			SCHEME	FOR LEARNING	Branch	Code	Co	ourse Code	CO Code	LO Code	
JPV	(טוקוט)	oma Wing) Bho		UTCOME	E 0	3	5	0	1	1	Format No. 4
DURSE	NAME	Embedded Systems	s with Arduino							-	
Desci	ription	Classify embedded sy	/stems.								
Descr	ription	Identify the embedde	ed system devices from	the real world.							
		1		SCHEME OF STUDY							
No.	Le	earning Content	Teaching – Learning Metho	Description of T-L d Process	Teach Hrs.		act. t Hrs.	LRs	Require	ed	Remarks
O-01 Embedded system: History, Bloch diagram, Comparison with genera purpose computers, classification applications and simple case studies (in functional diagram level) like Washing Machine, traffic light controller and microwave oven			al classroom lecture,	lassroom lecture, contents and provide PT, demonstration, handouts to students.				Hando board, Videos	ooks, PP outs, chal , charts. s lectures & other	lk 5-	
				SCHEME OF ASSESSMENT	•					I	
No.	Metho	d of Assessment	Descript	on of Assessment	N	/laximu Marks		Resourc	es Requ	uired	External / Internal
LO-01 Mid Semester Theory Exam/Assignment 3.		 explain each block. What are the difference systems are used? Explain the embedo washing machines. 	ram of embedded systems ent fields where embedded ed system used in automa	tic	10		Question	paper, F scale	Rating	Internal	
		3	washing machine Explain the embe	es. edd	es. edded system used in traffic li	edded system used in traffic lights.	edded system used in traffic lights.	edded system used in traffic lights.	edded system used in automatic es. edded system used in traffic lights.	edded system used in automatic es. edded system used in traffic lights.	edded system used in automatic es.

				SCHEME	FOR LEARNING	Bra	nch Code	Course Co	do	O LO ode Cod	de	
KGPV	י (טוסוט)	ma Wing) B	nopai	Οι	JTCOME	Ε	0 3	5 0	-	1 2	F	ormat No. 4
COURS	E NAME	Embedded Syste	ems with	Arduino					· · ·	·		
CO Des	cription	Classify embedded	d systems									
LO Des	cription	Compare different	t microcoi	ntrollers.								
		I			SCHEME OF STUDY							
S. No.	Le	earning Content	Le	Teaching – earning Method	Description of T-L Pro	cess	Teach Hrs.	Pract /Tut Hrs.		s Requi	ired	Remarks
LO-02	ARM, fea AVR micro Architecto Internal A diagram d	Architectural, Block of controller of 28, Functions of eac	ns cla PF de qu tu	teractive assroom lecture, PT, emonstration, uiz, assignments, torial	Teacher will explain the contents and provide handouts to students. Te will conduct quiz/assignn tutorial to make students practice their knowledge	nents/ s	8		Hand boar Num Prob	Books, F douts, c d, chart erical lems kbook	halk	
				S	CHEME OF ASSESSMENT	Γ						
S. No.	Metho	d of Assessment		Description of	f Assessment		kimum Iarks	Reso	urces Re	quired	I	External / Internal
LO-02 End Semester Theory Exam		 Def Cormic Wr 	t will be asked to fine a microcontr mpare microproc crocontrollers. ite names of som crocontrollers wit	I to (and/or): ntroller. rocessors with		10	Question	paper, R	ating so	cale	External	

			4. Exp	lain the f	es and applications. functional/pin diagram of microcontroller.									
			AD	DITIONA	L INSTRUCTIONS FOR THE HOD	/ FACI	ULTY (IF AN	Y)					
RGPV	/ (Diplo	oma Wing) Bl	hopal	SCH	IEME FOR LEARNING OUTCOME	B	ranch Coo	te 3	<u>c</u> c	ourse Cor	de	CO Code 1	LO Code	Format No. 4
COURS		Embedded Syste	ms with a	Arduino	OUTCOIVIE	E	U	3	5	U		T	3	
	cription	-			erals for use in Arduino board.									
LO Des	cription	Select essential pe	eripherals	for ATme	ega328									
		·			SCHEME OF STUDY									
S. No.	Lear	ning Content	Teach Lear Met	ning	Description of T-L Process	_	ach rs.	Pra /T Hr	ut		LRs R	equir	ed	Remarks
LO-03		Peripheral circuits: rcuit, Power supply	Lab demonst hands practice, assignmo	on , lab	 Teacher with support from lab staff will demonstrate the procedure of lab experiments. Student will conduct lab assignment based on these 			7	7	powe batte wires chart	er sup ery etc s, Lab	c.) con manu perime	laptor, necting al, ental	3

