="list-style-type: none"> Cloud computing definition, features, benefits & limitations, Cloud services (SAAS, PAAS, IAAS), Cloud Architecture Public, private & hybrid cloud, Cloud Virtualization 	Interactive classroom teaching, demonstration, quiz, assignments, tutorial	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	8	NIL	Handouts, chalk board, PPT, text book, charts, video film.							
SCHEME OF ASSESSMENT													
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required			External / Internal						
1	End semester theory examination	Pen Paper Test	10	Question paper + rating scale			External						
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)													
NIL													

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME			Branch Code			Course Code			CO Code	LO Code	Format No. 4
					I	0	4				4	11	
Course Name		IoT with Cloud Computing											
CO Description		Construct Cloud services, cloud platform & its applications for IoT											
LO Description		Outline Cloud platform for IoT											
SCHEME OF STUDY													
S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks						
1	Case study on available IoT Cloud Platform like AWS IoT/ Azure IoT / ThingSpeak	Interactive classroom teaching, demonstration, quiz, assignments, tutorial	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	7	NIL	Handouts, chalk board, PPT, text book, charts, video film.							
SCHEME OF ASSESSMENT													
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required				External / Internal					
1	Quiz/ Short Answer type questions	Quiz/ Short Answer /Pen Paper	10	Pen paper test + rating scale				Internal					
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)													
For performing the case studies, visit the official websites of AWS IoT (https://aws.amazon.com/iot-core/features/), Azure IoT(https://azure.microsoft.com/en-in/overview/iot/) & ThingSpeak (https://thingspeak.com/) .													

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME			Branch Code			Course Code			CO Code	LO Code	Format No. 4
					I	0	4				4	12	
Course Name	IoT with Cloud Computing												
CO Description	Construct Cloud services, cloud platform & its applications for IoT												
LO Description	Make use of IoT cloud platform.												
SCHEME OF STUDY													
S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks						
1	Setup working environment for available IoT cloud platform (AWS/AZURE/ThingSpeak)	Interactive lab classroom teaching, demonstration, quiz, assignments, tutorial	Teacher will demonstrate major components inside the lab to students, students will practice, provide quiz, assignment etc., teacher will conduct remedial and tutorials.	NIL	6	Handouts, chalk board, PPT, text book, charts, video film.							
SCHEME OF ASSESSMENT													
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required			External / Internal						
1	Laboratory observation and viva voce.	Student setup IoT cloud platform	10	Observation schedule/check-list /rating scales /rubrics			External						
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)													
Faculty & Students setup IoT cloud environment for IoT analytics platform service that allows you to aggregate, visualize, and analyze live data streams in the cloud. (https://thingspeak.com/)													

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME			Branch Code			Course Code			CO Code	LO Code	Format No. 4
					I	0	4				5	13	
Course Name	IoT with Cloud Computing												
CO Description	Apply Cloud computing data services for IoT to develop real time application												
LO Description	Explain cloud storage, virtualization & security												
SCHEME OF STUDY													
S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks						
1	<ul style="list-style-type: none"> Cloud Storage, High availability & disaster recovery, Cloud service requirement, Cloud adoption model Cloud Virtualization Technologies, Cloud security & Vulnerability 	Interactive classroom teaching, demonstration, quiz, assignments, tutorial	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	7	NIL	Handouts, chalk board, PPT, text book, charts, video film.							
SCHEME OF ASSESSMENT													
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required			External / Internal						
1	End semester theory examination	Pen Paper Test	10	Question paper + rating scale			External						
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)													
NIL													

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME			Branch Code			Course Code			CO Code	LO Code	Format No. 4
					I	0	4				5	14	
Course Name		IoT with Cloud Computing											
CO Description		Apply Cloud computing data services for IoT to develop real time application											
LO Description		Demonstrate Lifecycle of Cloud data for IoT, IoT Levels and deployment templates											
SCHEME OF STUDY													
S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks						
1	<ul style="list-style-type: none"> IoT cloud-data Collection, IoT data analytics, IoT data life Cycle Different IoT levels for real-time application deployment (level 1: Home Automation, Level-2: Smart Irrigation, Level-3: Package Tracking, Level-4: Noise Monitoring, Level-5: Forest Fire Detection, Level-6: Weather Monitoring System) 	Interactive classroom teaching, demonstration, quiz, assignments, tutorial	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/quiz/tutorial to make students practice their knowledge.	8	NIL	Handouts, chalk board, PPT, text book, charts, video film.							
SCHEME OF ASSESSMENT													
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required			External / Internal						
1	End semester theory examination	Pen Paper Test	10	Question paper + rating scale			External						
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)													
NIL													

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME			Branch Code			Course Code			CO Code	LO Code	Format No. 4
					I	0	4				5	15	
Course Name	IoT with Cloud Computing												
CO Description	Apply Cloud computing data services for IoT to develop real time application												
LO Description	Develop IoT applications using cloud computing approach												
SCHEME OF STUDY													
S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks						
1	Develop small IoT real-time application based on cloud service	Interactive lab classroom teaching, demonstration, quiz, assignments, tutorial	Teacher will demonstrate major components inside the lab to students, students will practice, provide quiz, assignment etc., teacher will conduct remedial and tutorials.	NIL	6	Handouts, chalk board, PPT, text book, charts, video film.							
SCHEME OF ASSESSMENT													
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required			External / Internal						
1	Lab Observation/Assignment	Student will be asked to develop a small IoT-Cloud based Project / Lab Observation	10	Observation schedule/check-list /rating scales /rubrics			Internal						
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)													
Faculty visit Arduino official website (https://create.arduino.cc/projecthub/products/arduino-iot-cloud) for performing IoT-Cloud projects based on different technologies.													