

RGPV (DIPLOMA WING) BHOPAL		OBE CURRICULUM FOR THE COURSE		FORMAT-3	Sheet No. 1/5	
Branch	Electrical Engineering			Semester	VI	
Course Code	613	Course Name	Internet of Things			
Course Outcome - 1		Use basics of Digital techniques and explain fundamental elements of IOT			Teach Hrs	Marks
Learning Outcome E0161311	Identify basics of Number Systems and logic gates. (Cognitive domain)			5 Hrs	10 Marks	
Contents	<ul style="list-style-type: none"> • Number Systems: decimal, binary, octal, hexadecimal and BCD; definition and interconversions. • Compliments: 1's and 2's compliment. • Binary Addition and Subtraction. • Logic Gates: AND, OR, NOT, NAND, NOR, X-OR, X-NOR; truth tables and circuit symbols. 					
Method of Assessment		External: End semester theory examination (Pen paper test).				
Learning Outcome E0161312	Explain elements of IOT (Cognitive domain)			7 Hrs	10 Marks	
Contents	<ul style="list-style-type: none"> • IOT: History, Definition, Architecture, Applications, Advantages and Disadvantages • IOT Architecture(Ecosystem), Hardware and Open Source Software Tools for developing IOT Applications • Arduino Board: Components, Functionality, IDE (Integrated Development Environment) 					
Method of Assessment		External: End semester theory examination (Pen paper test).				
Learning Outcome E0161313	Demonstrate use of Arduino IDE (Psychomotor domain)			5 Hrs	10 Marks	
Contents	<ul style="list-style-type: none"> • To build simple sketch in Arduino IDE /board to blink LED • To build simple sketch in Arduino IDE/board to change frequency of blinking of LED 					
Method of Assessment		Internal: Performance of given task and viva voce.				

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Branch	Electrical Engineering			Semester	VI
Course Code	613	Course Name	Internet of Things		
Course Outcome -2	Identify functions of various elements of Arduino programming.			Teach Hrs	Marks
Learning Outcome E0161321	Explain the basic Arduino programming (Cognitive domain)			7 Hrs	10 Marks
Contents	<ul style="list-style-type: none"> • Programming Language: Definition, types • Coding style: indentation, white spaces, comments • Variables: definition and types local global,int,float boolean ,string • Loop and conditional statements: if for and while • Arithmetic and logic operations • Arrays and strings (literals, variables,) • Functions :user defined ,syntax , parameters 				
Method of Assessment	External: End semester theory examination (Pen paper test).				
Learning Outcome E0161322	Use the digital / analog inputs and outputs in the Arduino programs and utilize inbuilt Arduino libraries. (Cognitive domain)			5 Hrs	Marks 10
Contents	<ul style="list-style-type: none"> • Digital Input and Output • Standard Arduino libraries • Inbuilt mathematical functions • Bit manipulation 				
Method of Assessment	Internal: Mid semester theory examination (Pen paper test)				
Learning Outcome E0161323	Develop basic Audrino programs (Psychomotor domain)			7 Hr	10 Marks
Contents	<ul style="list-style-type: none"> • Write a sketch that blinks 20 times, then paused for 3 seconds, and then started again using For command. • Write a sketch using if command to slowed down blinking of a LED to a certain point, it goes back to its fast starting speed. • Write a sketch to use self create function to blink LED. • Write a sketch to print HELLO /your NAME on serial monitor. • Write a sketch to print addition of two numbers on serial monitor. 				
Method of Assessment	External: Performance of given task and viva voce.				

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Course Code	613	Course Name	Internet of Things		
Course Outcome - 3		Select sensors and actuators and implement their interfacing for IOT applications		Teach Hrs	Marks
Learning Outcome E0161331	Interpret different sensors and their interfacing used in IOT (Cognitive domain)			7 Hrs	10 Marks
Contents	Definition, principle of operation and applications: <ul style="list-style-type: none"> • Temperature Sensor: Thermocouples, RTD, Thermistors, IR sensors • Pressure Sensor • Proximity Sensor: Inductive, Capacitive, Photoelectric, Ultrasonic • Accelerometer: Hall-effect accelerometers, Capacitive accelerometers, Piezoelectric accelerometers • Gyroscope: Rotary (classical) gyroscopes, Vibrating Structure Gyroscope, Optical Gyroscopes, MEMS (micro-electro-mechanical systems) Gyroscopes • Gas Sensor and Smoke Sensor • Level sensors: Point level sensors and continuous level sensor • Image sensors, CCD (charge-coupled device), and CMOS (complementary metal-oxide semiconductor) imagers • Motion detection sensors: Ultrasonic, Microwave • Soil Moisture Sensor • Interfacing of sensors with Arduino: DHT11(temp and humidity sensor), LDR, relay, MQ-135(Gas sensor) and LCD 				
Method of Assessment		External: End semester theory examination (Pen paper test).			
Learning Outcome E0161332	Use different Actuators for IOT applications (Cognitive domain)			5 Hrs	10 Marks
Contents	Principle of operation application and interfacing of following Actuators: <ul style="list-style-type: none"> • DC Motors • Servo Motors • Stepper Motors • Linear Actuators • Solenoids and Relay 				
Method of Assessment		External: End semester theory examination (Pen paper test).			
Learning Outcome E0161333	Demonstrate interfacing of Actuators with Arduino for IOT applications			6 Hrs	10 Marks