					SCHEME OF ASSESSMEN	т						
S. No.	Metho	d of Assessment	De	escription o	f Assessment	Maximum Marks	Re	source	es Req	juired	I	External / Internal
LO-03	Practica	l test in laboratory	 Connect essentia Atmega Connect 	al circuit to r 328. t appropriat al circuit to r	d to te crystal and microcontroller te power supply and microcontroller	15	Rı	ibrics/	Rating	scale		External
			ADDI	ITIONAL INS	STRUCTIONS FOR THE HOD	/ FACULTY (IF	ANY)					
				SCHEM	F FOR I FARNING	Branch Code	c	ourse Coo	le	CO Code	LO	
RGPV	/ (Diplo	oma Wing) B	hopal		E FOR LEARNING OUTCOME	Branch Code	с З 5	ourse Coo	le	CO Code 2	LO Code 4	Format No. 4
	/ (Diplo	oma Wing) B	•						le	Code	Code	Format No. 4
COURS	· ·	Embedded Syste	ems with Ar	rduino					le	Code	Code	Format No. Z
COURS CO Des	SE NAME	Embedded Syste	ems with Ar ega328 and	rduino peripheral fo	OUTCOME				le	Code	Code	Format No. Z
COURS CO Des	SE NAME	Embedded Syste Make use of ATmo	ems with Ar ega328 and	rduino peripheral fo	OUTCOME				ie I	Code	Code	Format No.

of Atmega328: port, counter,	classroom	f classroom contents and provide lecture, PPT, handouts to students. Te demonstration, will conduct assignment quiz, quiz/tutorial to make stu assignments, practice their knowledge tutorial				Text Books, PPT, Handouts, chalk board, charts, Video lecture- NPTEL and others.	
		SCHEME OF ASSESS	MENT				
Method of Assessment	Description o	of Assessment	-	-	Resour	ces Required	External / Internal
End Semester Theory Exam	 How the different ATmega328? What do you m microcontroller? Compare ATmeg microcontrollers. 	ports are initialized in nean by ISP of any a328 and ATmega8	10		Question p	aper, Rating scale	External
	ADDITIONAL IN	STRUCTIONS FOR THE	HOD/ FA	CULTY (II	F ANY)		
	of Atmega328: port, counter, timer, Bootloader Circuit, IS Atmega328, Comparison of ATmega8 and ATmega328 Method of Assessment	of Atmega328: port, counter, timer, Bootloader Circuit, ISP of Atmega328, Comparison of ATmega8 and ATmega328classroom lecture, PPT, demonstration, quiz, assignments, tutorialMethod of AssessmentDescription cMethod of AssessmentStudent will be asked 1. How the different ATmega328?End Semester Theory ExamStudent do you m microcontroller?End Semester Theory Exam2. What do you m microcontroller?4. What is a bootloa4. What is a bootloa	of Atmega328: port, counter, timer, Bootloader Circuit, ISP of Atmega328, Comparison of ATmega8 and ATmega328classroom lecture, PPT, demonstration, quiz, assignments, tutorialcontents and provide handouts to students. will conduct assignment guiz/tutorial to make s practice their knowledMethod of AssessmentDescription of AssessmentMethod of AssessmentStudent will be asked to(and/or): 1. How the different ports are initialized in ATmega328?End Semester Theory ExamStudent will be asked to(and/or): 3. Compare ATmega328 and ATmega8 assessment and controller?Mathematical SectionMathematical Section Atmega8 and ATmega8Method of AssessmentStudent will be asked to(and/or): 1. How the different ports are initialized in ATmega328?Mathematical SectionMathematical Section Atmega8 	of Atmega328: port, counter, timer, Bootloader Circuit, ISP of Atmega328, Comparison of ATmega8 and ATmega328classroom lecture, PPT, demonstration, quiz, assignments, tutorialcontents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.Method of AssessmentDescription of AssessmentMaxin MarMethod of AssessmentDescription of AssessmentMaxin MarImage: Student will be asked to(and/or): 1. How the different ports are initialized in ATmega328?Student will be asked to(and/or): 1. How the different ports are initialized in ATmega328?Maxin MarEnd Semester Theory Exam2. What do you mean by ISP of any microcontroller?103. Compare ATmega328 and ATmega8 microcontrollers.3. Compare ATmega328 and ATmega810	of Atmega328: port, counter, timer, Bootloader Circuit, ISP of Atmega328, Comparison of ATmega8 and ATmega328classroom lecture, PPT, demonstration, quiz, assignments, tutorialcontents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.Method of AssessmentDescription of AssessmentMaximum MarksMethod of AssessmentStudent will be asked to(and/or): 1. How the different ports are initialized in ATmega328?10End Semester Theory ExamStudent do you mean by ISP of any microcontroller?10S. Compare ATmega328 and ATmega8 microcontrollers.10	of Atmega328: port, counter, timer, Bootloader Circuit, ISP of Atmega328, Comparison of ATmega328 and ATmega328classroom lecture, PPT, demonstration, quiz, assignments, tutorialcontents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.Image: Contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.Method of AssessmentDescription of AssessmentMaximum MarksResourd MarksStudent will be asked to(and/or): 1. How the different ports are initialized in ATmega328?10Question provide MarksEnd Semester Theory Exam2. What do you mean by ISP of any microcontroller?10Question provide Marks	of Atmega328: port, counter, timer, Bootloader Circuit, ISP of Atmega328, Comparison of ATmega328 classroom lecture, PPT, demonstration, quiz, assignments, tutorial contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge. Handouts, chalk board, charts, Video lecture- NPTEL and others. Method of Assessment Description of Assessment SCHEME OF ASSESSMENT Maximum Marks Resources Required Method of Assessment Student will be asked to(and/or): 1. How the different ports are initialized in ATmega328? Maximum Marks Resources Required 2. What do you mean by ISP of any microcontroller? 10 Question paper, Rating scale 3. Compare ATmega328 and ATmega328 and ATmega3 microcontrollers. What is a bootloader circuit? 10

