



# ARSD College, University of Delhi

## Model Course Handout/Lesson Plan

Course Name : B.Sc. Electronics(H) , V semester						
Semester	Course Code	Course Title	Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
II	558	ROBOTICS – SEC (THEORY)	2	-	--	2
Teacher/Instructor(s)		Mr. PUNEET SEHGAL				
Session		EVEN SEMESTER (JAN 2022-JUNE 2022)				

### Course Objective:

After completion of this course students should be well versed in programming a micro controller. They should be able to use various sensors and make microcontroller respond to the external environment. Student would be in a position to make rudimentary robot which is capable of moving along a predetermined path, follow a drawn line and equivalent applications.

**Course Learning Outcomes:** At the end of this course, students will be able to

CO1 Familiarize with the programming environments used in robotics applications.

CO2 Understand the working of sensors, actuators and other components used in design and implementation of robotics.

CO3 Design timer/counter circuits and display their outputs using LCD and other indicator devices

CO4 Understand the communication standards like RS232 etc.

### Lesson Plan:

Syllabus Contents	Lectures	Topics to be covered
Programming Environments: Integrated Development Environment (IDE) for AVR microcontrollers, free IDEs like AVR Studio, WIN AVR. Installing and configuring for Robot programming, In System Programmer (ISP), loading programmes on Robot Actuators: DC Motors, Gearing and Efficiency, Servo Motors,	1	Integrated Development Environment (IDE) for AVR microcontrollers, free IDEs like AVR Studio,
	2	WIN AVR. Installing and configuring for Robot programming,
	3	In System Programmer (ISP), loading programmes on Robot
	4	DC Motors, Gearing and Efficiency,
	5	DC Motors, Gearing and Efficiency,
	6	Servo Motors,
	7	Stepper motors,
	8	Motor Control and its implementations

<p>Stepper motors, Motor Control and its implementations Sensors: White line sensors , IR range sensor of different range, Analog IR proximity sensors , Analog directional light intensity sensors, Position encoders, Servo mounted sensor pod/ Camera Pod, Wireless colour camera, Ultrasound scanner, Gyroscope and Accelerometer, Magnetometer, GPS receiver, Battery voltage sensing, Current Sensing LCD interfacing with the robot (2 x 16 Characters LCD) Other indicators: Indicator LEDs, Buzzer Timer / Counter operations: PWM generation, Motor velocity control, Servo control, velocity calculation and motor position Control, event scheduling Communication: Wired RS232 (serial) Communication, Wireless ZigBee Communication, USB Communication, Simplex infrared Communication (IR remote to robot)</p>	9	White line sensors , IR range sensor of different range,
	10	Analog IR proximity sensors ,
	11	Servo mounted sensor pod/ Camera Pod, Wireless colour camera,
	12	Ultrasound scanner, Gyroscope and Accelerometer
	13	Magnetometer, GPS receiver,
	14	Battery voltage sensing, Current Sensing
	15	LCD interfacing with the robot (2 x 16 Characters LCD)
	16	LCD interfacing with the robot (2 x 16 Characters LCD)
	17	Indicator LEDs,
	18	Buzzer
	19	PWM generation, Motor velocity control,
	20	Servo control,
	21	velocity calculation
	22	and motor position Control,
	23	event scheduling
	24	Wired RS232 (serial) Communication,
	25	Wireless ZigBee Communication,
	26	USB Communication,
	27	Simplex infrared Communication (IR remote to robot)
	28	Simplex infrared Communication (IR remote to robot)
	29	Analog directional light intensity sensors,
	30	Position encoders,

**Evaluation Scheme:**

No.	Component	Duration	Marks
1.	Internal Assessment		25
	• Quiz		
	• Class Test		
	• Attendance		
	• Assignment		
2.	End Semester Examination	3 hr	25

<b>Details of the Course</b>		
<b>Syllabus Contents</b>		<b>Contact Hours</b>
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<b>Total</b>		<b>30</b>
<b>Suggested Books:</b>		
<b>Sl. No.</b>	<b>Name of Authors/Books/Publishers</b>	<b>Year of Publication/Reprint</b>
1.	Saha, S.K., Introduction to Robotics, 2nd Edition, McGraw-Hill Education, New Delhi, 2014	2014
2.	R.K. Mittal, I.J. Nagrath, —Robotics & Control, Tata McGraw & Hills, 2005	2005
<b>Mode of Evaluation:</b>		Internal Assessment / End Semester Exam

**Progress Report:**

	<b>Syllabus Contents</b>	<b>date</b>	<b>Topics to be covered</b>
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