	(Psychomotor domain)		
Contents	<ul style="list-style-type: none"> To demonstrate DC motor/stepper motor / servo motor interfacing for IOT application To demonstrate interfacing of relay/linear actuator/solenoid for IOT applications 		
Method of Assessment	Internal: Performance of given task and viva voce.		
Learning Outcome E0161334	Perform interfacing of Sensors with Arduino for IOT applications. (Psychomotor domain)	6 Hrs	10 Marks
	<ul style="list-style-type: none"> To perform the interfacing of DHT11(temp and humidity sensor) /LDR/MQ-135(Gas sensor) / LCD 		
Method of Assessment	External: Performance of given task and viva voce.		

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Course Code	613	Course Name	Internet of Things			
Course Outcome - 4		Develop the concept of communication devices and cloud for IOT applications.			Teach Hrs	Marks
Learning Outcome E0161341	Classify communication devices for IOT. (Cognitive domain)			6 Hrs	10 Marks	
Contents	Pin diagram, max. no of connections, range: <ul style="list-style-type: none"> • Zigbee, • Bluetooth • RFID • NFC • ESP8266 					
Method of Assessment	External: End semester theory examination (Pen paper test).					
Learning Outcome E0161342	Explain use of cloud for IOT applications. (Cognitive domain)			6 Hrs	10 Marks	
Contents	<ul style="list-style-type: none"> • Cloud: definition, public cloud, private cloud, architecture • Webserver: Introduction, types, MQTT protocol • Accessing Arduino through third party Application Programming Interface (Blynk ,Cayeene) 					
Method of Assessment	Internal: Mid semester theory examination (Pen paper test)					
Learning Outcome E0161343	Perform remote operation of connected output device for given application. (Psychomotor domain)			6 Hrs	10 Marks	
Contents	<ul style="list-style-type: none"> • To demonstrate use of Third party Application Programming Interface Blynk /Cayeene for a given application.(e.g. to control motor/pump) • To demonstrate home automation using IOT. 					
Method of Assessment	External: Performance of given task and viva voce.					

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Course Code	613	Course Name	Internet of Things			
Course Outcome - 5		Identify need of IOT security and select components and devices for IOT applications			Teach Hrs	Marks
Learning Outcome E0161351	Illustrate Security for IOT (Cognitive domain)			5 Hrs	10 Marks	
Contents	IOT Security: Need and importance, Concerns and Risks, steps and tools for IOT security					
Method of Assessment	Internal: Assignment and Quiz					
Learning Outcome E0161352	Identify components and devices used in different IOT application. (Cognitive domain)			7 Hrs	10 Marks	
Contents	Block Diagram, Functioning and Advantages: <ul style="list-style-type: none"> • Smart Homes • Smart City • Smart Grid • Smart Farming • Smart Cars • Smart Retailing 					
Method of Assessment	External: End semester theory examination (Pen paper test).					

REFERENCE BOOKS:

S.N.	Title & Publication	Author
1.	Internet of Things (IoT), Publisher: INSC International Publishers	Kamal Upreti, Mohammad Shabbir Alam, Rituraj Jain, and Mohammad Shahanawaz Nasir
2.	Programming Arduino Getting Started with sketches, Publisher: Mc Graw Hill	Simon Monk
3.	Getting Started with Arduino: The Open Source Electronics Prototyping Platform, Publisher: Make Community, LLC	Massimo Banzi, Michael Shiloh
4.	Arduino Made Simple: With Interactive Projects, Publisher: BPB Publications	Ashwin Pajankar
5.	The Internet of Things: Enabling Technologies, Platforms, and Use Cases”, Publishers : CRC Press	Pethuru Raj and Anupama C. Raman
6.	Digital Electronics, Publisher: Pearson, 2008 or latest	Morris Mano