RGPV	/ (Diplo	oma Wing) B	hopal		E FOR LEARNING OUTCOME	Branch Co	ode C 3 5	ourse Code	CO Code 2	LO Code 5	Format No.
COURS	E NAME	Embedded Syste	ms with	Arduino							
CO Des	cription	Make use of ATm	ega328 ar	nd peripheral fo	or use in Arduino board.						
LO Des	cription	Configure timers,	counters	and ADC of AT	mega328.						
		1			SCHEME OF STUDY						
S. No.	O-05 Configuration of Two 8-bit ar			Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	I Rs Required		ed	Remarks
LO-05	05 Configuration of Two 8-bit and One 16-bit Timers and Counter 6-channel ADC Working.		ers cla leo Vi de qu	teractive assroom cture, PPT, deo, emonstration, uiz, signments.	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	7		Hand boar Video	Books, PP ⁻ louts, chal d, charts, de lecture- N others.	k	
					SCHEME OF ASSESSMEN	т					
S. No.	Metho	d of Assessment		Description	of Assessment	Maximu m Marks	Res	ources	Required		External / Internal
LO-05 Mid Semester Theory Exam/Assignment		 How ATmo How ATmo 3. What 	are the differ ega328? are the diffe ega328? t are the diffe	ed to (and/or): ent counters initialized in erent timers initialized in erent analog input/output and how do they work?	10	Question	n paper -	+ Rating sc	ale.	Internal	

			ADD	ITIONAL INSTRUCT	IONS FOR THE HOD)/ FA	CULT	Y (IF AN)	Y)					
RGPV	/ (Diplo	oma W	/ing) Bhopal	SCHEME FOI	_		Branch			se Code	-	CO Code	LO Code	Format No.
			ded Systems with A	OUTC	OME	E	() 3	5	0		3	7	
	cription		se of Arduino softwar		n.									
	Description Illustrate Arduino develo			· ·										
		1	•											
S. No.		Learni	ng Content	Teaching – Learning Method	Description of T-	L Prc	cess	Teach Hrs.	۲ / ۱	act. Tut rs.	LRs	Req	uired	Remarks
LO-06	Functiona Functions	al Block D s of each I nent Boar	en Source community, iagram of Arduino. Pin of Arduino, Arduino rd diagram (including Ily)	Interactive classroom lecture, PPT, Video, Demonstration, quiz, assignments.	Teacher will explain contents and provinandouts to stude Teacher will conduct assignments/ quiz to make students their knowledge.	ide nts. ıct /tuto	rial	7	-	-	Hand	douts d, cha b lectu L and rs.	ure-	
				SCHE	ME OF ASSESSMEN	Т								
S. No.	Meth Assess			Description of As	sessment				mum Irks			ourco quire		External / Internal
LO-06	End Se Theory	mester v Exam		Define open source har s of each pin of Arduin		t boa	rd.	1	0	C	Questio Ratir	on pa ng sca		External

			ADDITIONAL INS	STRUCTIONS FOR THE HOD	' FACUL	TY (IF A	NY)				
RGPV	/ (Dipla	oma Wing) Bhopa	al	E FOR LEARNING		ch Code		ourse Code	CO Code	LO Code	Format No. 4
	•••			OUTCOME	Ε	0 3	5	0	3	8	
		Embedded Systems w									
	cription	Make use of Arduino so		platform.							
LO Deso	cription	Explain the basics of Arc	duino platform.								
S. No.	Le	earning Content	Teaching – Learning Method	Learning Description of I-L Method Process			Pract. /Tut Hrs.		s Require	d	Remarks
LO-07 Arduino: Looping Making T 1st sketch Program (Arduino loader, S Interfaci		ning of an Arduino ISP), Arduino Boot erial Protocol (serial port g), Initialization of Serial g Functions, Basic Circuit	Interactive classroom lecture, PPT, Video, demonstration, quiz, assignments.	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	7			Text Books, PPT, Handouts, chalk board, charts, Video lecture- NPTEL and others.			
	,		,	SCHEME OF ASSESSMENT	•						
S. No.	Metho Assess		Descriptio	n of Assessment			axim um arks	Resou	rces Requ	ired	External / Internal

	1. What is aster2. What are	is an Arduino IDE? are the different essential blocks in an Arduino program? in ISP of Arduino.			10	Question paper , Rating scale			External
	•		of an Arduino board.						
	I	ADDITIONAL INSTRU	CTIONS FOR THE HOD/ F	ACULTY (I	F ANY)			I	
/ (Diplom	na Wing) Bhopa			Branch Code	e Cou 3 5	urse Code	CO Code 3	LO Code 8	Format No. 4
E NAME	mbedded Systems wi	th Arduino							
cription N	/lake use of Arduino sof	tware/hardware platf	orm.						
cription D		ring of basic periphera	als with Arduino.						
	emonstrate the interfa-	cing of basic periphera							
	emonstrate the interfa		SCHEME OF STUDY						
Lear	rning Content	Teaching – Learning Method		Teach Hrs.	Pract. / Tut Hrs.	LRs I	Require	ed	Remarks
	Theory Exa (Diplor E NAME E cription N	End Semester 1. What is a Theory Exam 2. What are 3. Explain IS 4. Explain set 4. Explain set 3. 7 (Diploma Wing) Bhopa E NAME Embedded Systems with cription Make use of Arduino sof	Theory Exam 3. Explain ISP of Arduino. 4. Explain serial port interfacing ADDITIONAL INSTRU V (Diploma Wing) Bhopal SCHEME F OU E NAME Embedded Systems with Arduino cription Make use of Arduino software/hardware platf	End Semester Theory Exam 1. What is an Arduino IDE? 2. What are the different essential blocks in an Arduino p 3. Explain ISP of Arduino. 4. Explain serial port interfacing of an Arduino board. ADDITIONAL INSTRUCTIONS FOR THE HOD/ F V (Diploma Wing) Bhopal SCHEME FOR LEARNING OUTCOME E NAME Embedded Systems with Arduino cription Make use of Arduino software/hardware platform.	End Semester Theory Exam 1. What is an Arduino IDE? 2. What are the different essential blocks in an Arduino program? 3. Explain ISP of Arduino. 4. Explain serial port interfacing of an Arduino board. ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (I V (Diploma Wing) Bhopal SCHEME FOR LEARNING OUTCOME E NAME Embedded Systems with Arduino Cription Make use of Arduino software/hardware platform.	I. What is an Arduino IDE? 1. What is an Arduino IDE? 10 Intervention ISP of Arduino. 10 10 Itervention ISP of Arduino ISP of Arduino Interfacing of an Arduino board. 10 10 Itervention ISP of Arduino INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY) Itervention Interfacing of an Arduino Interfacing OUTCOME Itervention Interfacing Outcome Itervention ISP of Arduino Interfacing Outcome Itervention Interfacing Outcome Itervention Interfacing Outcome Itervention Interfacing Outcome Itervention Ispace Itervention Interfacing Outcome Itervention Interfacing Outcome Itervention Interfacing Outcome Itervention Interfacing Outcome Itervention Ispace Itervention Interfacing Outcome Itervention Interfacing Outcome Itervention Interfacing Outcome Itervention Interfacing Outcome Itervention Ispace Itervention Interfacing Outcome Iterventinterventistic Interfacing Outcome	In What is an Arduino IDE? In What is an Arduino IDE? In Semester Theory Exam In What are the different essential blocks in an Arduino program? In Question Ratin In Explain ISP of Arduino. In Explain ISP of Arduino. In Interfacing of an Arduino board. In Interfacing of an Arduino board. In Additional Instructions For The Hody Facultry (IF ANY) In Interfacing of an Arduino board. In Interfacing of an Arduino board. In Additional Instructions For The Hody Facultry (IF ANY) In Interfacing of an Arduino board. In Interfacing of an Arduino board. In Interfacing Inte	In What is an Arduino IDE? In What is an Arduino IDE? In Question paper In End Semester Theory Exam In Explain ISP of Arduino. In Question paper In Explain ISP of Arduino. In Explain ISP of Arduino. In Provide the temperature of the temperature of the temperature of	I. What is an Arduino IDE? I. What is an Arduino IDE? III Question paper , Rating scale End Semester Theory Exam Sexplain ISP of Arduino. IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
LO-08	Practical test in laboratory	 Student will be asked to Write and execute an LED blinking program. Write and execute a program for single digit 7 segment display. Demonstrate how a POT is interfaced and programmed in Arduino? Demonstrate how a temperature sensor LM35 is interfaced and programmed in Arduino? Demonstrate how a 16x2 LCD display is interfaced and programmed in Arduino? 	10	Rubrics, Rating scale	Internal
		ADDITIONAL INSTRUCTIONS FOR THE	HOD/ FACULTY (IF ANY)	
RGPV	(Diploma Wing) Bhop	oal SCHEME FOR LEARNIN OUTCOME	G Branch Cod	Course Code CO Code LO Code 3 5 0 4 10	Format No 4
COURSE	NAME Embedded Systems	with Arduino			·
O Desci	RSE NAME Embedded System Description Develop small proje	s based on Arduino.			

				SCHEME OF STUDY						
S. No.	Learning Content	Lear	hing – ming thod	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	L	.Rs Require	ed	Remarks
LO-09	Motor Driver L293D, IR Senso Interfacing L293D with Arduin with relevant program and connection diagram.		m PPT, stration,	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz / tutorial to make students practice their knowledge.	7		Har boa Vide	t Books, PP ndouts, chal ard, charts, eo lecture- N others.	k	
				SCHEME OF ASSESSMEN	т					
S. No.	Method of Assessment	D	Description of Assessment			um Marks	Resources Required			External / Internal
LO-09	End Semester Theory Exam	 What is L2 What is an How a DC is 	 Student will be asked to (and/or): 1. What is L293D? 2. What is an IR sensor? 3. How a DC motor is interfaced with a 4. How an IR sensor is interfaced with a 			10		uestion pap Rating scale		External
		ADDITIC	ONAL INS	TRUCTIONS FOR THE HOD	/ FACULTY	(IF ANY)				
		C	СНЕМ	E FOR LEARNING	Branch C	Code Co	ourse Coo	de CO	LO	
RGPV	(Diploma Wing) B	nopal		OUTCOME	E 0	3 5	0	Code	Code 10	Format No.
COURS	E NAME Embedded Syste	ms with Ardui	ino						1	1

LO Deso	cription	Utilize Arduino i	n a simple h	nome automat	ion system.						
					SCHEME OF STUDY						
S. No.	Le	earning Content		Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs	5. L	Rs Req	uired	Remarks
LO-10	ULN2803 Home au	Interfacing of Relay Driver ULN2803 with Arduino, Code for Home automation (fans, lights, AC, fridge etc.) and its Control		ssroom contents and provide H ture, PPT, handouts to students. Teacher b leo, will conduct assignments/ le		Han boar	re- NPTE	halk s, Video			
	1		I		SCHEME OF ASSESSMENT		·				
S. No.				Descriptio	on of Assessment	Maximur	n Marks	Resou	irces Re	equired	External Internal
LO-10	Mid Semester Theory Exam/Assignment1. Wh 2. How 3. Dra syst		 What i How re Draw a 	elays can be int a planning diag n with proper p	to (and/or): terfaced with Arduino? ram of home automation vin connection to the Arduino	10	10 Quest		on pape scale.	r , Rating	g Internal
			AD	DITIONAL INS	STRUCTIONS FOR THE HOD/ FA	ACULTY (IF	ANY)				
				SCHEM	E FOR LEARNING	Branch Code	Сои	rse Code	со	LO	
RGPV	/ (Diplo	oma Wing) E	Bhopal				3 4	0	Code 4	Code 11	ormat No. 4
							-				

IO Description Preparing ATmega328 for independent bootable microcontroller in a circuit. SCHEME OF STUDY S. No. Learning Content Teaching – Learning Method Description of T-L Process Teach Hrs. Pract /Tut H L0-11 Basic ATmega328 Circuit, Interfacing of USB-UART, Initialization of serial port and its code Lab demonstration, PPT , hands on practice, lab assignments. •Teacher with support from lab staff will demonstrate the procedure of lab experiments. 8 Student will conduct lab assignment based on these experiments. •Student will conduct lab assignment based on these experiments. Maximum	I Rs Required	ts, nt
S. No. Learning Content Teaching – Learning Method Description of T-L Process Teach Hrs. Pract /Tut H LO-11 Basic ATmega328 Circuit, Interfacing of USB-UART, Initialization of serial port and its code Lab demonstration, PPT , hands on practice, lab assignments. •Teacher with support from lab staff will demonstrate the procedure of lab experiments. 8 Student will conduct lab assignment based on these experiments. •Student will conduct Iab assignment based on these experiments. •Student will conduct	rs. Arduino board, components, Lab mar charts, Handouts, experimental trainer instruments/kit with measuring instrument computer with releva simulation software a	ts, nt
S. No. Learning Content Learning Method Process Hrs. /Tut H LO-11 Basic ATmega328 Circuit, Interfacing of USB-UART, Initialization of serial port and its code Lab demonstration, PT , hands on practice, lab assignments. •Teacher with support from lab staff will demonstrate the procedure of lab experiments. 8 Student will conduct lab assignment based on these experiments. on these experiments. •Student will conduct lab assignment based on these experiments. •Student will conduct Image: Student will conduct Image	rs. Arduino board, components, Lab mar charts, Handouts, experimental trainer instruments/kit with measuring instrument computer with releva simulation software a	ts, nt
Interfacing of USB-UART, Initialization of serial port and its code PPT , hands on practice, lab assignments. PPT , hands on practice, lab assignments. •Student will conduct lab assignment based on these experiments. •SCHEME OF ASSESSMENT	components, Lab mar charts, Handouts, experimental trainer instruments/kit with measuring instrument computer with releva simulation software a	ts, nt
		nd
Mavimum		
S. No. Method of Assessment Description of Assessment Marks	Resources Required	External / Internal
LO-11Student will be asked to 1. Map Arduino pins to corresponding pins of ATmega328 microcontroller.1. Map Arduino pins to corresponding pins of ATmega328 microcontroller.2. Draw and explain a typical standalone circuit application of ATmega328.153. How USB-UART is interfaced with ATmega328?15	Rubrics, Rating scale	External
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)		

					OUTCOME							Code	Code	
						Ε	0	3	4	0		5	12	
COURS	E NAME	Embedded Syst	ems w	ith Arduino										
CO Des	cription	Utilize the embe	dded sy	stem concepts in	robotics.									
LO Des	cription	Define robotics a	nd its te	erminologies.										
		'			SCHEME OF STUDY									
S. No.	Le	earning Content		Teaching – Learning Method	Description of T-L Process	Teach Hrs.			act. t Hrs.		LRs R	equir	ed	Remarks
LO-12	of robots future tre of roboti Basic tern Repeatab freedom.	y of robots, Classification ots, Present status and trends. Basic components otic system. erminology- Accuracy, ability, Resolution, Degree of m. Specifications of robot. ion of Forward and Reverse atics		Interactive classroom lecture, PPT, Video, demonstration, quiz, assignments.	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	8		Text Books, PPT, Handouts, chalk board, charts, Video lecture- NPT and others.		lk				
	1			I	SCHEME OF ASSESSMENT	Ē							I	
S. No.	Method	of Assessment		Description	n of Assessment	Maxi	mun	n Ma	arks	Res	ource	es Req	uired	External / Internal
LO-12	End Seme	ester Theory Exam	1. WI 2. WI 3. WI co 4. WI	here does the cor me into the maki hat are the basic	ent parts of robot? ncept of embedded system	10		Question paper , 10 Rating scale.			External			
							τν /ı		IV)					
				ADDITIONAL INS	TRUCTIONS FOR THE HOD	FACUL	TY (I	FAN	IY)					

RGPV	/ (Diplo	oma Wing) Bho		1E FOR LEARNING OUTCOME	Branch C	ode C 3 4	CO LO Code Code 0 5	Format No. 4
COURS	E NAME	Embedded System	s with Arduino					
CO Description Utilize the embedd			d system concepts in	robotics.				
LO Des	cription	Identify the basic se	nsors used in robotic	S.				
				SCHEME OF STUDY				
S. No.	Le	earning Content	Teaching – Learning Method	Learning Process Hrs /Tu		Pract. /Tut Hrs.	LRs Required	Remarks
LO-13	Tactile se range ser sensor, Fe	n robot – Touch sensor nsor, Proximity and nsors, Robotic vision orce sensor, Light Pressure sensors.	s, Interactive classroom lecture, PPT, Video, demonstration, quiz, assignments.	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments / quiz / tutorial to make students practice their knowledge.	7		Text Books, PPT, Handouts, chalk board, charts, Video lecture- NPTEL and others.	
				SCHEME OF ASSESSMENT				
S. No.	Method of Assessment		Descriptio	on of Assessment	Maximum Marks		Resources Required	External / Internal
LO-13	End Sem	Snester Theory Exam	-	d to (and/or): re needed in robotics. ensors and their applications	5 10		Question paper , Rating scale.	External

RGPV	/ (Diplo	oma Wing) Bhopa	al SCHEM	Branch C E O	code 3 4	Course C	ode (Code (LO Code 15	Format No.		
COURSE NAMEEmbedded Systems withCO DescriptionUtilize the embedded system			th Arduino stem concepts in robotics.									
		1		SCHEME OF STUDY								
S. No.	Le	earning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hr		LRs Required			Remarks	
LO-14	demonst follower	ntation of small project ration of robot (e.g. line robot, robotic arm etc.) duino with ATmega328.	Lab demonstration, PPT , hands on practice, lab assignments.	 Teacher with support from lab staff will demonstrate the procedure of lab experiments. Student will conduct lab assignment based on these experiments. 		8	Ha ex tra ins wi ins co re so	Lab manual, charts, Handouts, experimental trainer instruments/kit with measuring instruments, computer with relevant simulation software and high speed internet.				
	I			SCHEME OF ASSESSMEN	T					1		
S. No.	Method	l of Assessment	Description	of Assessment	Maximu m Marks	Re	Resources Required			External / Internal		

LO-14	Practical test in laboratory	 Student will be asked to How the electronic parts of your robot is assembled? How the electrical parts of your robot is assembled? How the mechanical parts of your robot is assembled? How the mechanical parts of your robot is assembled? Demonstrate the ATmega328 based small robotic project. 	10	Rubrics, Rating scale	Internal						
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)											